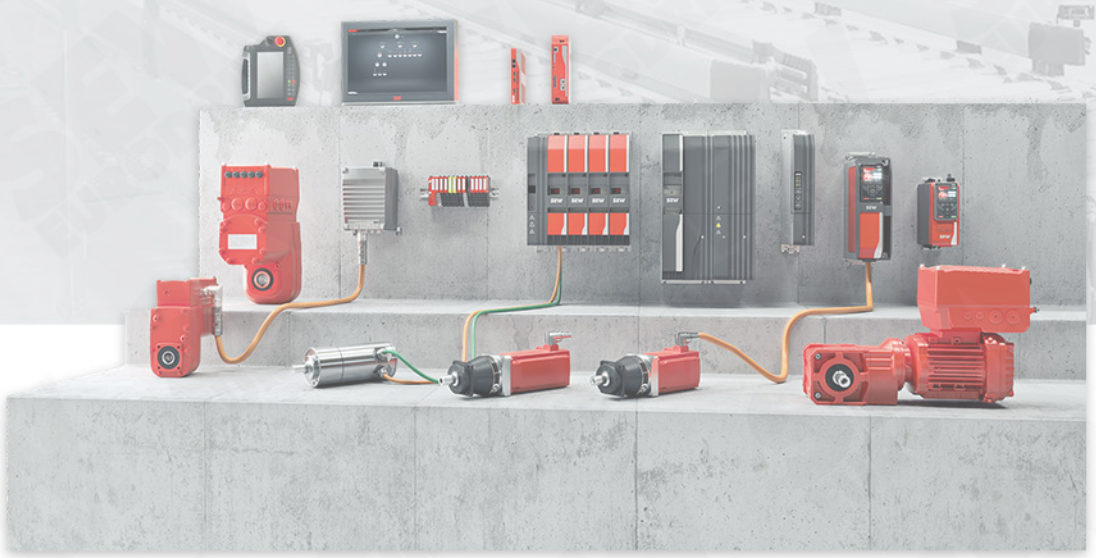
SEW EURODRIVE

Product Training Workbook



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MOVI-C® Automation System

MOVIKIT® RotaryKnife Software Module

Parameterization and Diagnostics

C140

DRIVE ACADEMY®

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Objectives of this training document
- In this workbook, you will learn to start up the cross cutter application on a training model and control it via the process data interface.

Additional documents
- MOVIKIT® RotaryKnife software module manual
- MOVIKIT® RotaryKnife brief information

The product training team will be happy to assist you if you have any questions or suggestions.

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Meaning of the symbols:

Operating notes

Information

Safety-relevant information

Tip

Diagnostics and troubleshooting

Practical task

Additional documentation

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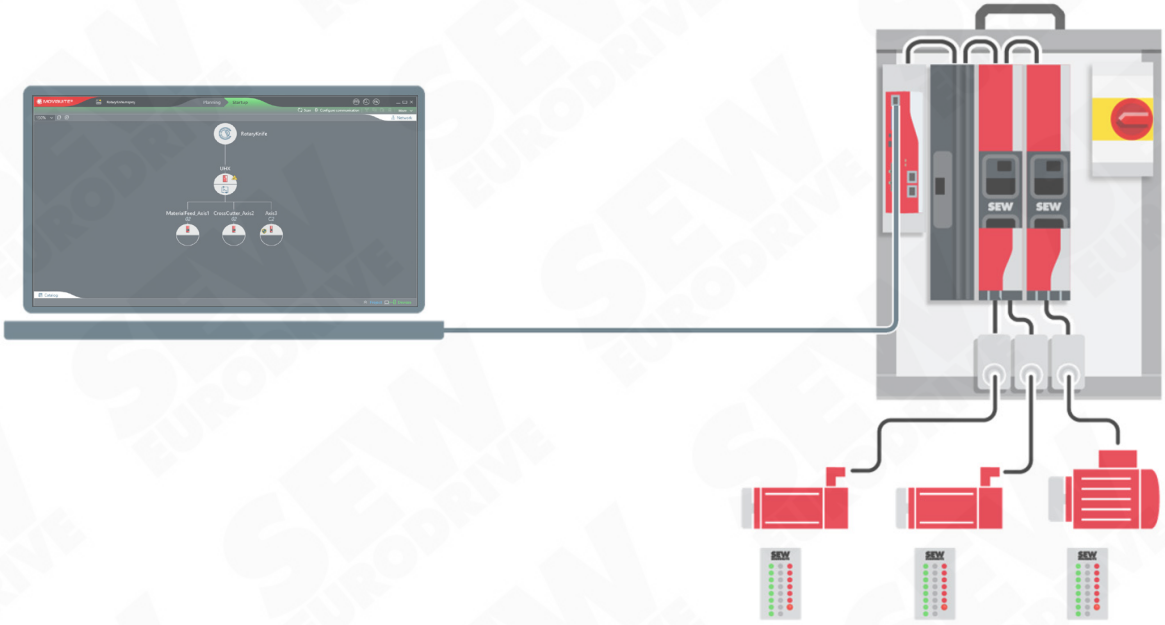
Workbook steps



