Application Note

FESTO

EHMD with Festo PLC using CMMT-ST through EtherCAT

This Application Note explains how to integrate Festo Rotary Gripper Module EHMD using CMMT-ST and function block library with Festo PLC through EtherCAT in the CODESYS programming environment

EHMD-40-RE-GE
EHMD-40-RE-GP
EHMD-40-RE-GE-16
EHMD-50-RE-GE-15

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1 Introduction

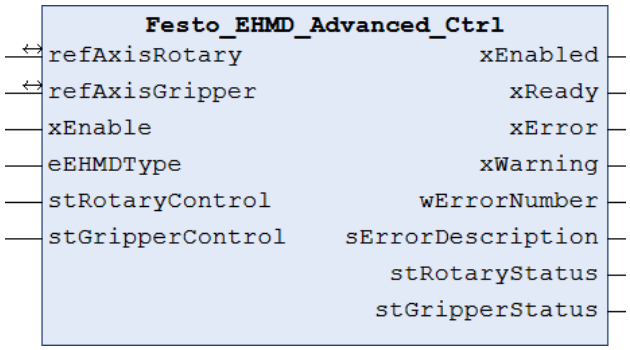
This application note demonstrates the communication between Festo Rotary Gripper Module EHMD and a Festo PLC using CMMT-ST through EtherCAT protocol.

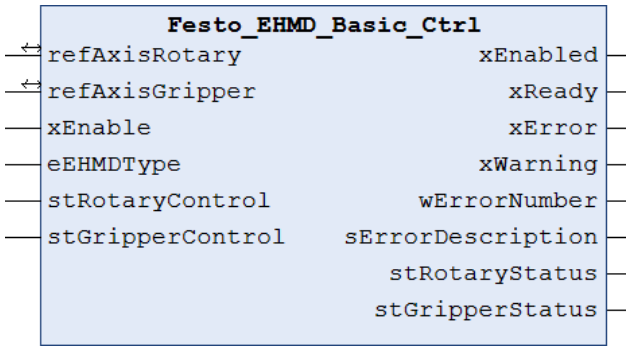
The **Festo_EHMD_PtP_EC** library contains three function blocks based on its function.

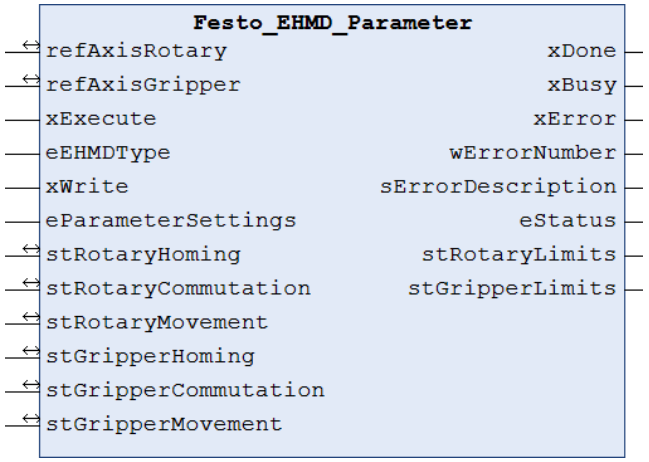
The **Festo_EHMD_Advanced_Ctrl** block used to control the EHMD module using advanced options.

The **Festo_EHMD_Basic_Ctrl** block used to control the EHMD module Decapping application using basic options.

The **Festo_EHMD_Parameter** block used to read or write optimal parameters of EHMD module.







1.1 Software Used

Software Name	Software Version
CODESYS	V3.5 SP16 Patch 4
Festo Automation Suite	V2.11.0.657
CMMT-ST Plug-in	V2.10.0.103
Festo CMMT-ST_PointToPoint Target Support Package	V3.5.16.50
Library (Festo_EHMD_PtP_EC)	V3.5.16.410

Table 1.1: Software used

1.2 Hardware Used

Device Name	Device Type	Version / Firmware
Festo PLC	CPX-E-CEC-M1-EP	V3.3.8
Rotary-Gripper Module	EHMD-40-RE-GE	Version Free
Motor Controller for Rotary	CMMT-ST-C8-1C-MP-S0	V36.11.0.3372
Motor Controller for Gripper	CMMT-ST-C8-1C-MP-S0	V36.11.0.3372
Motor Cable	NEBM-SF1W31-EH-2.6-Q15N-LE-28	-
Flat Flex Cable	NEBM-F1W31-EC-0.3-F1N-DF1W31	-
Ethernet Cable	-	Version Free

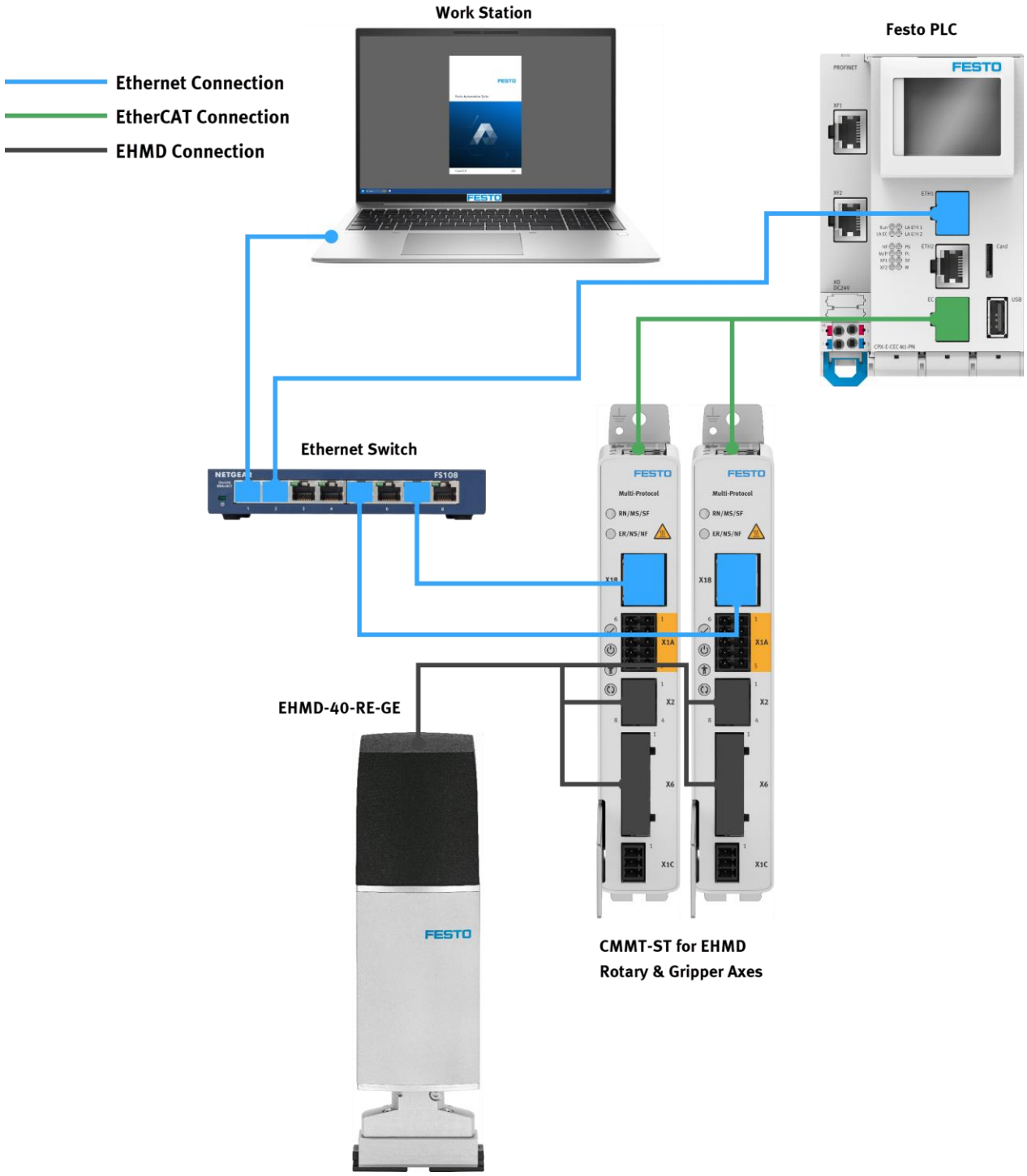
Table 1.2: Hardware used

1.3 Topology Overview

Note

This application note entirely based on the following Topology Overview configuration as shown.

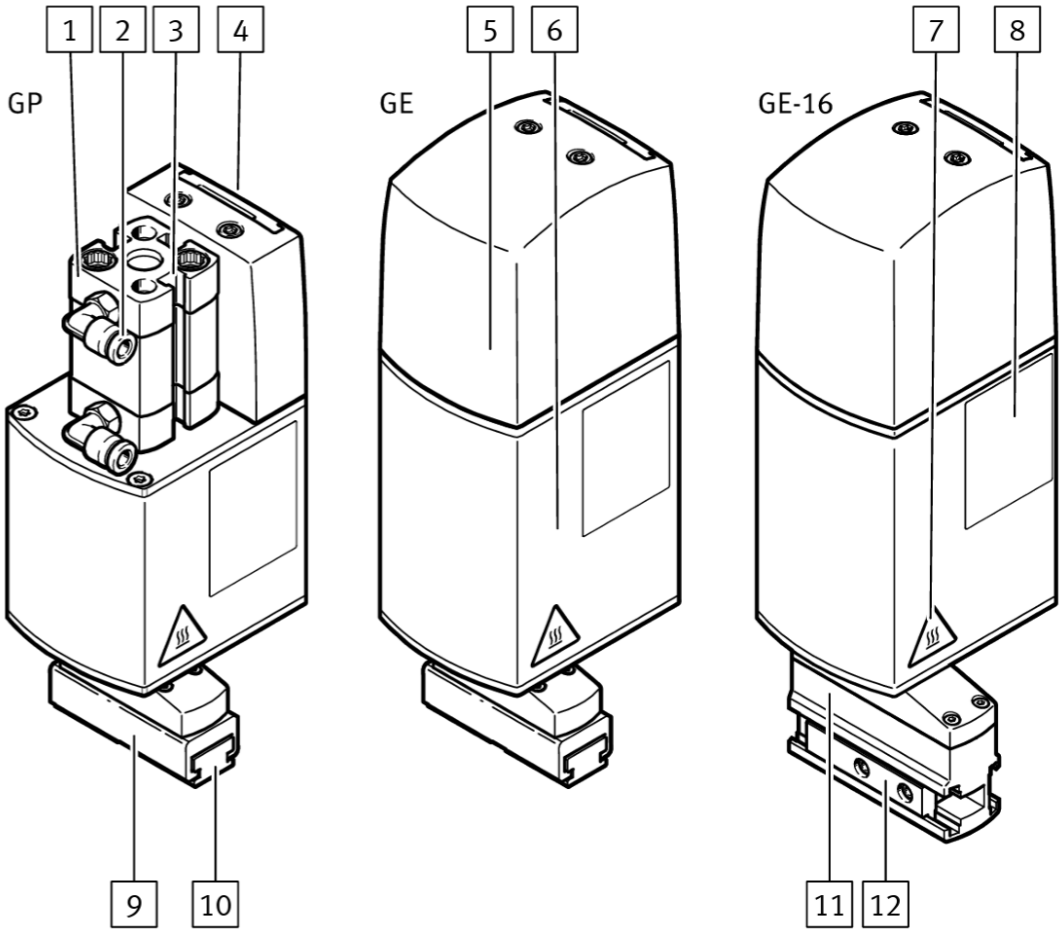
- The following Topology Overview is provided only as an example for this application note. It may vary depending on the actual user network configuration.



2 Hardware Configuration

2.1 Product Overview

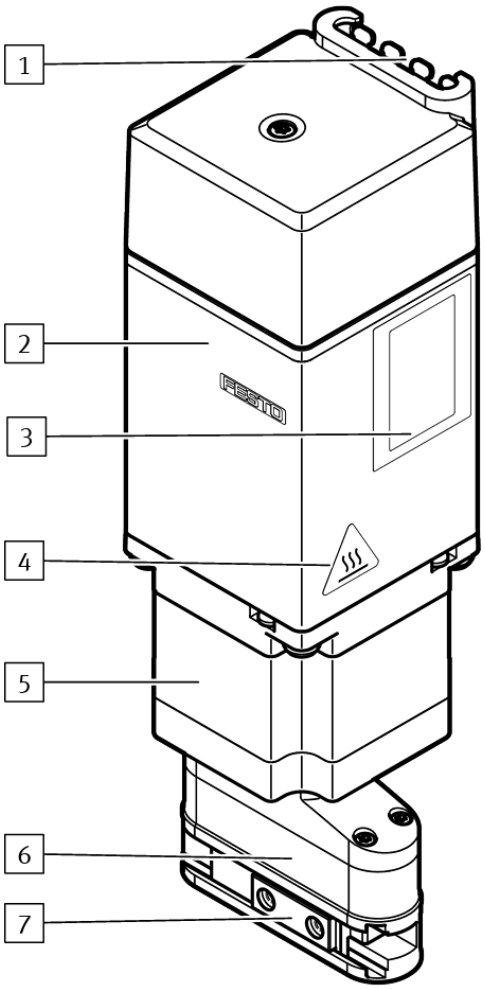
2.1.1 EHMD-40-RE-...



Product design EHMD-40-RE-GP/-GE/-GE-16

1	Pneumatic gripper drive	7	Warning: hot surface
2	Pneumatic port	8	Product labelling
3	Slot for sensor	9	Rotating short-stroke gripper
4	Electrical connection: motor and encoder	10	Gripper jaw with bottom guide
5	Electric gripper drive with encoder	11	Rotating long-stroke gripper
6	Electric rotary drive with encoder	12	Gripper jaw with lateral guide

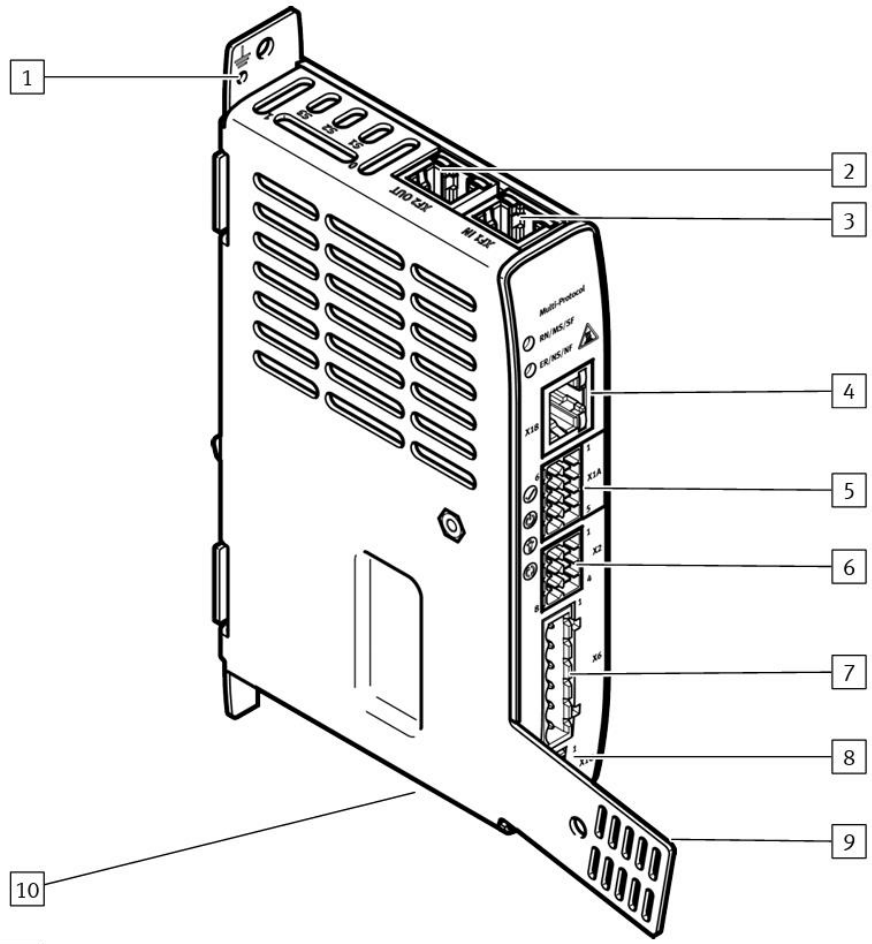
2.1.2 EHMD-50-RE-GE



Product design EHMD-50-RE-GE

1. Through-hole for motor cable and encoder cable
2. Electric gripper drive with encoder
3. Product labelling
4. Warning: hot surface
5. Electric rotary drive with encoder
6. Rotating long stroke gripper
7. Gripper jaw with lateral guide

2.1.3 CMMT-ST-...-MP-S0



Connections of the CMMT-ST-C8-1C-MP-S0

1 Functional earth connection with label
2 [XF2 OUT] RTE interface port 2
3 [XF1 IN] RTE interface port 1
4 [X18] standard Ethernet
5 [X1A] I/O interface
6 [X2] encoder connection
7 [X6] motor connection
8 [X1C] connection for the reference switch or limit switch
9 Sheet metal for connecting the cable shield and strain relief
10 [X9] load and logic voltage (underneath)

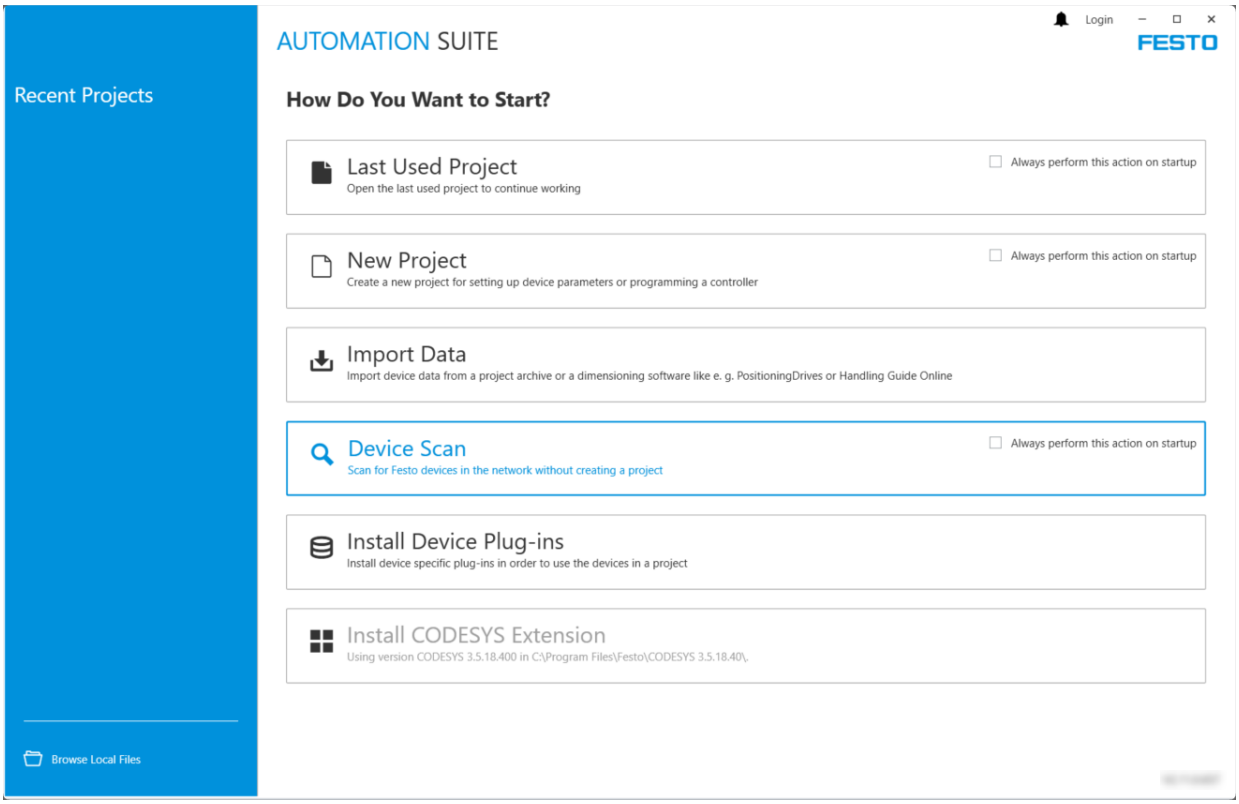
2.2 Festo PLC IP Address Configuration

Step 1



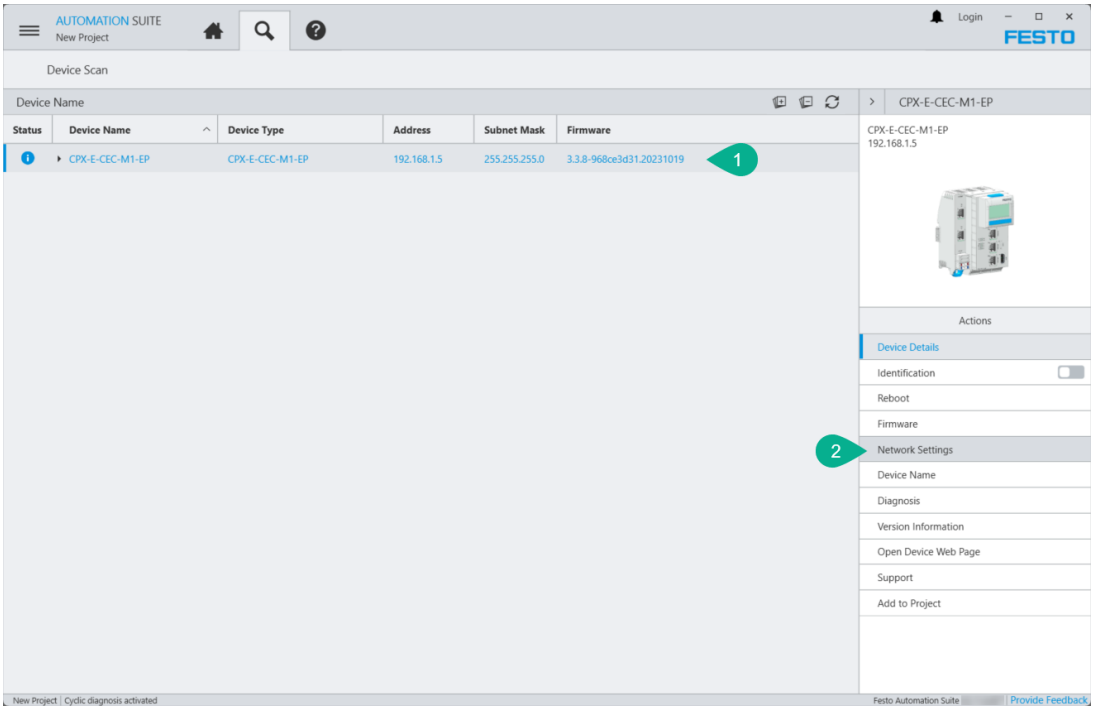
Open the **Festo Automation Suite** software (**Windows Start >> Festo Software >> Festo Automation Suite**).

Step 2



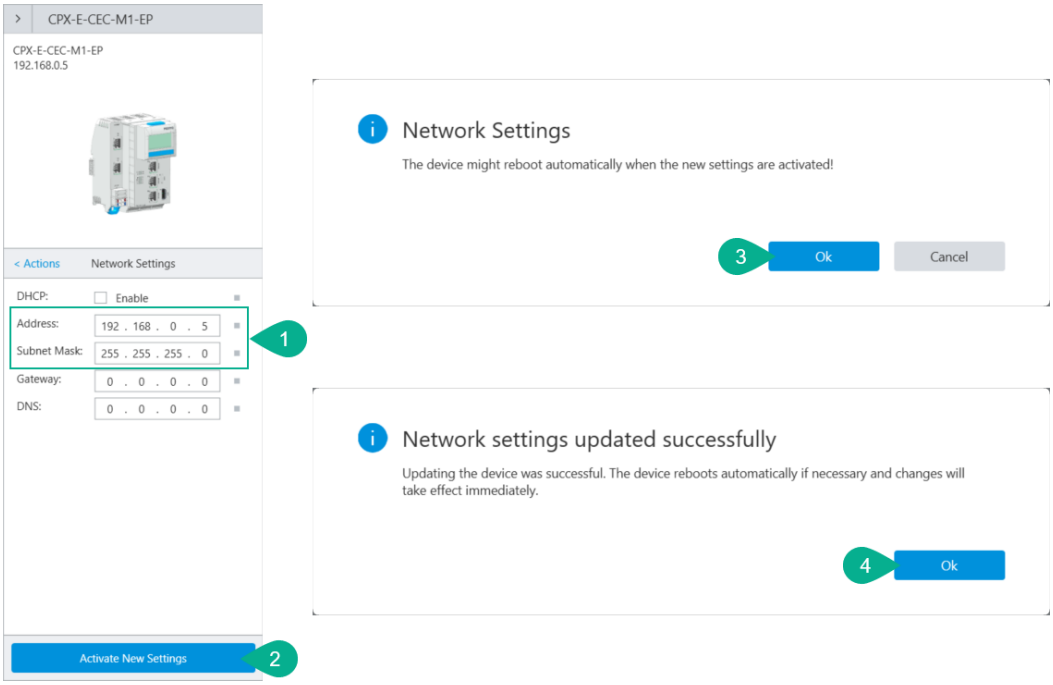
Click on **Device Scan** button from start screen.

Step 3



1. Select the **Festo PLC** from the **List View** in the Festo Automation Suite.
2. Click **Network Settings** in the action window.

Step 4



1. Enter the **IP Address & Subnet Mask** value for the PLC as per requirement.
2. Click on **Activate New Settings** button to assign the entered values to the module.
3. Click on **OK** button to reboot the device.
4. Click on **OK** button to close the confirmation window.

2.3 EHMD Module Configuration

2.3.1 CMMT-ST-...-MP-S0 IP Address Configuration

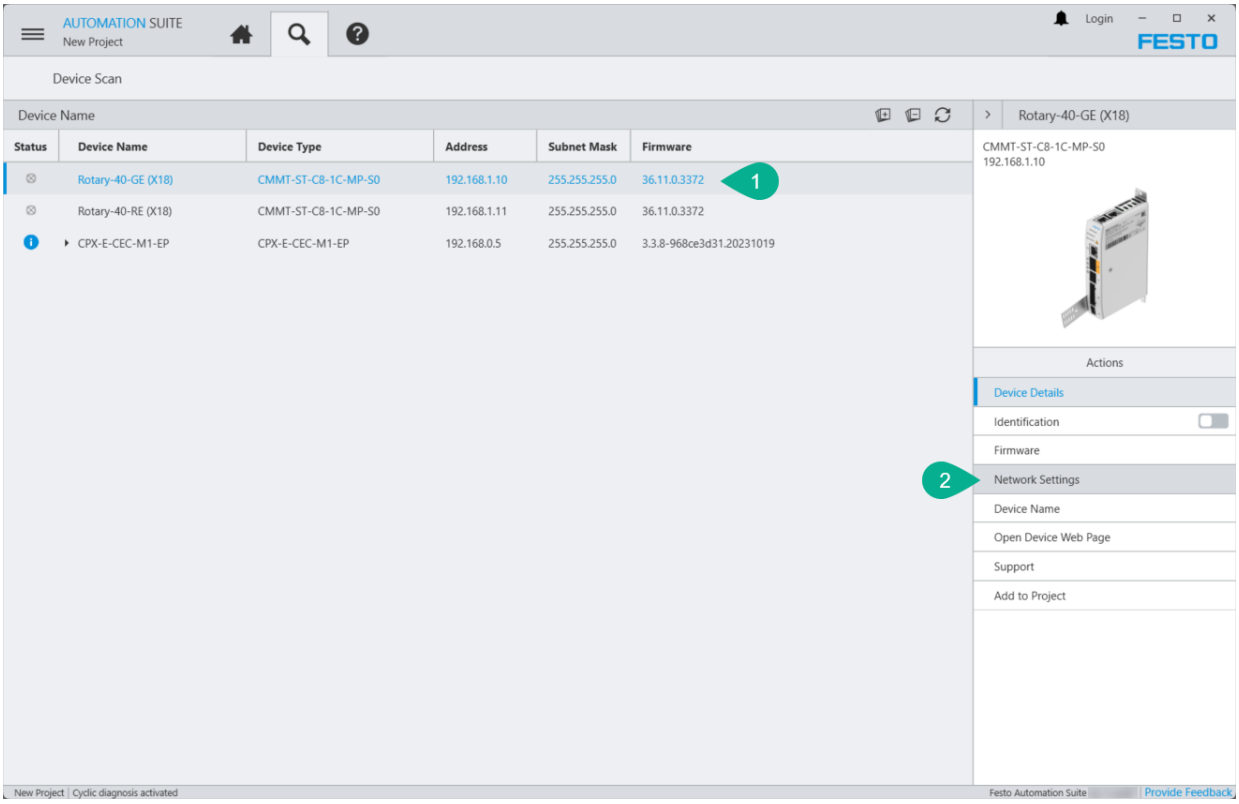
Note

- Before starting the IP address configuration of the CMMT-ST, ensure that the hardware connection is established as shown in the Topology Overview (Refer Chapter 1.3).

Step 1

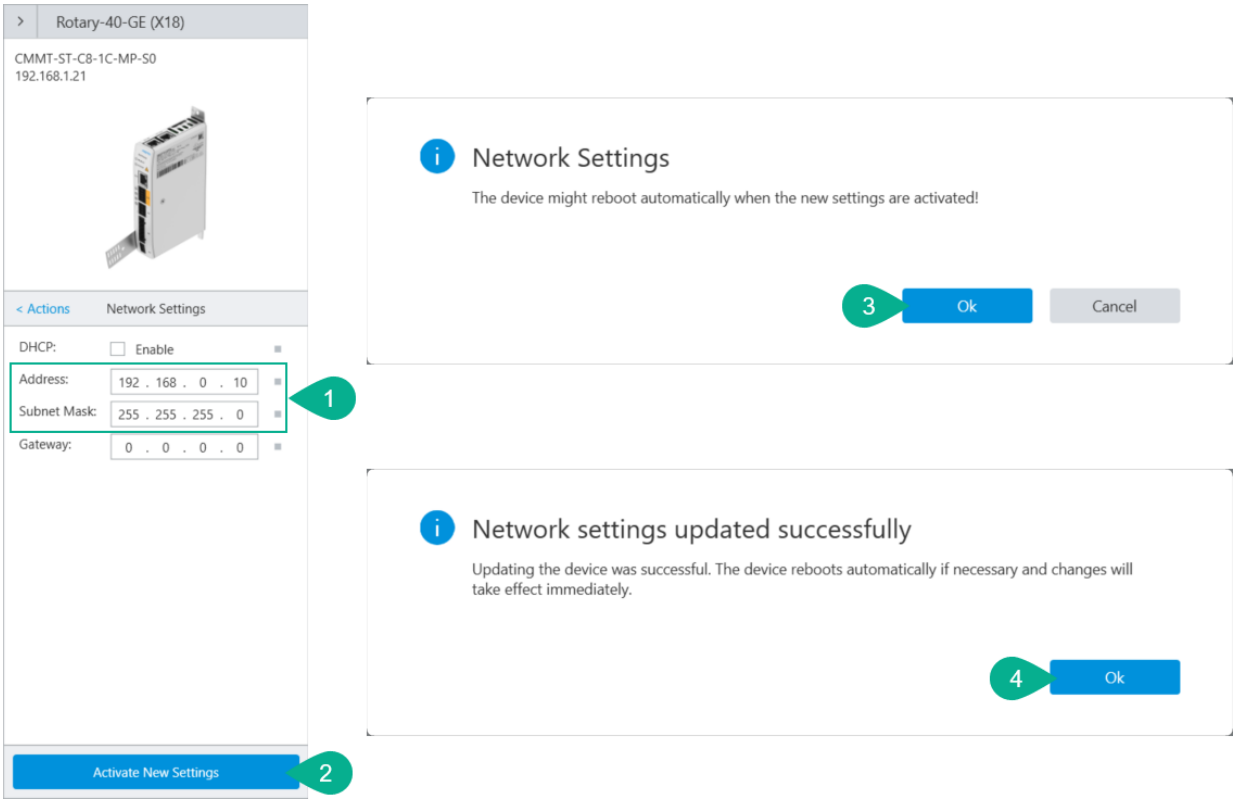
Open the FAS **Device Scan** window as shown on Chapter 2.2 **Step 1** and **Step 2**.

Step 2



1. Select any **CMMT-ST** from the **List View** in the Festo Automation Suite. For this application note, CMMT-ST for EHMD Gripper module is selected.
2. Click **Network Settings** in the action window.

Step 4

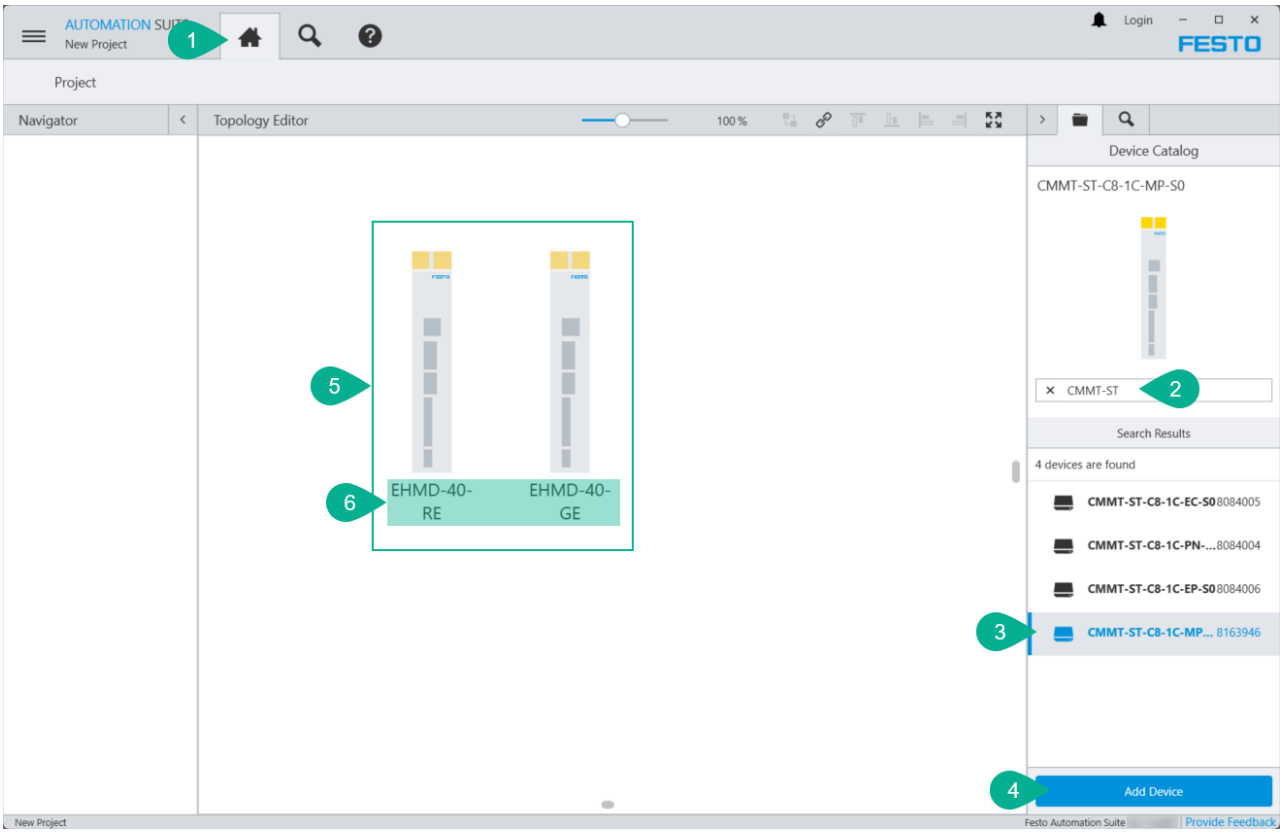


1. Enter the **IP Address & Subnet Mask** value for the CMMT-ST as per requirement.
2. Click on **Active New Settings** button to assign the entered values to the module.
3. Click on **OK** button to reboot the device.
4. Click on **OK** button to close the confirmation window.

Note

- Ensure that the CMMT-ST device IP address is within the same subnet as the PLC and workstation IP addresses. The above network configuration supports up to 255 devices.
- Repeat the above steps for configuring IP address of the CMMT-ST for EHMD Rotary module.

2.3.2 Creating a New Project with Motor Controller



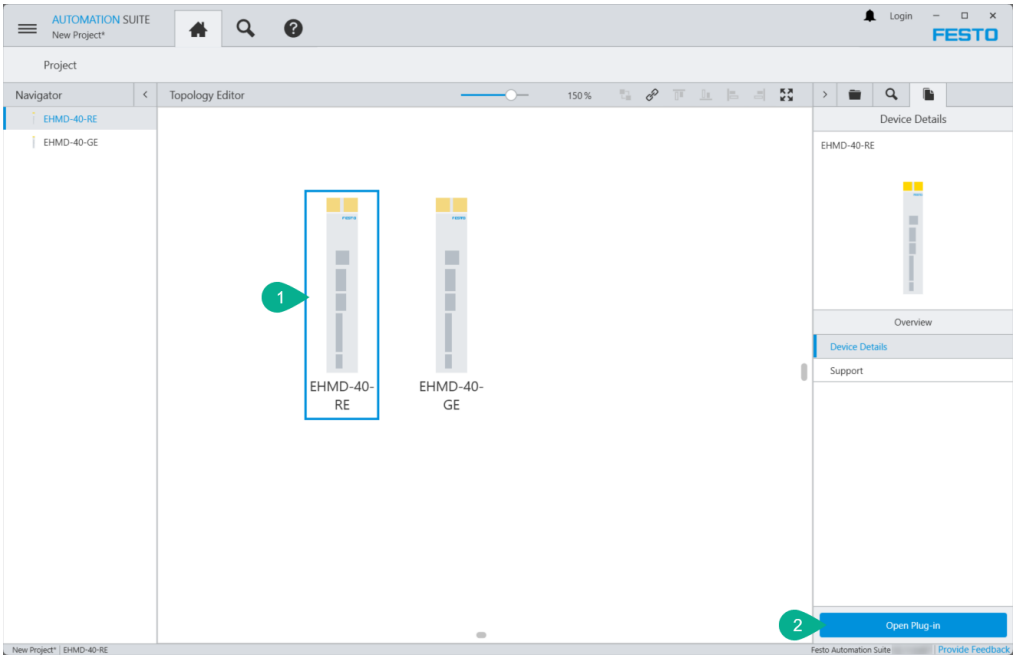
1. Click the **Project Section** button.
2. Search for **CMMT-ST** device.
3. Select the **CMMT-ST-C8-1c-MP-S0** device from the available search results.
4. Click the **Add Device** button to add the selected device to the **Topology Editor** window.
5. EHMD requires one CMMT-ST per axis, so the user must add an additional CMMT-ST.
6. Rename the CMMT-ST drives as required to distinguish the each axis controller.

2.3.3 EHMD Rotary Axis Configuration

Note

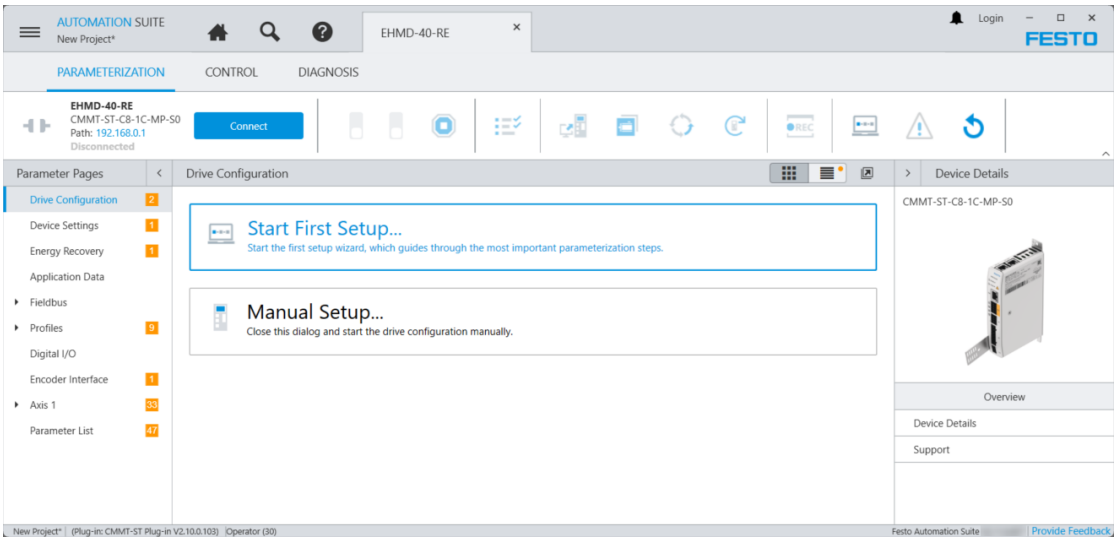
- Rotary and Gripper Axes must be configured separately with two independent motor controllers.
- EHMD Gripper Axis Configuration is shown on Chapter 2.3.4.

Step 1



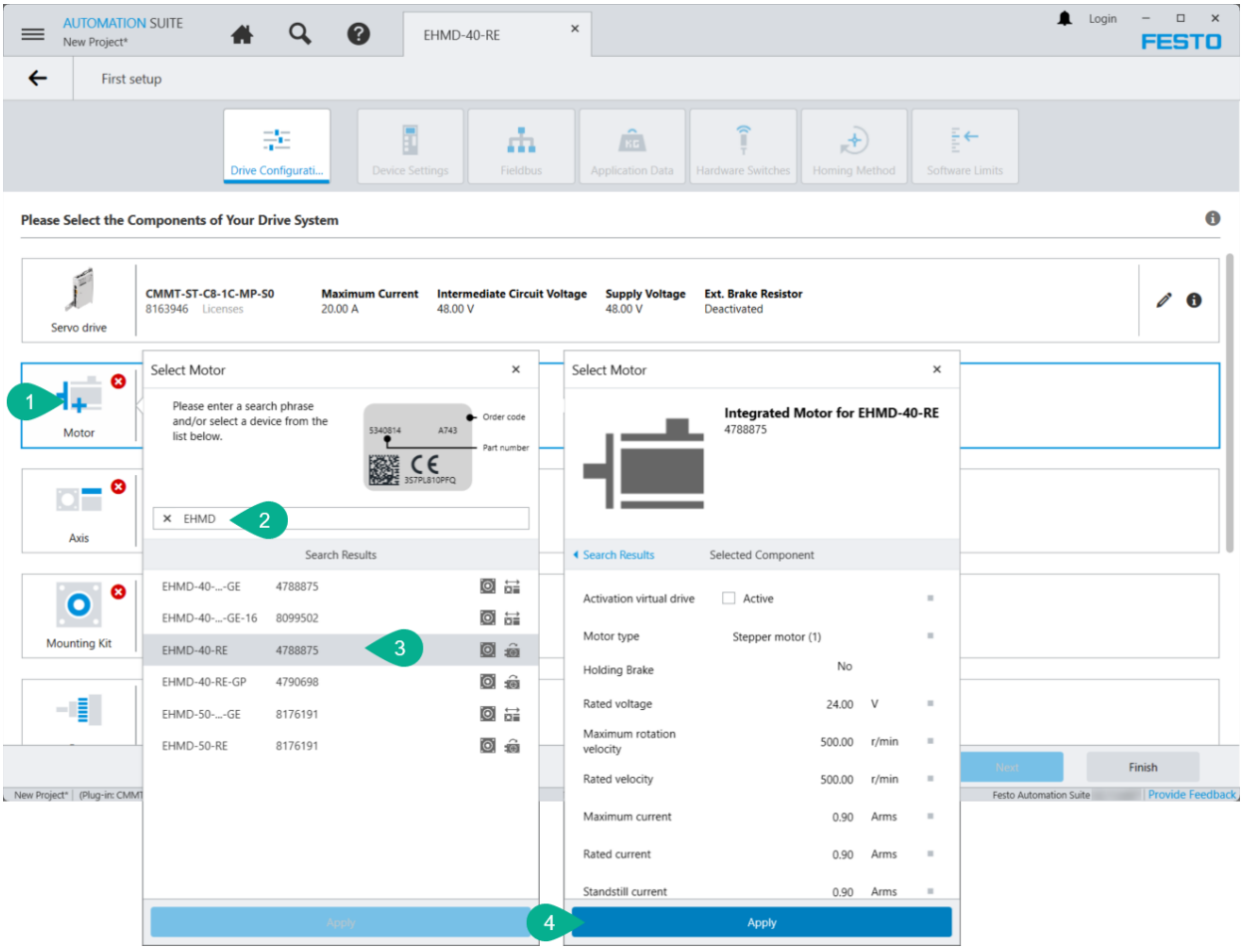
1. Select the **Motor Controller** for EHMD Rotary Module from **Topology Editor** window.
2. Click the **Open Plug-in** button to open the configuration.

Step 2



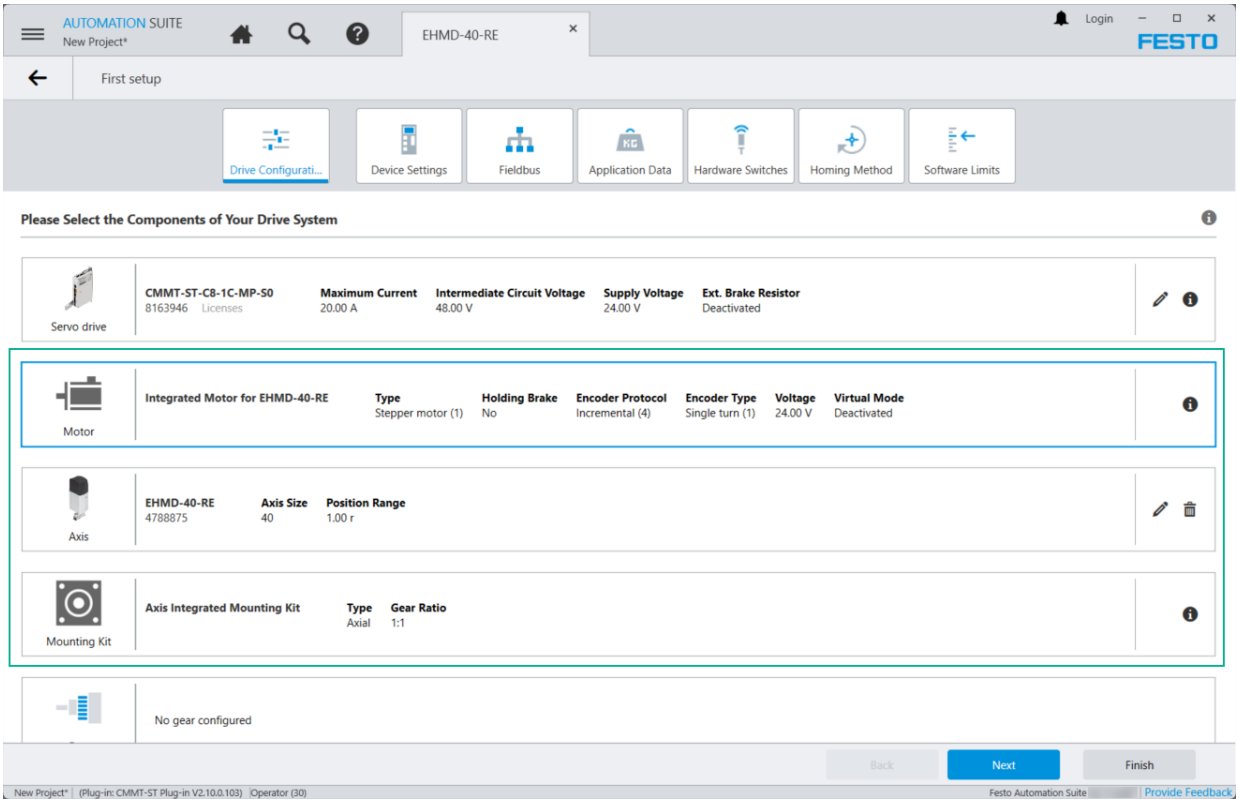
Click the **Start First Setup...** option from **Drive Configuration** window.

Step 3



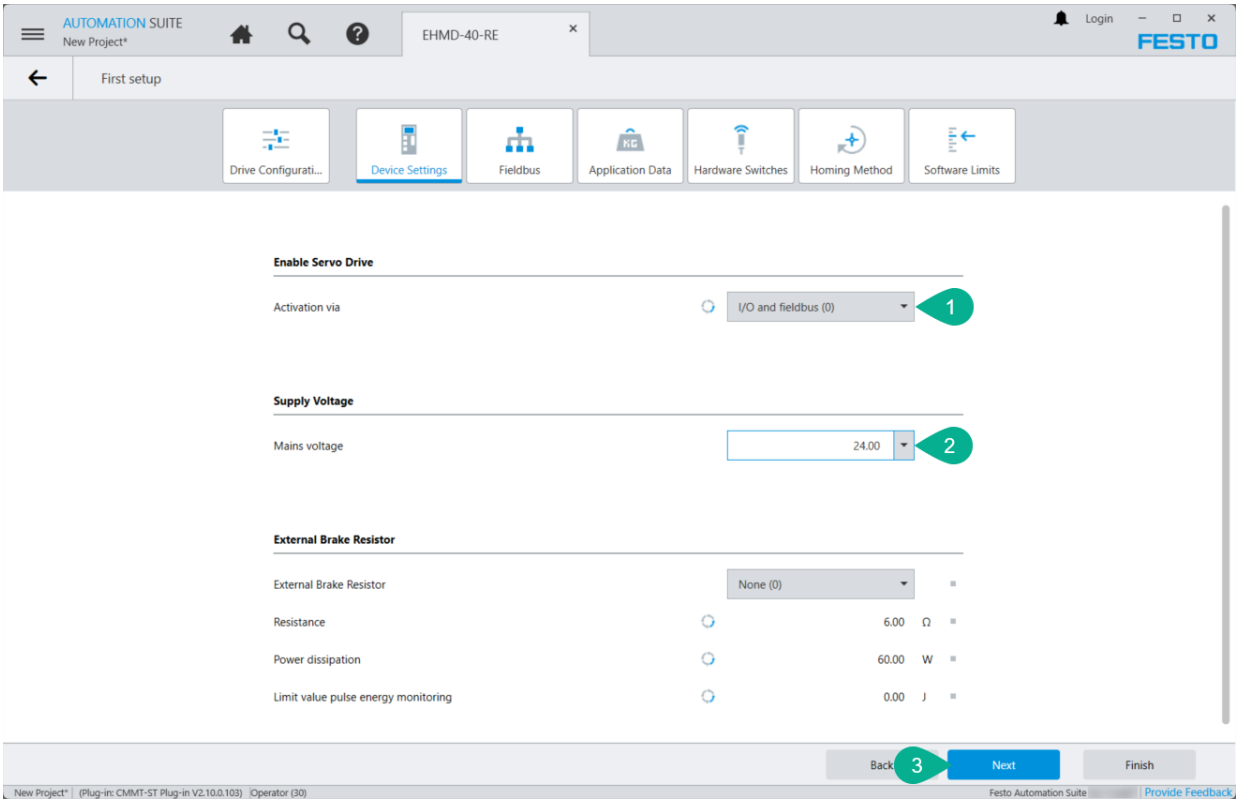
1. Click the **Motor** or **Axis** option to add the axis component.
2. Search for **EHMD** motor component.
3. Select **EHMD-40-RE** motor from the available search results.
4. After selecting the motor click the **Apply** button to add the motor to the project.

Step 4



The added **EHMD Rotary Axis** will be displayed as shown above image. Click the **Next** button for next level of configuration.

Step 5



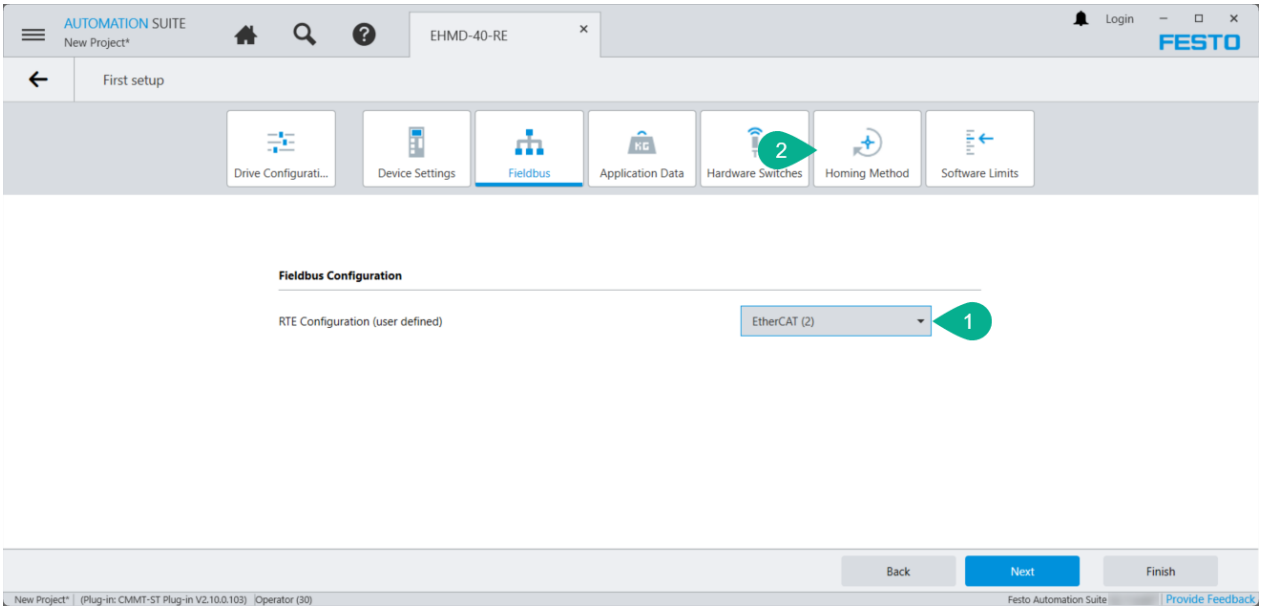
1. Select the required **Enable Servo Drive** method from **Activation via** drop-down list. For this application note, **I/O and Fieldbus** method has been selected.
2. Select the appropriate **Supply Voltage** for the motor controller via **Mains voltage** drop-down list. Refer to the note below.
3. Click the **Next** button for next level of configuration.

Note

Possible supply voltages for Rotary-Gripper EHMD module:

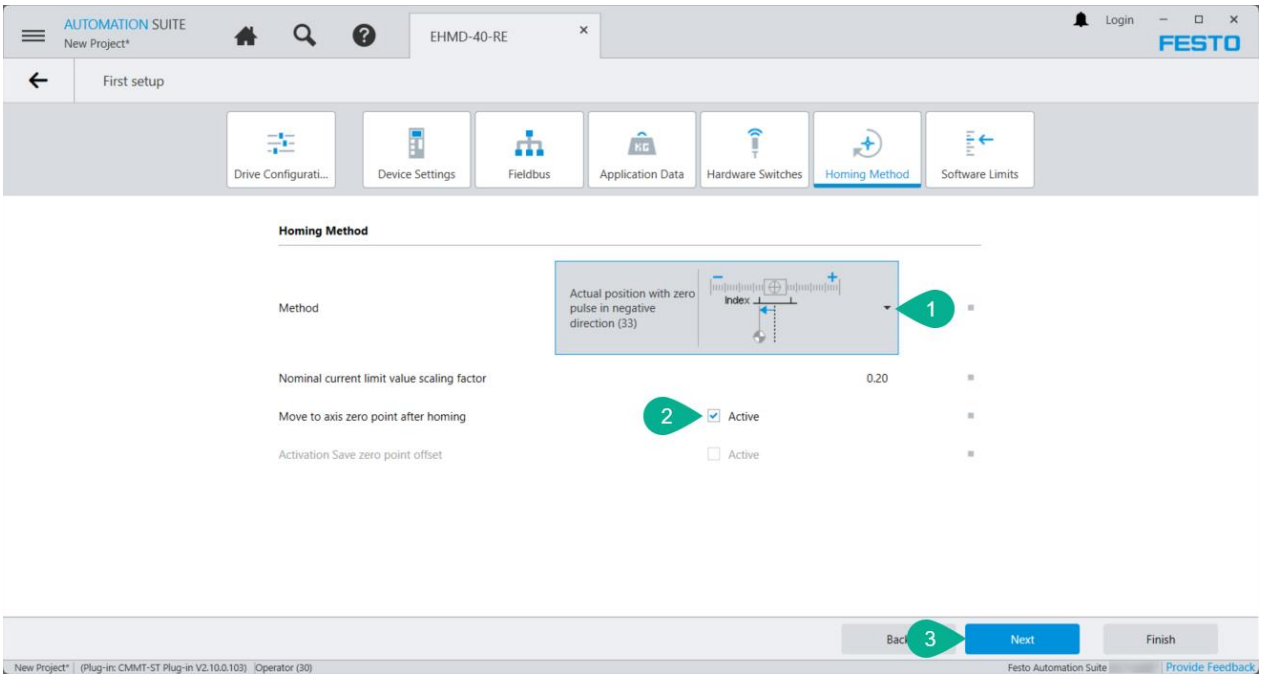
- 24 V for EHMD-40 Rotary-Gripper unit.
- 24 V or 48 V for EHMD-50 Rotary-Gripper unit.

Step 6



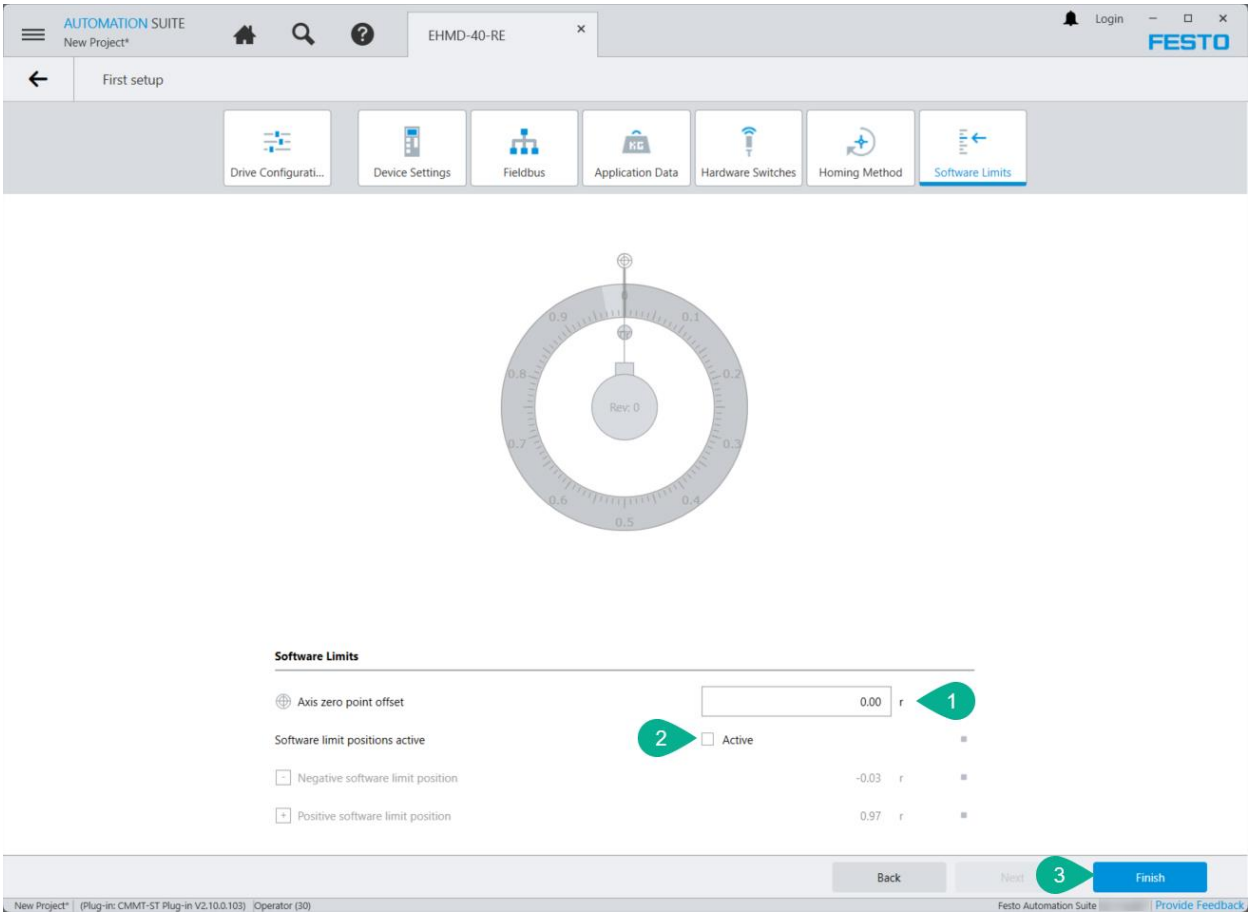
1. Select **EtherCAT** as a **Fieldbus Configuration** via **RTE Configuration (user defined)** drop-down list.
2. Click the **Homing Method** menu option to define the **Homing Method** of the rotary axis.

Step 7



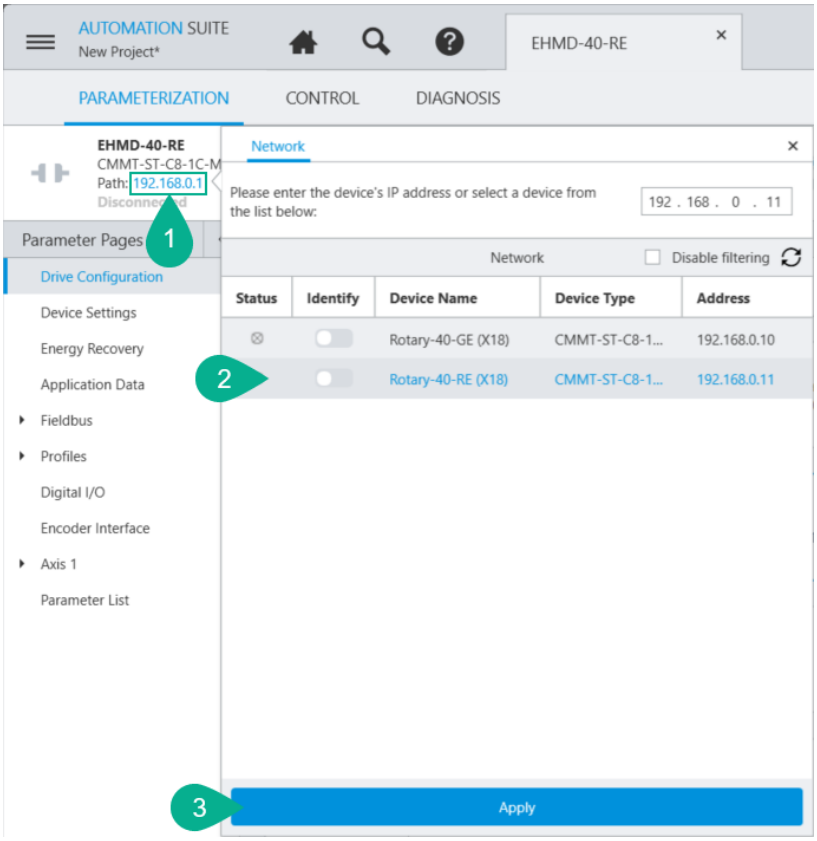
1. Select **Actual position with zero pulse in negative direction (33)** as a **Homing Method** via **Method** drop-down list.
2. Select the **Move to axis zero point after homing** checkbox.
3. click the **Next** button for next level of configuration.

Step 8



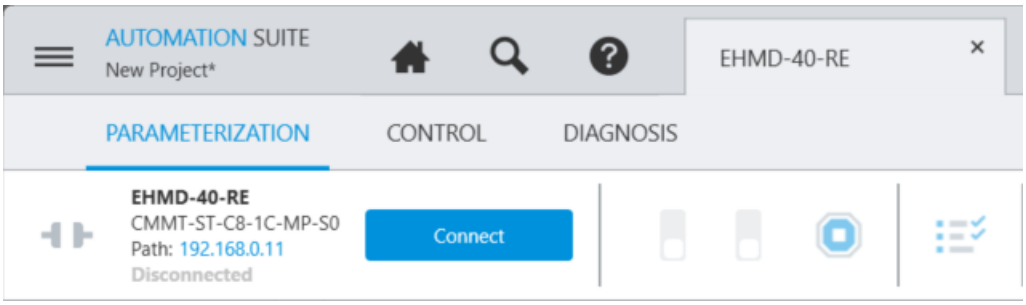
1. Enter the **Axis zero point offset** value as **Zero** for the EHMD Rotary Axis.
2. Ensure that **Software limit position active** checkbox is unselected.
3. Click the **Finish** button to complete the configuration.

Step 9



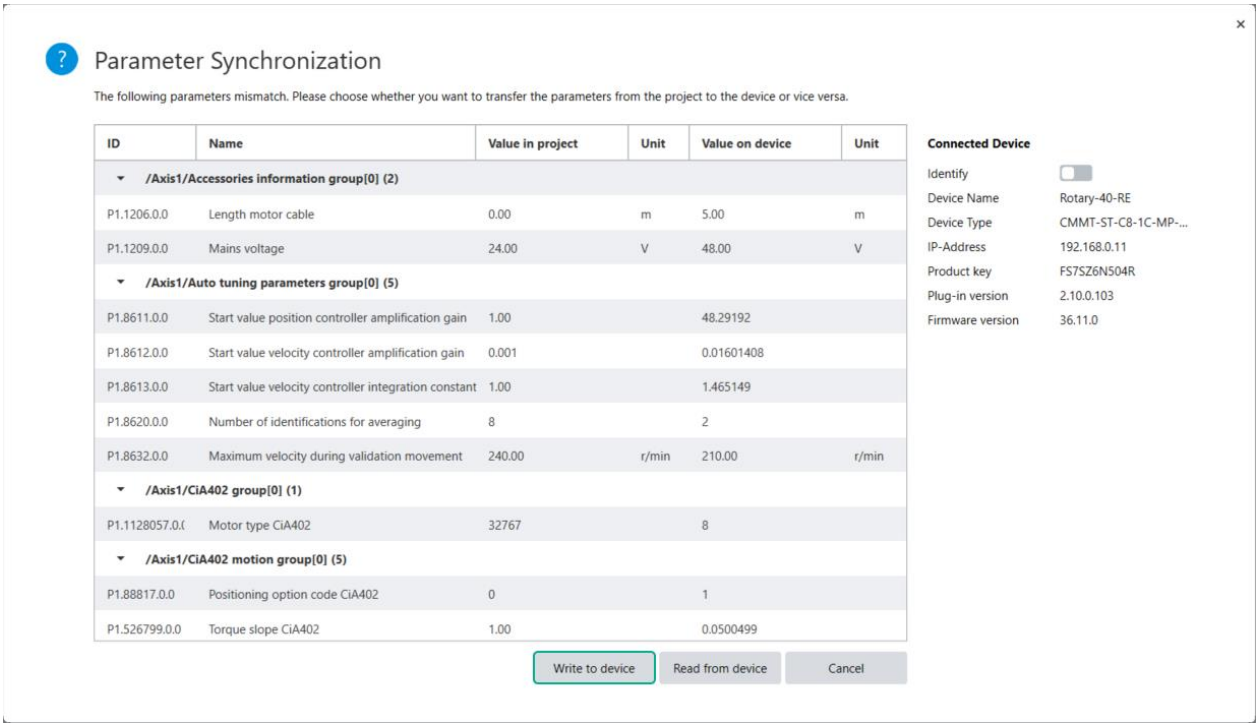
1. Click the Ip address **Path** option from tool bar.
2. Select the correct motor controller for the EHMD Rotary axis.
3. Click the **Apply** button to assign the **Path** address.

Step 10



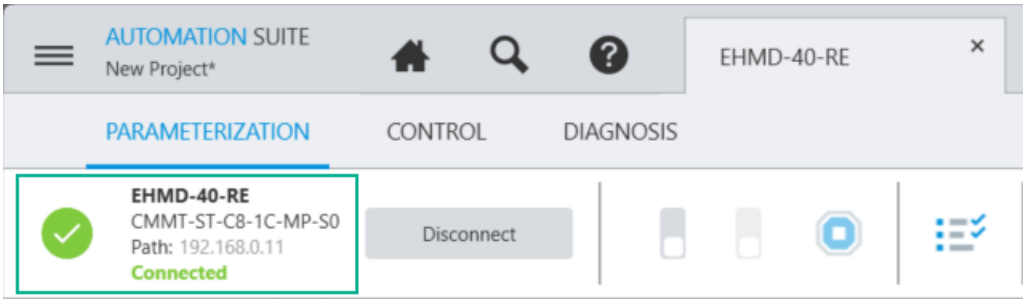
Click the **Connect** button to establish the communication.

Step 11



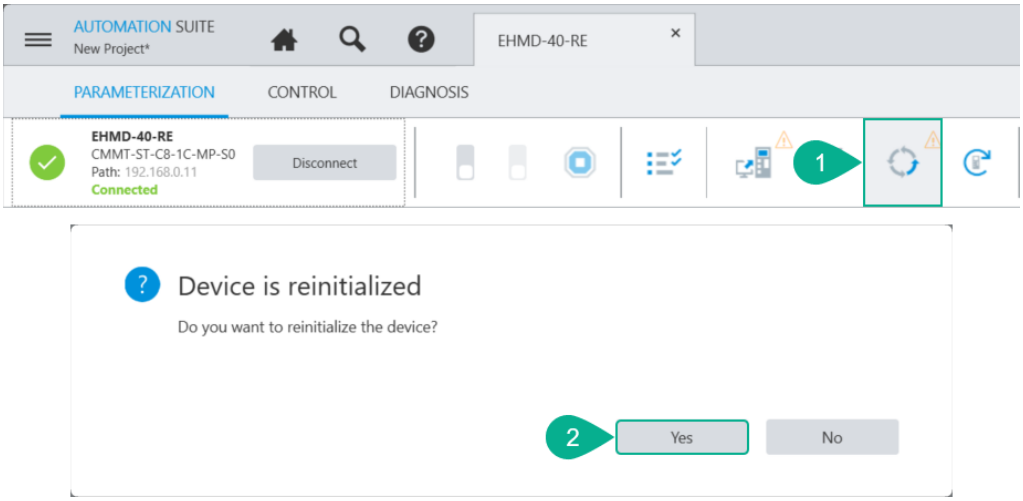
Click the **Write to device** button in the **Parameter Synchronization** window.

Step 12



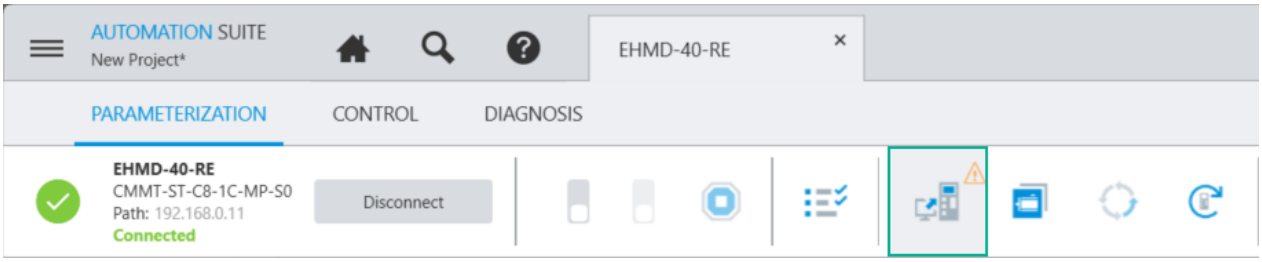
The status of the motor controller changes from Disconnected to Connected.

Step 13



1. Click the **Reinitialize** button to reinitialize the motor controller.
2. Click the **Yes** button to confirm the reinitialization of the motor controller.

Step 14



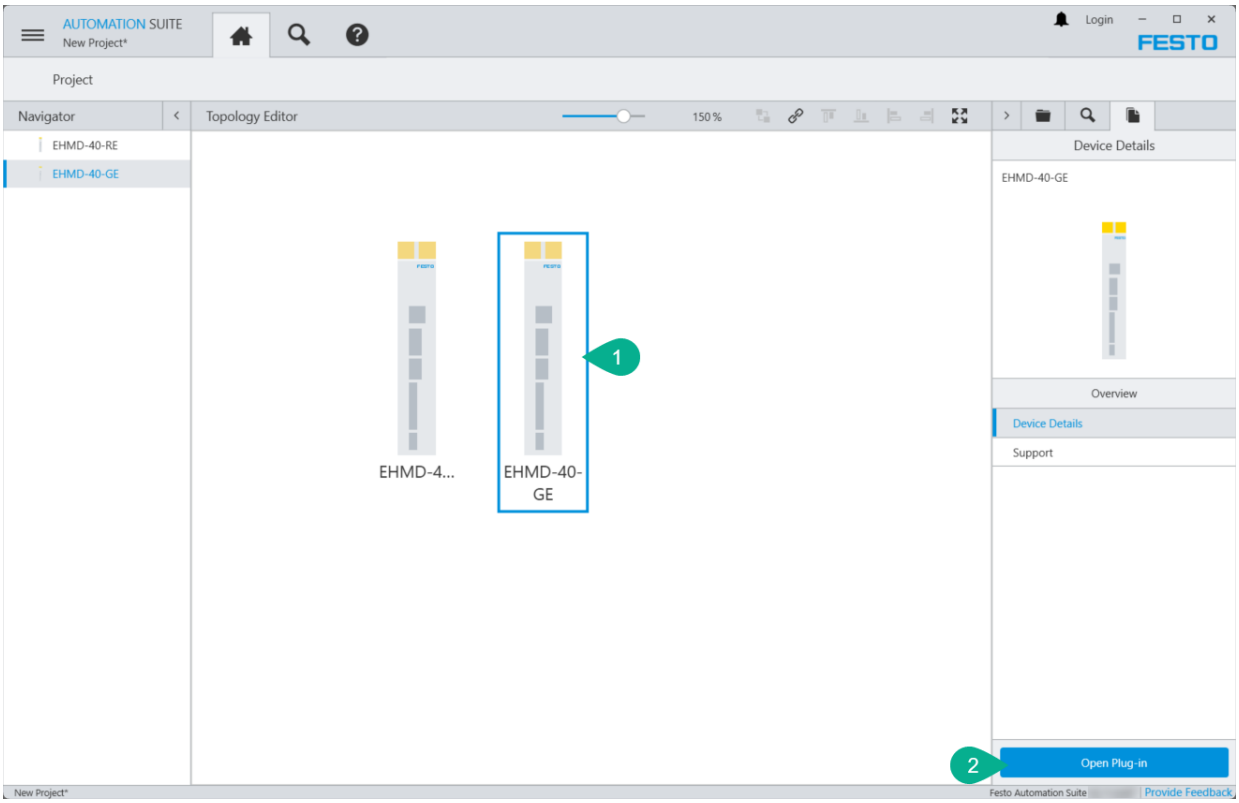
Click the **Store on Device** button to store all the parameters in the motor controller memory.

Note

- The triangle warning symbol on the buttons indicates action required.
- All the modified parameters will automatically erase from the motor controller during power re-start if the modified parameters are not stored in the motor controller.
- It's mandatory to reinitialize the motor controller for some parameter modification. If the motor controller is not reinitialized, then the motor controller performance remains the same as the previous configuration.

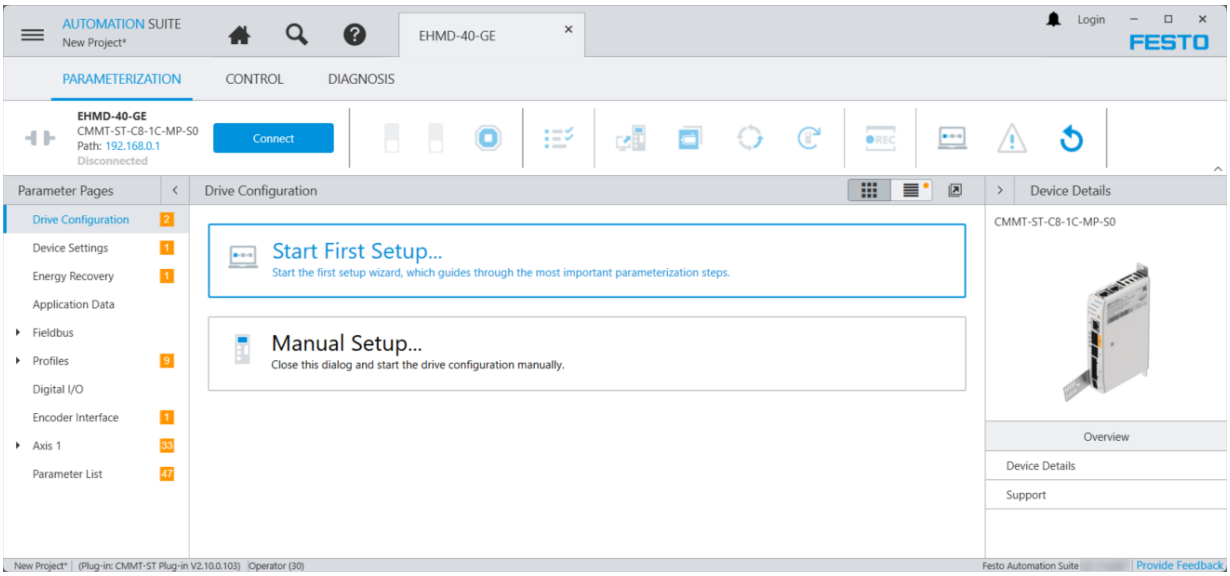
2.3.4 EHMD Gripper Axis Configuration

Step 1



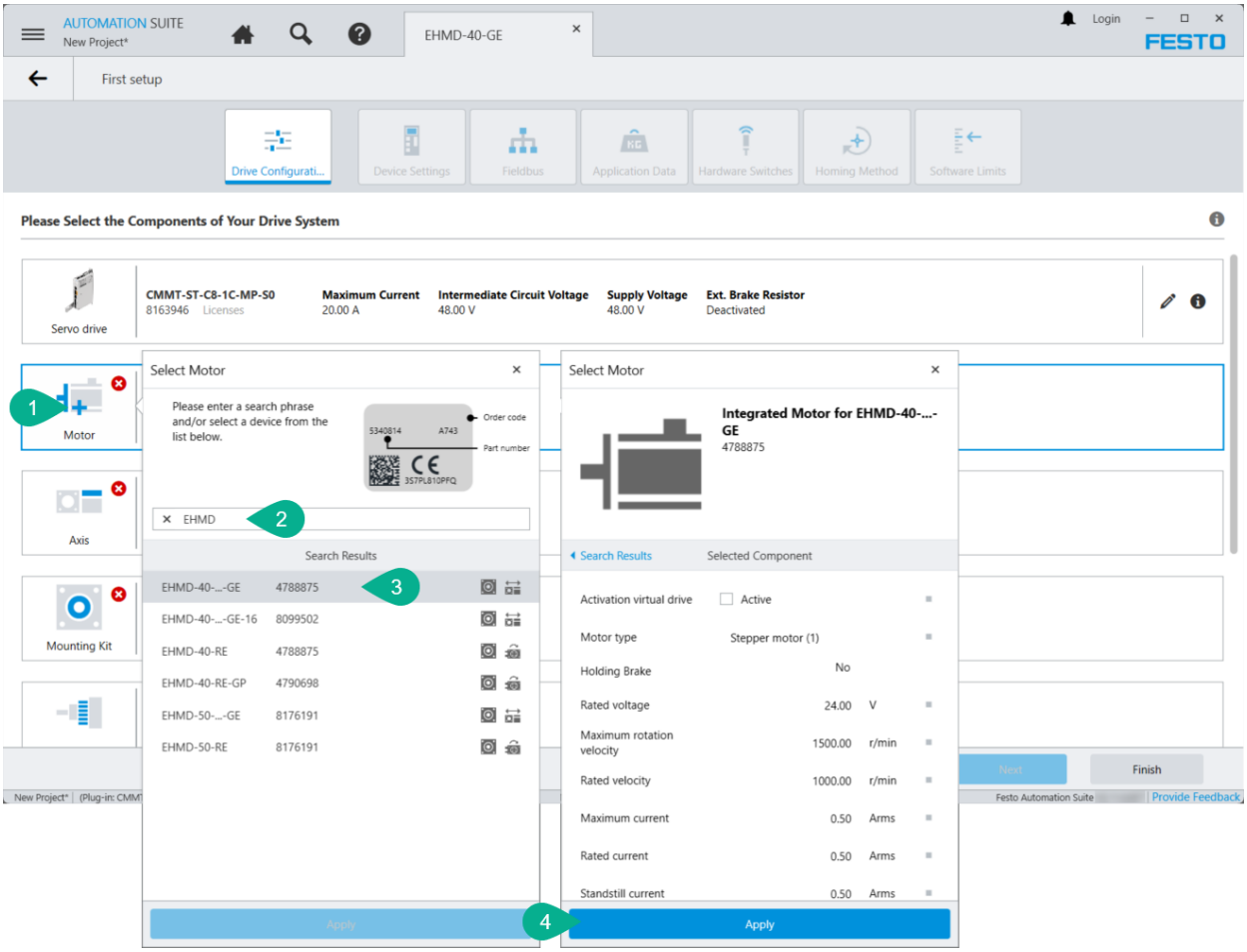
1. Select the **Motor Controller** for EHMD Gripper Module from **Topology Editor** window.
2. Click the **Open Plug-in** button to open the configuration.

Step 2



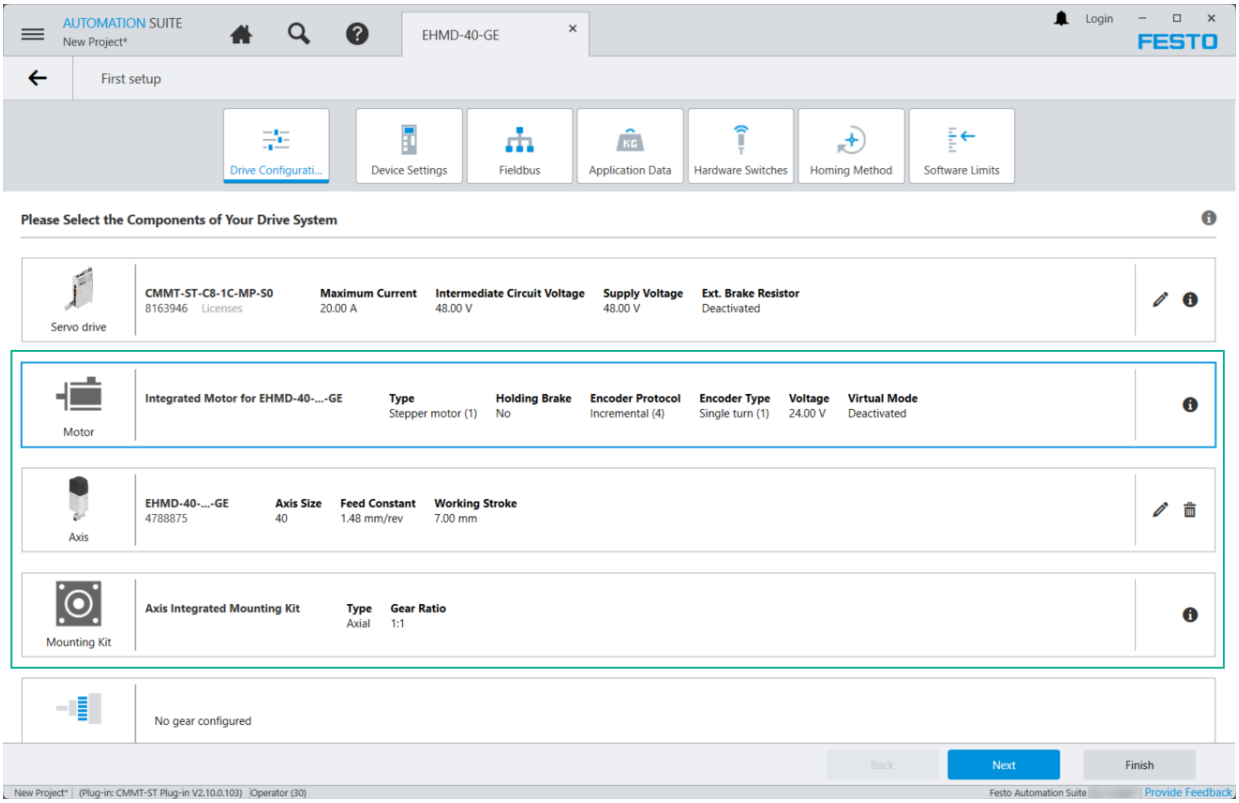
Click the **Start First Setup...** option from **Drive Configuration** window.