1. **Introduction to the cross cutter application**
2. **Project setup and device configuration in MOVISUITE®**
3. **Master configuration (material feed)**
4. **Slave configuration (cross cutter)**
5. **Creation and Start of the IEC project**
6. **Control via the MOVILINK® Process data monitor**

For the following exercises, the drives must be started up and optimized correctly in CFC or VFC^{PLUS} control mode. For information on startup and operation of MOVISUITE®, refer to **Workbook C101 MOVISUITE® – Practice on the Inverter.**

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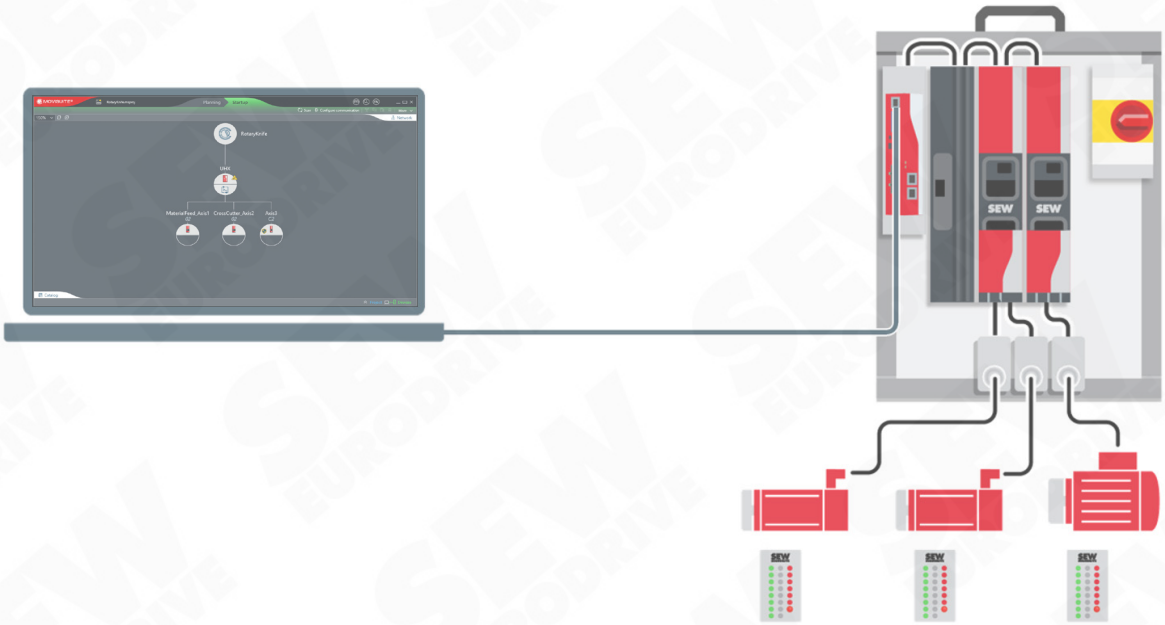
1 Introduction to the cross cutter application

Objectives:

- Being familiar with the cross cutter as a typical application for the MOVIKIT® RotaryKnife
- Being familiar with the system configuration of the training model and software used



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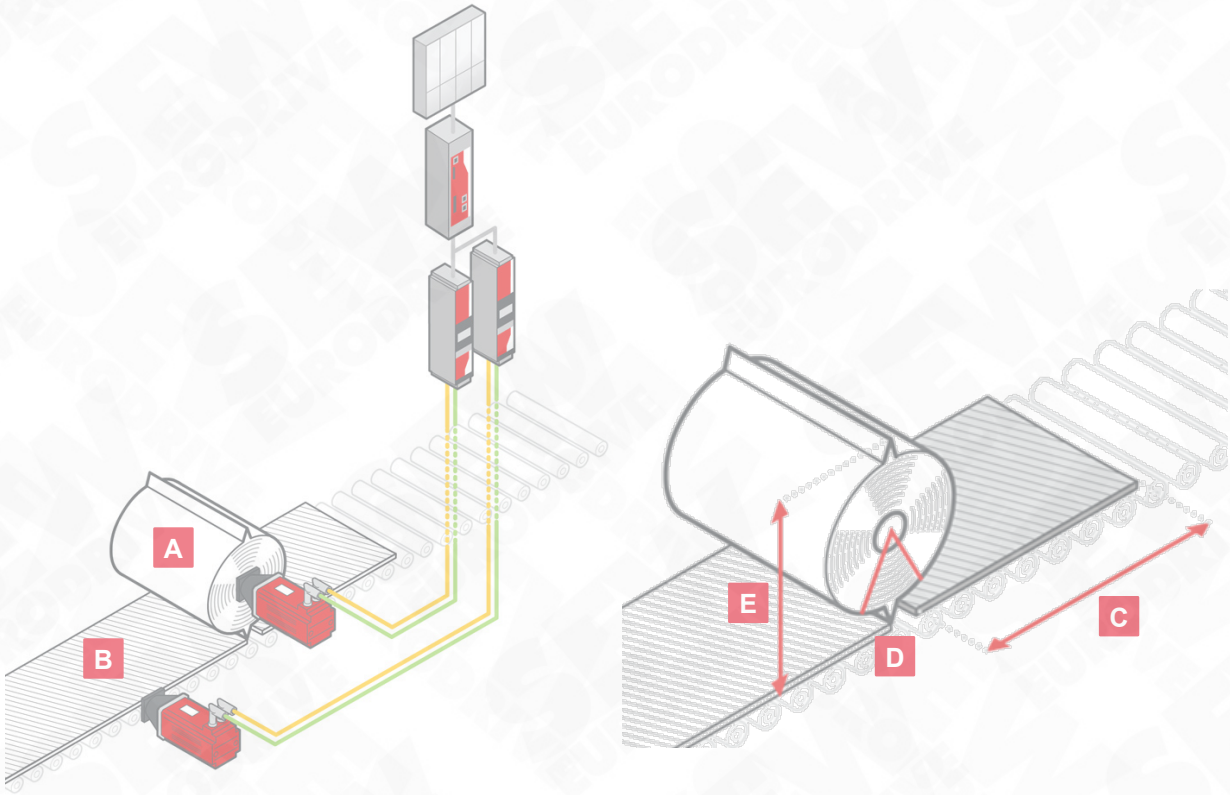
1.1 Cross cutter application



Application:
A common industrial application for the MOVIKIT® RotaryKnife is the cross cutter. It cuts thin material such as paper, cardboard, or metal into individual products without stopping the production line.

- **A** **Cross cutter:** The cross cutter consists of a cylinder with knife blades fastened along the longitudinal axis. While the cylinder is rotating, the knife cuts the material running under it.
- **B** **Material feed:** The material is continuously moved forward depending on the machine speed.
- **C** **Cutting length:** The cutting length can be influenced by the speed of the cross cutter. To adjust the cutting length, the cross cutter is decelerated or accelerated after the cut.
- **D** **Cutting position:** The cross cutter moves synchronously to the material at the cutting position or at a specific angle (synchronous angle).
- **E** **Knife diameter:** Diameter of the rotary knife when there are 2 Knifes

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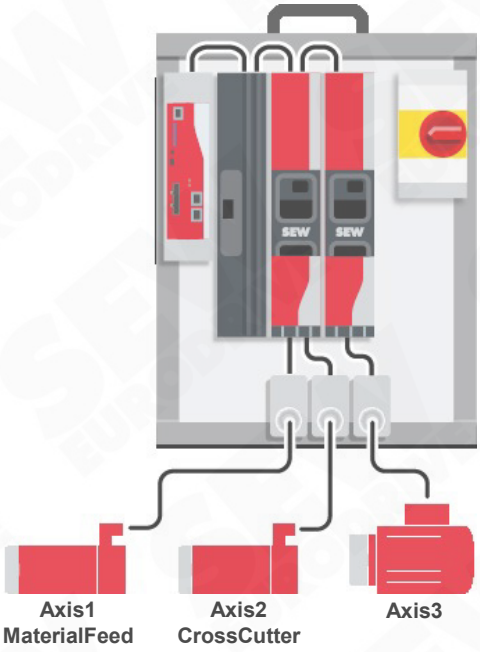
1.2 Training model



Axis1 / Master **MaterialFeed_Axis1**: Drive with motor encoder => MOVIKIT® Gearing
Axis2 / Slave **CrossCutter_Axis2**: Drive with motor encoder => MOVIKIT® RotaryKnife
Axis3: Drive with motor encoder => not used

If the training model is not available, the exercises can also be done using any MOVI-C® CONTROLLER and MOVIDRIVE® modular/system with drive. The hardware configuration must then be adapted according to the hardware being used. If no inverter/drive hardware is available, the axes can be operated in a simulation.