Step 3



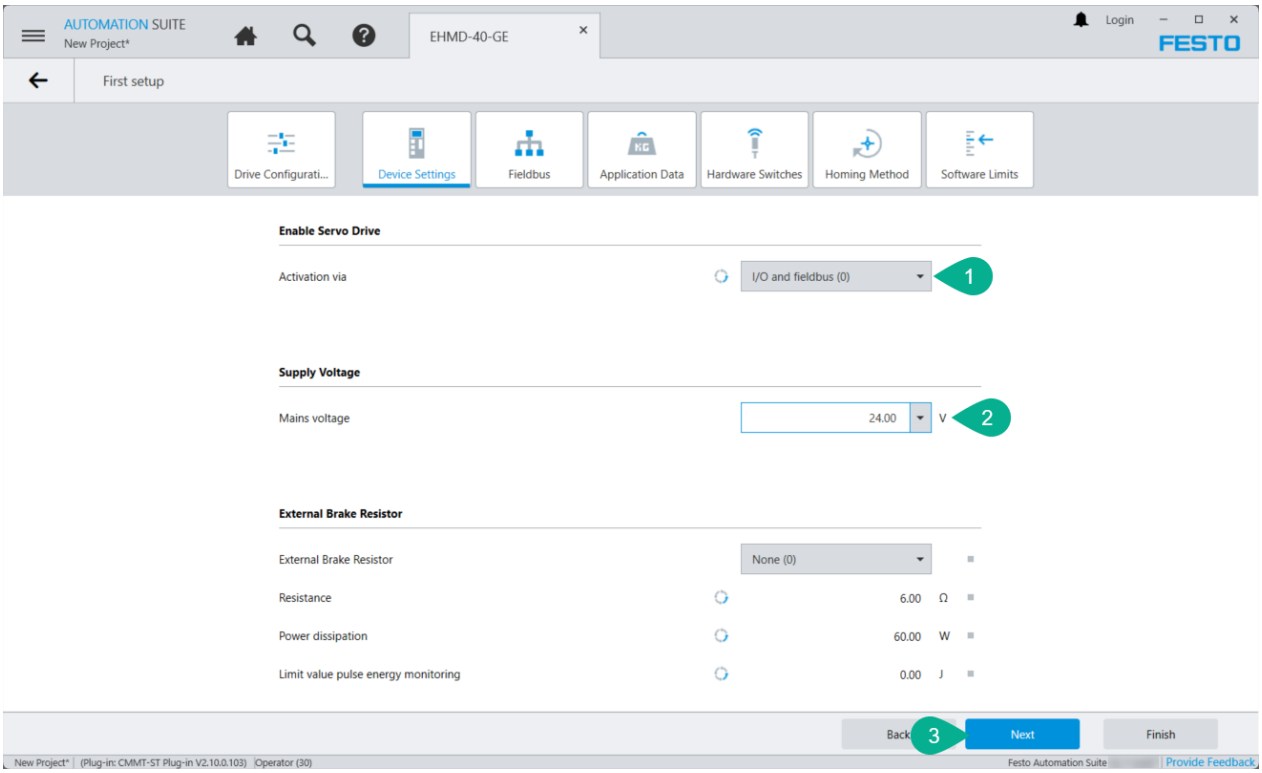
1. Click the **Motor** or **Axis** option to add the axis component.
2. Search for **EHMD** motor component.
3. Select **EHMD-40-...-GE** motor from the available search results.
4. After selecting the motor click the **Apply** button to add the motor to the project.

Step 4



The added **EHMD Gripper Axis** will be displayed as shown above image. Click the **Next** button for next level configuration.

Step 5



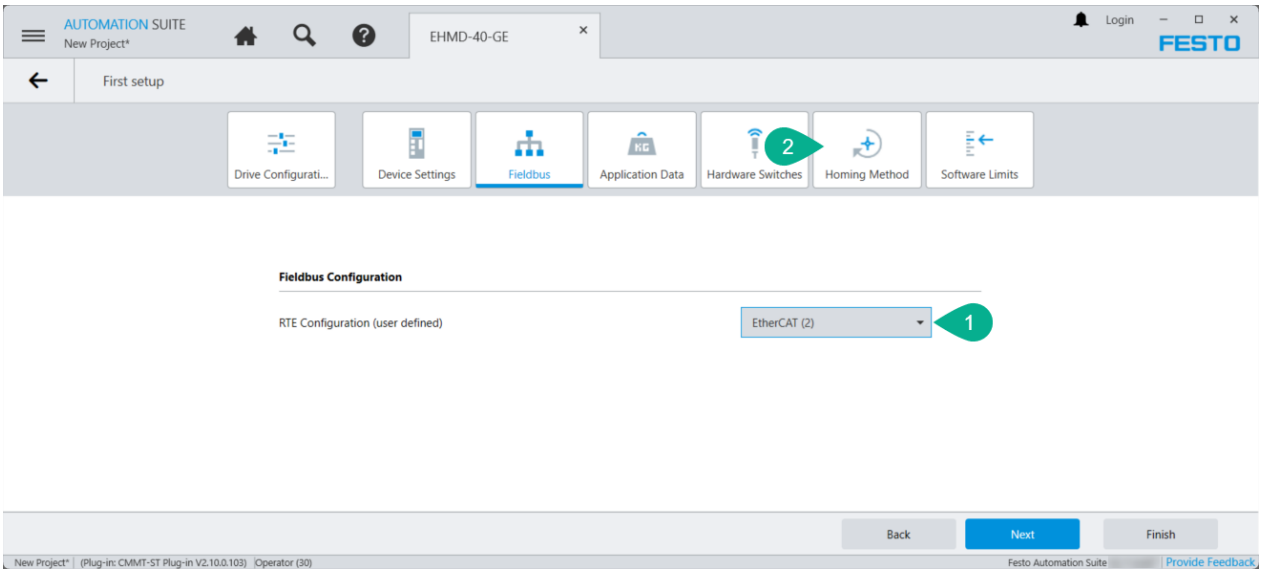
1. Select the required **Enable Servo Drive** method from **Activation via** drop-down list. For this application note, **I/O and Fieldbus** method has been selected.
2. Select the appropriate **Supply Voltage** for the motor controller via **Mains voltage** drop-down list. Refer below note.
3. Click the **Next** button for next level configuration.

Note

Possible supply voltages for Rotary-Gripper EHMD module:

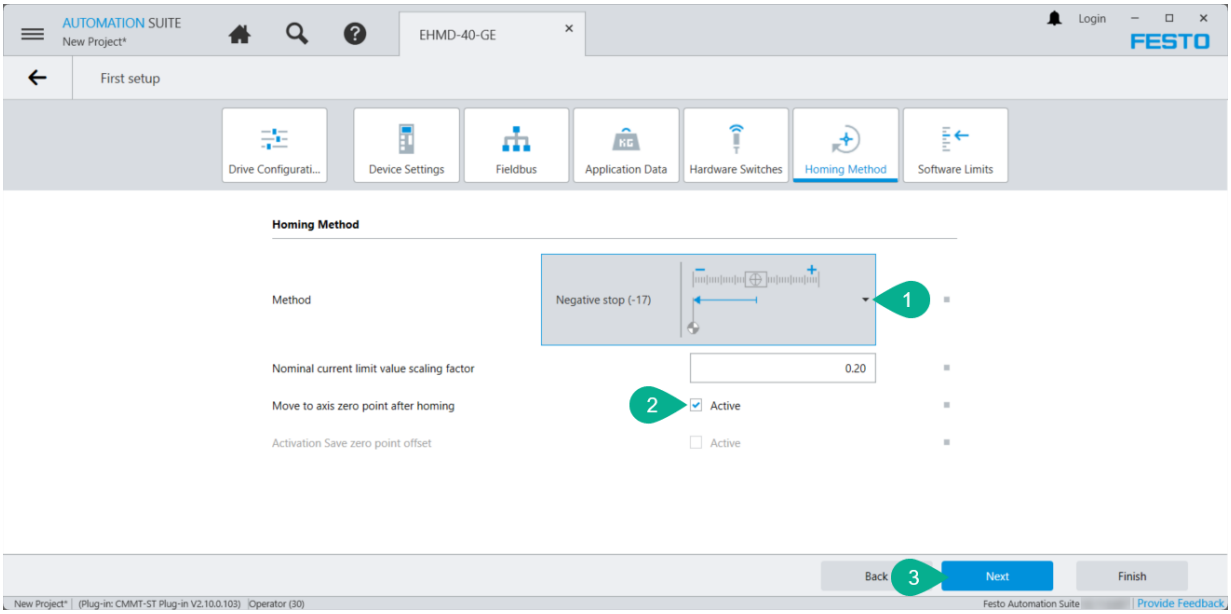
- 24 V for EHMD-40 Rotary-Gripper unit.
- 24 V or 48 V for EHMD-50 Rotary-Gripper unit.

Step 6



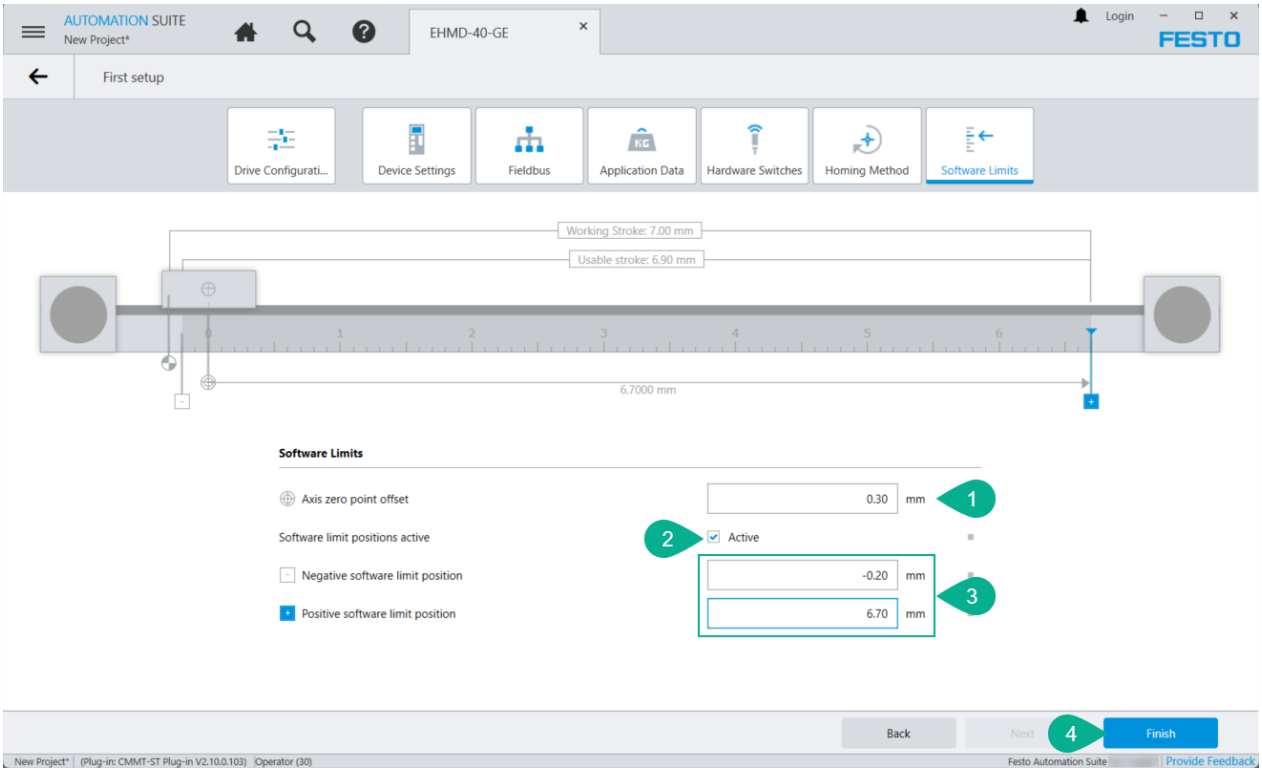
1. Select **EtherCAT** as a **Fieldbus Configuration** via **RTE Configuration (user defined)** drop-down list.
2. Click the **Homing Method** menu option to define the **Homing Method** of the rotary axis.

Step 7



1. Select **Negative stop (-17)** as a **Homing Method** via **Method** drop-down list.
2. Select the **Move to axis zero point after homing** checkbox.
3. click the **Next** button for next level configuration.

Step 8



1. Enter the required **Axis zero point offset** value as per EHMD Gripper Module requirement. Refer below note.
2. Ensure that **Software limit position active** checkbox is selected.

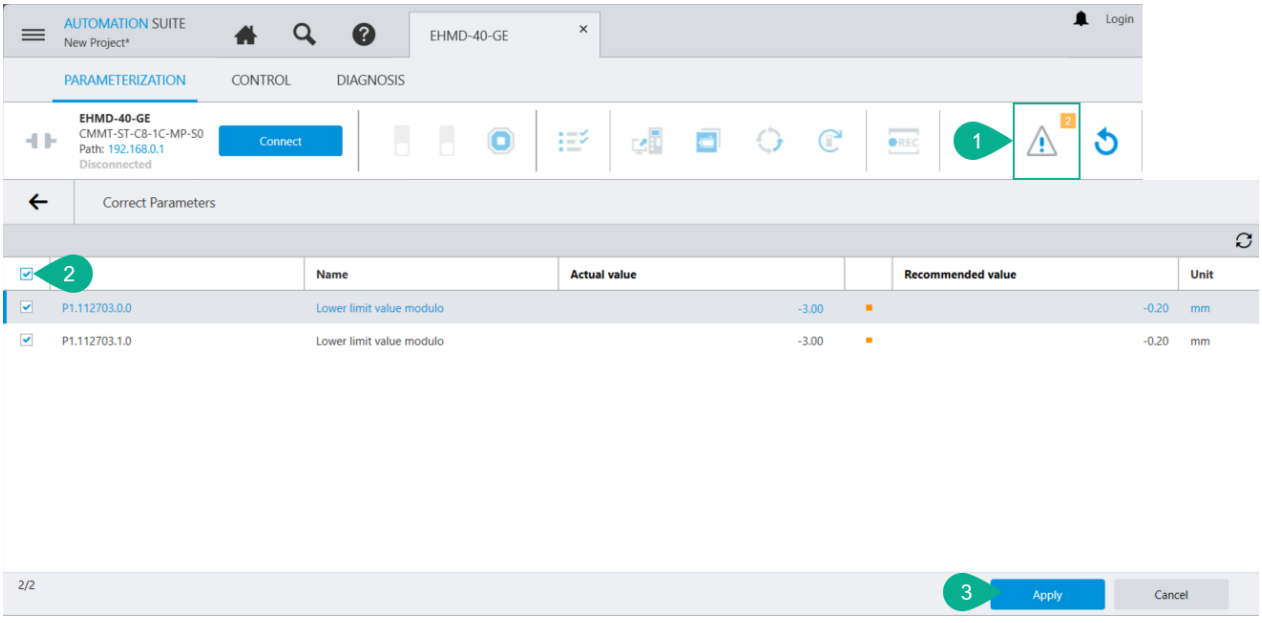
3. Enter the required **Negative & Positive software limit position** values as per EHMD Gripper Module requirement. Refer below note.
4. Click the **Finish** button to complete the configuration.

Note

Software Limits for EHMD Gripper Module:

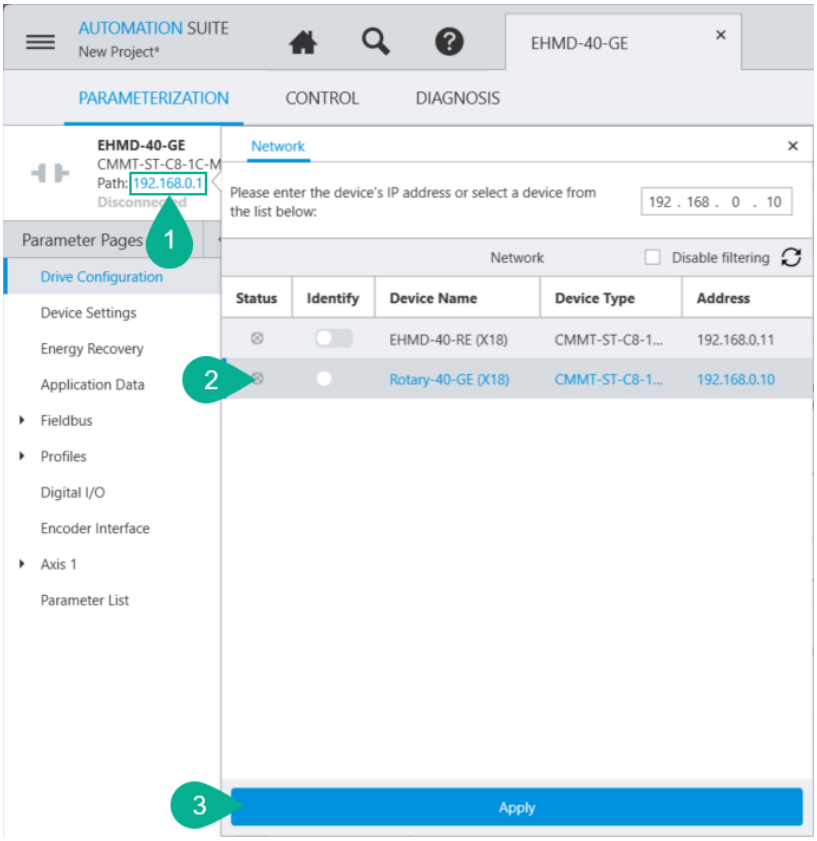
- EHMD-40-...-GE Gripper
  - Axis zero point offset ---> 0.3 mm
  - Negative Software Limit Position ---> -0.2 mm
  - Positive Software Limit Position ---> 6.7 mm
- EHMD-40-...-GE-16 Gripper
  - Axis zero point offset ---> 0.5 mm
  - Negative Software Limit Position ---> -0.3 mm
  - Positive Software Limit Position ---> 18 mm
- EHMD-50-...-GE-15 Gripper
  - Axis zero point offset ---> 0.5 mm
  - Negative Software Limit Position ---> -0.3 mm
  - Positive Software Limit Position ---> 15.3 mm

Step 9



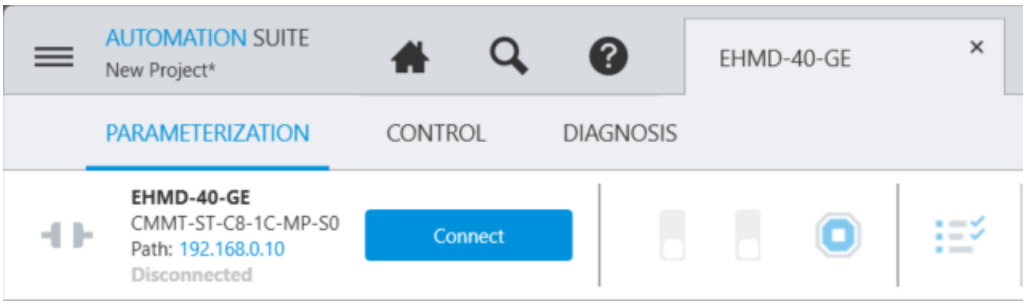
1. Click the **Correct Parameters** button to correct the modified parameters.
2. Click the checkbox to correct all the parameters at once.
3. Click the **Apply** button to apply the system generated recommended values.

Step 10



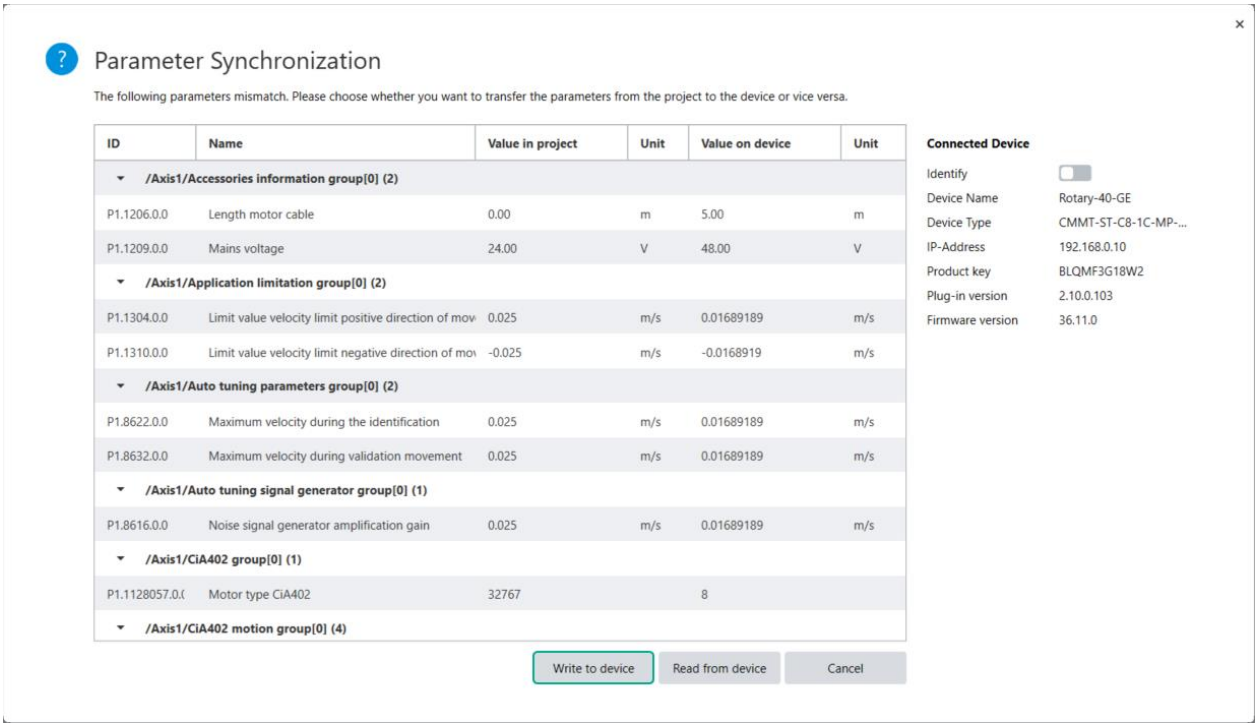
1. Click the Ip address **Path** option from tool bar.
2. Select the correct motor controller for the EHMD Gripper axis.
3. Click the **Apply** button to assign the **Path** address.

Step 11



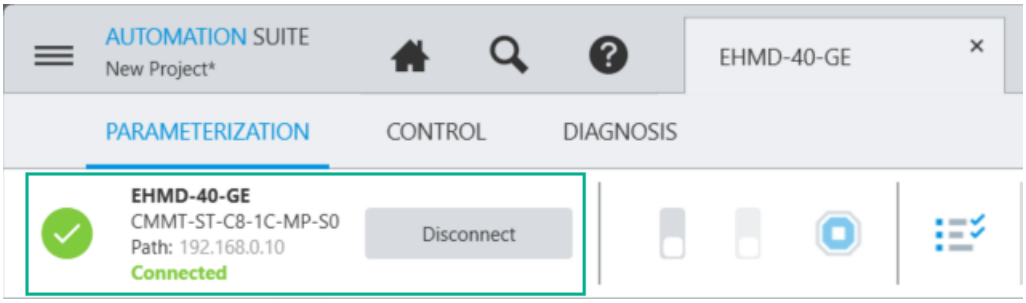
Click the **Connect** button to establish the communication.

Step 12



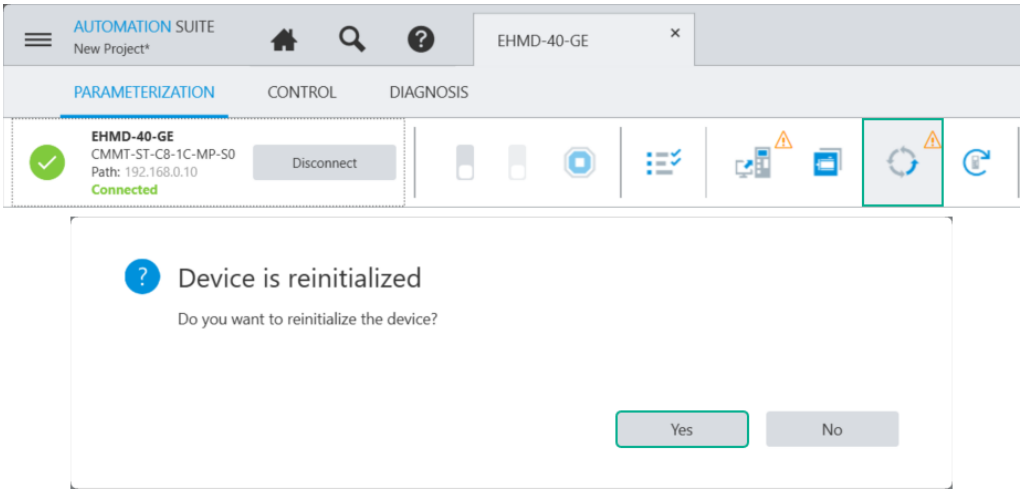
Click the **Write to device** button in the **Parameter Synchronization** window.

Step 13



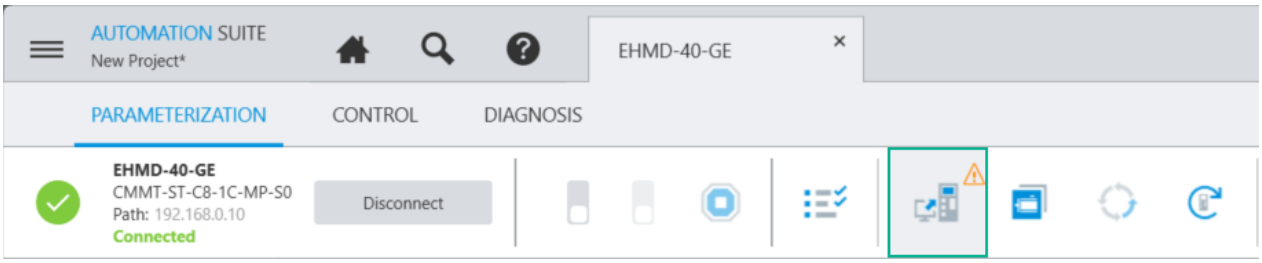
The status of the motor controller changes from Disconnected to Connected.

Step 14



1. Click the **Reinitialize** button to reinitialize the motor controller.
2. Click the **Yes** button to confirm the reinitialization of the motor controller.

Step 15



Click the **Store on Device** button to store all the parameters in the motor controller memory.

Note

- The triangle warning symbol on the buttons indicates action required.
- All the modified parameters will automatically erase from the motor controller during power re-start if the modified parameters are not stored in the motor controller.
- It's mandatory to reinitialize the motor controller for some parameter modification. If the motor controller is not reinitialized, then the motor controller performance remains the same as the previous configuration.

3 Software Configuration

This chapter describes the configurations of CODESYS software, including creating a new project, adding the controller to the project, configuring CMMT-ST-...-MP-S0 as EtherCAT slave, and adding the **Festo_EHMD_PtP_EC** library to the project.

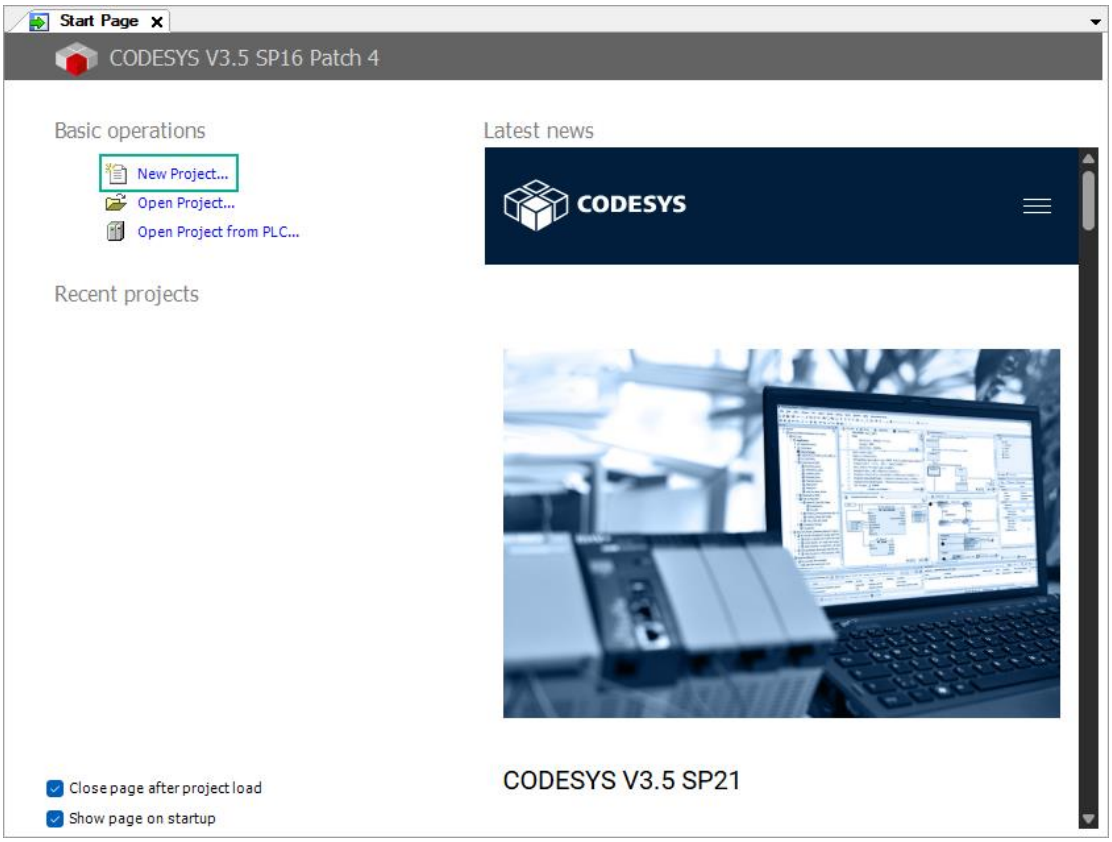
3.1 Creating a New Project and Adding the Controller to the Project

Step 1



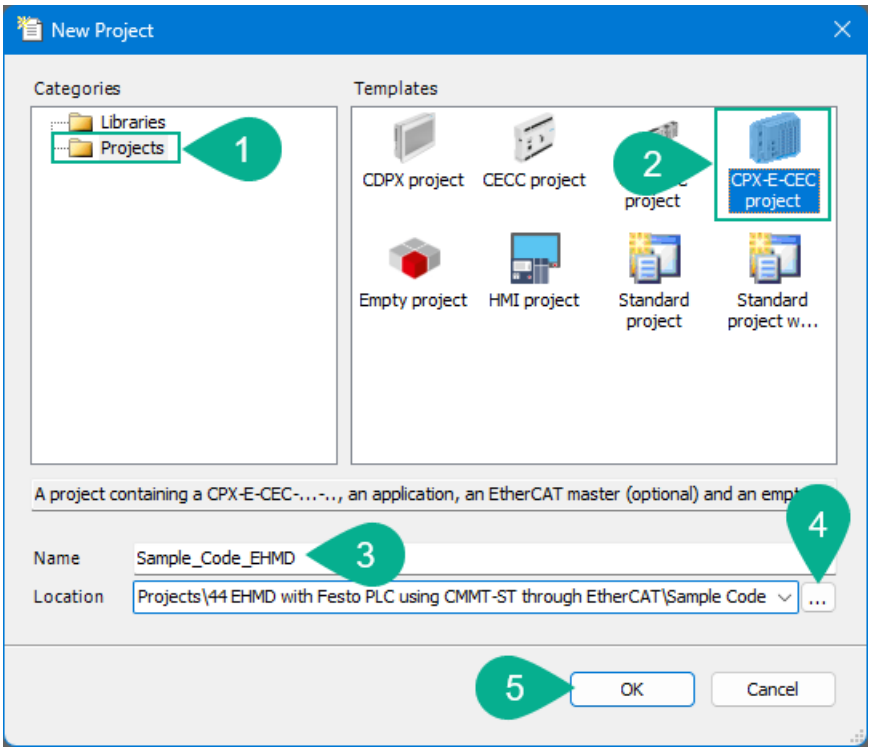
Open the **CODESYS V3.5 SP16 Patch 4** software (**Windows Start >> CODESYS >> CODESYS V3.5 SP16 Patch 4**).

Step 2



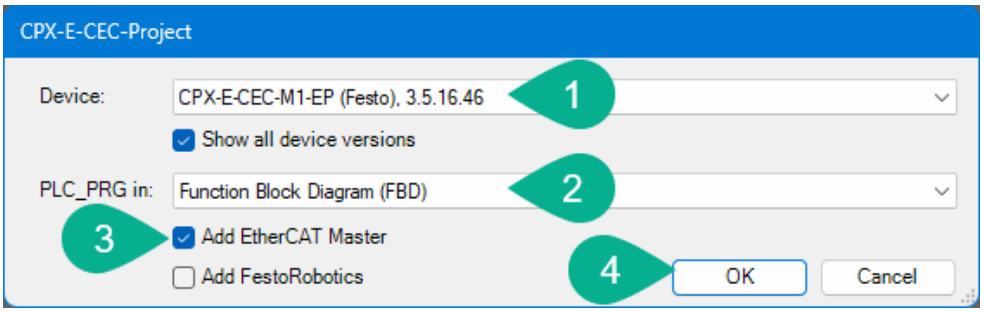
Click the **New Project** option in the **Start Page** to create a new project.

Step 3



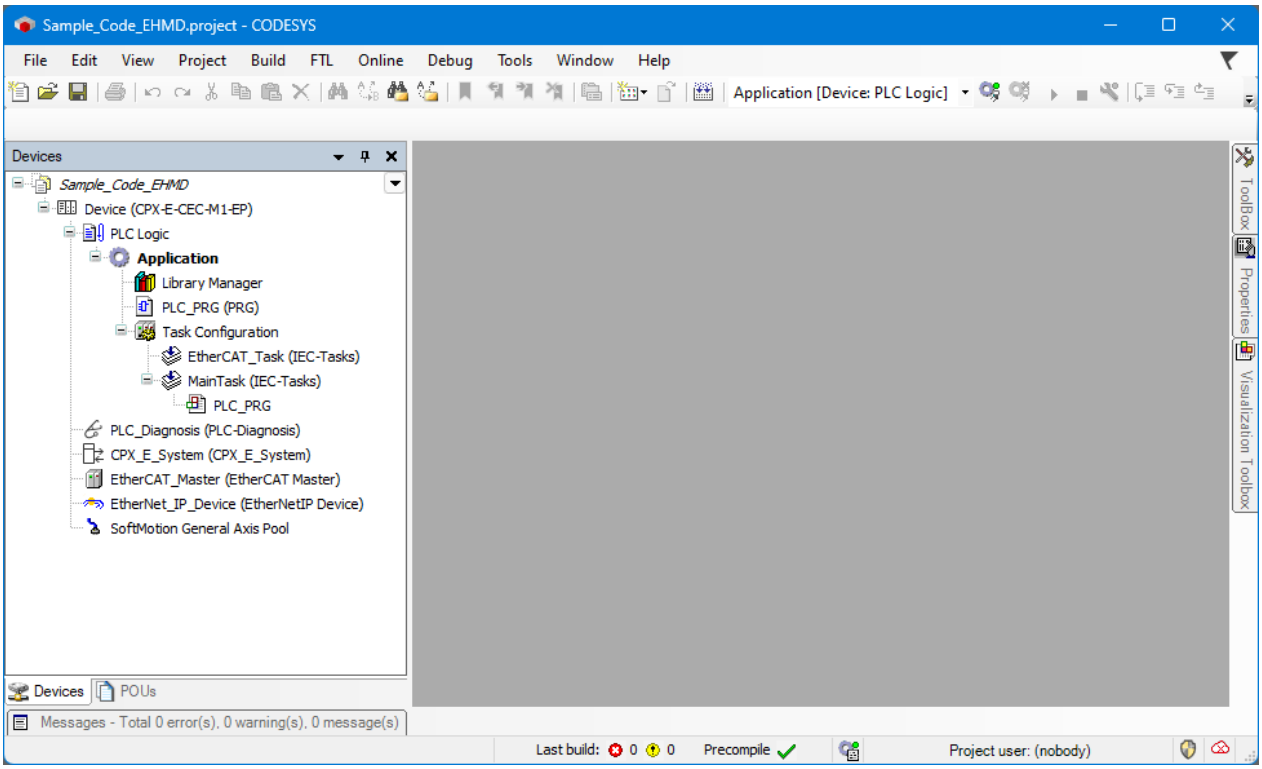
1. Select the **Projects** option from **Categories** section.
2. Select the **CPX-E-CEC Project** as a **Template** from **Projects** Category.
3. Enter the name for the project.
4. Select the location where the project has to be saved on the workstation.
5. Click the **OK** button to create the project.

Step 4



1. Select the required **PLC** and **Version** from the **Device** drop-down list. For this application note, **CPX-E-CEC-M1-EP, 3.5.16.46** has been selected.
2. Select the required programming language from **PLC_PRG in** drop-down list. For this sample code, **Function Block Diagram (FBD)** has been selected.
3. Select the **Add EtherCAT Master** check box to add the **EtherCAT Master** to the project.
4. Click the **OK** button to add the device to the project.

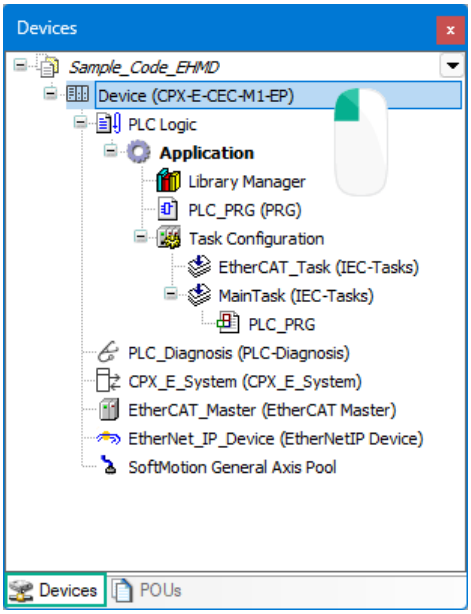
Once the device has been added the project view looks as shown below.



3.2 Selecting the Communication Gateway Connection

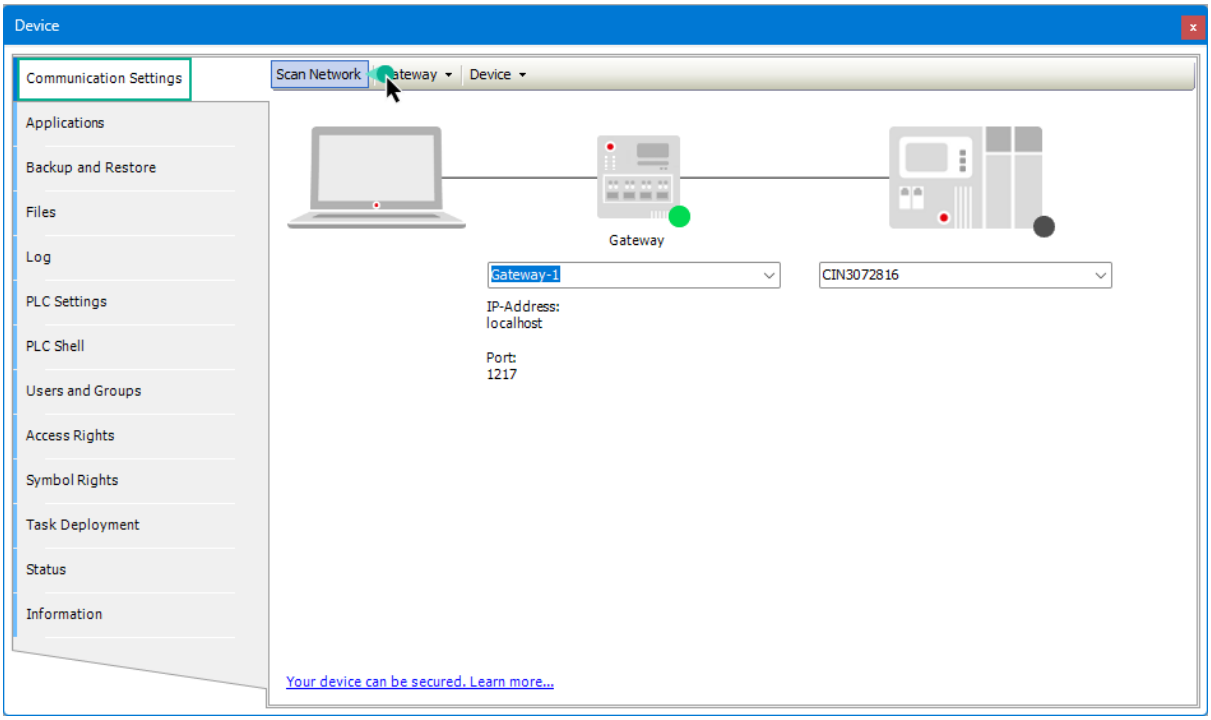
To establish TCP communication in the CODESYS controller, a gateway (network path) must first be set up for the controller.