Software:

- MOVISUITE® 2.50
- IEC Editor 3.5.18.2
- MOVIKIT® RotaryKnife 9.0.16.200
- MOVIKIT® Gearing 9.0.22.200

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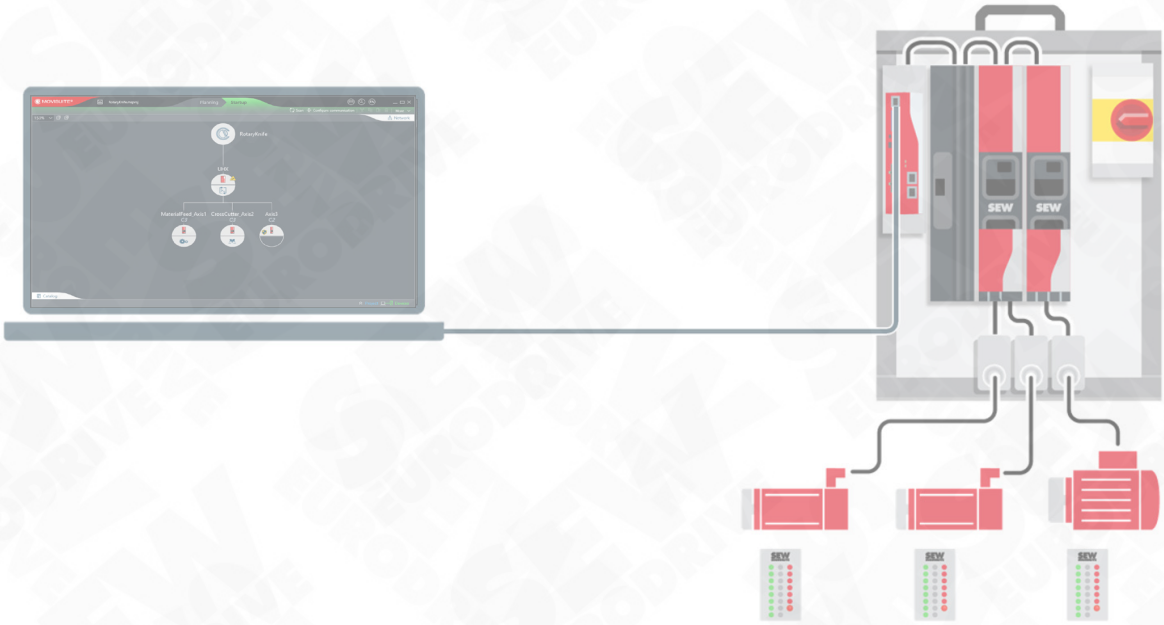
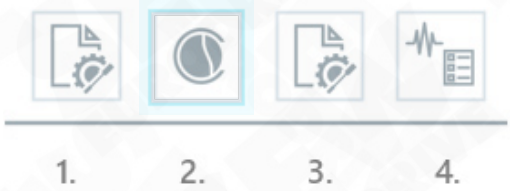
2 Project setup and device configuration in MOVISUITE®

Objectives:
- Being able to set up the MOVISUITE® project and configure the devices
- Being able to configure MOVIKIT® software modules





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2.1 Creating the MOVISUITE® project