Step 1



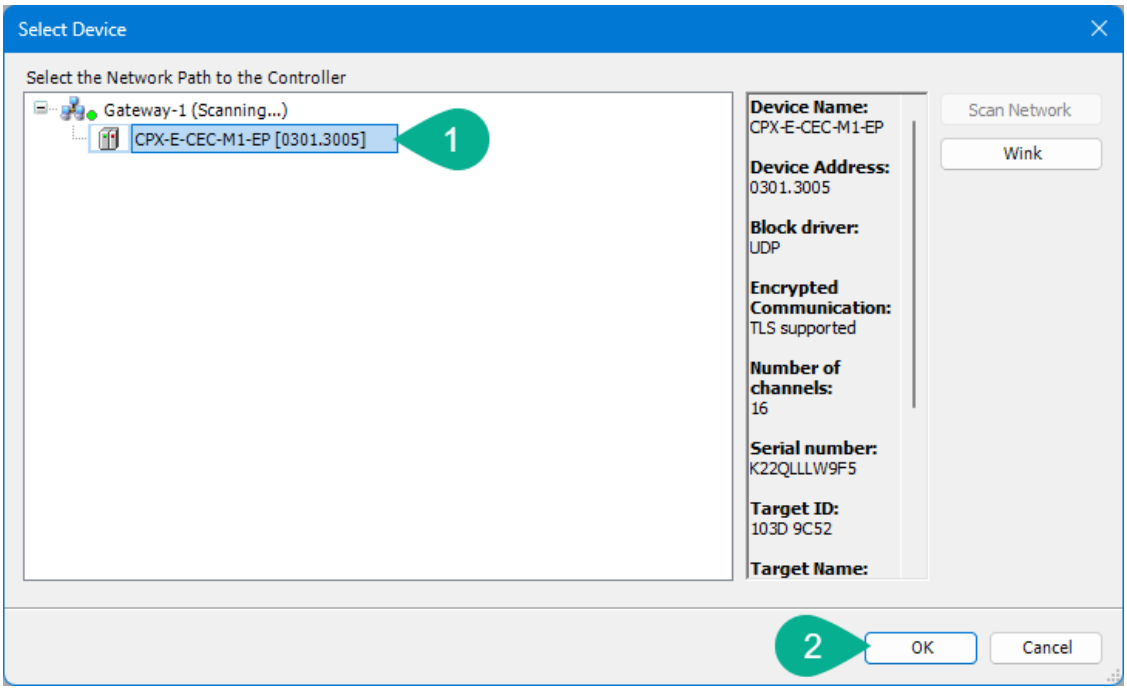
Double click the **Device (CPX-E-CEC-M1-EP)** from the **Devices** toolbox.

Step 2



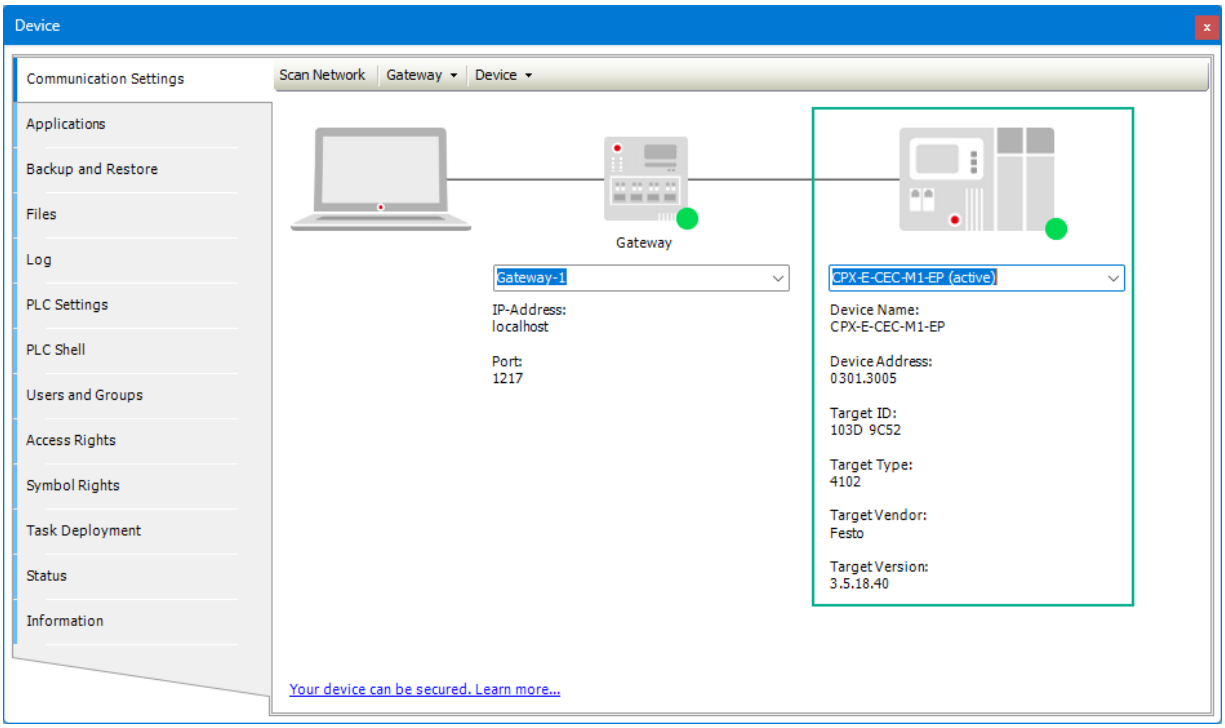
Click the **Scan Network** option from the **Communication Settings** tab of the **Device** setting window.

Step 3



1. Click the scanned device from the **Select Device** window.
2. Click the **OK** button to establish communication between PC and PLC.

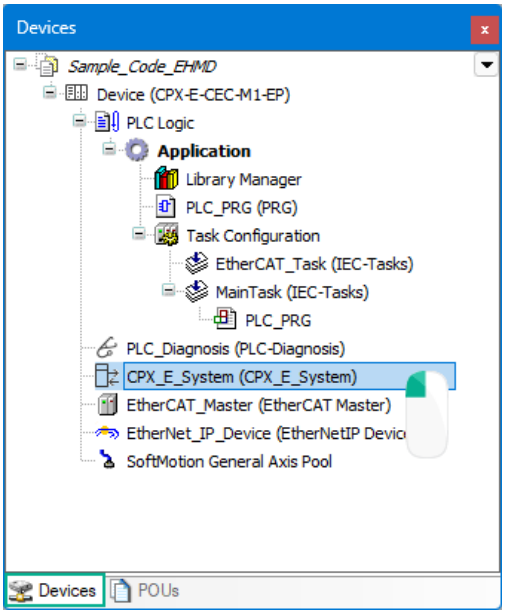
Once the communication has been established, network path will be active and appear as shown below.



3.3 Adding Actual Controller Configuration to the Project

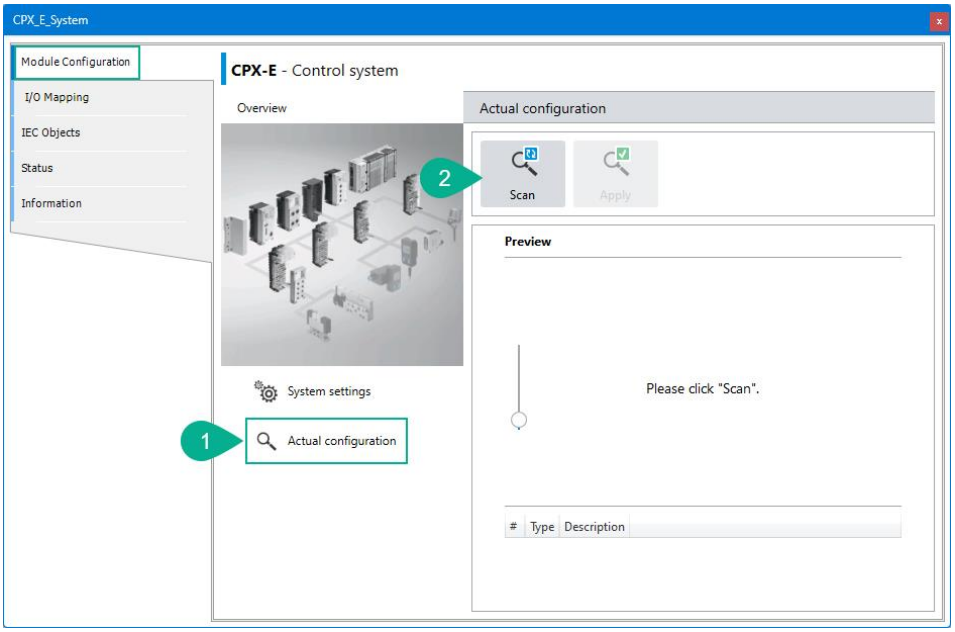
The actual hardware configuration of the controller can be found automatically by searching the controller connected in the network, illustrated in below steps.

Step 1



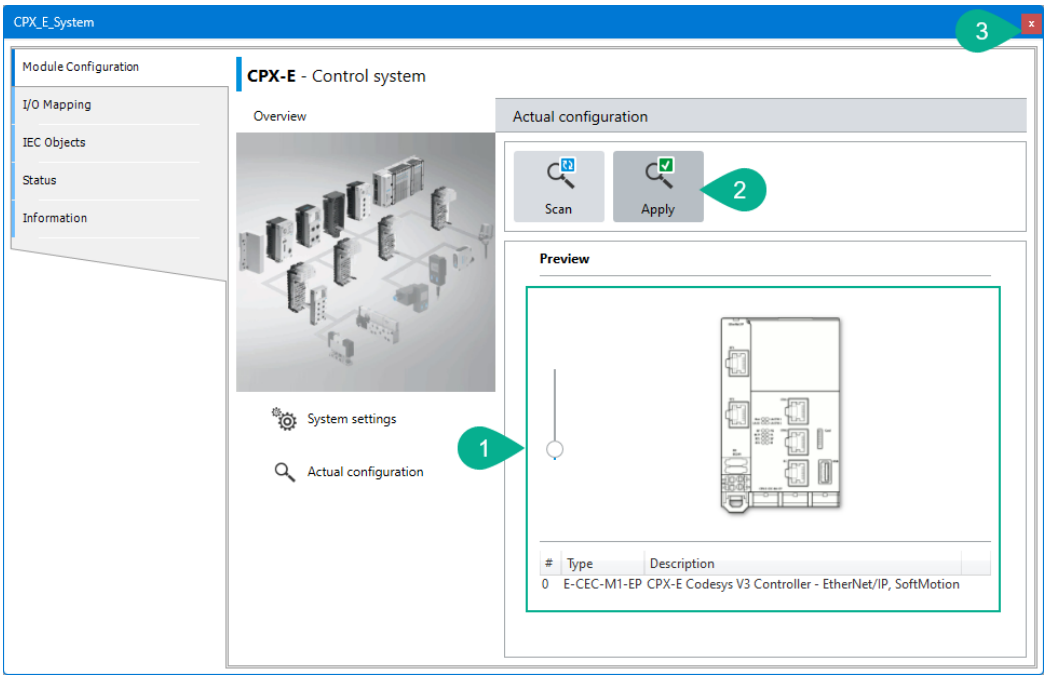
Double click the **CPX_E_System** option under **Device Tree** from **Devices** toolbox.

Step 2



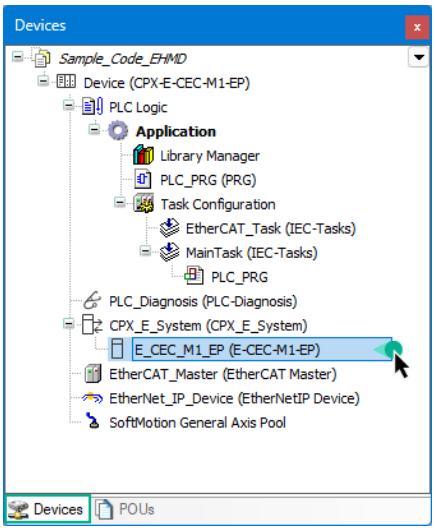
1. Click the **Actual Configuration** option from the **Module Configuration** tab of the **CPX_E_System** setting window.
2. Click the **Scan** option to detect the connected PLCs hardware configuration.

Step 3



1. Once the **Scan** is completed and **Controller Configuration** is detected, it will be displayed in **Preview window** as shown.
2. Click the **Apply** button to add the detected hardware configurations to the project.
3. Click the **Close** icon to close the **CPX_E_System** setting window.

The added controller configuration will be available under **Device Tree** as shown below.



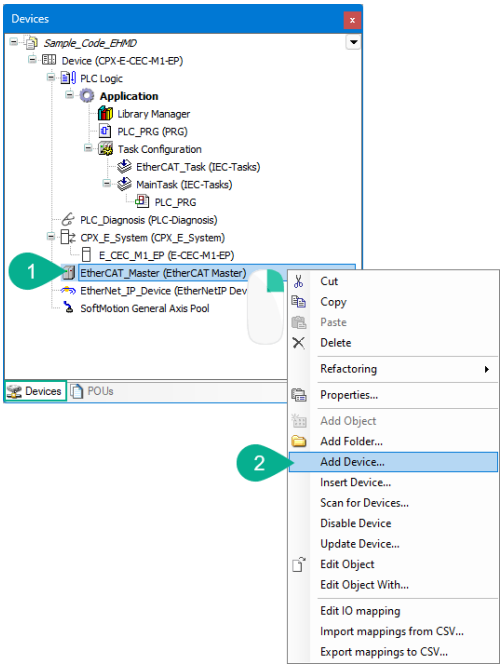
3.4 Adding CMMT-ST-MP-S0 Motor Controller to the Project as EtherCAT Slave

The connected CMMT-ST-MP-S0 motor controllers for EHMD can be added manually to the controller connected in the network, illustrated in below steps.

Note

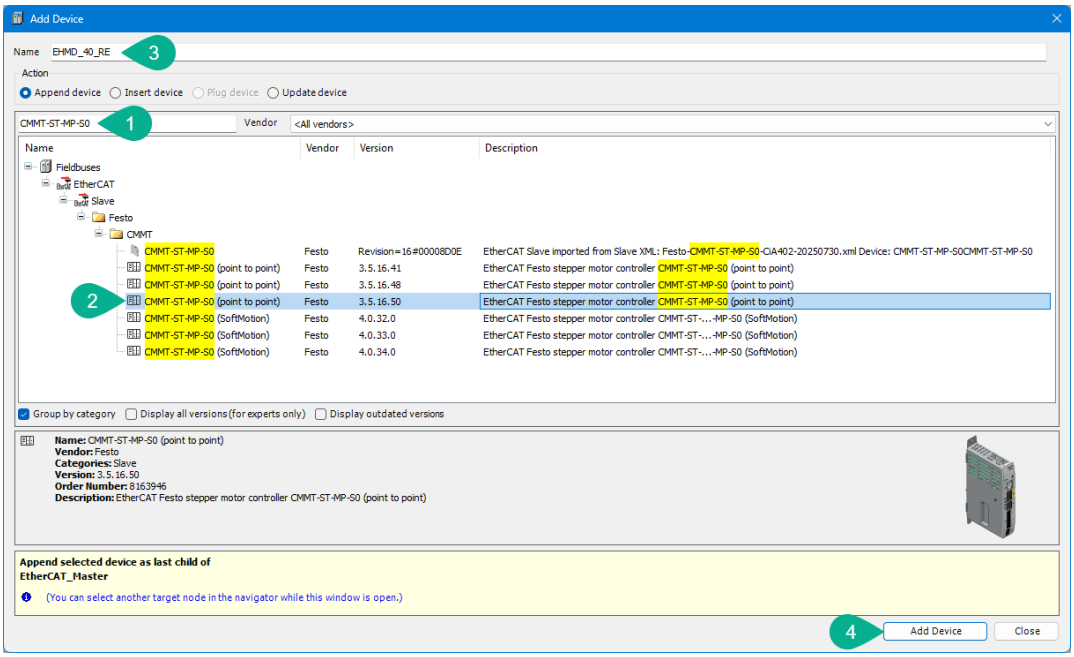
- Since the Rotary and Gripper Axes are configured separately with two independent motor controllers, it is recommended that user has to configure separate motor controllers for each axis and rename them to a distinct, descriptive name to avoid confusion.

Step 1



1. Right-click the **EtherCAT_Master** device under **Device Tree** from the **Devices** window.
2. Click the **Add Device...** option to add a device.

Step 2



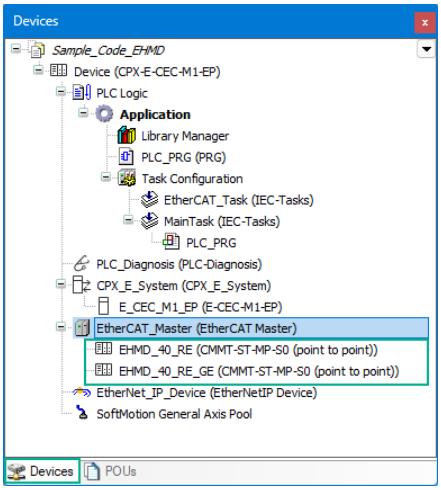
1. Search for **CMMT-ST-MP-S0** in the search box in the **Add Device** window.
2. Select the **CMMT-ST-MP-S0 (point to point)** device with version **3.5.16.50** from the available devices.
3. Enter a distinct, descriptive name for the EHMD Rotary Axis motor controller as required. For this application note, **EHMD_40_RE** has been used. Refer below note.
4. Click the **Add Device** button to add the device to the project.

Note

- For this application note, the motor controller for the EHMD Rotary Axis is connected first, followed by the motor controller for the EHMD Gripper Axis. Refer Chapter 1.3.

While the **Add Device** window is open, the user can also add the EHMD Gripper Axis motor controller by adding the same type of device and renaming it as required.

Once all the steps has been completed, the added **CMMT-ST-MP-S0** motor controllers will be shown under **EtherCAT_Master** device in the **Device Tree** from the **Devices** toolbox as shown below.

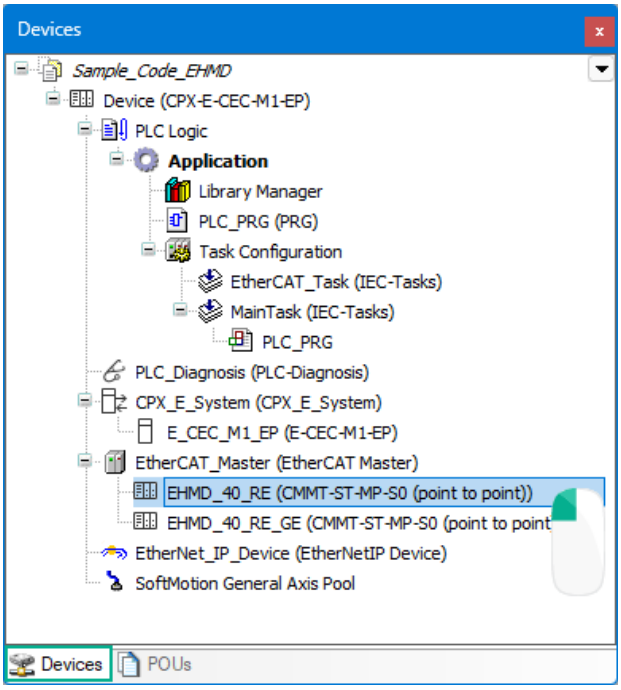


3.5 Assigning Explicit Device Identification for CMMT-ST-MP-S0 Motor Controllers

Note

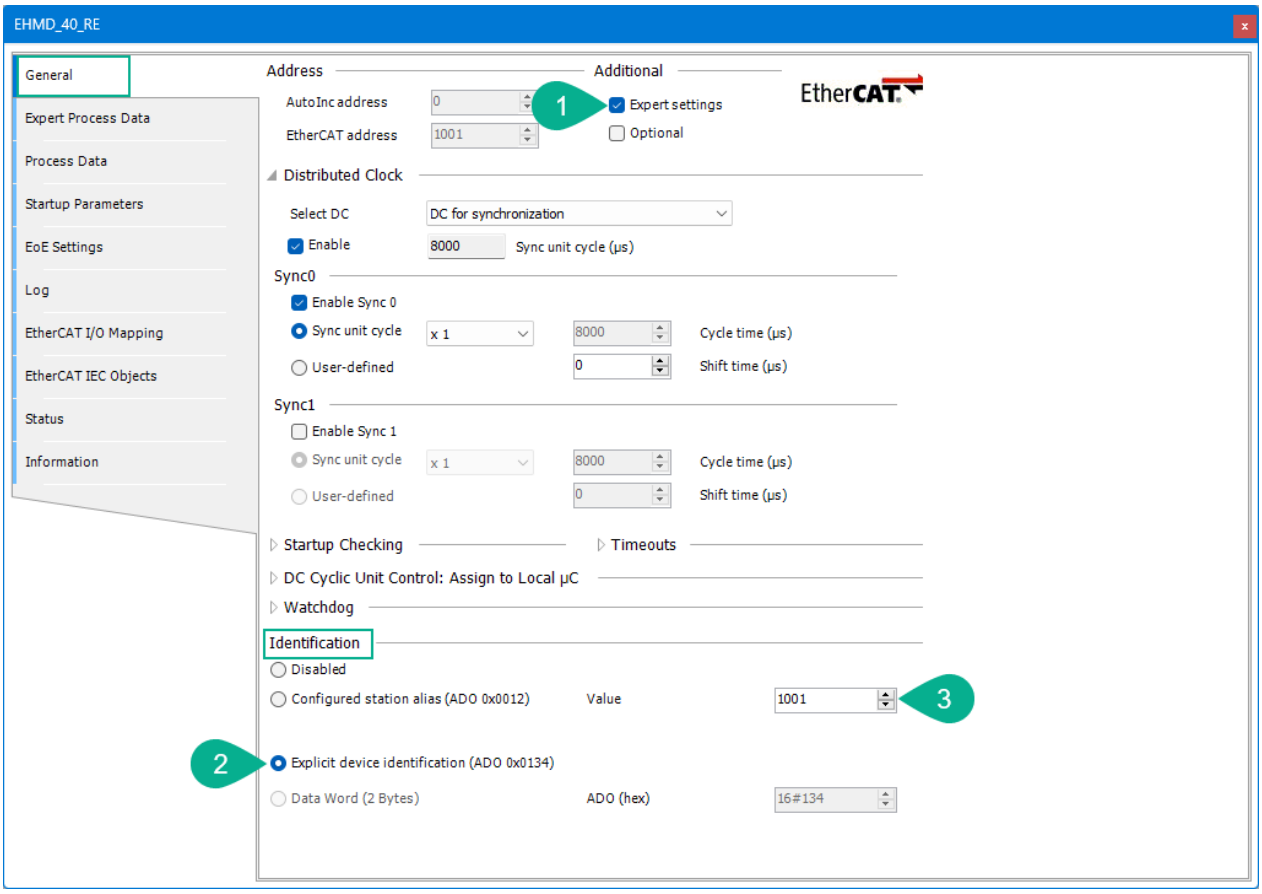
- This chapter is common for both motor controllers of EHMD Rotary and Gripper axes.
- If the user does not know the order of the CMMT-ST-MP-S0 motor controllers connected to the PLC, or if the EHMD motor cabling differs from the method shown in Chapter 1.3 (for example, if the motor cables have been swapped), the following procedure is required to identify and correctly assign the axes.
- If the devices have already been configured manually and their order is known, and the cabling matches the method shown in Chapter 1.3, this chapter can be skipped.

Step 1



Double click the **EHMD_40_RE** device under **EtherCAT_Master** device in the **Device Tree** from the **Devices** toolbox.

Step 2



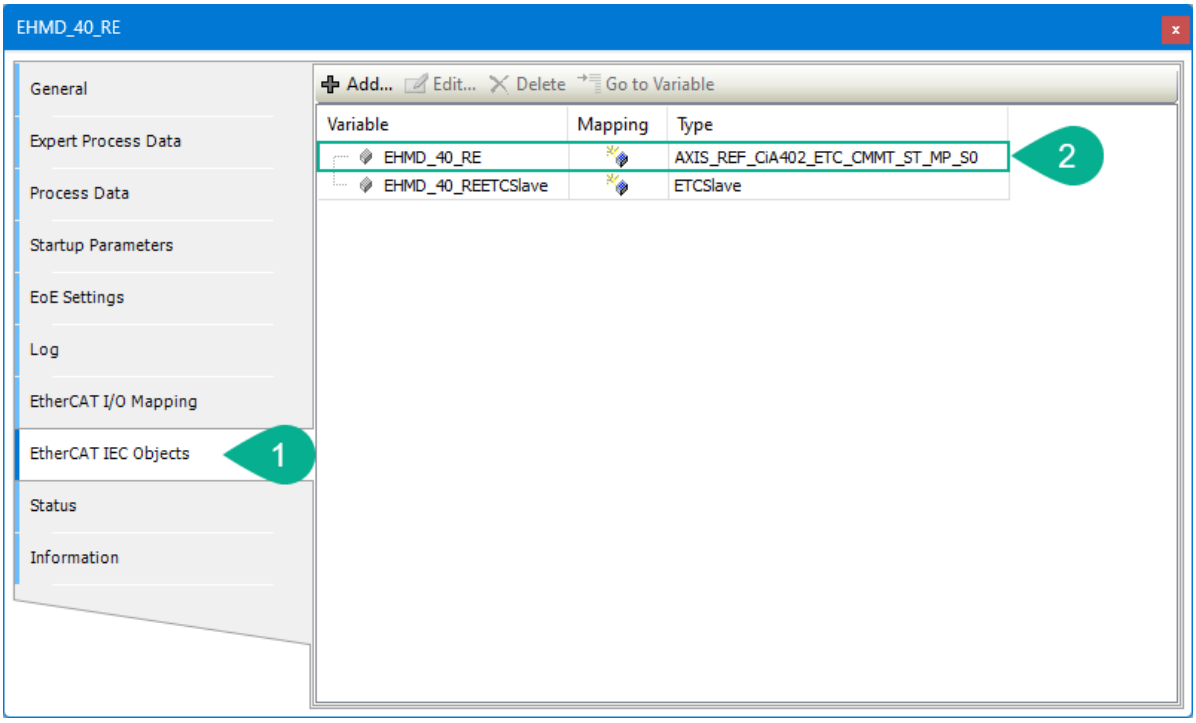
1. Click the **Expert Settings** checkbox under **Additional** section in the **General** tab of the **EHMD_40_RE** window.
2. Click the **Explicit device identification (ADO 0x0134)** option under the **Identification** settings.
3. Enter the required EtherCAT slave node address in the **Value** box as shown. For this application note, the value **1001** has been assigned.

3.6 Finding the EtherCAT IEC Object for CMMT-ST-MP-S0 Motor Controller

To control the connected EHMD motor controllers, the user must obtain the **EtherCAT IEC Object** rather than use the EtherCAT slave address. The method to obtain the IEC Objects are shown below.

Note

- This chapter is common for the both motor controllers of EHMD Rotary and Gripper axes.



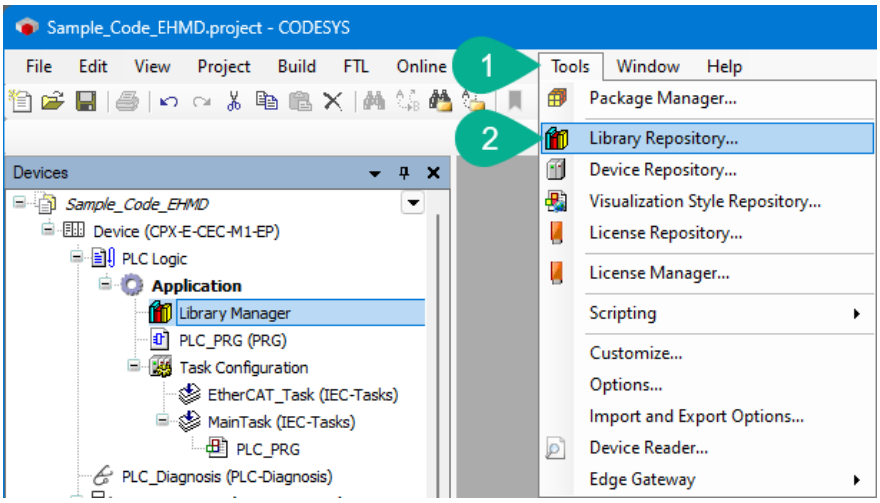
1. Select the **EtherCAT IEC Objects** tab from the **EHMD_40_RE** window.
2. The user can find the **EtherCAT IEC Object** variable with device name as shown.

3.7 Importing Festo_EHMD_PtP_EC Library into CODESYS

Step 1

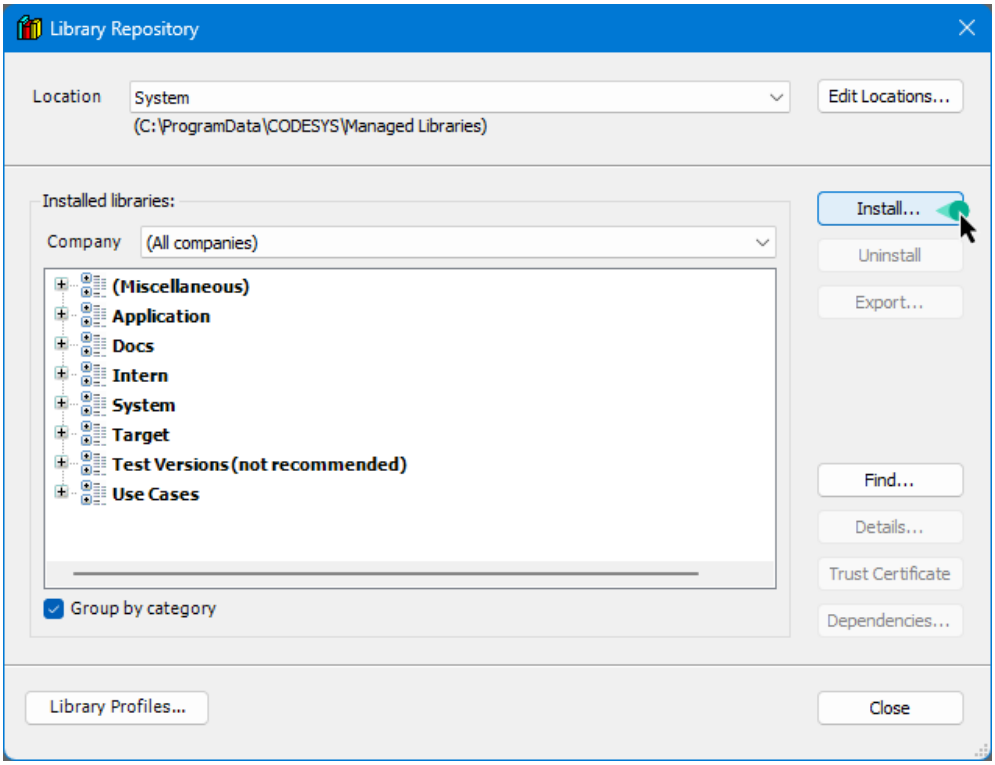
Download the **Festo_EHMD_PtP_EC** library from the **Festo_Support_Portal** and save it in the appropriate folder on the workstation.

Step 2



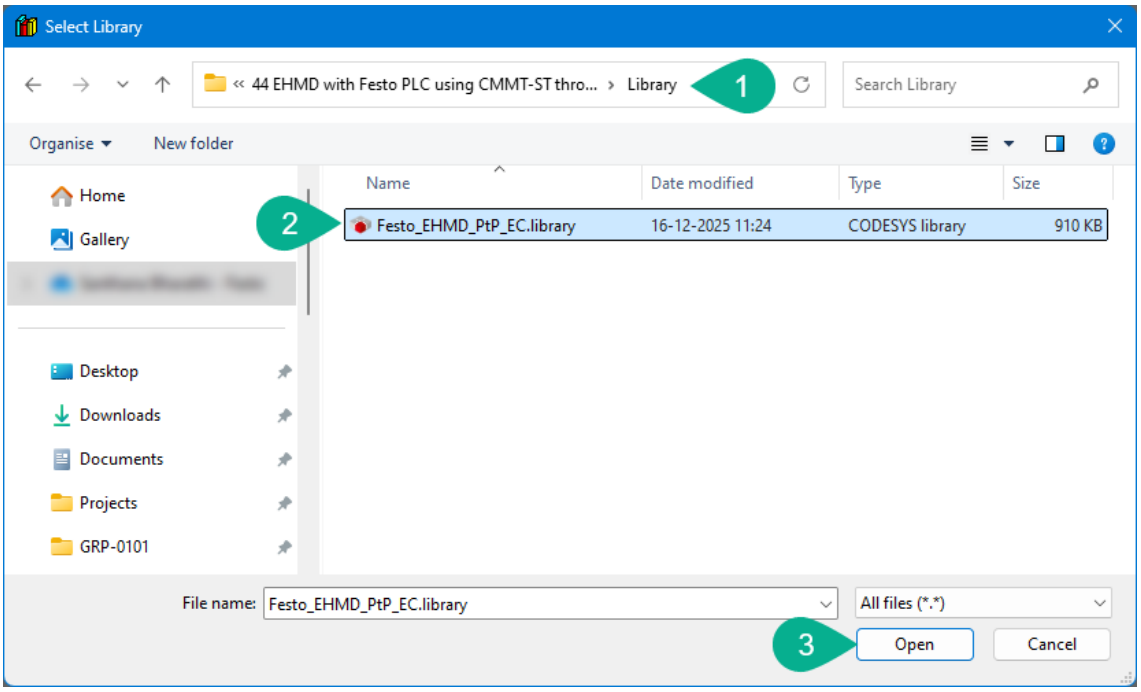
1. Select the **Tools** menu option from the toolbar.
2. Click the **Library Repository...** option from the **Tools** menu option.

Step 3



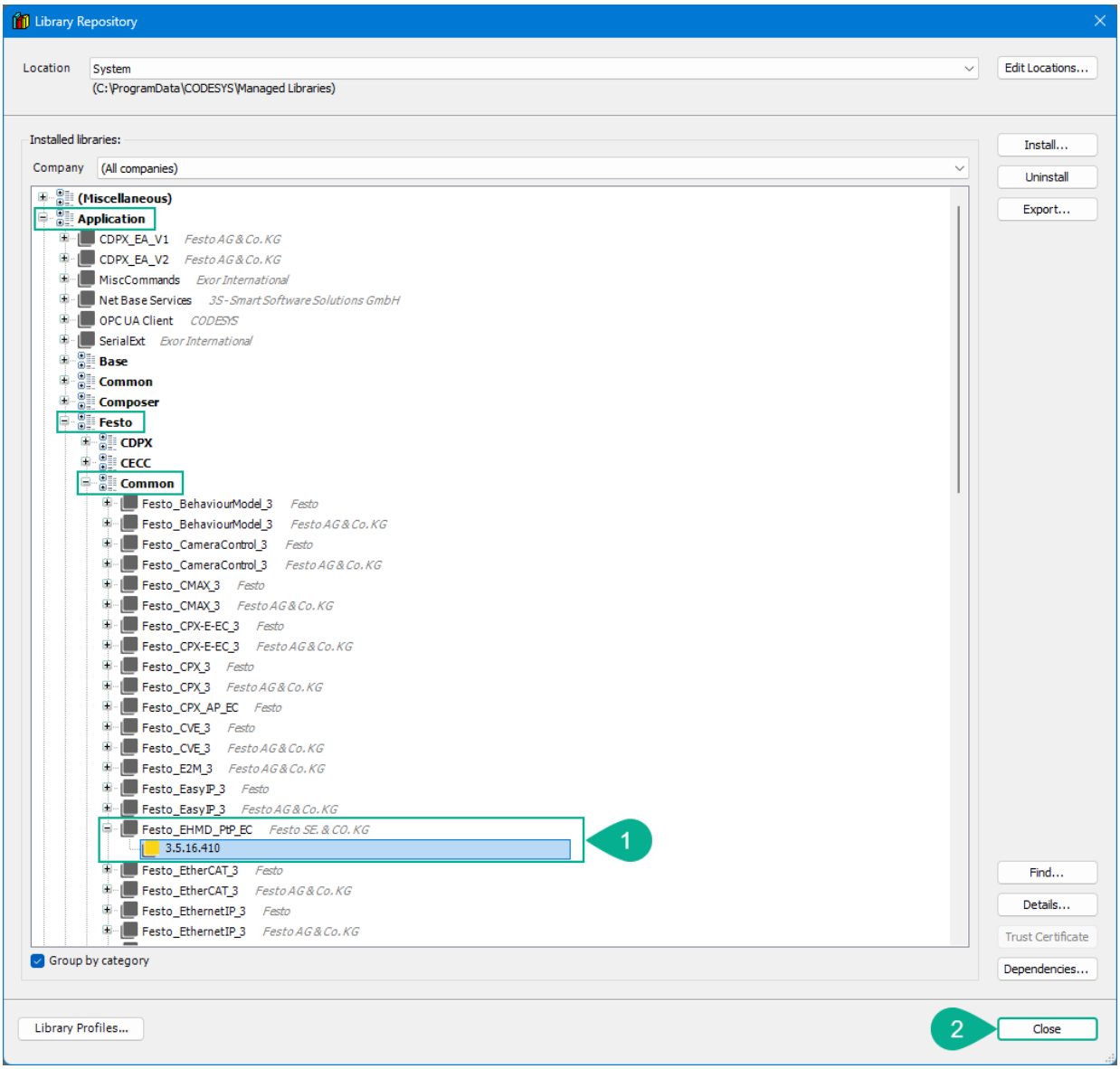
Click the **Install** button in the **Library Repository** window.

Step 4



1. Locate the **Festo_EHMD_PtP_EC** library file on the workstation.
2. Select the located **Festo_EHMD_PtP_EC** library.
3. Click the **Open** button to start the library installation.

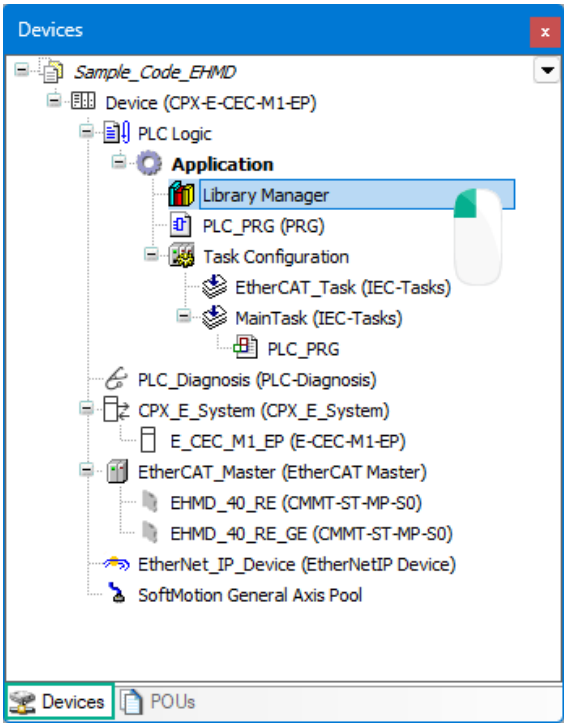
Step 5



1. The installed **Festo_EHMD_PtP_EC** library can be found in following path **Application >> Festo >> Common >>** option in the **Library Repository** window.
2. Click the **Close** button to close the **Library Repository** window.

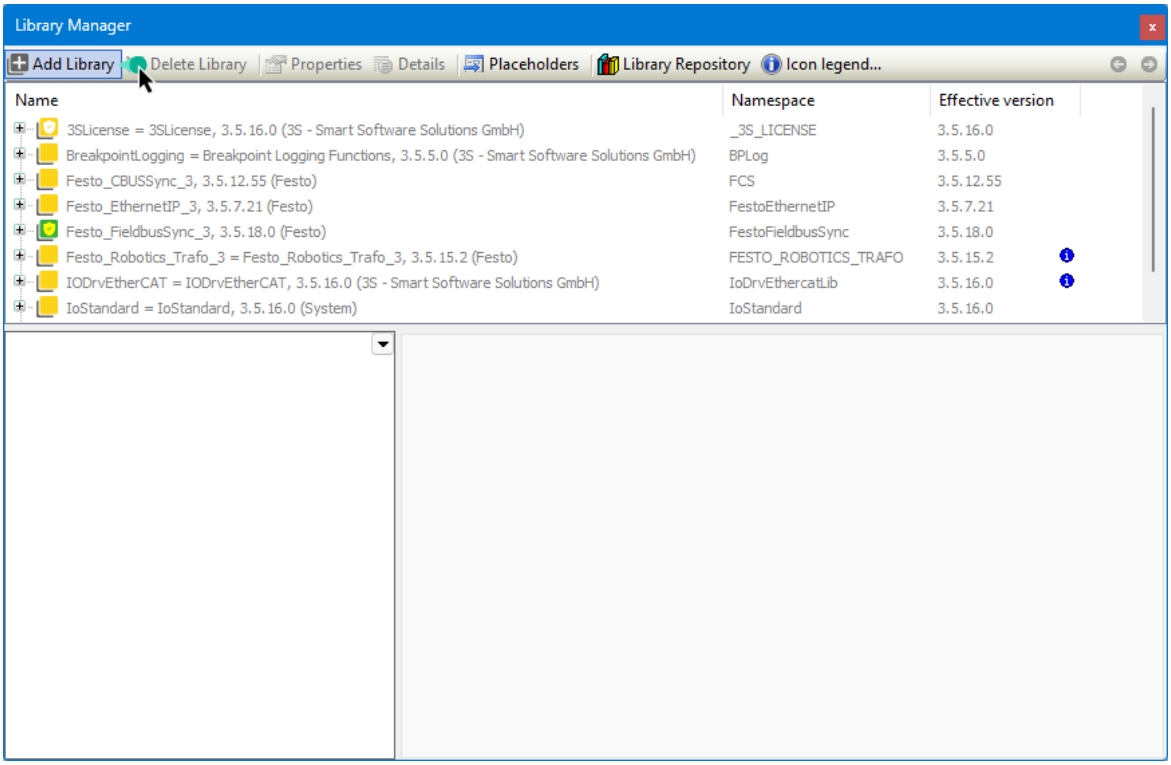
3.8 Adding Festo_EHMD_PtP_EC Library into CODESYS Project

Step 1



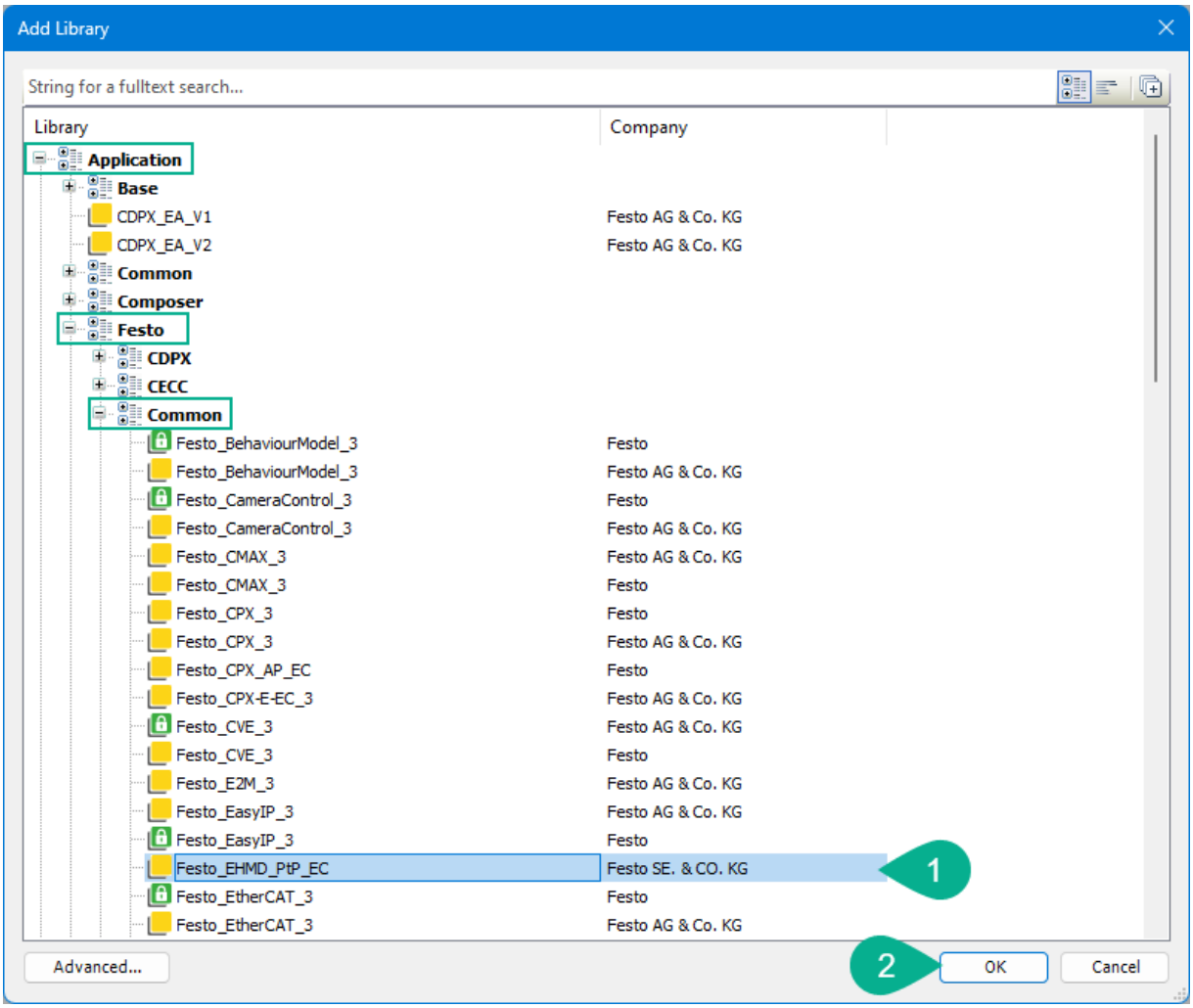
Double click the **Library Manager** option under the **Application** option from **Device Tree** in the **Devices** toolbox.

Step 2



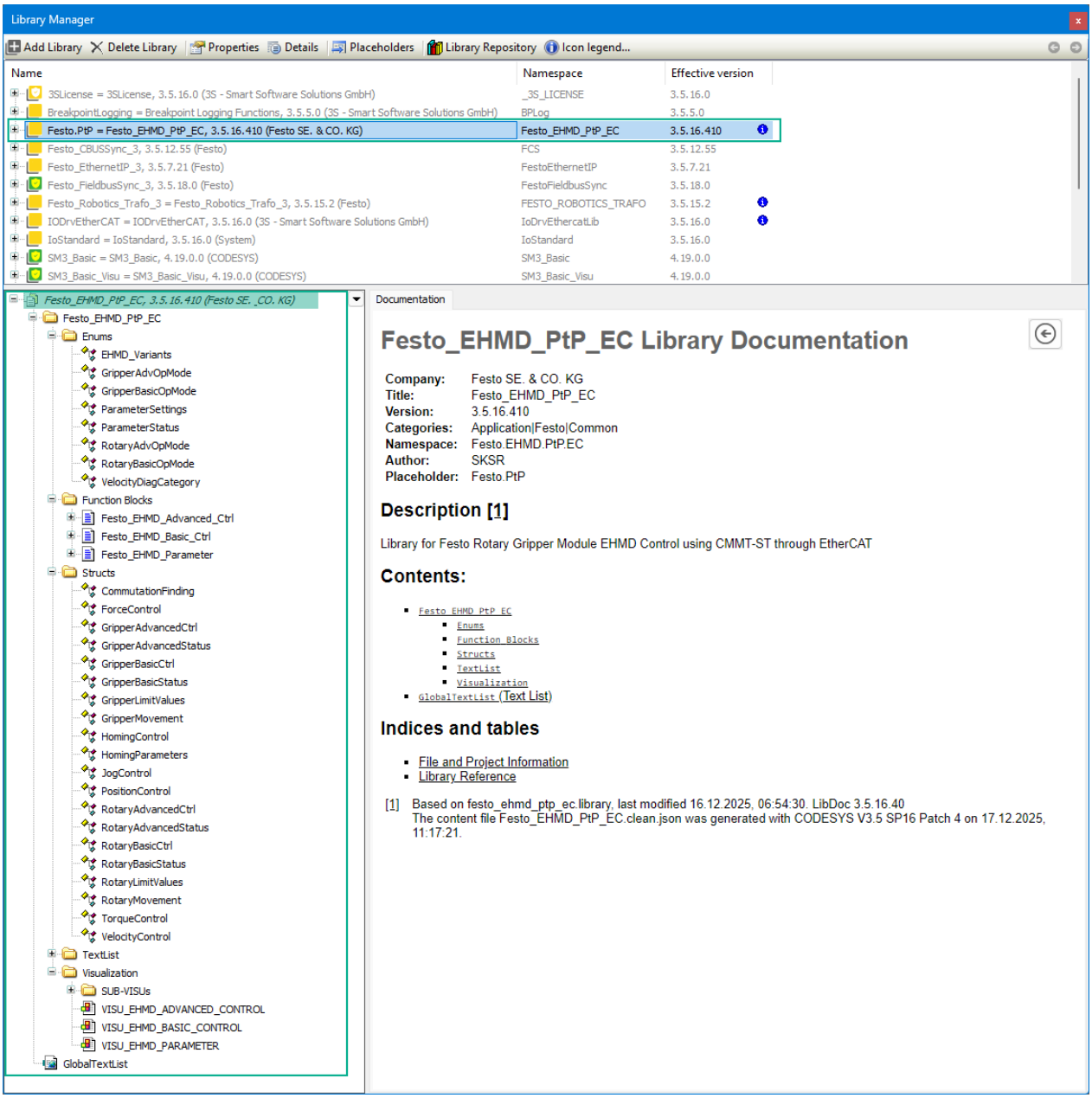
Click the **Add Library** button in the **Library Manager** window.

Step 3



1. Select the **Festo_EHMD_PtP_EC** library from the installed library list (**Application >> Festo >> Common**).
2. Click the **OK** button to add the library to the project.

Once the library is added successfully, the library elements will be available as shown below, highlighted in green



The library has the following function blocks, structures, and enumerations.

Function Blocks:

- Festo_EHMD_Advanced_Ctrl
- Festo_EHMD_Basic_Ctrl
- Festo_EHMD_Parameter

Structures:

- RotaryAdvancedCtrl
- RotaryAdvancedStatus
- GripperAdvancedCtrl
- GripperAdvancedStatus
- HomingControl
- PositionControl
- VelocityControl
- TorqueControl
- JogControl
- ForceControl
- RotaryBasicCtrl
- RotaryBasicStatus
- GripperBasicCtrl
- GripperBasicStatus
- HomingParameters
- CommutationFinding
- RotaryMovement
- GripperMovement
- RotaryLimitValues
- GripperLimitValues

Enumerations:

- EHMD_Variants
- RotaryAdvOpMode
- GripperAdvOpMode
- RotaryBasicOpMode
- GripperBasicOpMode
- ParameterSettings
- VelocityDiagCategory
- ParameterStatus

Visualization:

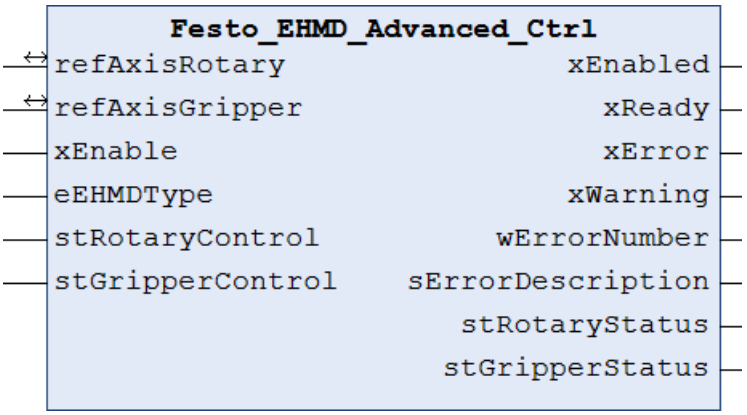
- VISU_EHMD_ADVANCED_CONTROL
- VISU_EHMD_BASIC_CONTROL
- VISU_EHMD_PARAMETER

The above structures, enumerations and unions are user-defined data types that are used in the EHMD library function blocks.

4 Festo_EHMD_PtP_EC Library Function Blocks Description

4.1 Festo_EHMD_Advanced_Ctrl

The **Festo_EHMD_Advanced_Ctrl** block is used to control the EHMD module rotary and gripper axes using the advanced control options.



4.1.1 Festo_EHMD_Advanced_Ctrl Block In-Out Variables

In-Out Variables	Data Type	Description
refAxisRotary	AXIS_REF_FESTO	Reference Structure for the EHMD Rotary Axis
refAxisGripper	AXIS_REF_FESTO	Reference Structure for the EHMD Gripper Axis

Table 4.1: Festo_EHMD_Advanced_Ctrl Block In-Out Variables descriptions

4.1.2 Festo_EHMD_Advanced_Ctrl Block Input Variables

Input Variables	Data Type	Description
xEnable	BOOL	Enables the Block. **TRUE =** Block Enable. **FALSE =** Block Disable.
eEHMDType	ENUM of the type **EHMD_Variants**	Enumeration for EHMD Type Selection. Refer Chapter 4.5.1
stRotaryControl	STRUCT of the type **RotaryAdvancedCtrl**	Structure for EHMD Rotary Axis Advanced Control. Refer Chapter 4.4.1.
stGripperControl	STRUCT of the type **GripperAdvancedCtrl**	Structure for EHMD Gripper Axis Advanced Control. Refer Chapter 4.4.2

Table 4.2: Festo_EHMD_Advanced_Ctrl Block Input Variables descriptions

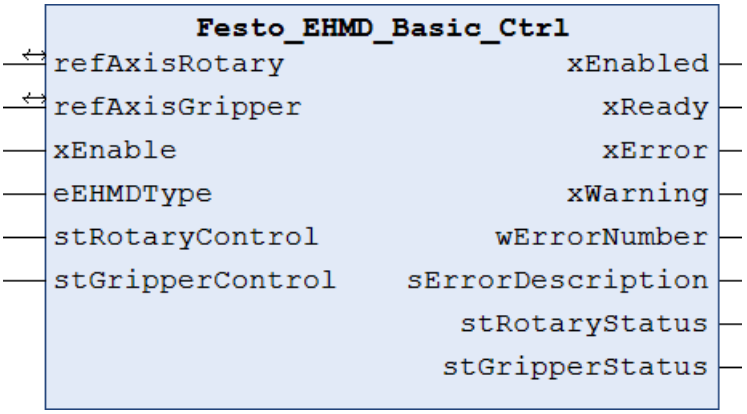
4.1.3 Festo_EHMD_Advanced_Ctrl Block Output Variables

Output Variables	Data Type	Description
xEnabled	BOOL	Block Enabled Status. **TRUE =** Block Enabled. **FALSE =** Block Disabled
xReady	BOOL	Block Ready Status. **TRUE =** EHMD Ready for Operation. **FALSE =** EHMD not Ready for Operation
xError	BOOL	Block Error Status. **TRUE =** FB has Error. **FALSE =** FB has No Error
xWarning	BOOL	Block Warning Status. **TRUE =** Operation Mode Changed for EHMD Rotary or Gripper Axis during Operation.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
stRotaryStatus	STRUCT of the type **RotaryAdvancedStatus**	Structure for EHMD Rotary Axis Advanced Status. Refer Chapter 4.4.3.
stGripperStatus	STRUCT of the type **GripperAdvancedStatus**	Structure for EHMD Gripper Axis Advanced Status. Refer Chapter 4.4.4.

Table 4.3: Festo_EHMD_Advanced_Ctrl Block Output Variables descriptions

4.2 Festo_EHMD_Basic_Ctrl

The **Festo_EHMD_Basic_Ctrl** block is used to control the EHMD module rotary and gripper axes decapping application using the basic control options.



4.2.1 Festo_EHMD_Basic_Ctrl Block In-Out Variables

In-Out Variables	Data Type	Description
refAxisRotary	AXIS_REF_FESTO	Reference Structure for the EHMD Rotary Axis
refAxisGripper	AXIS_REF_FESTO	Reference Structure for the EHMD Gripper Axis

Table 4.4: Festo_EHMD_Basic_Ctrl Block In-Out Variables descriptions

4.2.2 Festo_EHMD_Basic_Ctrl Block Input Variables

Input Variables	Data Type	Description
xEnable	BOOL	Enables the Block. **TRUE =** Block Enable. **FALSE =** Block Disable.
eEHMDType	ENUM of the type **EHMD_Variants**	Enumeration for EHMD Type Selection. Refer Chapter 4.5.1
stRotaryControl	STRUCT of the type **RotaryBasicCtrl**	Structure for EHMD Rotary Axis Basic Control. Refer Chapter 4.4.11.
stGripperControl	STRUCT of the type **GripperBasicCtrl**	Structure for EHMD Gripper Axis Basic Control. Refer Chapter 4.4.12.

Table 4.5: Festo_EHMD_Basic_Ctrl Block Input Variables descriptions

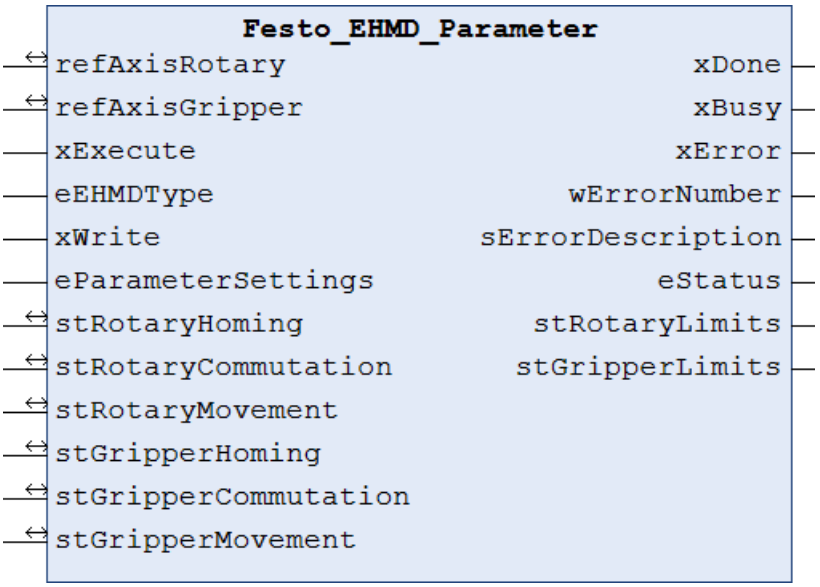
4.2.3 Festo_EHMD_Basic_Ctrl Block Output Variables

Output Variables	Data Type	Description
xEnabled	BOOL	Block Enabled Status. **TRUE =** Block Enabled. **FALSE =** Block Disabled
xReady	BOOL	Block Ready Status. **TRUE =** EHMD Ready for Operation. **FALSE =** EHMD not Ready for Operation
xError	BOOL	Block Error Status. **TRUE =** FB has Error. **FALSE =** FB has No Error
xWarning	BOOL	Block Warning Status. **TRUE =** Operation Mode Changed for EHMD Rotary or Gripper Axis during Operation.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
stRotaryStatus	STRUCT of the type **RotaryBasicStatus**	Structure for EHMD Rotary Axis Basic Status. Refer Chapter 4.4.13.
stGripperStatus	STRUCT of the type **GripperBasicStatus**	Structure for EHMD Gripper Axis Basic Status. Refer Chapter 4.4.14.

Table 4.6: Festo_EHMD_Basic_Ctrl Block Output Variables descriptions

4.3 Festo_EHMD_Parameter

The **Festo_EHMD_Parameter** block is used to read or write the optimal parameters of EHMD module rotary and gripper axes.



4.3.1 Festo_EHMD_Parameters Block In-Out Variables

In-Out Variables	Data Type	Description
refAxisRotary	AXIS_REF_FESTO	Reference Structure for the EHMD Rotary Axis
refAxisGripper	AXIS_REF_FESTO	Reference Structure for the EHMD Gripper Axis
stRotaryHoming	STRUCT of the type **HomingParameters**	Structure for EHMD Rotary Axis Homing Parameters. Refer Chapter 4.4.15.
stRotaryCommutation	STRUCT of the type **CommutationFinding**	Structure for EHMD Rotary Axis Commutation Finding Parameters. Refer Chapter 4.4.16.
stRotaryMovement	STRUCT of the type **RotaryMovement**	Structure for EHMD Rotary Axis Movement Parameters. Refer Chapter 4.4.17.
stGripperHoming	STRUCT of the type **HomingParameters**	Structure for EHMD Gripper Axis Homing Parameters. Refer Chapter 4.4.15.
stGripperCommutation	STRUCT of the type **CommutationFinding**	Structure for EHMD Gripper Axis Commutation Finding Parameters. Refer Chapter 4.4.16.
stGripperMovement	STRUCT of the type **GripperMovement**	Structure for EHMD Gripper Axis Movement Parameters. Refer Chapter 4.4.18.

Table 4.7: Festo_EHMD_Parameters Block In-Out Variables descriptions

4.3.2 Festo_EHMD_Parameters Block Input Variables

Input Variables	Data Type	Description
xExecute	BOOL	**TRUE =** Execute Read / Write Parameters.
eEHMDType	ENUM of the type **EHMD_Variants**	Enumeration for EHMD Type Selection. Refer Chapter 4.5.1
xWrite	BOOL	**TRUE =** Write Parameters. **FALSE =** Read Parameters.
eParameterSettings	ENUM of the type **ParameterSettings**	Enumeration for Parameter Set Selection to Write. Refer Chapter 4.5.6.

Table 4.8: Festo_EHMD_Parameters Block Input Variables descriptions

4.3.3 Festo_EHMD_Parameters Block Output Variables

Output Variables	Data Type	Description
xDone	BOOL	**TRUE =** EHMD Parameter Read / Write Completed Successfully.
xBusy	BOOL	**TRUE =** EHMD Parameter Read / Write is in Progress.
xError	BOOL	**TRUE =** Error Occurred while in EHMD Parameter Read / Write Process.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
eStatus	ENUM of the type **ParameterStatus**	Enumeration for Read / Write Parameter Status. Refer Chapter 4.5.8.
stRotaryLimits	STRUCT of the type **RotaryLimitValues**	EHMD Rotary Axis Limit Values Structure. Refer Chapter 4.4.19.
stGripperLimits	STRUCT of the type **GripperLimitValues**	EHMD Gripper Axis Limit Values Structure. Refer Chapter 4.4.20.

Table 4.9: Festo_EHMD_Parameters Block Output Variables descriptions

Note

- For the pneumatic gripper variant **EHMD-40-RE-GP**, the user must assign a dummy EtherCAT IEC object name to the **refAxisGripper** in-out variable of the function blocks to avoid a compiler error.

4.4 Structures

4.4.1 RotaryAdvancedCtrl

Structure Variables	Data Type	Description
xEnableAxis	BOOL	Enable the EHMD Rotary Axis. **TRUE =** Enable Power Output Stage. **FALSE =** Block Power Output Stage.
xStopAxis	BOOL	Stop the EHMD Rotary Axis Motion. **TRUE =** Stop Axis Motion Command.
xHaltAxis	BOOL	Pause the EHMD Rotary Axis Motion. **TRUE =** Pause Axis Motion Command.
xAckError	BOOL	Reset the EHMD Rotary Axis Errors. **TRUE =** Reset the Errors.
eOperationMode	ENUM of the type **RotaryAdvOpMode**	Enumeration of Advanced Operating Mode Selection of the EHMD Rotary Axis. Refer Chapter 4.5.2.
xExecuteMode	BOOL	Start the EHMD Rotary Axis Motion Task. **TRUE =** Start Motion Task.
stHoming	STRUCT of the type **HomingControl**	Structure Containing Parameters Related to Homing Operation for EHMD Rotary Axis. Refer Chapter 4.4.5.
stMovePosition	STRUCT of the type **PositionControl**	Structure Containing Parameters Related to Position Control (Absolute & Relative) Operation for EHMD Rotary Axis. Refer Chapter 4.4.6.
stVelocityControl	STRUCT of the type **VelocityControl**	Structure Containing Parameters Related to Velocity Control Operation for EHMD Rotary Axis. Refer Chapter 4.4.7.
stTorqueControl	STRUCT of the type **TorqueControl**	Structure Containing Parameters Related to Torque Control Operation for EHMD Rotary Axis. Refer Chapter 4.4.8.
stJog	STRUCT of the type **JogControl**	Structure Containing Parameters Related to Jog Operation for EHMD Rotary Axis. Refer Chapter 4.4.9.

Table 4.10: RotaryAdvancedCtrl descriptions

4.4.2 GripperAdvancedCtrl

Structure Variables	Data Type	Description
xEnableAxis	BOOL	Enable the EHMD Gripper Axis. **TRUE =** Enable Power Output Stage. **FALSE =** Block Power Output Stage.
xStopAxis	BOOL	Stop the EHMD Gripper Axis Motion. **TRUE =** Stop Axis Motion Command.
xHaltAxis	BOOL	Pause the EHMD Gripper Axis Motion. **TRUE =** Pause Axis Motion Command.
xAckError	BOOL	Reset the EHMD Gripper Axis Errors. **TRUE =** Reset the Errors.
eOperationMode	ENUM of the type **GripperAdvOpMode**	Enumeration of Advanced Operating Mode Selection of the EHMD Gripper Axis. Refer Chapter 4.5.3.
xExecuteMode	BOOL	Start the EHMD Gripper Axis Motion Task. **TRUE =** Start Motion Task.
stHoming	STRUCT of the type **HomingControl**	Structure Containing Parameters Related to Homing Operation for EHMD Gripper Axis. Refer Chapter 4.4.5.
stMovePosition	STRUCT of the type **PositionControl**	Structure Containing Parameters Related to Position Control (Absolute & Relative) Operation for EHMD Gripper Axis. Refer Chapter 4.4.6.
stForceControl	STRUCT of the type **ForceControl**	Structure Containing Parameters Related to Force Control Operation for EHMD Gripper Axis. Refer Chapter 4.4.10.
stJog	STRUCT of the type **JogControl**	Structure Containing Parameters Related to Jog Operation for EHMD Gripper Axis. Refer Chapter 4.4.9.

Table 4.11: GripperAdvancedCtrl descriptions

4.4.3 RotaryAdvancedStatus

Structure Variables	Data Type	Description
xAxisEnabled	BOOL	Status of EHMD Rotary Axis Ready and Switched On. **TRUE =** Power Output Stage Enabled. **FALSE =** Power Output Stage Disabled.
xDone	BOOL	EHMD Rotary Axis Motion Task is Completed. **TRUE =** Task Completed. **FALSE =** Task Not Completed or Not Started.
xBusy	BOOL	EHMD Rotary Axis Motion Task is Not Yet Completed. **TRUE =** Task Started but Not Completed. **FALSE =** Task Completed or Not Started
xError	BOOL	An Error Occurred During EHMD Rotary Axis Processing. **TRUE =** Error Active. **FALSE =** No Error.
xAxisWarning	BOOL	**TRUE =** Warning(s) Present on the EHMD Rotary Axis.
xAxisError	BOOL	**TRUE =** Error(s) Present on the EHMD Rotary Axis.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
eActOperationMode	ENUM of the type **RotaryAdvOpMode**	Enumeration of Current Advanced Operating Mode of the EHMD Rotary Axis. Refer Chapter 4.5.2.
xHomingValid	BOOL	Absolute Reference Position is Known for the EHMD Rotary Axis. **TRUE =** Axis is Homed.
xInAction	BOOL	**TRUE =** EHMD Rotary Axis is Moving.
xMotionComplete	BOOL	**TRUE =** EHMD Rotary Axis Motion Task Completed.
xCommandAborted	BOOL	**TRUE =** EHMD Rotary Axis Task Aborted by Another Task During Processing or Due to Power Output Stage being Switched Off.
xInVelocity	BOOL	**TRUE =** EHMD Rotary Axis Target Velocity Reached.
xInTorque	BOOL	**TRUE =** EHMD Rotary Axis Target Torque Reached.
rActualPosition	REAL	EHMD Rotary Axis Current Position in User Unit.
rActualVelocity	REAL	EHMD Rotary Axis Current Velocity in User Unit.
rActualTorque	REAL	EHMD Rotary Axis Current Torque in User Unit.

Table 4.12: RotaryAdvancedStatus descriptions

4.4.4 GripperAdvancedStatus

Structure Variables	Data Type	Description
xAxisEnabled	BOOL	Status of EHMD Gripper Axis Ready and Switched On. **TRUE =** Power Output Stage Enabled. **FALSE =** Power Output Stage Disabled.
xDone	BOOL	EHMD Gripper Axis Motion Task is Completed. **TRUE =** Task Completed. **FALSE =** Task Not Completed or Not Started.
xBusy	BOOL	EHMD Gripper Axis Motion Task is Not Yet Completed. **TRUE =** Task Started but Not Completed. **FALSE =** Task Completed or Not Started
xError	BOOL	An Error Occurred During EHMD Gripper Axis Processing. **TRUE =** Error Active. **FALSE =** No Error.
xAxisWarning	BOOL	**TRUE =** Warning(s) Present on the EHMD Gripper Axis.
xAxisError	BOOL	**TRUE =** Error(s) Present on the EHMD Gripper Axis.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
eActOperationMode	ENUM of the type **GripperAdvOpMode**	Enumeration of Current Advanced Operating Mode of the EHMD Gripper Axis. Refer Chapter 4.5.3.
xHomingValid	BOOL	Absolute Reference Position is Known for the EHMD Gripper Axis. **TRUE =** Axis is Homed.
xInAction	BOOL	**TRUE =** EHMD Gripper Axis is Moving.
xMotionComplete	BOOL	**TRUE =** EHMD Gripper Axis Motion Task Completed.
xCommandAborted	BOOL	**TRUE =** EHMD Gripper Axis Task Aborted by Another Task During Processing or Due to Power Output Stage being Switched Off.
xInForce	BOOL	**TRUE =** EHMD Gripper Axis Target Force Reached.
rActualPosition	REAL	EHMD Gripper Axis Current Position in User Unit.
rActualVelocity	REAL	EHMD Gripper Axis Current Velocity in User Unit.
rActualForce	REAL	EHMD Gripper Axis Current Force in User Unit.

Table 4.13: GripperAdvancedStatus descriptions

4.4.5 HomingControl

Structure Variables	Data Type	Description
rAxisZeroPoint	REAL	Absolute Position if Reference Switch Detected or Axis Zero Point Offset in User Unit.
diHomingMethod	DINT	Number of Homing Method According to CiA402 Specification. (Homing Method is Only Written if diHomingMethod is Non-Zero). **diHomingMethod = 0 :** As Parametrized In Automation Suite.

Table 4.14: HomingControl descriptions

4.4.6 PositionControl

Structure Variables	Data Type	Description
xContinuousUpdate	BOOL	If Input is True during Rising Edge of Execute, Changes at Input Variables will Start a New Movement Immediately.
rPosition	REAL	Absolute Position or Relative Distance Value for the Motion in User Unit.
rVelocity	REAL	Maximum Target Velocity Value in User Unit.
rAcceleration	REAL	Maximum Acceleration Value in User Unit.
rDeceleration	REAL	Maximum Deceleration Value in User Unit.
rJerk	REAL	Maximum Jerk Value in User Unit.
eDirection	ENUM of the type **MC_DIRECTION**	Enumeration to Define the Positioning Direction if “Modulo” is Activated.
eBufferMode	ENUM of the type **MC_BUFFER_MODE**	Enumeration to Define the Chronological Sequence of the FB.

Table 4.15: PositionControl descriptions

4.4.7 VelocityControl

Structure Variables	Data Type	Description
xContinuousUpdate	BOOL	If Input is True during Rising Edge of Execute, Changes at Input Variables will Start a New Movement Immediately.
rVelocity	REAL	Maximum Target Velocity Value in User Unit.
rAcceleration	REAL	Maximum Acceleration Value in User Unit.
rDeceleration	REAL	Maximum Deceleration Value in User Unit.
rJerk	REAL	Maximum Jerk Value in User Unit.
eBufferMode	ENUM of the type **MC_BUFFER_MODE**	Enumeration to Define the Chronological Sequence of the FB.
xStrokeLimitation	BOOL	Activation of the Software Limit Positions. **TRUE =** Software Limit is Active for Motion Job.
rNegativeStrokeLimit	REAL	Negative Software Limit Position Value in User Unit.
rPositiveStrokeLimi	REAL	Positive Software Limit Position Value in User Unit.

Table 4.16: VelocityControl descriptions

4.4.8 TorqueControl

Structure Variables	Data Type	Description
xContinuousUpdate	BOOL	If Input is True during Rising Edge of Execute, Changes at Input Variables will Start a New Movement Immediately.
rTorque	REAL	Value of the Torque at the Gear Shaft in Nm.
rTorqueRamp	REAL	Maximum Time Derivative of the Set Value of the Torque in Nm/s.
rVelocity	REAL	Maximum Target Velocity Value in User Unit.
eBufferMode	ENUM of the type **MC_BUFFER_MODE**	Enumeration to Define the Chronological Sequence of the FB.
xStrokeLimitation	BOOL	Activation of the Software Limit Positions. **TRUE =** Software Limit is Active for Motion Job.
rNegativeStrokeLimit	REAL	Negative Software Limit Position Value in User Unit.
rPositiveStrokeLimi	REAL	Positive Software Limit Position Value in User Unit.

Table 4.17: TorqueControl descriptions

4.4.9 JogControl

Structure Variables	Data Type	Description
xJogPositive	BOOL	Jog EHMD in Positive Direction.
xJogNegative	BOOL	Jog EHMD in Negative Direction.
eBufferMode	ENUM of the type **MC_JOG_MODE**	Enumeration to Select Different Jog Mode in Profile Jog Mode.

Table 4.18: JogControl descriptions

4.4.10 ForceControl

Structure Variables	Data Type	Description
xContinuousUpdate	BOOL	If Input is True during Rising Edge of Execute, Changes at Input Variables will Start a New Movement Immediately.
rForce	REAL	Value of the Force at the Gear Shaft in Nm.
rForceRamp	REAL	Maximum Time Derivative of the Set Value of the Force in Nm/s.
rVelocity	REAL	Maximum Target Velocity Value in User Unit.
eBufferMode	ENUM of the type **MC_BUFFER_MODE**	Enumeration to Define the Chronological Sequence of the FB.
xStrokeLimitation	BOOL	Activation of the Software Limit Positions. **TRUE =** Software Limit is Active for Motion Job.
rNegativeStrokeLimit	REAL	Negative Software Limit Position Value in User Unit.
rPositiveStrokeLimit	REAL	Positive Software Limit Position Value in User Unit.

Table 4.19: ForceControl descriptions

4.4.11 RotaryBasicCtrl

Structure Variables	Data Type	Description
xEnableAxis	BOOL	Enable the EHMD Rotary Axis. **TRUE =** Enable Power Output Stage. **FALSE =** Block Power Output Stage.
xStopAxis	BOOL	Stop the EHMD Rotary Axis Motion. **TRUE =** Stop Axis Motion Command.
xHaltAxis	BOOL	Pause the EHMD Rotary Axis Motion. **TRUE =** Pause Axis Motion Command.
xAckError	BOOL	Reset the EHMD Rotary Axis Errors. **TRUE =** Reset the Errors.
xHoming	BOOL	EHMD Rotary Axis Homing Command. **TRUE =** Start Homing of the EHMD Rotary Axis.
eOperationMode	ENUM of the type **RotaryBasicOpMode**	Enumeration of Basic Operating Mode Selection of the EHMD Rotary Axis. Refer Chapter 4.5.4.
xDecap	BOOL	EHMD Rotary Axis Decapping Function Command. **TRUE =** Execute Decapping Function.
xCap	BOOL	EHMD Rotary Axis Capping Function Command. **TRUE =** Execute Capping Function.
xSearch	BOOL	EHMD Rotary Axis Search Function Command. **TRUE =** Execute the Search Function.
rRevolution	REAL	Relative Distance Value of the Motion for EHMD Rotary Axis in User Unit.
rVelocity	REAL	Maximum Target Velocity Value for EHMD Rotary Axis in User Unit.
rTorque	REAL	Setpoint Torque at the Gear Shaft for EHMD Rotary Axis in Nm.
rAcceleration	REAL	Maximum Acceleration Value in User Unit.
rDeceleration	REAL	Maximum Deceleration Value in User Unit.
rJerk	REAL	Maximum Jerk Value in User Unit.
rTorqueRamp	REAL	Maximum Time Derivative of the Set Value of the Torque in Nm/s.

Table 4.20: RotaryBasicCtrl descriptions

4.4.12 GripperBasicCtrl

Structure Variables	Data Type	Description
xEnableAxis	BOOL	Enable the EHMD Gripper Axis. **TRUE =** Enable Power Output Stage. **FALSE =** Block Power Output Stage.
xStopAxis	BOOL	Stop the EHMD Gripper Axis Motion. **TRUE =** Stop Axis Motion Command.
xHaltAxis	BOOL	Pause the EHMD Gripper Axis Motion. **TRUE =** Pause Axis Motion Command.
xAckError	BOOL	Reset the EHMD Gripper Axis Errors. **TRUE =** Reset the Errors.
xHoming	BOOL	EHMD Gripper Axis Homing Command. **TRUE =** Start Homing of the EHMD Gripper Axis.
eOperationMode	ENUM of the type **GripperBasicOpMode**	Enumeration of Basic Operating Mode Selection of the EHMD Gripper Axis. Refer Chapter 4.5.5.
xGripperOpen	BOOL	EHMD Gripper Axis Open Command. **TRUE =** Open the EHMD Gripper Axis.
xGripperClose	BOOL	EHMD Gripper Axis Close Command. **TRUE =** Close the EHMD Gripper Axis.
rOpenPosition	REAL	Maximum Open Position Value for the EHMD Gripper Axis in User Unit. The Value of the Open Position must be Lower than the Value of the Close Position. **0 =** Specified Negative Software Limit Position.
rClosePosition	REAL	Maximum Close Position Value for the EHMD Gripper Axis in User Unit. The Value of the Close Position must be Greater than the Value of the Open Position. **0 =** Specified Positive Software Limit Position.
rVelocity	REAL	Maximum Target Velocity Value for EHMD Gripper Axis in User Unit.
rForce	REAL	Setpoint Force at the Gear Shaft for EHMD Gripper Axis in Nm.
rAcceleration	REAL	Maximum Acceleration Value in User Unit.
rDeceleration	REAL	Maximum Deceleration Value in User Unit.
rJerk	REAL	Maximum Jerk Value in User Unit.
rForceRamp	REAL	Maximum Time Derivative of the Set Value of the Force in Nm/s.

Table 4.21: GripperBasicCtrl descriptions

4.4.13 RotaryBasicStatus

Structure Variables	Data Type	Description
xAxisEnabled	BOOL	Status of EHMD Rotary Axis Ready and Switched On. **TRUE =** Power Output Stage Enabled. **FALSE =** Power Output Stage Disabled.
xDone	BOOL	EHMD Rotary Axis Motion Task is Completed. **TRUE =** Task Completed. **FALSE =** Task Not Completed or Not Started.
xBusy	BOOL	EHMD Rotary Axis Motion Task is Not Yet Completed. **TRUE =** Task Started but Not Completed. **FALSE =** Task Completed or Not Started
xError	BOOL	An Error Occurred During EHMD Rotary Axis Processing. **TRUE =** Error Active. **FALSE =** No Error.
xAxisWarning	BOOL	**TRUE =** Warning(s) Present on the EHMD Rotary Axis.
xAxisError	BOOL	**TRUE =** Error(s) Present on the EHMD Rotary Axis.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
eActOperationMode	ENUM of the type **RotaryBasicOpMode**	Enumeration of Current Basic Operating Mode of the EHMD Rotary Axis. Refer Chapter 4.5.4.
xHomingValid	BOOL	Absolute Reference Position is Known for the EHMD Rotary Axis. **TRUE =** Axis is Homed.
xInAction	BOOL	**TRUE =** EHMD Rotary Axis is Moving.
xMotionComplete	BOOL	**TRUE =** EHMD Rotary Axis Motion Task Completed.
xCommandAborted	BOOL	**TRUE =** EHMD Rotary Axis Task Aborted by Another Task During Processing or Due to Power Output Stage being Switched Off.
xInVelocity	BOOL	**TRUE =** EHMD Rotary Axis Target Velocity Reached.
xInTorque	BOOL	**TRUE =** EHMD Rotary Axis Target Torque Reached.
rActualPosition	REAL	EHMD Rotary Axis Current Position in User Unit.
rActualVelocity	REAL	EHMD Rotary Axis Current Velocity in User Unit.
rActualTorque	REAL	EHMD Rotary Axis Current Torque in User Unit.

Table 4.22: RotaryBasicStatus descriptions

4.4.14 GripperBasicStatus

Structure Variables	Data Type	Description
xAxisEnabled	BOOL	Status of EHMD Gripper Axis Ready and Switched On. **TRUE =** Power Output Stage Enabled. **FALSE =** Power Output Stage Disabled.
xDone	BOOL	EHMD Gripper Axis Motion Task is Completed. **TRUE =** Task Completed. **FALSE =** Task Not Completed or Not Started.
xBusy	BOOL	EHMD Gripper Axis Motion Task is Not Yet Completed. **TRUE =** Task Started but Not Completed. **FALSE =** Task Completed or Not Started
xError	BOOL	An Error Occurred During EHMD Gripper Axis Processing. **TRUE =** Error Active. **FALSE =** No Error.
xAxisWarning	BOOL	**TRUE =** Warning(s) Present on the EHMD Gripper Axis.
xAxisError	BOOL	**TRUE =** Error(s) Present on the EHMD Gripper Axis.
wErrorNumber	WORD	Diagnostic Error Number.
sErrorDescription	STRING	Error Report String Using the Error Number.
eActOperationMode	ENUM of the type **GripperBasicOpMode**	Enumeration of Current Basic Operating Mode of the EHMD Gripper Axis. Refer Chapter 4.5.5.
xHomingValid	BOOL	Absolute Reference Position is Known for the EHMD Gripper Axis. **TRUE =** Axis is Homed.
xInAction	BOOL	**TRUE =** EHMD Gripper Axis is Moving.
xMotionComplete	BOOL	**TRUE =** EHMD Gripper Axis Motion Task Completed.
xCommandAborted	BOOL	**TRUE =** EHMD Gripper Axis Task Aborted by Another Task During Processing or Due to Power Output Stage being Switched Off.
xInForce	BOOL	**TRUE =** EHMD Gripper Axis Target Force Reached.
rActualPosition	REAL	EHMD Gripper Axis Current Position in User Unit.
rActualVelocity	REAL	EHMD Gripper Axis Current Velocity in User Unit.
rActualForce	REAL	EHMD Gripper Axis Current Force in User Unit.

Table 4.23: GripperBasicStatus descriptions

4.4.15 HomingParameters

Structure Variables	Data Type	Description
diHomingMode	DINT	Selected Homing Method for Homing of the EHMD Axes.
rAxisZeroPoint	REAL	Offset of the Axis Zero Point to the Reference Mark.
xStrokeLimitation	BOOL	Activation of the Software Limit Positions. **TRUE =** Software Limit is Active for Motion Job.
rNegativeStrokeLimit	REAL	Negative Software Limit Position Value in User Unit. The Value of the Negative Software Limit Position must be Lower than the Value of the Positive Software Limit Position.
rPositiveStrokeLimit	REAL	Positive Software Limit Position Value in User Unit. The Value of the Positive Software Limit Position must be Greater than the Value of the Negative Software Limit Position.
rCrawlVelocity	REAL	Setpoint Velocity of Creeping of the Reference Mark.
rCrawlAcceleration	REAL	Setpoint Acceleration of Creeping of the Reference Mark.
rCrawlJerk	REAL	Setpoint Jerk of Creeping of the Reference Mark.
rSearchVelocity	REAL	Setpoint Velocity of Searching of the Reference Mark.
rSearchAcceleration	REAL	Setpoint Acceleration of Searching of the Reference Mark.
rSearchJerk	REAL	Setpoint Jerk of Searching of the Reference Mark.
rRunningVelocity	REAL	Setpoint Velocity of Move to the Reference Mark.
rRunningAcceleration	REAL	Setpoint Acceleration of Move to the Reference Mark.
rRunningJerk	REAL	Setpoint Jerk of Move to the Reference Mark.