1. Create a new project and rename the devices

1 Create a new project from network scan and save it as RotaryKnife.

2 Assign the names for the devices as shown.

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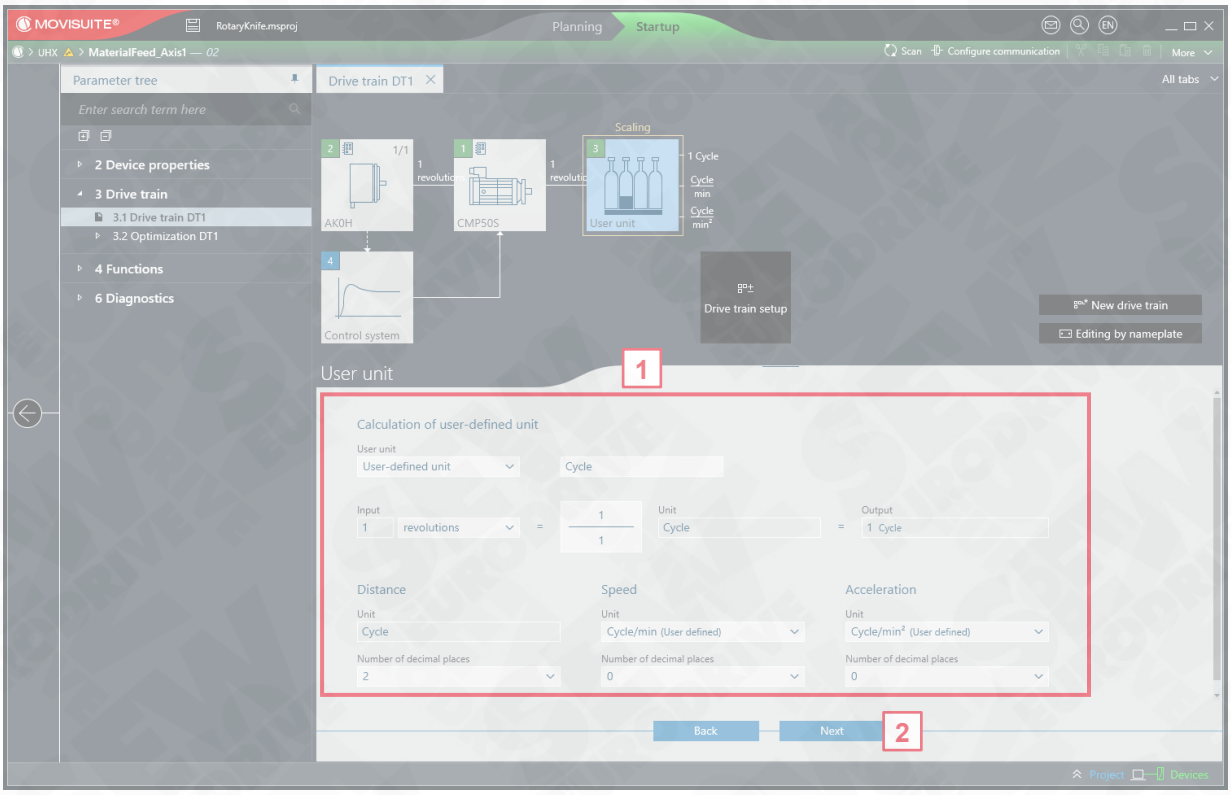
2.2 Configuring MaterialFeed_Axis1

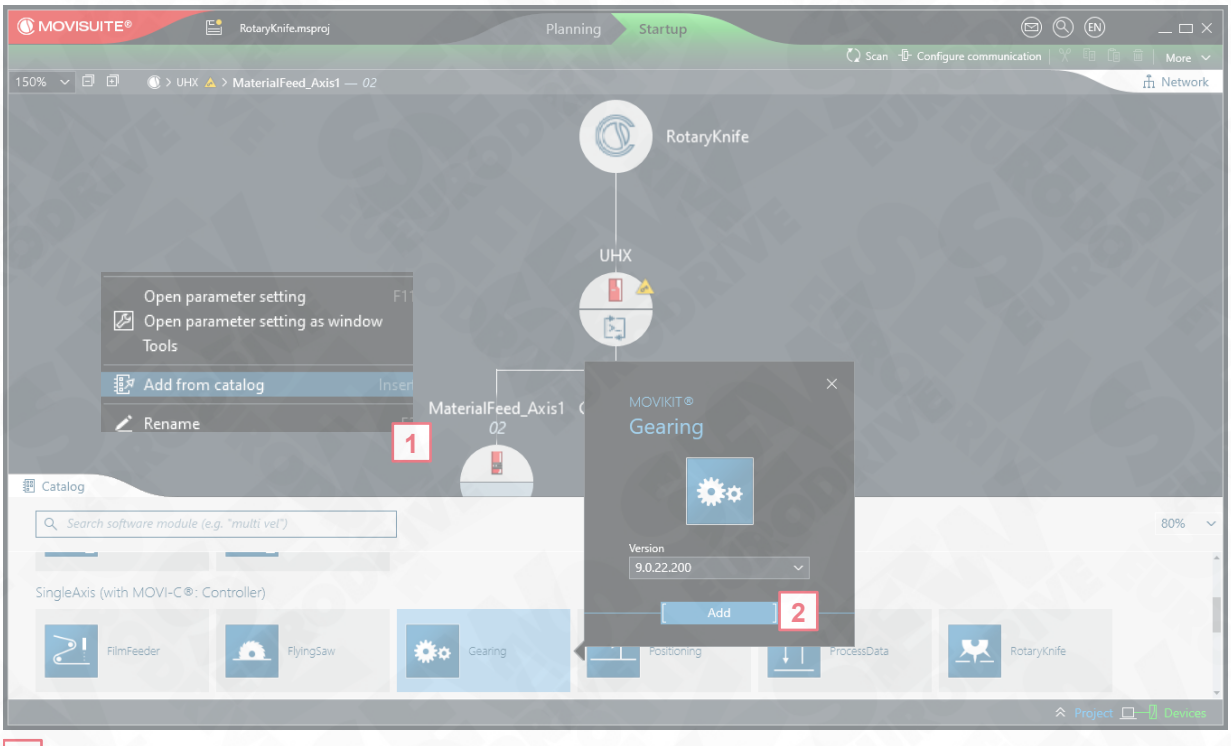
1. Configure the drive train



1 Configure the user units for the material feed as shown. The number of decimal places will be set automatically by the following MOVIKIT® software module.