Table 4.24: HomingParameters descriptions

4.4.16 CommutationFinding

Structure Variables	Data Type	Description
rVelocity	REAL	Set Velocity for the Commutation-Angle Detection.
rAcceleration	REAL	Set Acceleration for the Commutation-Angle Detection.
rCommutationAngle	REAL	Damping Time for the Commutation-Angle Detection.
rMonitoringWindowAngle	REAL	Size of the Window for Monitoring the Commutation-Angle Detection. (**Unit:** electrical angle).

Table 4.25: CommutationFinding descriptions

4.4.17 RotaryMovement

Structure Variables	Data Type	Description
rVelocity_V1	REAL	Jog Mode – Velocity V1.
rVelocity_V2	REAL	Jog Mode – Velocity V2.
rVelocity_SingleStep	REAL	Single Step Mode – Velocity.
rVelocityLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Velocity” Specified by the User.
rVelocityUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Velocity” Specified by the User.
rTorqueLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Torque” Specified by the User.
rTorqueUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Torque” Specified by the User.

Table 4.26: RotaryMovement descriptions

4.4.18 GripperMovement

Structure Variables	Data Type	Description
rVelocity_V1	REAL	Jog Mode – Velocity V1.
rVelocity_V2	REAL	Jog Mode – Velocity V2.
rVelocity_SingleStep	REAL	Single Step Mode – Velocity.
rVelocityLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Velocity” Specified by the User.
rVelocityUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Velocity” Specified by the User.
rForceLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Force” Specified by the User.
rForceUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Force” Specified by the User.
rVelocity_Limit	REAL	Specifies the Amount of the Maximum Velocity.
eVelocity_Diag	ENUM of the type **VelocityDiagCategory**	Diagnostic Category of the Allocated Error. Refer Chapter 4.5.7.
rConv_Factor_Force	REAL	Conversion Factor for the Force.

Table 4.27: GripperMovement descriptions

4.4.19 RotaryLimitValues

Structure Variables	Data Type	Description
rNegLimitPosition	REAL	Negative Software Limit Position Value in User Unit.
rPosLimitPosition	REAL	Positive Software Limit Position Value in User Unit.
rTorqueLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Torque” Specified by the User.
rTorqueUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Torque” Specified by the User.

Table 4.28: RotaryLimitValues descriptions

4.4.20 GripperLimitValues

Structure Variables	Data Type	Description
rNegLimitPosition	REAL	Negative Software Limit Position Value in User Unit.
rPosLimitPosition	REAL	Positive Software Limit Position Value in User Unit.
rForceLowerLimit	REAL	The Dynamic Limit Value “Lower Limit Value of Force” Specified by the User.
rForceUpperLimit	REAL	The Dynamic Limit Value “Upper Limit Value of Force” Specified by the User.

Table 4.29: GripperLimitValues descriptions

4.5 Enumeration

4.5.1 EHMD_Variants

Enumeration Value	Enumeration Text
0	No_Variant_Selected
1	EHMD_40_RE_GE
2	EHMD_40_RE_GP
3	EHMD_40_RE_GE_16
4	EHMD_50_RE_GE_15

Table 4.30: EHMD_Variants enumerations

4.5.2 RotaryAdvOpMode

Enumeration Value	Enumeration Text
0	No_Mode_Selected
1	Homing_Mode
2	Move_Absolute
3	Move_Relative
4	Velocity_Control
5	Torque_Control
6	Jog_Mode

Table 4.31: RotaryAdvOpMode enumerations

4.5.3 GripperAdvOpMode

Enumeration Value	Enumeration Text
0	No_Mode_Selected
1	Homing_Mode
2	Move_Absolute
3	Move_Relative
4	Force_Control
5	Jog_Mode

Table 4.32: GripperAdvOpMode enumerations

4.5.4 RotaryBasicOpMode

Enumeration Value	Enumeration Text
0	No_Mode_Selected
1	Velocity_Control
2	Revolution_Control
3	Torque_Control
4	Search_Function

Table 4.33: RotaryBasicOpMode enumerations

4.5.5 GripperBasicOpMode

Enumeration Value	Enumeration Text
0	No_Mode_Selected
1	Open_Close
2	Force_Control

Table 4.34: GripperBasicOpMode enumerations

4.5.6 ParameterSettings

Enumeration Value	Enumeration Text
0	Default
1	User_Defined

Table 4.35: ParameterSettings enumerations

4.5.7 VelocityDiagCategory

Enumeration Value	Enumeration Text
0	Ignore
1	Information
2	Warning
3	Stop_Category_2
4	Stop_Category_1
5	Stop_Category_0

Table 4.36: VelocityDiagCategory enumerations

4.5.8 ParameterStatus

Status Value	Status Text	Description
0	Idle	No Operation in Progress
1	Initializing	Initializing Parameter Operation
2	Processing_Rotary	Processing Rotary Parameters (Read or Write)
3	Rotary_Homing_Mode	Rotary Homing Mode
4	Rotary_Axis_Zero_Point_Offset	Rotary Axis Zero Point Offset
5	Rotary_Software_Limit_Positions_Active	Rotary Software Limit Positions Active
6	Rotary_Negative_Software_Limit_Position	Rotary Negative Software Limit Position

Status Value	Status Text	Description
7	Rotary_Positive_Software_Limit_Position	Rotary Positive Software Limit Position
8	Rotary_Homing_Velocity_Crawl	Rotary Homing Velocity Crawl
9	Rotary_Homing_Acceleration_Crawl	Rotary Homing Acceleration Crawl
10	Rotary_Homing_Jerk_Crawl	Rotary Homing Jerk Crawl
11	Rotary_Homing_Velocity_Search	Rotary Homing Velocity Search
12	Rotary_Homing_Acceleration_Search	Rotary Homing Acceleration Search
13	Rotary_Homing_Jerk_Search	Rotary Homing Jerk Search
14	Rotary_Homing_Velocity_Running	Rotary Homing Velocity Running
15	Rotary_Homing_Acceleration_Running	Rotary Homing Acceleration Running
16	Rotary_Homing_Jerk_Running	Rotary Homing Jerk Running
17	Rotary_Commutation_Finding_Velocity	Rotary Commutation Finding Velocity
18	Rotary_Commutation_Finding_Acceleration	Rotary Commutation Finding Acceleration
19	Rotary_Commutation_Finding_Damping_Time	Rotary Commutation Finding Damping Time
20	Rotary_Commutation_Finding_Monitoring_Window	Rotary Commutation Finding Monitoring Window Angle
21	Rotary_Manual_Velocity_V1	Rotary Manual Velocity V1
22	Rotary_Manual_Velocity_V2	Rotary Manual Velocity V2
23	Rotary_Single_Step_Velocity	Rotary Single Step Velocity
24	Rotary_Lower_Limit_Velocity	Rotary Lower Limit Velocity
25	Rotary_Upper_Limit_Velocity	Rotary Upper Limit Velocity
26	Rotary_Lower_Limit_Torque	Rotary Lower Limit Torque
27	Rotary_Upper_Limit_Torque	Rotary Upper Limit Torque
28	Processing_Gripper	Processing Gripper Parameters (Read or Write)
29	Gripper_Homing_Mode	Gripper Homing Mode
30	Gripper_Axis_Zero_Point_Offset	Gripper Axis Zero Point Offset
31	Gripper_Software_Limit_Positions_Active	Gripper Software Limit Positions Active
32	Gripper_Negative_Software_Limit_Position	Gripper Negative Software Limit Position
33	Gripper_Positive_Software_Limit_Position	Gripper Positive Software Limit Position
34	Gripper_Homing_Velocity_Crawl	Gripper Homing Velocity Crawl
35	Gripper_Homing_Acceleration_Crawl	Gripper Homing Acceleration Crawl
36	Gripper_Homing_Jerk_Crawl	Gripper Homing Jerk Crawl
37	Gripper_Homing_Velocity_Search	Gripper Homing Velocity Search
38	Gripper_Homing_Acceleration_Search	Gripper Homing Acceleration Search

Status Value	Status Text	Description
39	Gripper_Homing_Jerk_Search	Gripper Homing Jerk Search
40	Gripper_Homing_Velocity_Running	Gripper Homing Velocity Running
41	Gripper_Homing_Acceleration_Running	Gripper Homing Acceleration Running
42	Gripper_Homing_Jerk_Running	Gripper Homing Jerk Running
43	Gripper_Commutation_Finding_Velocity	Gripper Commutation Finding Velocity
44	Gripper_Commutation_Finding_Acceleration	Gripper Commutation Finding Acceleration
45	Gripper_Commutation_Finding_Damping_Time	Gripper Commutation Finding Damping Time
46	Gripper_Commutation_Finding_Monitoring_Window	Gripper Commutation Finding Monitoring Window Angle
47	Gripper_Manual_Velocity_V1	Gripper Manual Velocity V1
48	Gripper_Manual_Velocity_V2	Gripper Manual Velocity V2
49	Gripper_Single_Step_Velocity	Gripper Single Step Velocity
50	Gripper_Lower_Limit_Velocity	Gripper Lower Limit Velocity
51	Gripper_Upper_Limit_Velocity	Gripper Upper Limit Velocity
52	Gripper_Lower_Limit_Force	Gripper Lower Limit Force
53	Gripper_Upper_Limit_Force	Gripper Upper Limit Force
54	Gripper_Velocity_Limit	Gripper Velocity Limit
55	Gripper_Velocity_Diagnostic_Category	Gripper Velocity Diagnostic Category
56	Gripper_Conversion_Factor_Force	Gripper Conversion Factor Force
57	Reading_Working_Stroke	Reading Working Stroke Parameters
58	Reading_Rotary_Working_Stroke	Reading Rotary Working Stroke
59	Reading_Gripper_Working_Stroke	Reading Gripper Working Stroke
60	Rotary_Operation_Complete	Rotary Axis Operation Complete
61	Gripper_Operation_Complete	Gripper Axis Operation Complete
62	Working_Stroke_Read_Complete	Working Stroke Read Complete
63	Complete	All Operations Complete

Table 4.37: ParameterStatus descriptions

5 Configuration of EHMD Function Blocks in CODESYS Software

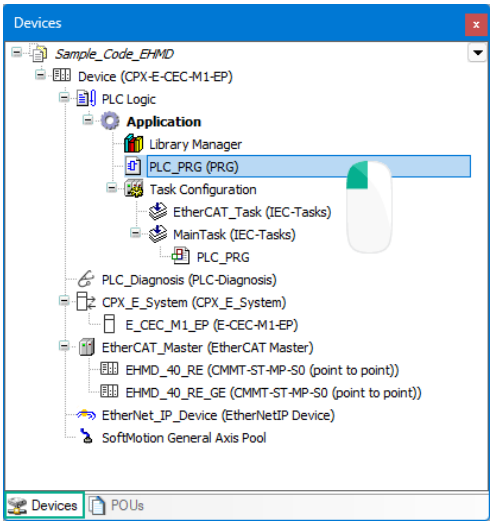
This chapters describes about adding **Festo_EHMD_PtP_EC** library function blocks in program & assigning input and output tags.

Programming Language

This Application Note explains the integration of **Festo_EHMD_PtP_EC** library function blocks in **Function Block Diagram (FBD)** program.

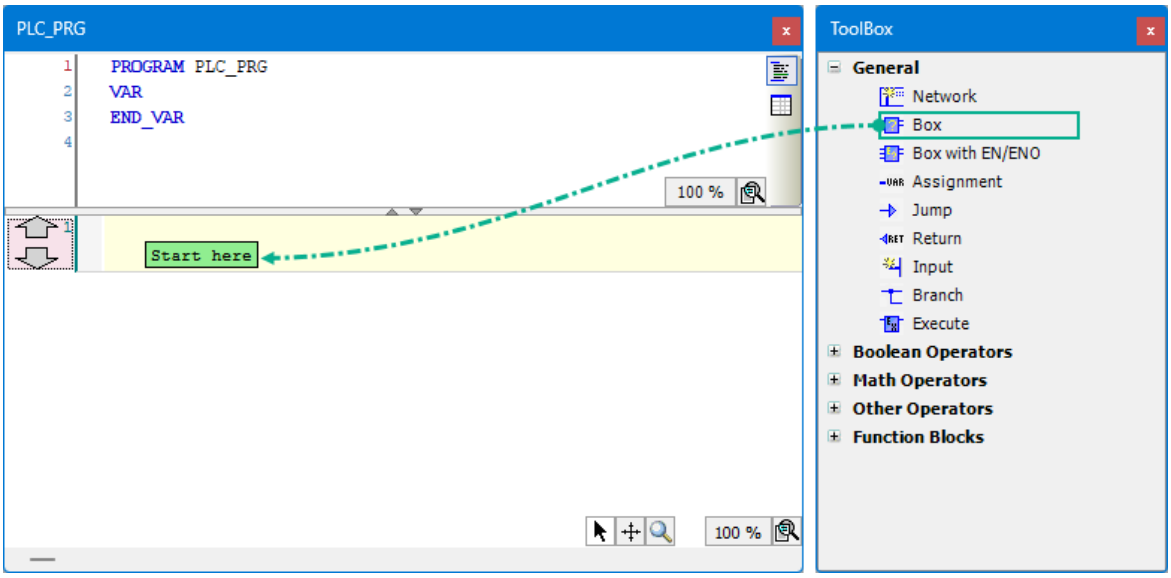
User can implement the function blocks as per their requirement.

Step 1



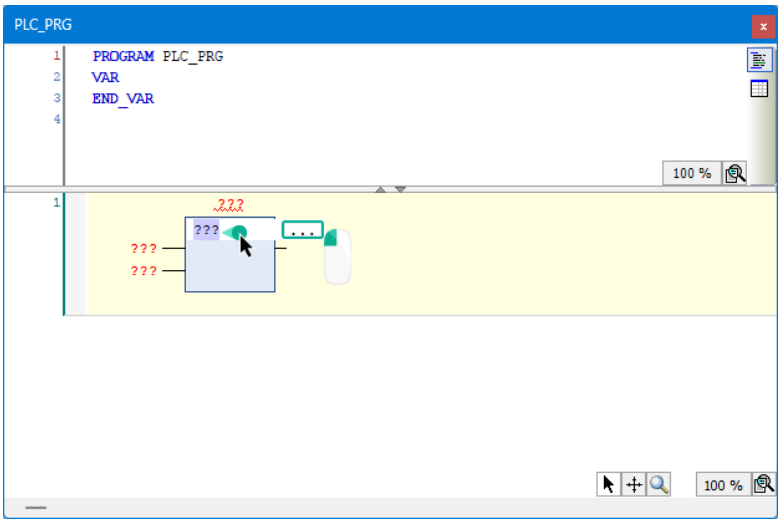
Double click the **PLC_PRG (PRG)** option under the **Application** from the **Device Tree** in the **Devices** toolbox.

Step 2



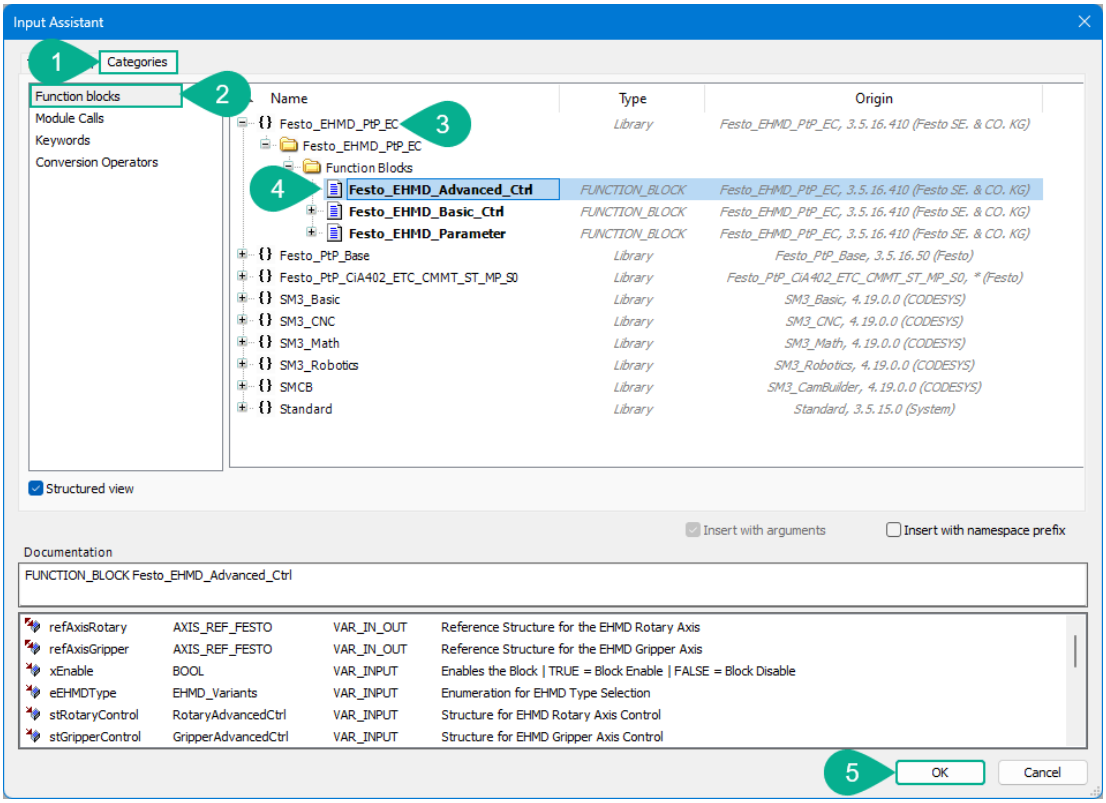
Drag and drop the **Box** element from the **Toolbox** window to an empty rung in the **PLC_PRG** window.

Step 3



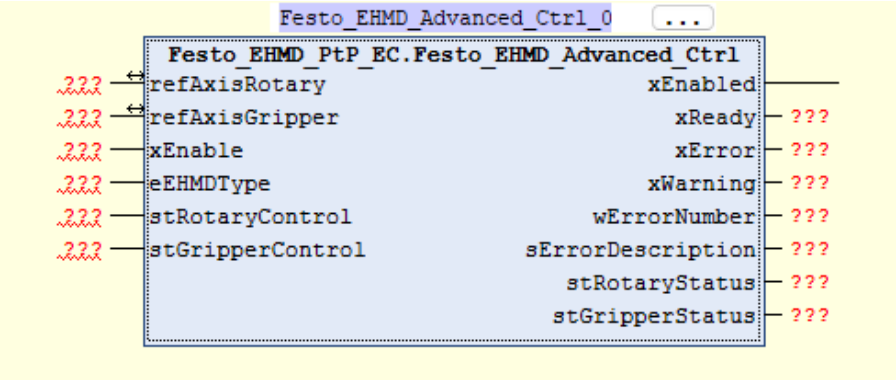
Click inside the added **Box** element and click the **… (Browse)** button to open the **Input Assistant** window.

Step 4



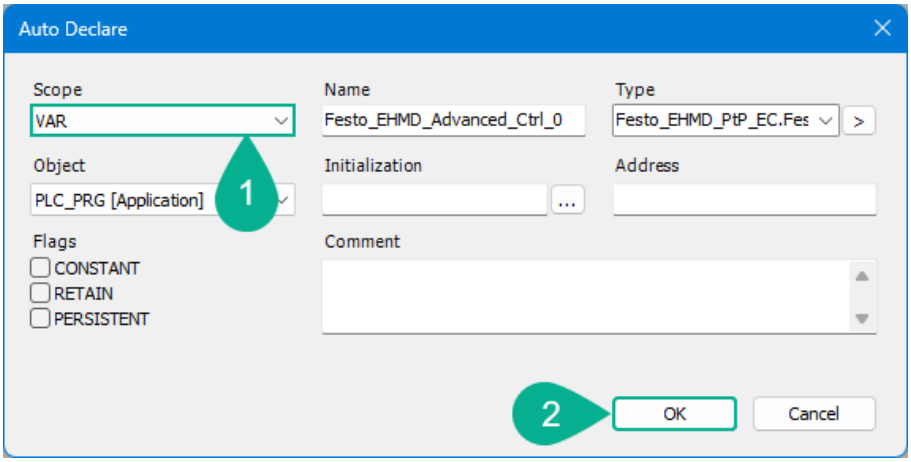
1. Go to the **Categories** tab in the **Input Assistant** window.
2. Select the **Function Blocks** option from the available list.
3. Expand the **Festo_EHMD_PtP_EC** library.
4. Select the **Festo_EHMD_Advanced_Ctrl** function block from the **Function Blocks** folder.
5. Click the **OK** button to add the function block.

Step 5



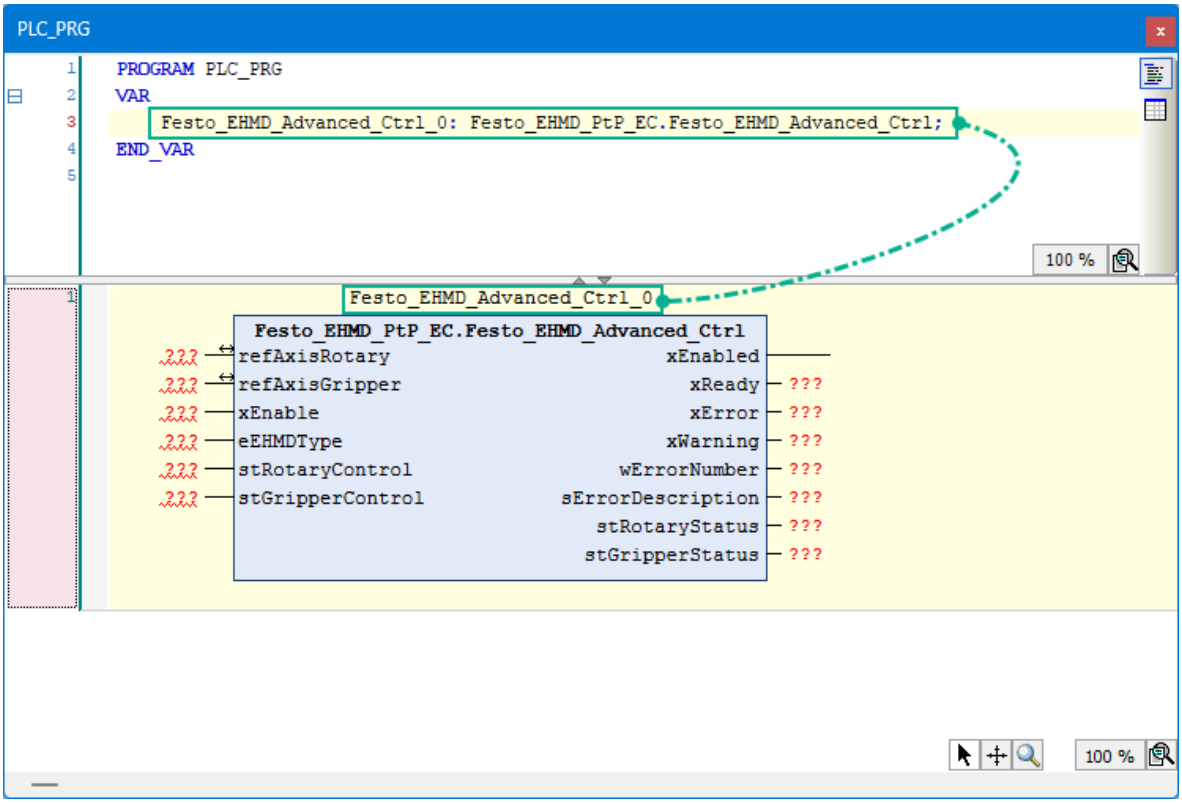
Enter the required name for the function block and press the **Enter** button to **Auto Declare** the tag name.

Step 6



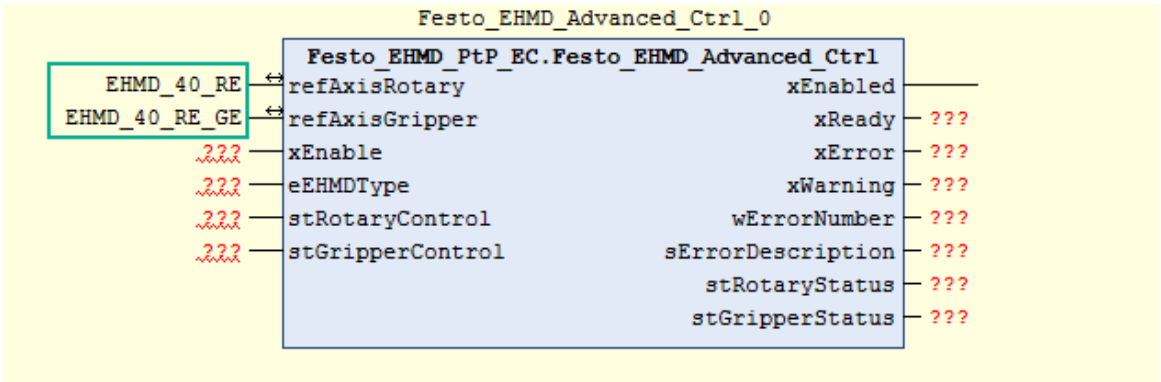
1. Select the **Scope** for the tag as required from the **Scope** drop-down list in the **Auto Declare** window.
2. Click the **OK** button to declare the tag name.

Step 7



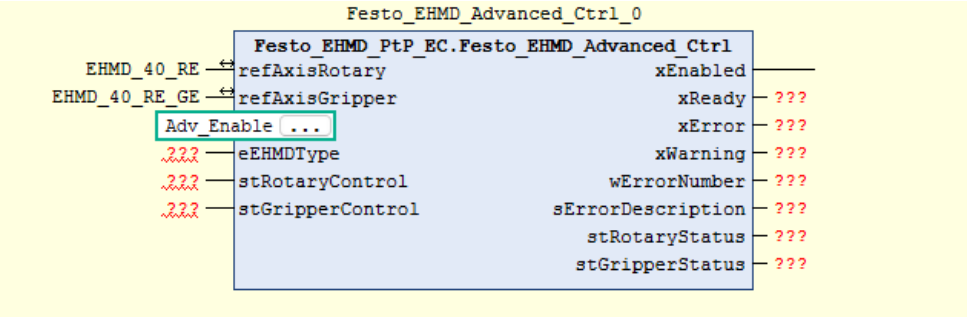
The function block will appear as shown above after assigning the instance name.

Step 8



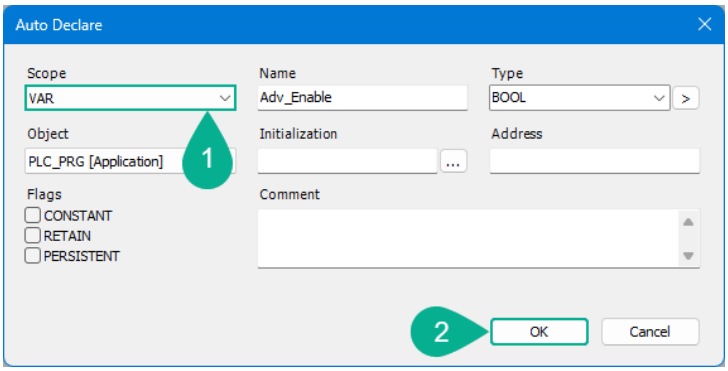
Enter the **EtherCAT IEC Objects** for the CMMT-ST-MP-S0 motor controllers of the EHMD Rotary and Gripper Axes as shown. Refer Chapter 3.6.

Step 9



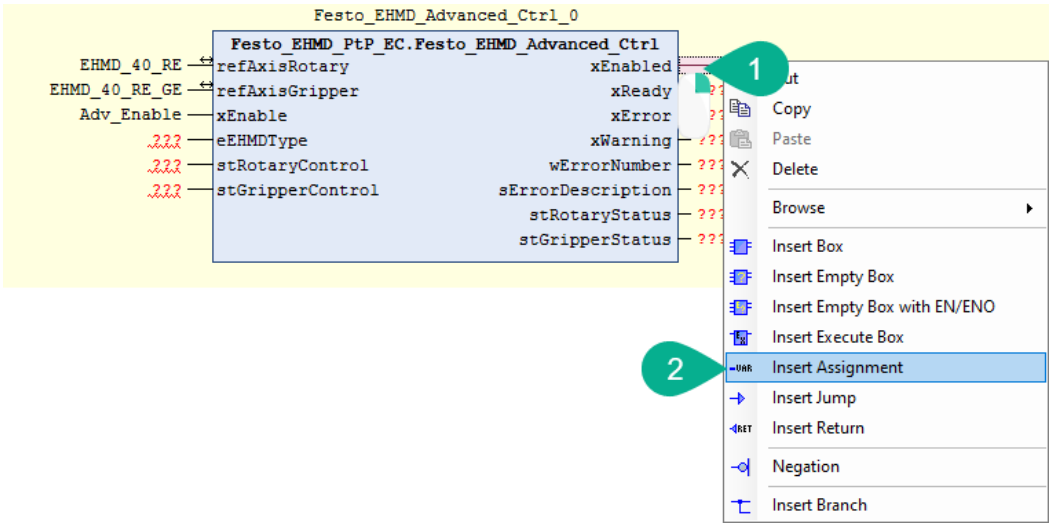
Enter the tag name for the **xEnable** input tag and press the **Enter** button to **Auto Declare** the tag name.

Step 10



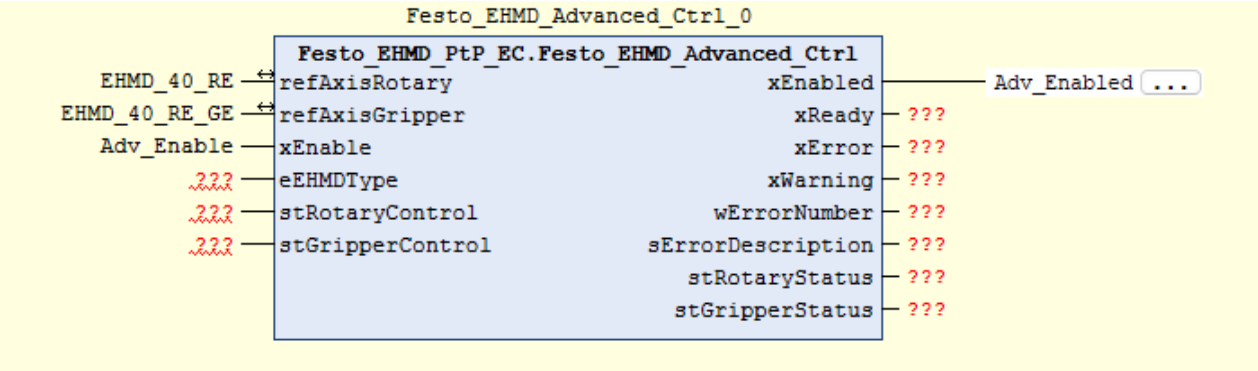
1. Select the **Scope** for the tag as required from the **Scope** drop-down list in the **Auto Declare** window.
2. Click the **OK** button to declare the tag name.

Step 11



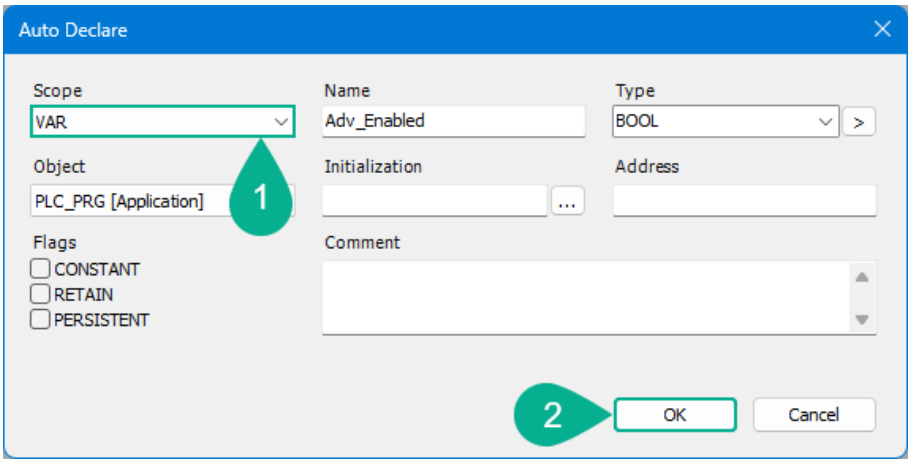
1. Right-click the **xEnabled** output tag.
2. Click the **Insert Assignment** button to add the **Variable** to the function block (FB) output.

Step 12



Enter the tag name for the **xEnabled** output tag and press the **Enter** button to **Auto Declare** the tag name.

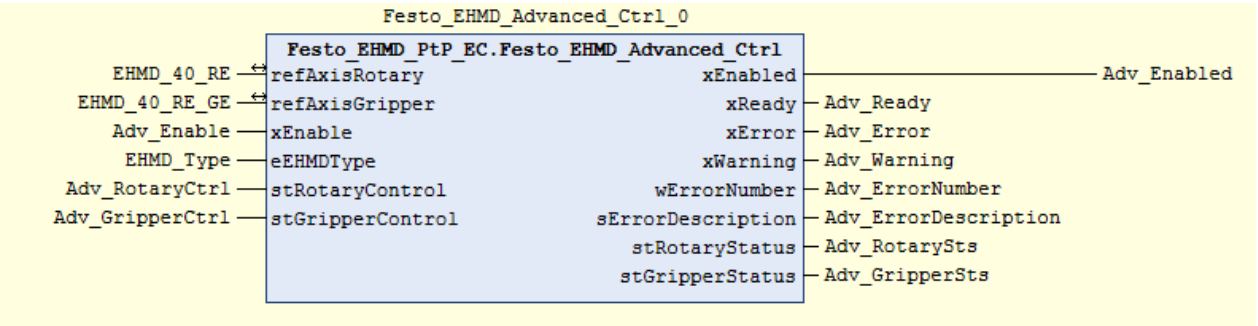
Step 13



1. Select the **Scope** for the tag as required from the **Scope** drop-down list in the **Auto Declare** window.
2. Click the **OK** button to declare the tag name.

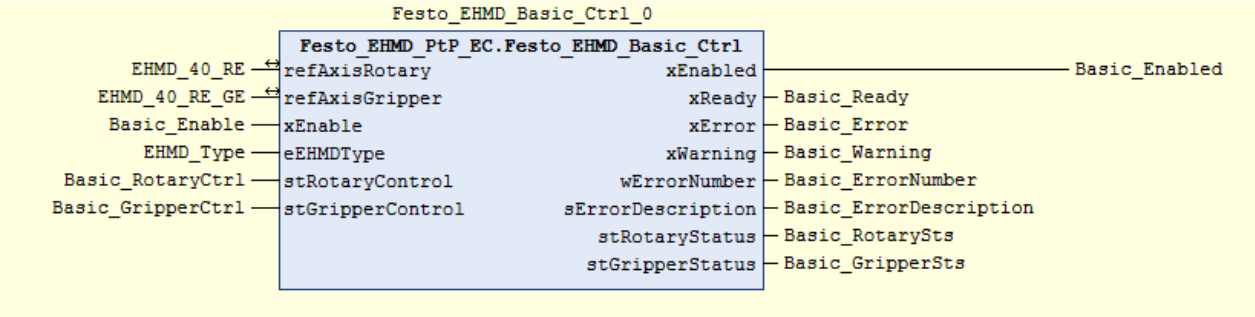
Repeat the **Steps 9 to 13** for the other interface tags of the function block.

Once all the IO assignments are complete, the **Festo_EHMD_Advanced_Ctrl** block will appear as shown below.

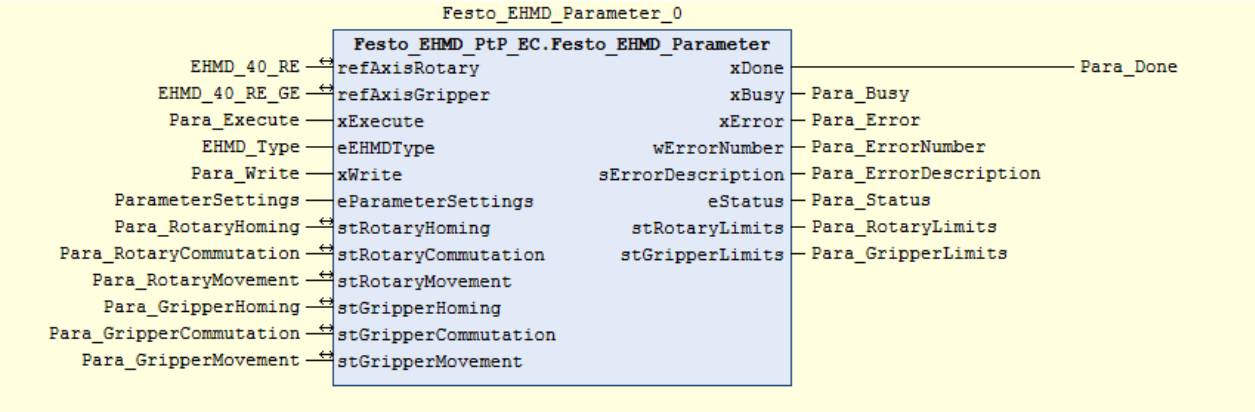


Follow the above-mentioned steps for configuring all the function blocks in the **Festo_EHMD_PtP_EC** library.

Once all the IO assignments are complete, the **Festo_EHMD_Basic_Ctrl** block will appear as shown below.



Once all the IO assignments are complete, the **Festo_EHMD_Parameter** block will appear as shown below.

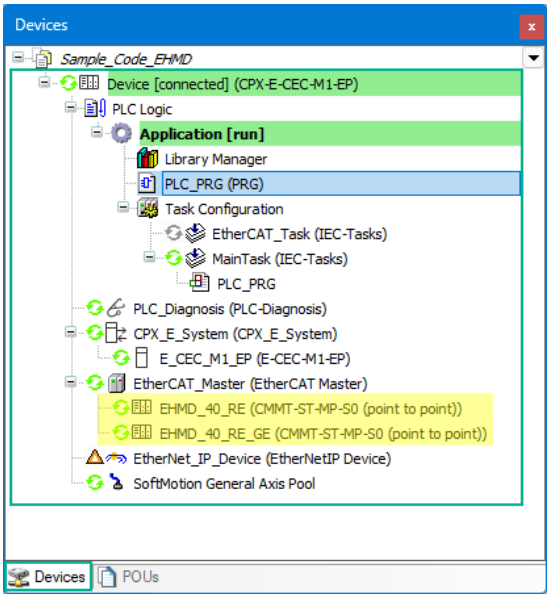


Note

- Ensure that namespace is assigned to all **Festo_EHMD_PtP_EC** library user defined data.

Once all the configurations are done, **Build and Download** the project to the controller.

After successful project download, the communication between **Festo Controller** and **CMMT-ST-MP-S0 motor controller** will be established which is highlighted in yellow box and **Device** tree will look as shown.



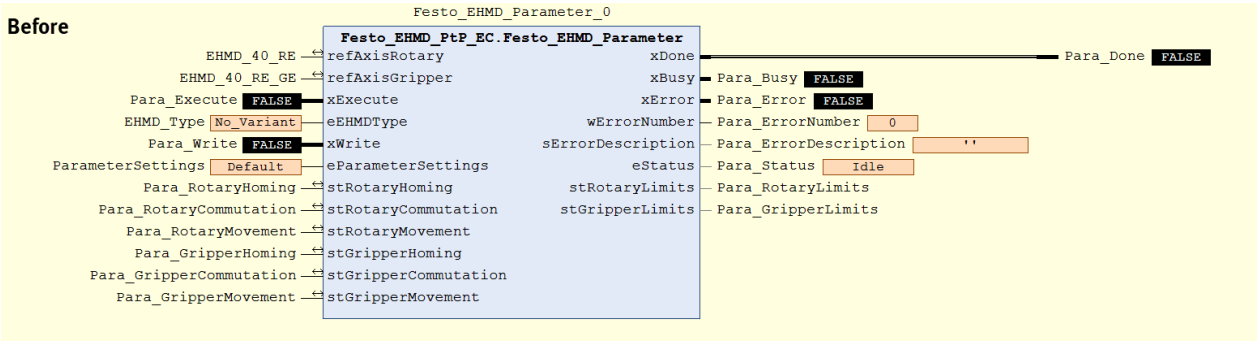
6 Sample Code for EHMD Library Function Blocks

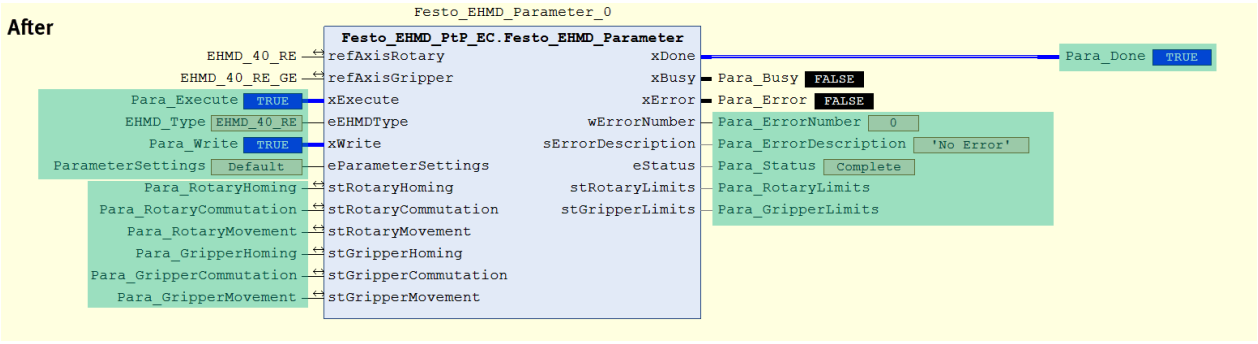
This chapter demonstrates how to control the EHMD module using the advanced option, implement a decapping application using the basic option, and read and write optimal parameters for the EHMD module connected to a Festo PLC via an EtherCAT network using CMMT-ST-MP-S0 motor controllers. These functions are implemented using the **Festo_EHMD_PtP_EC** library function blocks.

6.1 Sample Code for Read and Write EHMD Module Parameters using Festo_EHMD_Parameter Block

This chapter explains how to set parameters that are not optimal for the EHMD to optimal values and how to read their current values.