2 Click **Next > Transfer data to device**.

2. Assign the MOVIKIT® Gearing software module



1 Right-click MaterialFeed_Axis1 and select **Add from catalog**.

2 Add MOVIKIT® Gearing, then reset the following error E-34.01.

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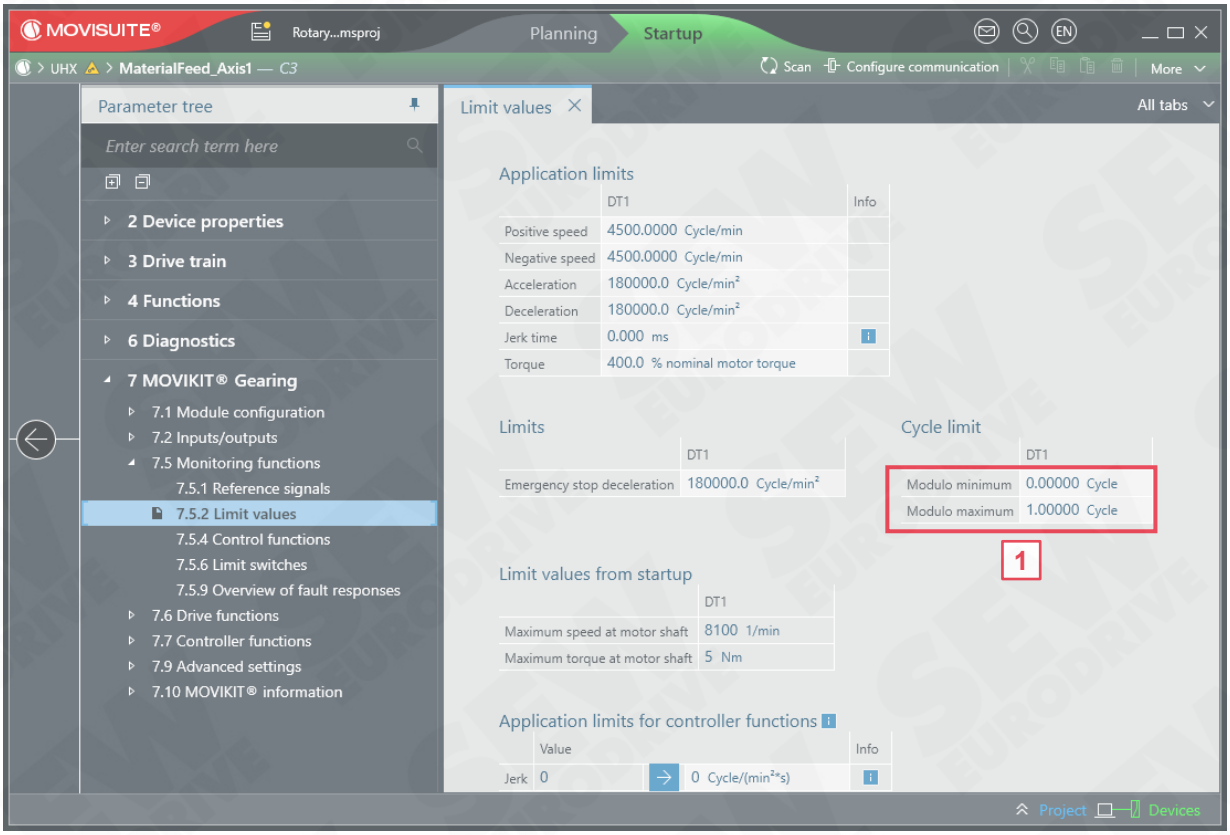
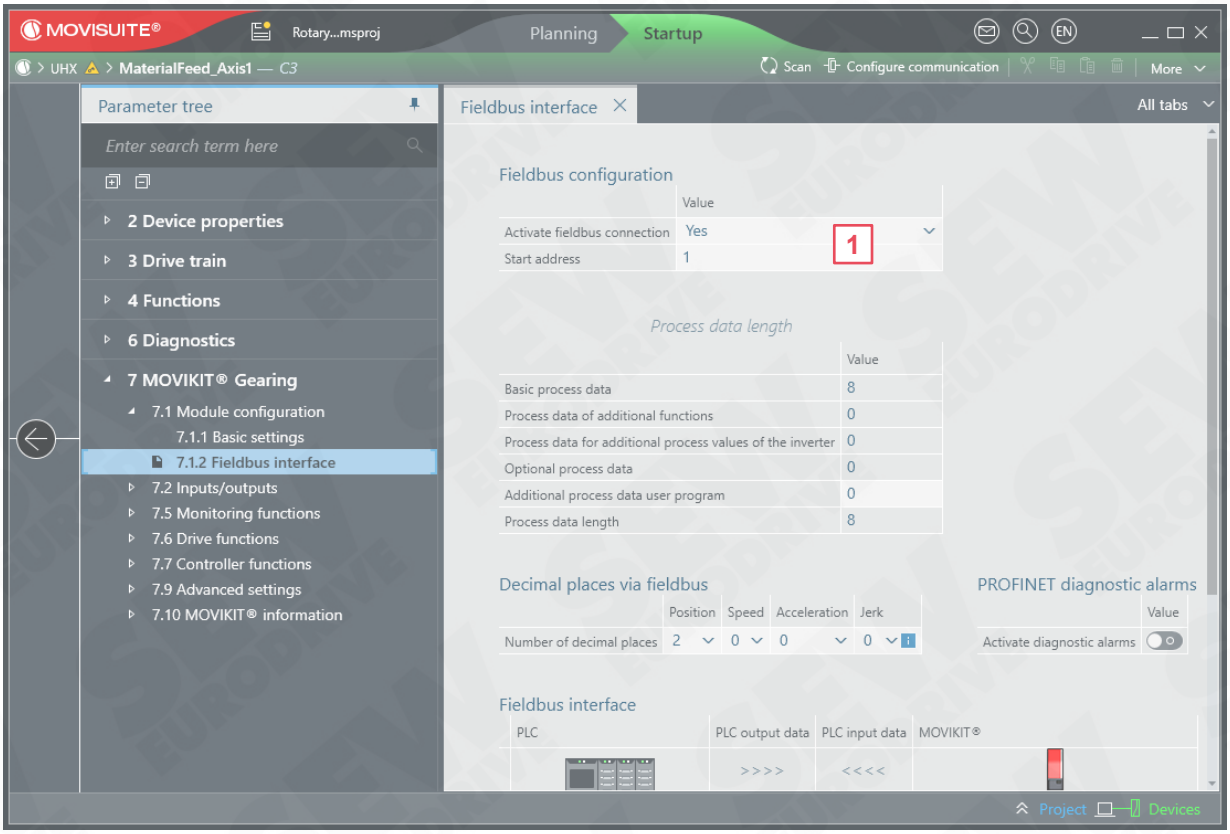
3. Configure the Cycle limit



1 Configure the Cycle limit as shown.

4. Activate the fieldbus interface



1 Activate the fieldbus connection and keep the default start address 1.

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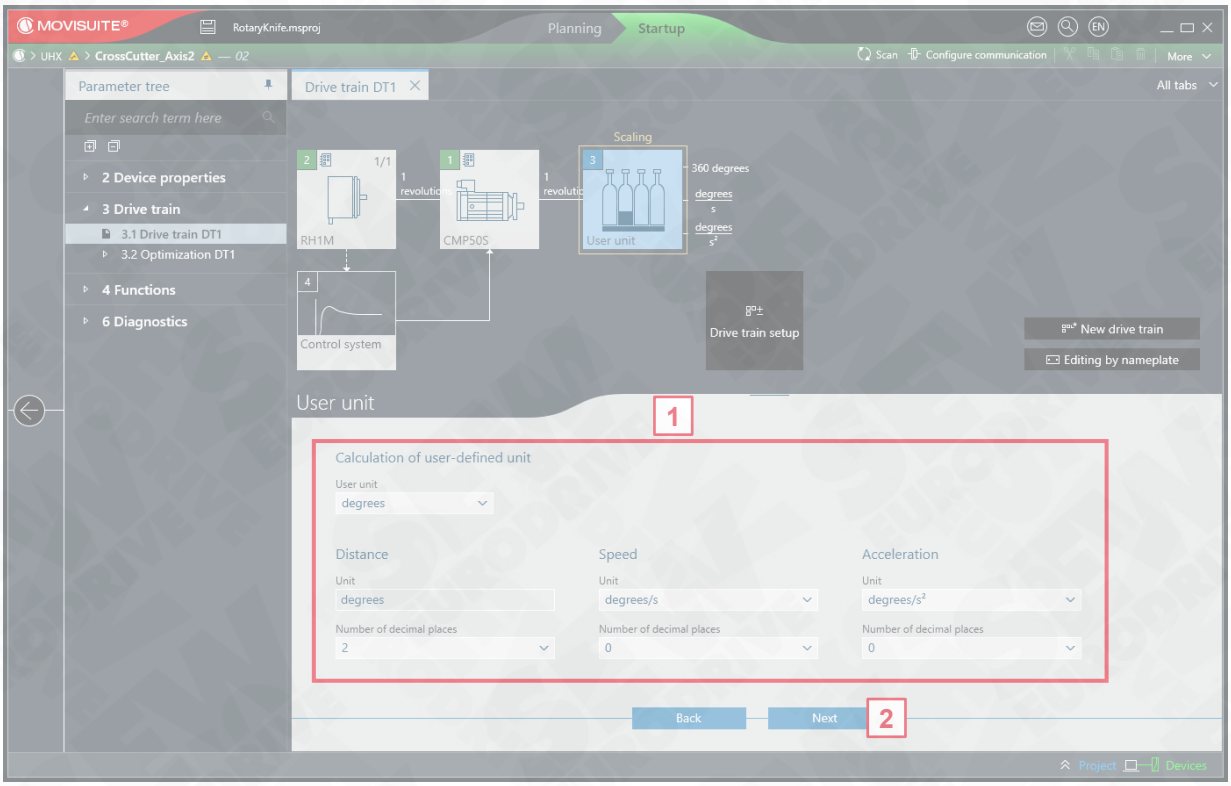
2.3 Configuring CrossCutter_Axis2