6.1.1 Sample Code for Writing the EHMD Module Parameters



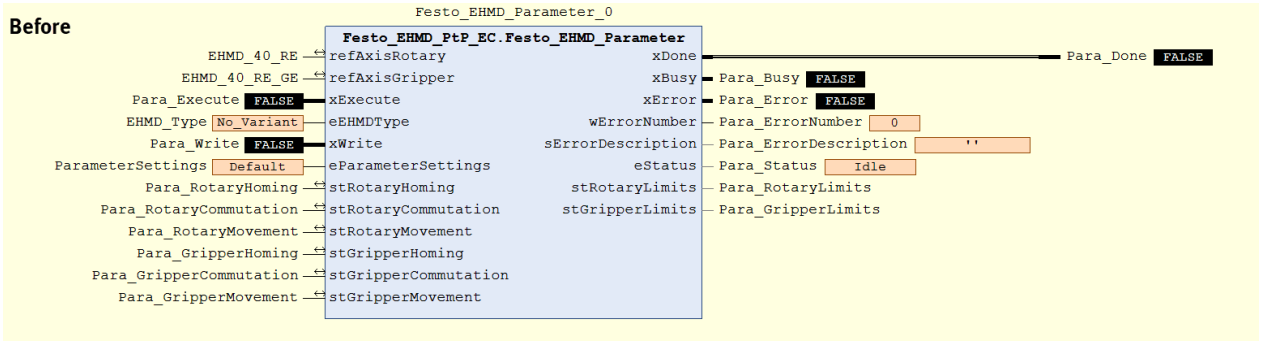


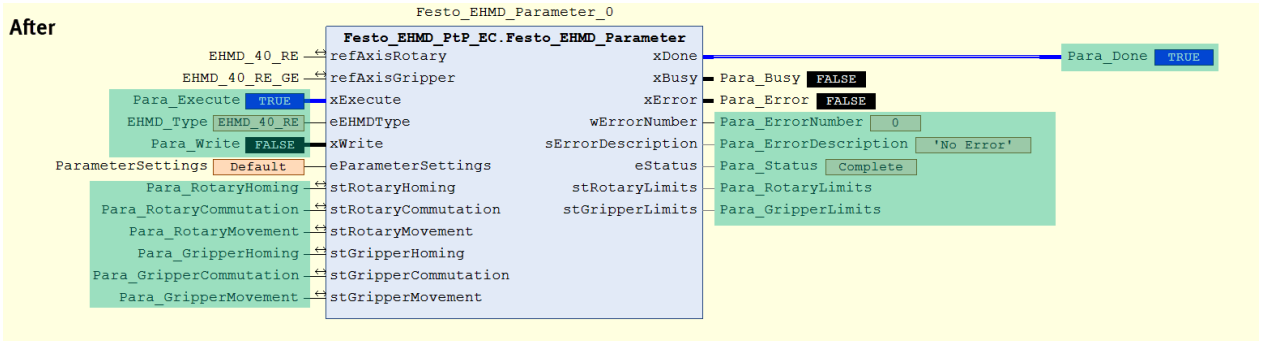
1. Select the connected EHMD Module type in the **eEHMDType** input tag.
2. Toggle the **xWrite** control tag from **FALSE** to **TRUE** to enable the write parameters function of the block.
3. Select the preferred parameter settings in the **eParameterSettings** input tag. For this application note, **Default** settings have been selected.
4. Toggle the **xExecute** control tag from **FALSE** to **TRUE** to write all the default parameters to the device.
5. Once the block starts writing the parameters to the device, the user can simultaneously check which parameter is currently being written in the **eStatus** monitoring tag.
6. Once all the parameters have been successfully written to the device, the monitoring tag **xDone** will be set to **TRUE**, and **eStatus** will display the message **Complete**.
7. And all of the block's I/O tags will be updated to match the default parameters written to the device.

Note

- If the user selects the **User_Defined** parameter settings, the user must enter all parameter values manually.

6.1.2 Sample Code for Reading the EHMD Module Parameters



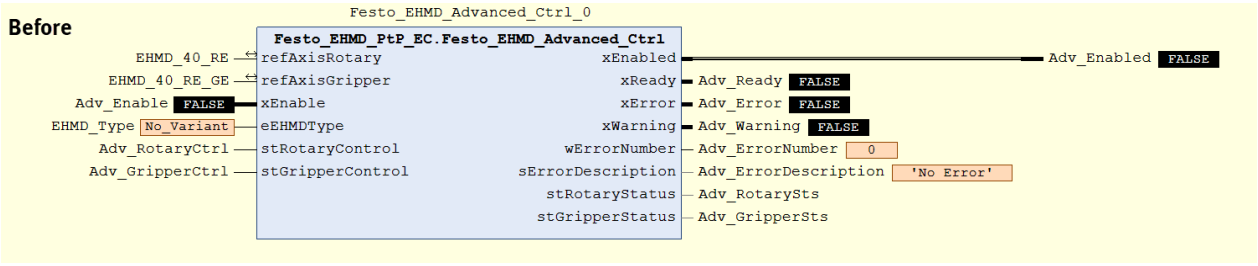


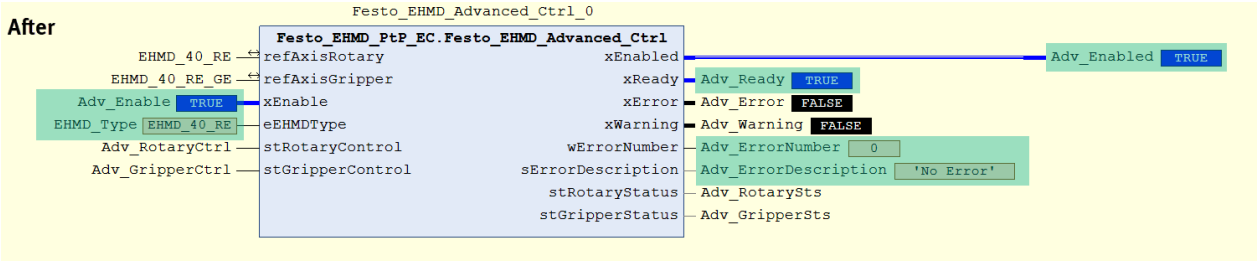
1. Select the connected EHMD Module type in the **eEHMDType** input tag.
2. Set the **xWrite** control tag to **FALSE** to enable the read parameters function of the block.
3. Toggle the **xExecute** control tag from **FALSE** to **TRUE** to read all the parameters from the device.
4. Once the block starts reading the parameters to the device, the user can simultaneously check which parameter is currently being read in the **eStatus** monitoring tag.
5. Once all the parameters have been successfully read from the device, the monitoring tag **xDone** will be set to **TRUE**, and **eStatus** will display the message **Complete**.
6. And all of the block's I/O tags will be updated with the parameters read from the device.

6.2 Sample Code for the EHMD Module Control using Festo_EHMD_Advanced_Ctrl Block

This chapter explains how to control the Rotary Gripper Module EHMD with advanced options.

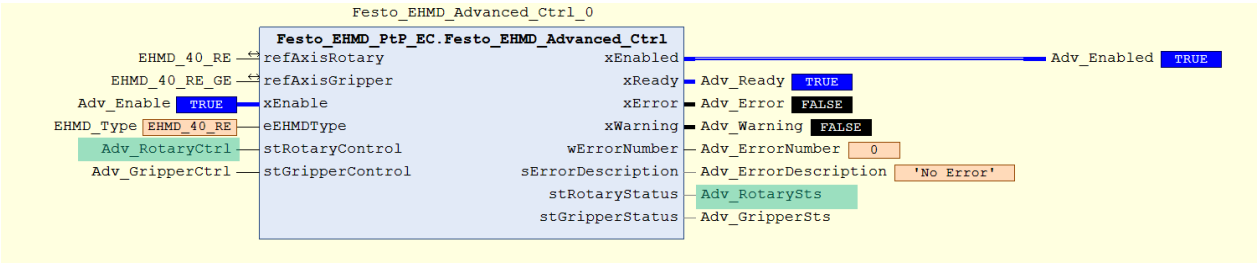
6.2.1 Initialize the Festo_EHMD_Advanced_Ctrl Block





1. Select the connected EHMD Module type in the **eEHMDType** input tag.
2. Toggle the **xEnable** control tag from **FALSE** to **TRUE** to enable the block and start reading the limit parameters of the EHMD module.
3. Once the block is enabled successfully, the monitoring tag **xEnabled** will be set to **TRUE**.
4. Once the limit parameters are successfully read, the monitoring tag **xReady** will be set to **TRUE**.

6.2.2 EHMD Rotary Axis Initialization



Before

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	TRUE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.000172			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

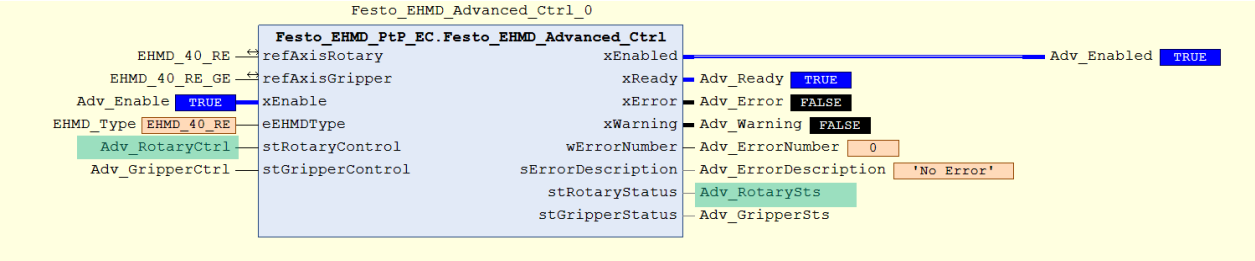
After

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	TRUE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-8.6E-05			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Toggle the **xAckError** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to reinitialize the EHMD module rotary axis.
2. Once the axis is reinitialized successfully, the monitoring tag element of the **RotaryAdvancedStatus** structure **xAxisError** will be set to **FALSE**.

6.2.3 EHMD Rotary Axis Enable



Device.Application.PLC_PRG

Before

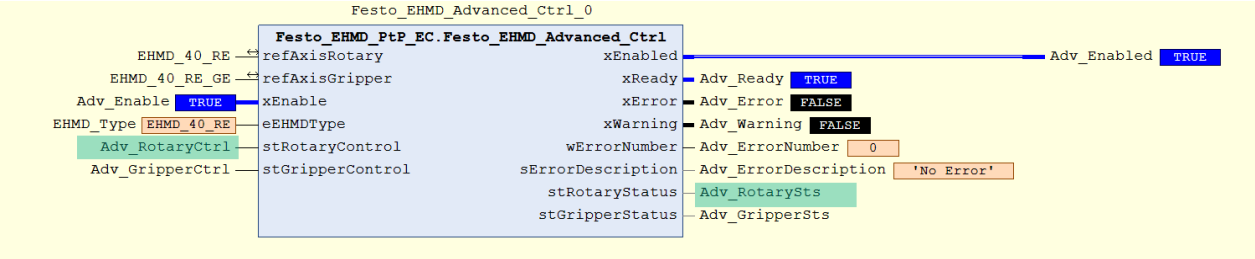
Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.000129			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

Device.Application.PLC_PRG

Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	-0.000215000007			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Toggle the **xEnableAxis** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to enable the EHMD module rotary axis.
2. Once the axis is enabled successfully, the monitoring tag element of the **RotaryAdvancedStatus** structure **xAxisEnabled** will be set to **TRUE**.

6.2.4 EHMD Rotary Axis Homing



Before

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
rAxisZeroPoint	REAL	0			Absolute Position if Re...ence Switch Detecte...
diHomingMethod	DINT	0			Enumeration of the Su...orted Homing Metho...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.000172			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

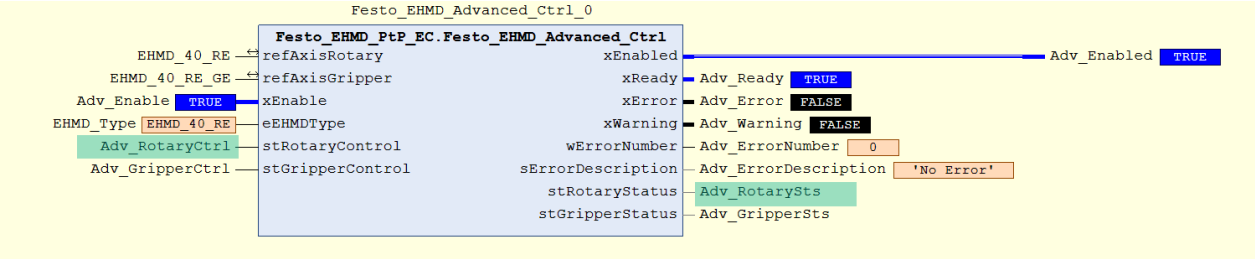
After

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
rAxisZeroPoint	REAL	0			Absolute Position if Re...ence Switch Detecte...
diHomingMethod	DINT	0			Enumeration of the Su...orted Homing Metho...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.001978			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Homing_Mode** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Zero Point Offset** & **Homing Method** values in the **HomingControl** structure elements of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis homing.
4. Once the axis is homed successfully, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xHomingValid** will be set to **TRUE** and **eActOperationMode** changed to **Homing_Mode**.

6.2.5 EHMD Rotary Axis Absolute Positioning Mode



Device.Application.PLC_PRG

Before

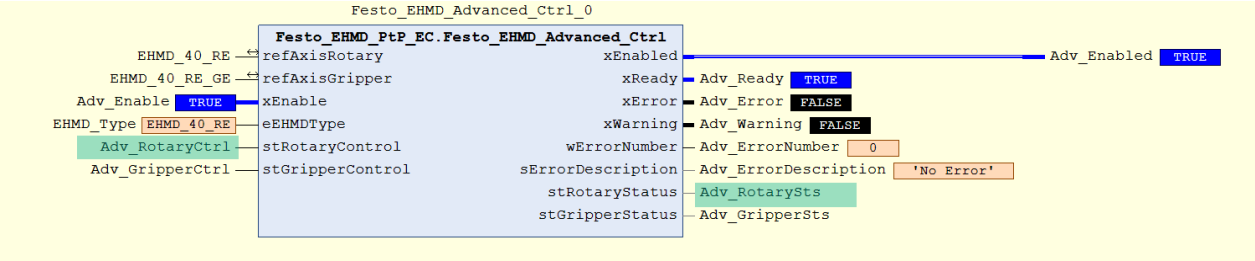
Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate	BOOL	FALSE			
rPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velocity Value in User Unit
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
eDirection	MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode	MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	-0.164475			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.001196			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

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Expression	After	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Move_Absolute			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	5			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	100			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	600			Maximum Acceleration Value in User Unit
rDeceleration		REAL	500			Maximum Deceleration Value in User Unit
rJerk		REAL	1000			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Move_Absolute			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	5.000024			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	-0.000598			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Move_Absolute** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Position, Velocity, Acceleration, Deceleration, Jerk, Direction** and **BufferMode** values in the **PositionControl** structure elements of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis absolute movement.
4. Once the axis absolute movement has started, the monitoring tag elements of the **RotaryAdvanced-Status** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOperationMode** changed to **Move_Absolute**.
6. The monitoring tag elements of the **RotaryAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be updated to actual position & velocity values of the EHMD module rotary axis.

6.2.6 EHMD Rotary Axis Relative Positioning Mode



Device.Application.PLC_PRG

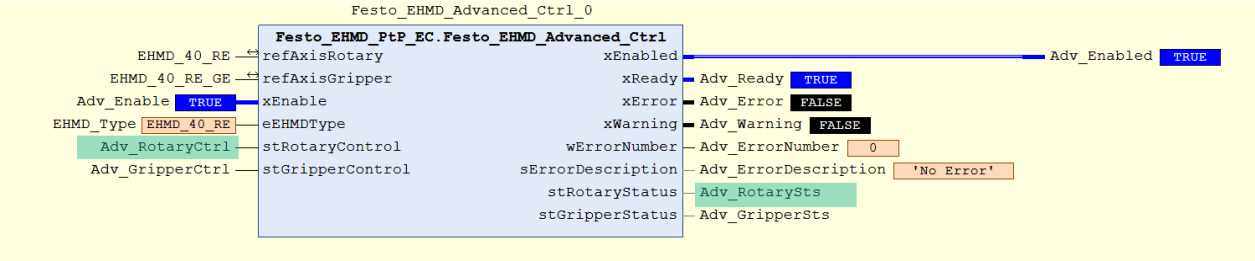
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	0			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0			Maximum Deceleration Value in User Unit
rJerk		REAL	0			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	-0.164475			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	0.001196			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

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Expression	After	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Move_Relative			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	5			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	100			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	600			Maximum Acceleration Value in User Unit
rDeceleration		REAL	500			Maximum Deceleration Value in User Unit
rJerk		REAL	1000			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Move_Relative			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	10.0000238			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	-0.002691			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Move_Relative** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Position, Velocity, Acceleration, Deceleration, Jerk, Direction** and **BufferMode** values in the **PositionControl** structure elements of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis relative movement.
4. Once the axis absolute movement has started, the monitoring tag elements of the **RotaryAdvanced-Status** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOperationMode** changed to **Move_Relative**.
6. The monitoring tag elements of the **RotaryAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module rotary axis.

6.2.7 EHMD Rotary Axis Velocity Control Mode



Device.Application.PLC_PRG

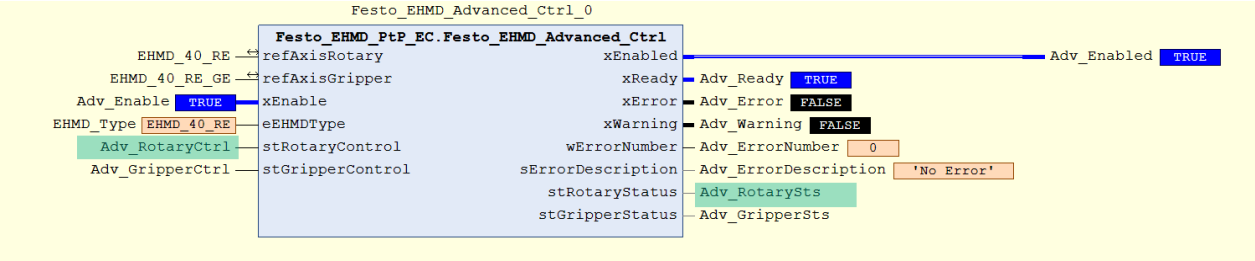
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	0			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0			Maximum Deceleration Value in User Unit
rJerk		REAL	0			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	-0.164475			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	0.001196			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

Device.Application.PLC_PRG

Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Velocity_Control			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
xContinuousUpdate		BOOL	FALSE			
rVelocity		REAL	50			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	500			Maximum Acceleration Value in User Unit
rDeceleration		REAL	500			Maximum Deceleration Value in User Unit
rJerk		REAL	5000			Maximum Jerk Value in User Unit
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
xStrokeLimitation		BOOL	FALSE			Activation of the Softw... Limit Positions | TR...
rNegativeStrokeLimit		REAL	0			Negative Software Lim...osition Value in User...
rPositiveStrokeLimit		REAL	0			Positive Software Limit...sition Value in User ...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Velocity_Control			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	TRUE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	TRUE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	25.1805248			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	52.386			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	0.005681			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Velocity_Control** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Velocity, Acceleration, Deceleration, Jerk, BufferMode, Stroke Limitation, Negative** and **Positive Stroke Limit** values in the **VelocityControl** structure elements of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis velocity control mode.
4. Once the axis velocity control has started, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xInVelocity** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Velocity_Control**.
5. The monitoring tag elements of the **RotaryAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module rotary axis.
6. Since **Velocity Control** mode is a continuous motion, the user has to stop the axis manually by toggling the **xStopAxis** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to stop the EHMD module rotary axis.

6.2.8 EHMD Rotary Axis Torque Control Mode



Device.Application.PLC_PRG

Before

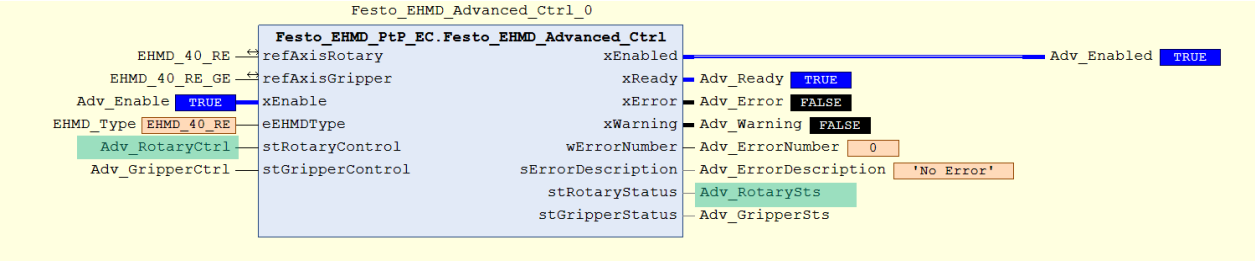
Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stVelocityControl	VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl	TorqueControl				Structure Containing P...meters Related to T...
xContinuousUpdate	BOOL	FALSE			
rTorque	REAL	0			Value of the Torque at the gear shaft in Nm
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
rVelocity	REAL	0			Maximum Target Velocity Value in User Unit
eBufferMode	MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
xStrokeLimitation	BOOL	FALSE			Activation of the Softw... Limit Positions | TR...
rNegativeStrokeLimit	REAL	0			Negative Software Lim...osition Value in User...
rPositiveStrokeLimit	REAL	0			Positive Software Limit...sition Value in User ...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-0.001794			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				

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Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Torque_Control			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
xContinuousUpdate		BOOL	FALSE			
rTorque		REAL	0.3			Value of the Torque at the gear shaft in Nm
rTorqueRamp		REAL	0.1			Maximum Time Deriva...f the Set Value of t...
rVelocity		REAL	50			Maximum Target Velocity Value in User Unit
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
xStrokeLimitation		BOOL	FALSE			Activation of the Softw... Limit Positions | TR...
rNegativeStrokeLimit		REAL	0			Negative Software Lim...osition Value in User...
rPositiveStrokeLimit		REAL	0			Positive Software Limit...sition Value in User ...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Torque_Control			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	TRUE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	23.0110245			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	0.298701018			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Torque_Control** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Torque, Torque Ramp, Velocity, Buffer Mode, Stroke Limitation, Negative** and **Positive Stroke Limit** values in the **TorqueControl** structure elements of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis torque control mode.
4. Once the axis torque control has started, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xInTorque** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Torque_Control**.
5. The monitoring tag elements of the **RotaryAdvancedStatus** structure **rActualPosition** & **rActualTorque** will be update to actual position & torque values of the EHMD module rotary axis.
6. Since **Torque Control** mode is a continuous motion, the user has to stop the axis manually by toggling the **xStopAxis** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to stop the EHMD module rotary axis.

6.2.9 EHMD Rotary Axis Jog Mode



Device.Application.PLC_PRG

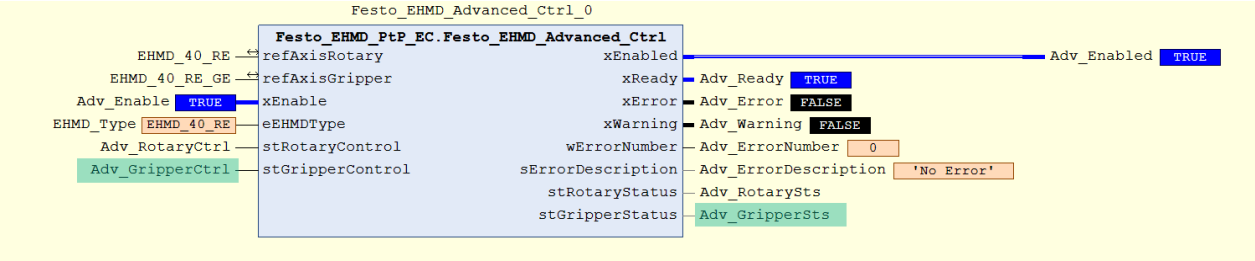
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
xJogPositive		BOOL	FALSE			Jog EHMD in Positive Direction
xJogNegative		BOOL	FALSE			Jog EHMD in Negative Direction
eJogMode		MC_JOG_MODE	mcDefault			Enumeration to Select...ferent Jog Mode in P...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	TRUE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	-0.002691			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

Device.Application.PLC_PRG

Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError		BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
eOperationMode		ROTARYADVOPMODE	Jog_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stVelocityControl		VelocityControl				Structure Containing P...meters Related to V...
stTorqueControl		TorqueControl				Structure Containing P...meters Related to T...
stJog		JogControl				Structure Containing Parameters Related to J...
xJogPositive		BOOL	TRUE			Jog EHMD in Positive Direction
xJogNegative		BOOL	FALSE			Jog EHMD in Negative Direction
eJogMode		MC_JOG_MODE	mcDefault			Enumeration to Select...ferent Jog Mode in P...
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	TRUE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError		BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning		BOOL	TRUE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		ROTARYADVOPMODE	Jog_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	TRUE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete		BOOL	FALSE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity		BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque		BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition		REAL	0.870024			EHMD Rotary Axis Current Position in User Unit
rActualVelocity		REAL	14.145			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque		REAL	0.006877			EHMD Rotary Axis Current Torque in User Unit
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				

1. Select the **Jog_Mode** as the operation mode in the **eOperationMode** control tag element of the **RotaryAdvancedCtrl** structure.
2. Enter the required **Jog Mode** value in the **eJogMode** element of the **JogControl** structure element of the **RotaryAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis Jog control mode.
4. Toggle the **xJogPositive** or **xJogNegative** elements of the **JogControl** structure element of the **RotaryAdvancedCtrl** structure from **FALSE** to **TRUE** to move the EHMD module rotary axis in either positive or negative direction respectively.
5. Once the axis jog control has started, the monitoring tag elements of the **RotaryAdvancedStatus** structure **xBusy** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Jog_Mode**.
6. The monitoring tag elements of the **RotaryAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module rotary axis.
7. Toggle the **xExecuteMode** control tag element, **xJogPositive** and **xJogNegative** elements of the **JogControl** structure element of the **RotaryAdvancedCtrl** structure from **TRUE** to **FALSE** to stop the **Jog Mode** of the EHMD module rotary axis.

6.2.10 EHMD Gripper Axis Initialization



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stForceControl	ForceControl				Structure Containing P...meters Related to F...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	TRUE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.001196			EHMD Gripper Axis Cu...nt Torque in User Unit

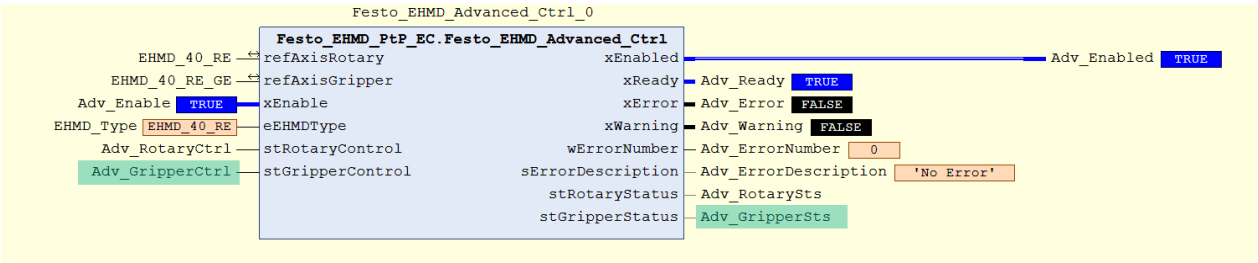
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	TRUE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stForceControl	ForceControl				Structure Containing P...meters Related to F...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.003588			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Toggle the **xAckError** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to reinitialize the EHMD module gripper axis.
2. Once the axis is reinitialized successfully, the monitoring tag element of the **GripperAdvancedStatus** structure **xAxisError** will be set to **FALSE**.

6.2.11 EHMD Gripper Axis Enable



Before

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stForceControl	ForceControl				Structure Containing P...meters Related to F...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.000897			EHMD Gripper Axis Cu...nt Torque in User Unit

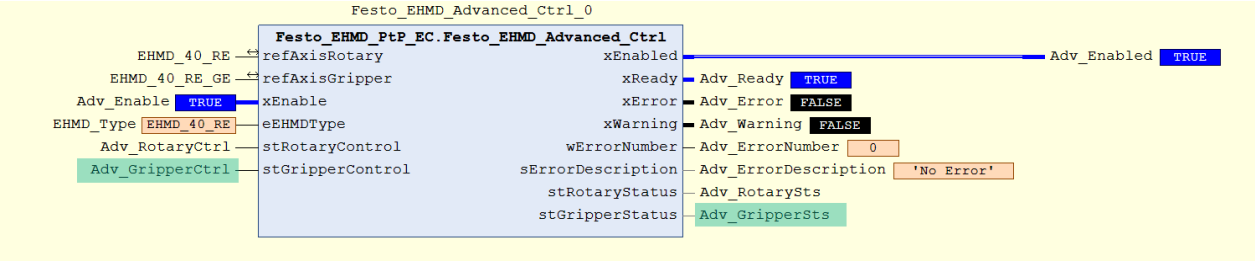
After

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stForceControl	ForceControl				Structure Containing P...meters Related to F...
stJog	JogControl				Structure Containing Parameters Related to J...
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	-0.007499			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.004784			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Toggle the **xEnableAxis** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to enable the EHMD module gripper axis.
2. Once the axis is enabled successfully, the monitoring tag element of the **GripperAdvancedStatus** structure **xAxisEnabled** will be set to **TRUE**.

6.2.12 EHMD Gripper Axis Homing



Device.Application.PLC_PRG

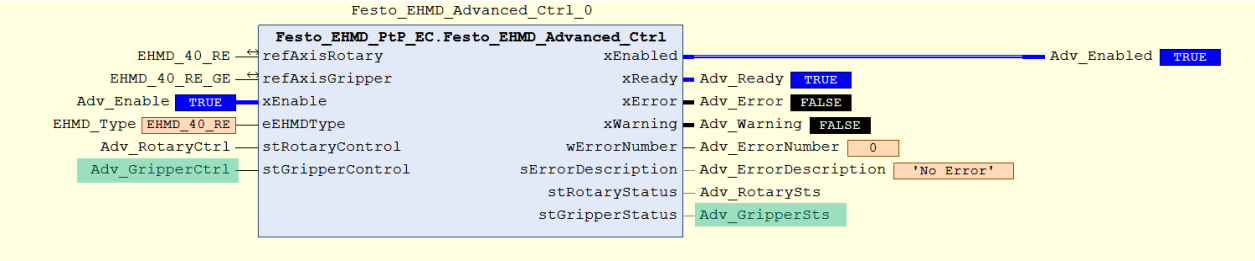
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
rAxisZeroPoint		REAL	0			Absolute Position if Re...ence Switch Detecte...
diHomingMethod		DINT	0			Enumeration of the Su...orted Homing Metho...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	-0.00699999975			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	-0.000299			EHMD Gripper Axis Cu...nt Torque in User Unit

Device.Application.PLC_PRG

Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
rAxisZeroPoint		REAL	0			Absolute Position if Re...ence Switch Detecte...
diHomingMethod		DINT	0			Enumeration of the Su...orted Homing Metho...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	-0.003588			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Select the **Homing_Mode** as the operation mode in the **eOperationMode** control tag element of the **GripperAdvancedCtrl** structure.
2. Enter the required **Zero Point Offset** & **Homing Method** values in the **HomingControl** structure elements of the **GripperAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis homing.
4. Once the axis is homed successfully, the monitoring tag elements of the **GripperAdvancedStatus** structure **xHomingValid** will be set to **TRUE** and **eActOperationMode** changed to **Homing_Mode**.

6.2.13 EHMD Gripper Axis Absolute Positioning Mode



Device.Application.PLC_PRG

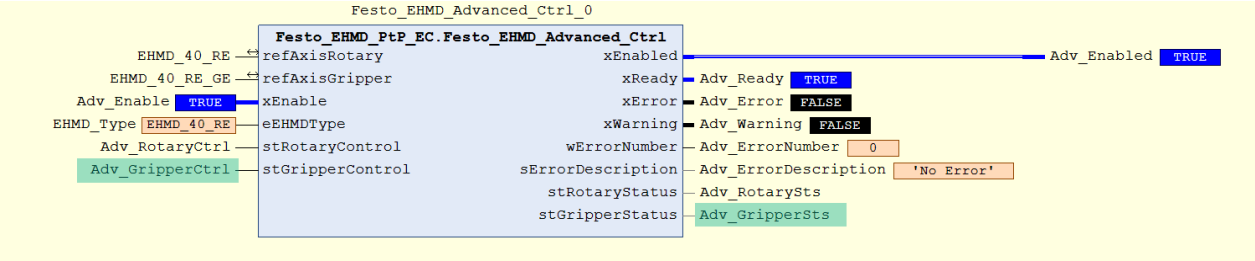
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	0			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0			Maximum Deceleration Value in User Unit
rJerk		REAL	0			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.000559			EHMD Gripper Axis Current Force in User Unit

Device.Application.PLC_PRG

Expression	After	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Move_Absolute			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	4.5			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	0.01			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0.2			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0.2			Maximum Deceleration Value in User Unit
rJerk		REAL	2			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Move_Absolute			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	4.5			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.000774			EHMD Gripper Axis Current Force in User Unit

1. Select the **Move_Absolute** as the operation mode in the **eOperationMode** control tag element of the **GripperAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Position, Velocity, Acceleration, Deceleration, Jerk, Direction** and **BufferMode** values in the **PositionControl** structure elements of the **GripperAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis absolute movement.
4. Once the axis absolute movement has started, the monitoring tag elements of the **GripperAdvancedStatus** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **GripperAdvancedStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOperationMode** changed to **Move_Absolute**.
6. The monitoring tag elements of the **GripperAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module gripper axis.

6.2.14 EHMD Gripper Axis Relative Positioning Mode



Device.Application.PLC_PRG

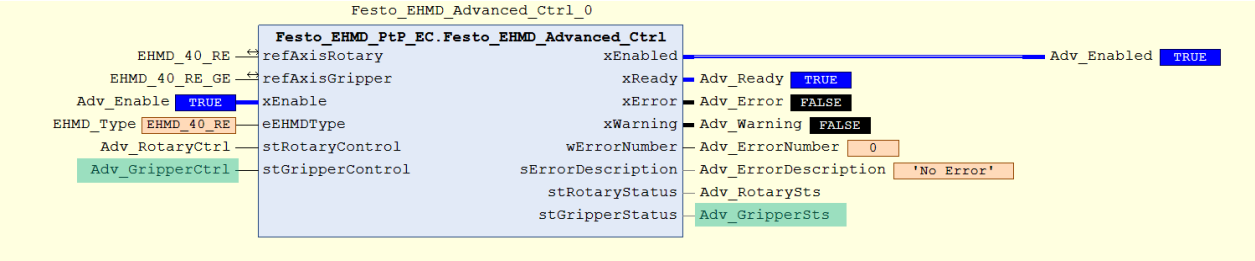
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	0			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0			Maximum Deceleration Value in User Unit
rJerk		REAL	0			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.000559			EHMD Gripper Axis Current Force in User Unit

Device.Application.PLC_PRG

Expression	After	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Move_Relative			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
xContinuousUpdate		BOOL	FALSE			
rPosition		REAL	3			Absolute or Relative Di...nce Value of the Mo...
rVelocity		REAL	1			Maximum Target Velocity Value in User Unit
rAcceleration		REAL	0.2			Maximum Acceleration Value in User Unit
rDeceleration		REAL	0.2			Maximum Deceleration Value in User Unit
rJerk		REAL	2			Maximum Jerk Value in User Unit
eDirection		MC_DIRECTION	mcNormal			Enumeration to Define... Positioning Directio...
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Move_Relative			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	3.00000024			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.000731			EHMD Gripper Axis Current Force in User Unit

1. Select the **Move_Relative** as the operation mode in the **eOperationMode** control tag element of the **GripperAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Position, Velocity, Acceleration, Deceleration, Jerk, Direction** and **BufferMode** values in the **PositionControl** structure elements of the **GripperAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis relative movement.
4. Once the axis absolute movement has started, the monitoring tag elements of the **GripperAdvancedStatus** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **GripperAdvancedStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOperationMode** changed to **Move_Relative**.
6. The monitoring tag elements of the **GripperAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module gripper axis.

6.2.15 EHMD Gripper Axis Force Control Mode



Device.Application.PLC_PRG

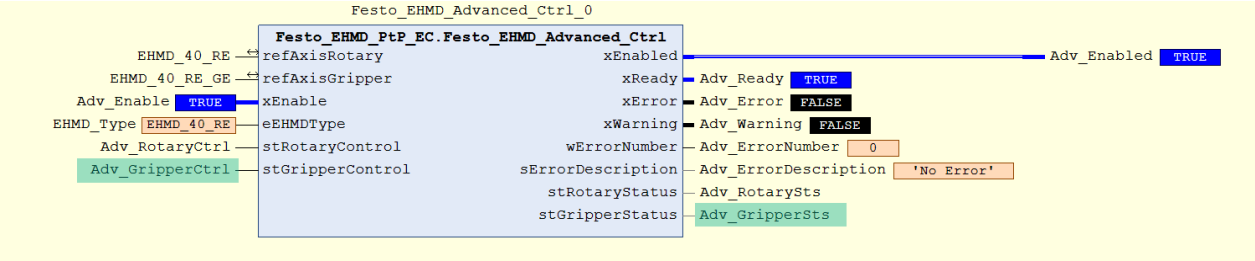
Expression	Before	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
xContinuousUpdate		BOOL	FALSE			
rForce		REAL	0			Value of the Force at the gear shaft in Nm
rForceRamp		REAL	0			Maximum Time Deriva...f the Set Value of t...
rVelocity		REAL	0			Maximum Target Velocity Value in User Unit
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
xStrokeLimitation		BOOL	FALSE			Activation of the Softw... Limit Positions | TR...
rNegativeStrokeLimit		REAL	0			Negative Software Lim...osition Value in User...
rPositiveStrokeLimit		REAL	0			Positive Software Limit...sition Value in User ...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	TRUE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.000473			EHMD Gripper Axis Current Force in User Unit

Device.Application.PLC_PRG

Expression	After	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0		Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	TRUE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Force_Control			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
xContinuousUpdate		BOOL	FALSE			
rForce		REAL	0.01			Value of the Force at the gear shaft in Nm
rForceRamp		REAL	0.001			Maximum Time Deriva...f the Set Value of t...
rVelocity		REAL	0.02			Maximum Target Velocity Value in User Unit
eBufferMode		MC_BUFFER_MODE	mcAborting			Enumeration to Define... Chronological Sequ...
xStrokeLimitation		BOOL	FALSE			Activation of the Softw... Limit Positions | TR...
rNegativeStrokeLimit		REAL	0			Negative Software Lim...osition Value in User...
rPositiveStrokeLimit		REAL	0			Positive Software Limit...sition Value in User ...
stJog		JogControl				Structure Containing Parameters Related to J...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Force_Control			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	TRUE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	3.00000024			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	-0.000344			EHMD Gripper Axis Current Force in User Unit

1. Select the **Force_Control** as the operation mode in the **eOperationMode** control tag element of the **GripperAdvancedCtrl** structure.
2. Enter the required **Continuous Update, Force, Force Ramp, Velocity, Buffer Mode, Stroke Limitation, Negative** and **Positive Stroke Limit** values in the **ForceControl** structure elements of the **GripperAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis force control mode.
4. Once the axis force control has started, the monitoring tag elements of the **GripperAdvancedStatus** structure **xInForce** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Force_Control**.
5. The monitoring tag elements of the **GripperAdvancedStatus** structure **rActualPosition** & **rActualForce** will be update to actual position & force values of the EHMD module gripper axis.
6. Since **Force Control** mode is a continuous motion, the user has to stop the axis manually by toggling the **xStopAxis** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to stop the EHMD module gripper axis.

6.2.16 EHMD Gripper Axis Jog Mode



Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0 **Before**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable	BOOL	TRUE			
Adv_Enabled	BOOL	TRUE			
EHMD_Type	EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl	Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode	GRIPPERADVOPMODE	Homing_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode	BOOL	FALSE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming	HomingControl				Structure Containing P...meters Related to H...
stMovePosition	PositionControl				Structure Containing P...meters Related to P...
stForceControl	ForceControl				Structure Containing P...meters Related to F...
stJog	JogControl				Structure Containing Parameters Related to J...
xJogPositive	BOOL	FALSE			Jog EHMD in Positive Direction
xJogNegative	BOOL	FALSE			Jog EHMD in Negative Direction
eJogMode	MC_JOG_MODE	mcDefault			Enumeration to Select...ferent Jog Mode in P...
Adv_Ready	BOOL	TRUE			
Adv_Error	BOOL	FALSE			
Adv_Warning	BOOL	FALSE			
Adv_ErrorNumber	WORD	0			
Adv_ErrorDescription	STRING	'No Error'			
Adv_RotarySts	Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts	Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERADVOPMODE	Homing_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.001161			EHMD Gripper Axis Current Force in User Unit

Device.Application.PLC_PRG

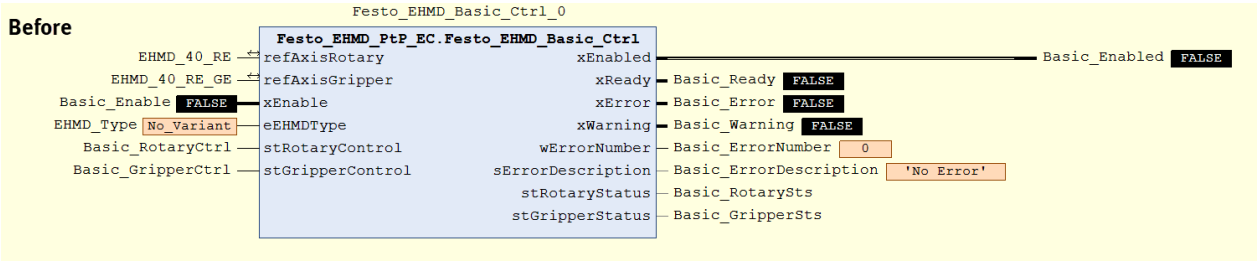
Expression		Type	Value	Prepared value	Address	Comment
Festo_EHMD_Advanced_Ctrl_0	**After**	Festo_EHMD_PtP_EC.Festo_EHMD_Advanced_Ctrl				
Adv_Enable		BOOL	TRUE			
Adv_Enabled		BOOL	TRUE			
EHMD_Type		EHMD_VARIANTS	EHMD_40_RE_GE			
Adv_RotaryCtrl		Festo_EHMD_PtP_EC.RotaryAdvancedCtrl				
Adv_GripperCtrl		Festo_EHMD_PtP_EC.GripperAdvancedCtrl				
xEnableAxis		BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis		BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis		BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError		BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
eOperationMode		GRIPPERADVOPMODE	Jog_Mode			Enumeration of Opera... Mode Selection of t...
xExecuteMode		BOOL	TRUE			Start the EHMD Rotary...ripper Axis Motion T...
stHoming		HomingControl				Structure Containing P...meters Related to H...
stMovePosition		PositionControl				Structure Containing P...meters Related to P...
stForceControl		ForceControl				Structure Containing P...meters Related to F...
stJog		JogControl				Structure Containing Parameters Related to J...
xJogPositive		BOOL	TRUE			Jog EHMD in Positive Direction
xJogNegative		BOOL	FALSE			Jog EHMD in Negative Direction
eJogMode		MC_JOG_MODE	mcDefault			Enumeration to Select...ferent Jog Mode in P...
Adv_Ready		BOOL	TRUE			
Adv_Error		BOOL	FALSE			
Adv_Warning		BOOL	FALSE			
Adv_ErrorNumber		WORD	0			
Adv_ErrorDescription		STRING	'No Error'			
Adv_RotarySts		Festo_EHMD_PtP_EC.RotaryAdvancedStatus				
Adv_GripperSts		Festo_EHMD_PtP_EC.GripperAdvancedStatus				
xAxisEnabled		BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone		BOOL	FALSE			
xBusy		BOOL	TRUE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError		BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning		BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError		BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber		WORD	0			Diagnostic Error Number
sErrorDescription		STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode		GRIPPERADVOPMODE	Jog_Mode			Enumeration of Curre...perating Mode of th...
xHomingValid		BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction		BOOL	TRUE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete		BOOL	FALSE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted		BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce		BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition		REAL	1.641			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity		REAL	1			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce		REAL	0.001376			EHMD Gripper Axis Current Force in User Unit

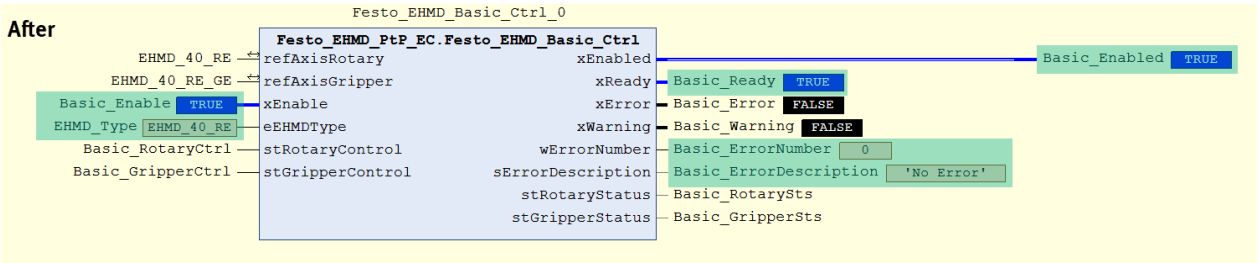
1. Select the **Jog_Mode** as the operation mode in the **eOperationMode** control tag element of the **GripperAdvancedCtrl** structure.
2. Enter the required **Jog Mode** value in the **eJogMode** element of the **JogControl** structure element of the **GripperAdvancedCtrl** structure.
3. Toggle the **xExecuteMode** control tag element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis Jog control mode.
4. Toggle the **xJogPositive** or **xJogNegative** elements of the **JogControl** structure element of the **GripperAdvancedCtrl** structure from **FALSE** to **TRUE** to move the EHMD module gripper axis in either positive or negative direction respectively.
5. Once the axis jog control has started, the monitoring tag elements of the **GripperAdvancedStatus** structure **xBusy** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Jog_Mode**.
6. The monitoring tag elements of the **GripperAdvancedStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module gripper axis.
7. Toggle the **xExecuteMode** control tag element, **xJogPositive** and **xJogNegative** elements of the **JogControl** structure element of the **GripperAdvancedCtrl** structure from **TRUE** to **FALSE** to stop the **Jog Mode** of the EHMD module gripper axis.

6.3 Sample Code for the EHMD Module Control using Festo_EHMD_Basic_Ctrl Block

This chapter explains how to control the Rotary Gripper Module EHMD decapping application with basic options.

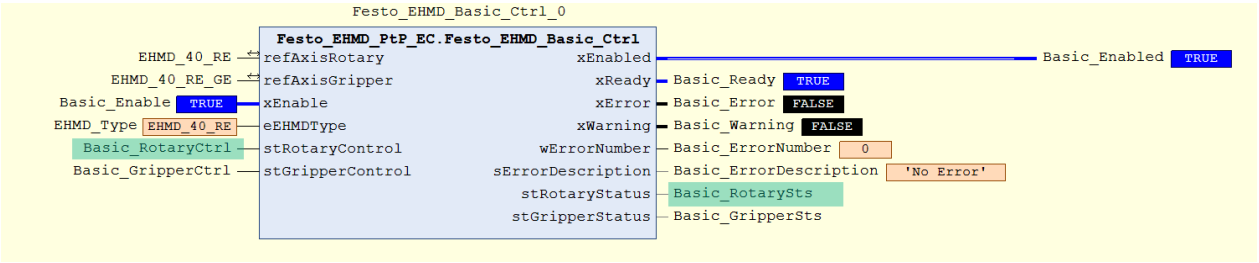
6.3.1 Initialize the Festo_EHMD_Basic_Ctrl Block





1. Select the connected EHMD Module type in the **eEHMDType** input tag.
2. Toggle the **xEnable** control tag from **FALSE** to **TRUE** to enable the block and start limit parameters of the EHMD module.
3. Once the block is enabled is successfully, the monitoring tag **xEnabled** will be set to **TRUE**.
4. Once the limit parameters are successfully read, the monitoring tag **xReady** will be set to **TRUE**.

6.3.2 EHMD Rotary Axis Initialization



Before

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	TRUE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.000215000007			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

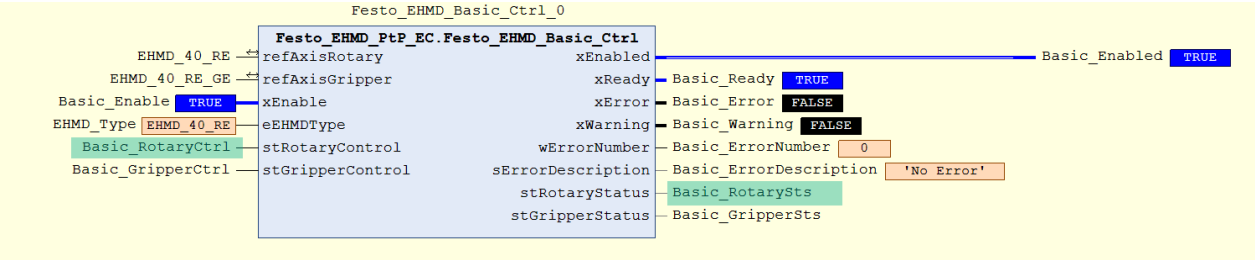
After

Device.Application.PLC_PRG

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	TRUE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-4.3E-05			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Toggle the **xAckError** control tag element of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to re-initialize the EHMD module rotary axis.
2. Once the axis is reinitialized successfully, the monitoring tag element of the **RotaryBasicStatus** structure **xAxisError** will be set to **FALSE**.

6.3.3 EHMD Rotary Axis Enable



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.000129			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

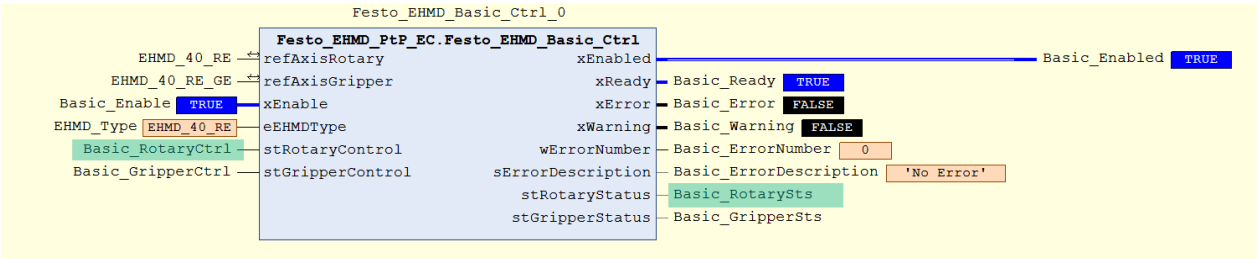
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	8.6E-05			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Toggle the **xEnableAxis** control tag element of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to enable the EHMD module rotary axis.
2. Once the axis is enabled successfully, the monitoring tag element of the **RotaryBasicStatus** structure **xAxisEnabled** will be set to **TRUE**.

6.3.4 EHMD Rotary Axis Homing



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	0			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	8.6E-05			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

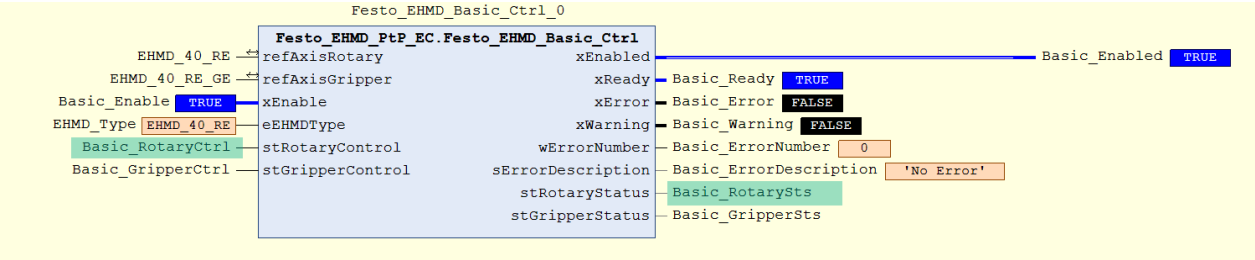
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	TRUE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	3.02400017			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-8.6E-05			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Toggle the **xHoming** control tag element of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis homing.
2. Once the axis is homed successfully, the monitoring tag elements of the **RotaryBasicStatus** structure **xHomingValid** will be set to **TRUE**.

6.3.5 EHMD Rotary Axis Velocity Control Mode



Device.Application.PLC_PRG

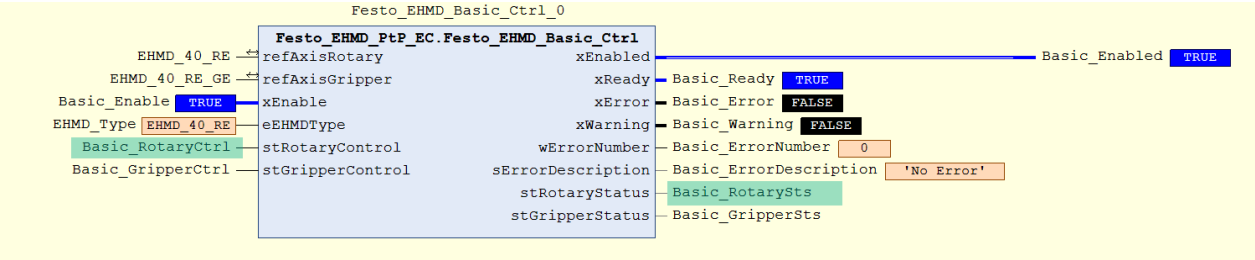
Expression **Before**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.002392			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

Device.Application.PLC_PRG

Expression **After**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	Velocity_Control			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	TRUE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	75			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	500			Maximum Acceleration Value in User Unit
rDeceleration	REAL	500			Maximum Deceleration Value in User Unit
rJerk	REAL	5000			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	Velocity_Control			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	TRUE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	TRUE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	4.735524			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	86.771			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.002392			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Select the **Velocity_Control** as the operation mode in the **eOperationMode** control tag element of the **RotaryBasicCtrl** structure.
2. Enter the required **Velocity, Acceleration, Deceleration** and **Jerk** values in the **RotaryBasicCtrl** structure elements.
3. Toggle the **xDecap** or **xCap** control tag elements of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis decapping or capping application in velocity control mode.
4. Once the axis velocity control has started, the monitoring tag elements of the **RotaryBasicStatus** structure **xInVelocity** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Velocity_Control**.
5. The monitoring tag elements of the **RotaryBasicStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module rotary axis.
6. Since **Velocity Control** mode is a continuous motion, the user has to stop the axis manually by toggling the **xStopAxis** control tag element of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to stop the EHMD module rotary axis.

6.3.6 EHMD Rotary Axis Revolution Control Mode



Device.Application.PLC_PRG

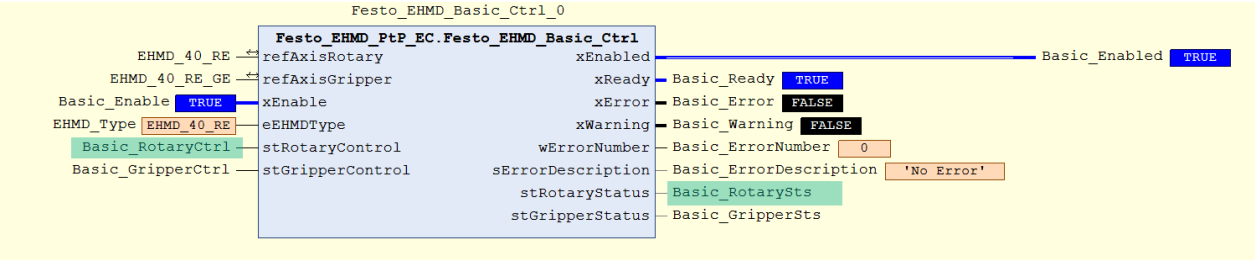
Expression **Before**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.002392			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

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Expression **After**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	Revolution_Control			
xDecap	BOOL	TRUE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	10			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	75			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	500			Maximum Acceleration Value in User Unit
rDeceleration	REAL	500			Maximum Deceleration Value in User Unit
rJerk	REAL	5000			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	Revolution_Control			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	-9.999975			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-0.000598			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Select the **Revolution_Control** as the operation mode in the **eOperationMode** control tag element of the **RotaryBasicCtrl** structure.
2. Enter the required **Revolution, Velocity, Acceleration, Deceleration** and **Jerk** values in the **RotaryBasic-Ctrl** structure elements.
3. Toggle the **xDecap** or **xCap** control tag elements of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis decapping or capping application in revolution control mode.
4. Once the axis revolution control has started, the monitoring tag elements of the **RotaryBasicStatus** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **RotaryBasicStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOp-erationMode** changed to **Revolution_Control**.
6. The monitoring tag elements of the **RotaryBasicStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module rotary axis.

6.3.7 EHMD Rotary Axis Torque Control Mode



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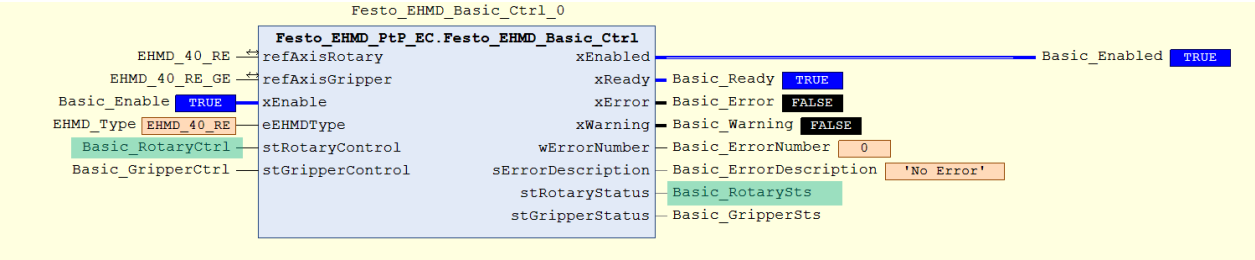
Expression **Before**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.002392			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

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Expression **After**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	Torque_Control			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	TRUE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	75			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0.3			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0.1			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	Torque_Control			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	TRUE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	TRUE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	6.810024			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.066079			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Select the **Torque_Control** as the operation mode in the **eOperationMode** control tag element of the **RotaryBasicCtrl** structure.
2. Enter the required **Torque, Torque Ramp** and **Velocity** values in the **RotaryBasicCtrl** structure elements.
3. Toggle the **xDecap** or **xCap** control tag elements of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis decapping or capping application in torque control mode.
4. Once the axis torque control has started, the monitoring tag elements of the **RotaryBasicStatus** structure **xInTorque** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Torque_Control**.
5. The monitoring tag elements of the **RotaryBasicStatus** structure **rActualPosition** & **rActualTorque** will be update to actual position & torque values of the EHMD module rotary axis.
6. Once the set **Torque** achieved, the EHMD module rotary axis will stop and, the monitoring tag elements of the **RotaryBasicStatus** structure **xMotionComplete** & **xDone** will be set to **TRUE**.

6.3.8 EHMD Rotary Axis Search Function



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	FALSE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	0			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	2.4E-05			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.002392			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

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After - 270° Negative Rotation

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	Search_Function			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	TRUE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	5			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0.3			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0.1			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	TRUE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	Search_Function			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	FALSE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	-0.748475			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	-0.000598			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

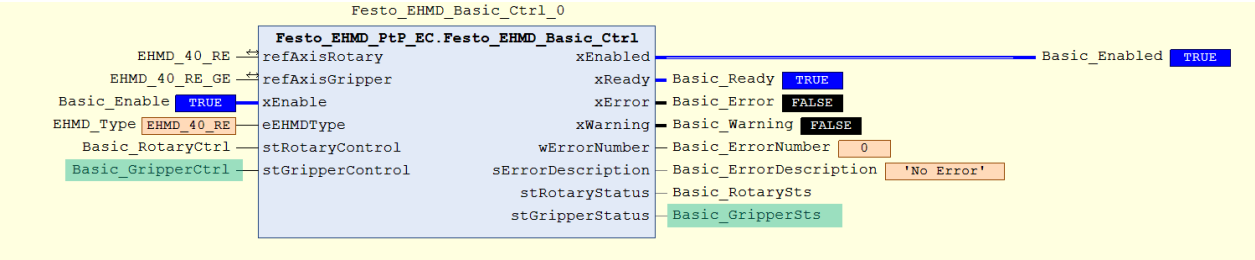
Device.Application.PLC_PRG

After - Positive Rotation Torque Control

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Rota...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Rotary...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Rotar...xis Motion | TRUE =...
xAckError	BOOL	FALSE			Reset the EHMD Rotar...is Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Rotary Homing ...mand | TRUE = Sta...
eOperationMode	ROTARYBASICOPMODE	Search_Function			
xDecap	BOOL	FALSE			EHMD Rotary Decappi...unction Command | ...
xCap	BOOL	FALSE			EHMD Rotary Capping...nction Command | T...
xSearch	BOOL	TRUE			EHMD Rotary Search F...ction Command | TR...
rRevolution	REAL	0			Relative Distance Valu... the Motion for EHM...
rVelocity	REAL	5			Maximum Target Velo... Value for EHMD Rot...
rTorque	REAL	0.3			Setpoint Torque at the Gear Shaft for EHMD ...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rTorqueRamp	REAL	0.1			Maximum Time Deriva...f the Set Value of t...
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Rotary Axis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Rotary Axis Mot...Task is Not Yet Com...
xError	BOOL	FALSE			An Error Occured Duri...HMD Rotary Axis Pr...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...nt on the EHMD Rot...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Rotary ...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	ROTARYBASICOPMODE	Search_Function			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Rotary Axis is Moving
xMotionComplete	BOOL	FALSE			TRUE = EHMD Rotary ... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Rotary ... Task Aborted by A...
xInVelocity	BOOL	FALSE			TRUE = EHMD Rotary ... Target Velocity Re...
xInTorque	BOOL	TRUE			TRUE = EHMD Rotary ... Target Torque Rea...
rActualPosition	REAL	1.49702394			EHMD Rotary Axis Current Position in User Unit
rActualVelocity	REAL	0			EHMD Rotary Axis Current Velocity in User Unit
rActualTorque	REAL	0.066079			EHMD Rotary Axis Current Torque in User Unit
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				

1. Select the **Search_Function** as the operation mode in the **eOperationMode** control tag element of the **RotaryBasicCtrl** structure.
2. Enter the required **Torque, Torque Ramp** and **Velocity** values in the **RotaryBasicCtrl** structure elements.
3. Toggle the **xSearch** control tag element of the **RotaryBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module rotary axis search function.
4. Once the axis search function has started, first the EHMD module rotary axis will rotate 270 degree in negative direction.
5. The monitoring tag elements of the **RotaryBasicStatus** structure **eActOperationMode** changed to **Search_Function** and **rActualPosition** & **rActualTorque** will be update to actual position value of the EHMD module rotary axis.
6. Once the rotation is completed, the EHMD module rotary axis will start rotate in positive direction with the torque control mode.
7. Once the axis torque control has started, the monitoring tag elements of the **RotaryBasicStatus** structure **xInTorque** will be set to **TRUE** and **rActualPosition** & **rActualTorque** will be update to actual position & torque values of the EHMD module rotary axis.
8. Once the set **Torque** achieved, the EHMD module rotary axis will stop and, the monitoring tag elements of the **RotaryBasicStatus** structure **xMotionComplete** & **xDone** will be set to **TRUE**.

6.3.9 EHMD Gripper Axis Initialization



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	TRUE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.00328900013			EHMD Gripper Axis Cu...nt Torque in User Unit

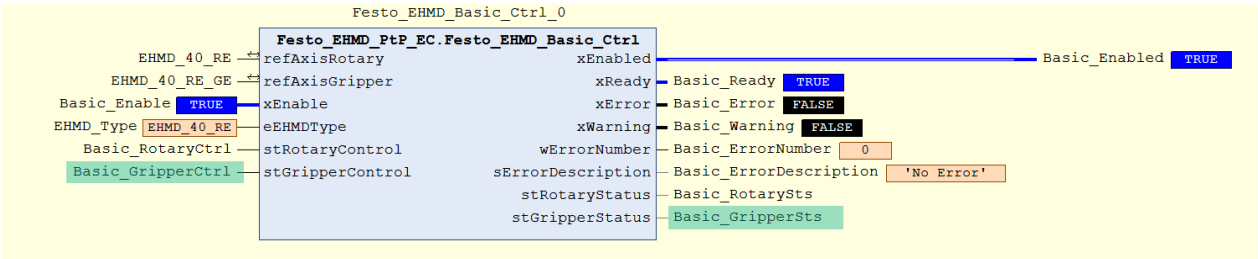
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	TRUE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.000299			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Toggle the **xAckError** control tag element of the **GripperBasicCtrl** structure from **FALSE** to **TRUE** to re-initialize the EHMD module gripper axis.
2. Once the axis is reinitialized successfully, the monitoring tag element of the **GripperBasicStatus** structure **xAxisError** will be set to **FALSE**.

6.3.10 EHMD Gripper Axis Enable



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	FALSE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	FALSE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	FALSE			
Basic_Ready	BOOL	FALSE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	FALSE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.000299			EHMD Gripper Axis Cu...nt Torque in User Unit

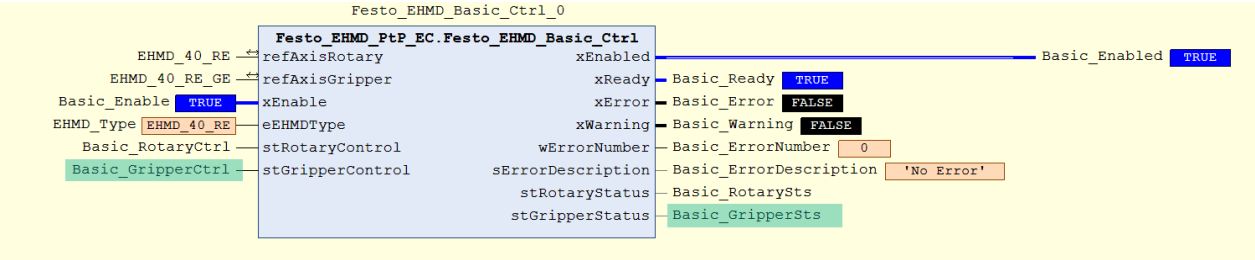
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	-0.00699999975			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.000897			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Toggle the **xEnableAxis** control tag element of the **GripperBasicCtrl** structure from **FALSE** to **TRUE** to enable the EHMD module gripper axis.
2. Once the axis is enabled successfully, the monitoring tag element of the **GripperBasicStatus** structure **xAxisEnabled** will be set to **TRUE**.

6.3.11 EHMD Gripper Axis Homing



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	FALSE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	-0.00699999975			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.000897			EHMD Gripper Axis Cu...nt Torque in User Unit

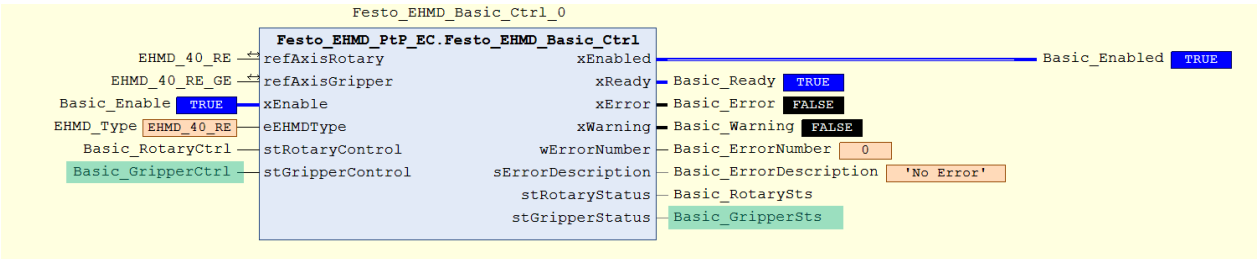
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	TRUE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	FALSE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	-0.00508300029			EHMD Gripper Axis Cu...nt Torque in User Unit

1. Toggle the **xHoming** control tag element of the **GripperBasicCtrl** structure from **FALSE** to **TRUE** to start the EHMD module gripper axis homing.
2. Once the axis is homed successfully, the monitoring tag elements of the **GripperBasicStatus** structure **xHomingValid** will be set to **TRUE**.

6.3.12 EHMD Gripper Axis Open-Close Mode



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.000731			EHMD Gripper Axis Current Force in User Unit

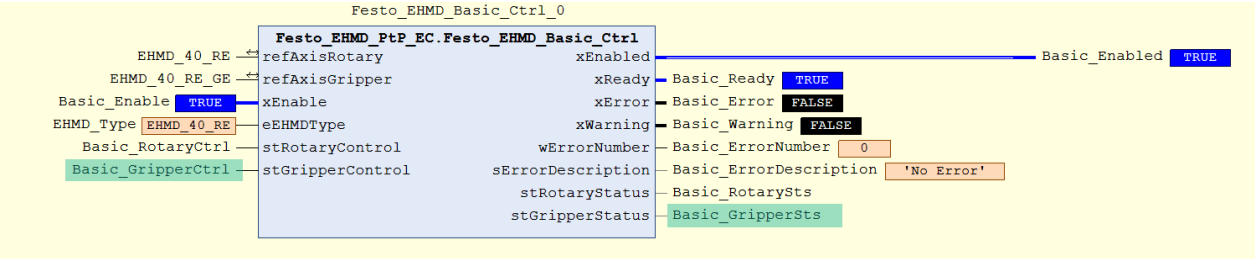
Device.Application.PLC_PRG

After

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	Open_Close			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	TRUE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	-0.15			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	4			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	1.5			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0.2			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0.2			Maximum Deceleration Value in User Unit
rJerk	REAL	2			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	Open_Close			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	4			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.000989			EHMD Gripper Axis Current Force in User Unit

1. Select the **Open_Close** as the operation mode in the **eOperationMode** control tag element of the **GripperBasicCtrl** structure.
2. Enter the required **Open Position, Close Position, Velocity, Acceleration, Deceleration** and **Jerk** values in the **GripperBasicCtrl** structure elements.
3. Toggle the **xGripperOpen** or **xGripperClose** control tag elements of the **GripperBasicCtrl** structure from **FALSE** to **TRUE** to start the open or close EHMD module gripper axis.
4. Once the axis open or close movement has started, the monitoring tag elements of the **GripperBasicStatus** structure **xBusy** & **xInAction** will be set to **TRUE**.
5. Once the axis is moved successfully, the monitoring tag elements of the **GripperBasicStatus** structure **xDone** & **xMotionComplete** will be set to **TRUE**, **xInAction** and **xBusy** will be set to **FALSE** and **eActOperationMode** changed to **Open_Close**.
6. The monitoring tag elements of the **GripperBasicStatus** structure **rActualPosition** & **rActualVelocity** will be update to actual position & velocity values of the EHMD module gripper axis.

6.3.13 EHMD Gripper Axis Force Control Mode



Device.Application.PLC_PRG

Before

Expression	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	FALSE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	0			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	No_Mode_Selected			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	FALSE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	FALSE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	0			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.000731			EHMD Gripper Axis Current Force in User Unit

Device.Application.PLC_PRG

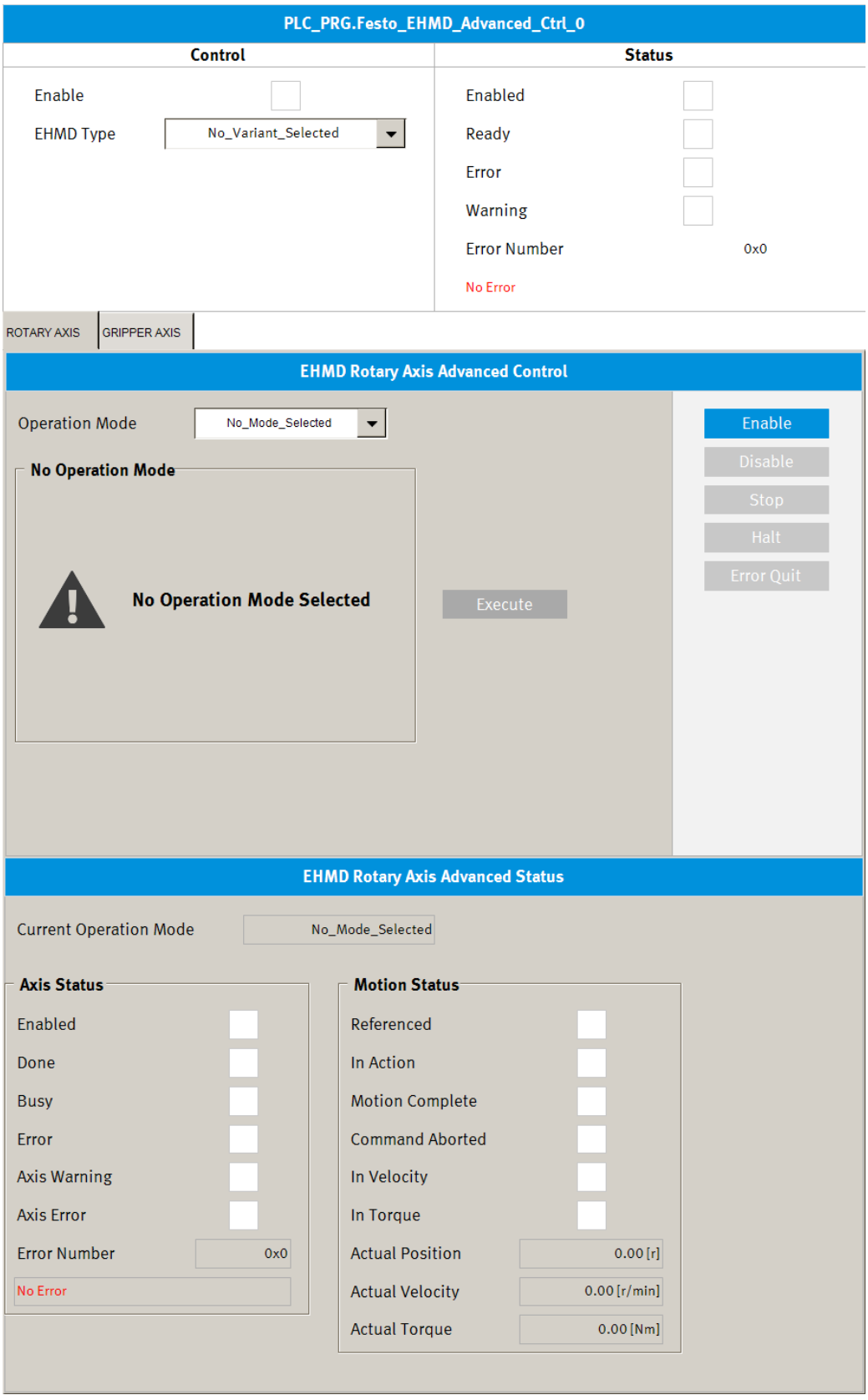
Expression **After**	Type	Value	Prepared value	Address	Comment
Festo_EHMD_Basic_Ctrl_0	Festo_EHMD_PtP_EC.Festo_EHMD_Basic_Ctrl				
Basic_Enable	BOOL	TRUE			
Basic_RotaryCtrl	Festo_EHMD_PtP_EC.RotaryBasicCtrl				
Basic_GripperCtrl	Festo_EHMD_PtP_EC.GripperBasicCtrl				
xEnableAxis	BOOL	TRUE			Enable the EHMD Grip...Axis | TRUE = Enabl...
xStopAxis	BOOL	FALSE			Stop the EHMD Grippe...is Motion | TRUE = ...
xHaltAxis	BOOL	FALSE			Pause the EHMD Gripp...Axis Motion | TRUE ...
xAckError	BOOL	FALSE			Reset the EHMD Gripp...xis Errors | TRUE = ...
xHoming	BOOL	FALSE			EHMD Gripper Homing...mand | TRUE = Sta...
eOperationMode	GRIPPERBASICOPMODE	Force_Control			
xGripperOpen	BOOL	FALSE			EHMD Gripper Open C...and | TRUE = Open...
xGripperClose	BOOL	TRUE			EHMD Gripper Close C...and | TRUE = Close...
rOpenPosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rClosePosition	REAL	0			Absolute or Relative Di...nce Value of the Mo...
rVelocity	REAL	1.5			Maximum Target Velo...Value for EHMD Grip...
rForce	REAL	0.03			Setpoint Force at the ...r Shaft for EHMD Gri...
rAcceleration	REAL	0			Maximum Acceleration Value in User Unit
rDeceleration	REAL	0			Maximum Deceleration Value in User Unit
rJerk	REAL	0			Maximum Jerk Value in User Unit
rForceRamp	REAL	0.003			Maximum Time Deriva...f the Set Value of t...
Basic_Enabled	BOOL	TRUE			
Basic_Ready	BOOL	TRUE			
Basic_Error	BOOL	FALSE			
Basic_Warning	BOOL	FALSE			
Basic_ErrorNumber	WORD	0			
Basic_ErrorDescription	STRING	'No Error'			
Basic_RotarySts	Festo_EHMD_PtP_EC.RotaryBasicStatus				
Basic_GripperSts	Festo_EHMD_PtP_EC.GripperBasicStatus				
xAxisEnabled	BOOL	TRUE			Status of EHMD Gripp...xis Ready and Switc...
xDone	BOOL	TRUE			
xBusy	BOOL	FALSE			EHMD Gripper Axis Mo... Task is Not Yet Co...
xError	BOOL	FALSE			An Error Occured Duri...HMD Gripper Axis P...
xAxisWarning	BOOL	FALSE			TRUE = Warning(s) Pr...t on the EHMD Grip...
xAxisError	BOOL	FALSE			TRUE = Error(s) Prese...n the EHMD Gripper...
wErrorNumber	WORD	0			Diagnostic Error Number
sErrorDescription	STRING	'No Error'			Error Report String Using the Error Number
eActOperationMode	GRIPPERBASICOPMODE	Force_Control			Enumeration of Curre...perating Mode of th...
xHomingValid	BOOL	TRUE			Absolute Reference Po...on is Known for the ...
xInAction	BOOL	FALSE			TRUE = EHMD Gripper Axis is Moving
xMotionComplete	BOOL	TRUE			TRUE = EHMD Gripper... Motion Task Compl...
xCommandAborted	BOOL	TRUE			TRUE = EHMD Gripper...s Task Aborted by A...
xInForce	BOOL	TRUE			TRUE = EHMD Gripper...s Target Torque Re...
rActualPosition	REAL	5.59400034			EHMD Gripper Axis Cu...t Position in User Unit
rActualVelocity	REAL	0			EHMD Gripper Axis Cu...t Velocity in User Unit
rActualForce	REAL	0.012986			EHMD Gripper Axis Current Force in User Unit

1. Select the **Force_Control** as the operation mode in the **eOperationMode** control tag element of the **GripperBasicCtrl** structure.
2. Enter the required **Force, Force Ramp** and **Velocity** values in the **ForceControl** structure elements of the **GripperBasicCtrl** structure.
3. Toggle the **xGripperOpen** or **xGripperClose** control tag elements of the **GripperBasicCtrl** structure from **FALSE** to **TRUE** to start the open or close EHMD module gripper axis with force control.
4. Once the axis force control has started, the monitoring tag elements of the **GripperBasicStatus** structure **xInForce** & **xInAction** will be set to **TRUE** and **eActOperationMode** changed to **Force_Control**.
5. The monitoring tag elements of the **GripperBasicStatus** structure **rActualPosition** & **rActualForce** will be update to actual position & torque values of the EHMD module gripper axis.
6. Once the set **Force** achieved, the EHMD module gripper axis will stop and, the monitoring tag elements of the **GripperBasicStatus** structure **xMotionComplete** & **xDone** will be set to **TRUE**..

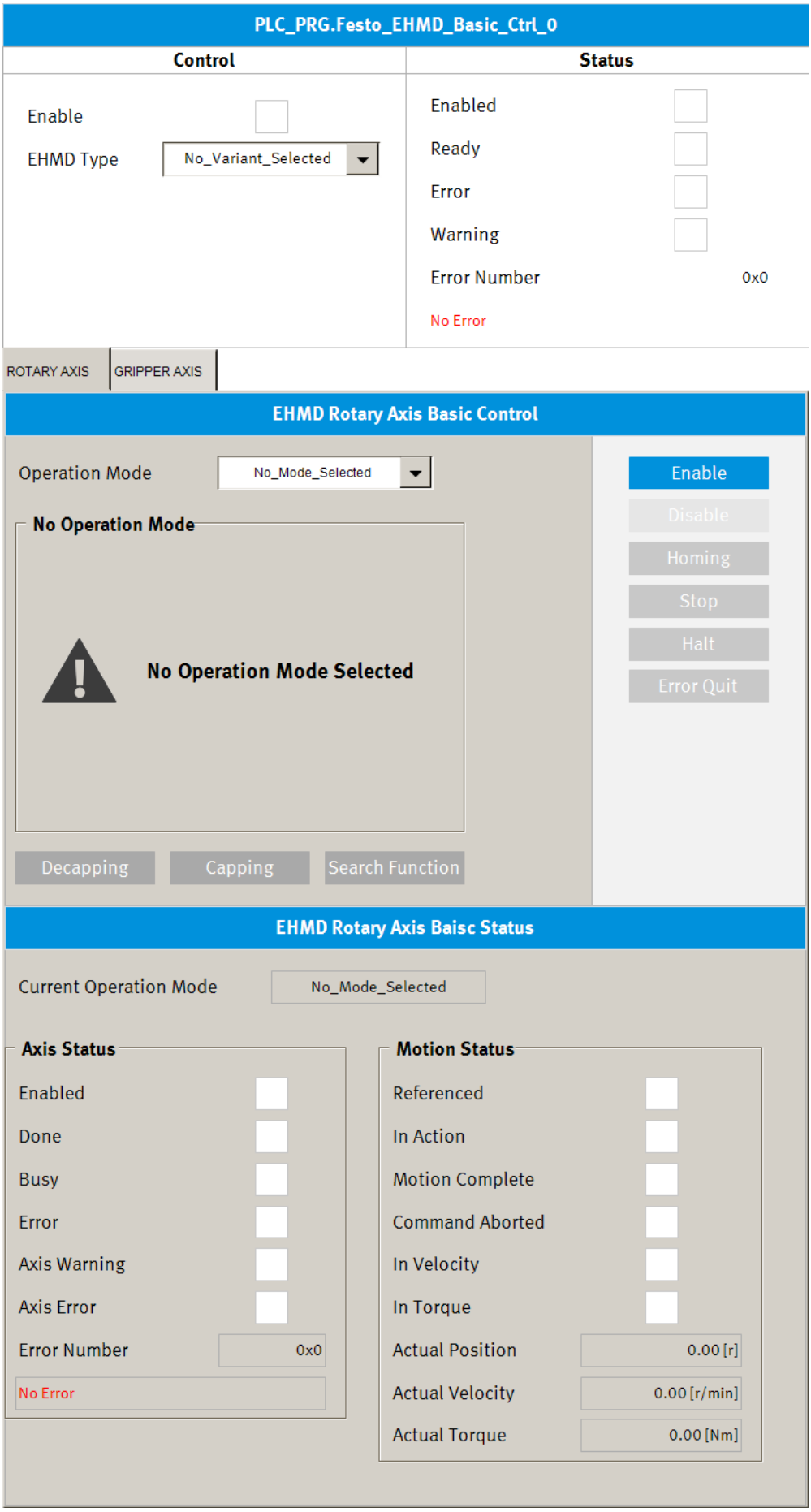
7 Visualizations in Festo_EHMD_PtP_EC Library

There are 3 visualizations available in the **Festo_EHMD_PtP_EC** library for the users to control the function blocks.

7.1 VISU_EHMD_ADVANCED_CONTROL



7.2 VISU_EHMD_BASIC_CONTROL



7.3 VISU_EHMD_PARAMETER