1. Configure the drive train



1 Configure the user units for the material feed as shown. Here, too, the number of decimal places will be set by the following MOVIKIT® software module.

2 Click **Next > Transfer data to device**.

2. Assign the MOVIKIT® RotaryKnife software module

1 Assign MOVIKIT® RotaryKnife to CrossCutter_Axis2 and reset the following error E-34.01 again.

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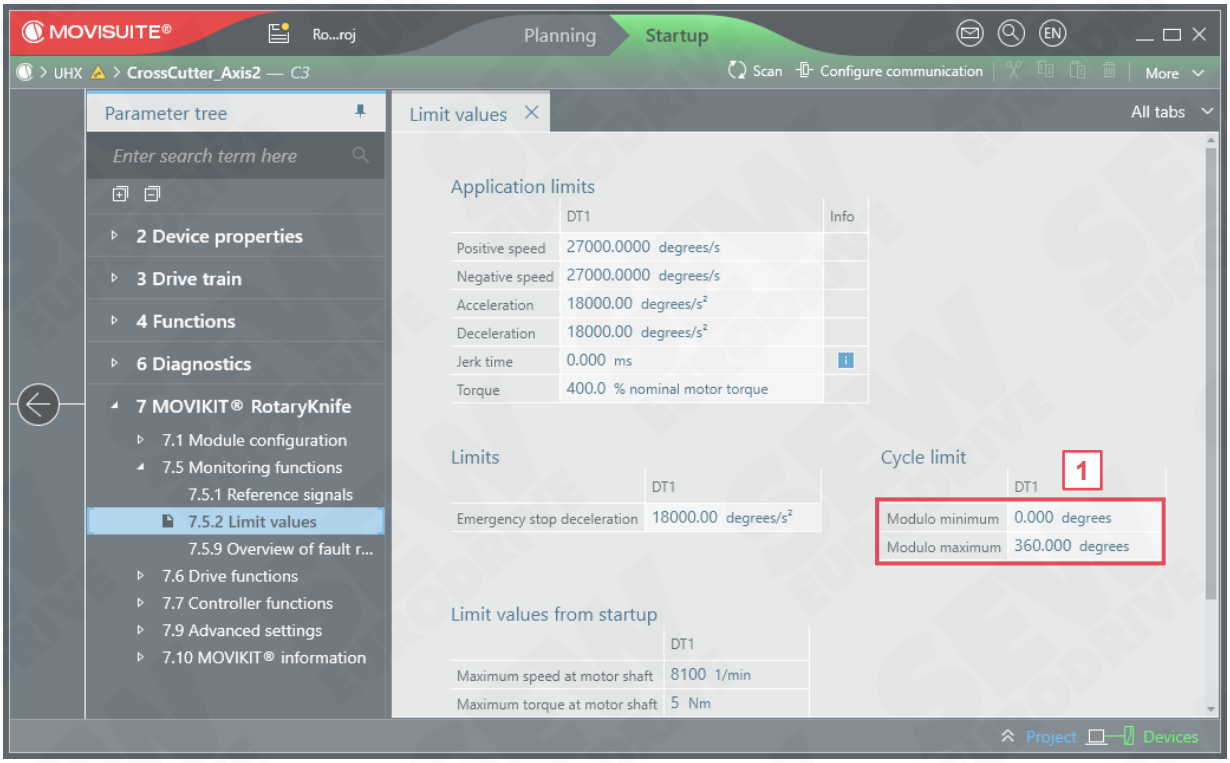
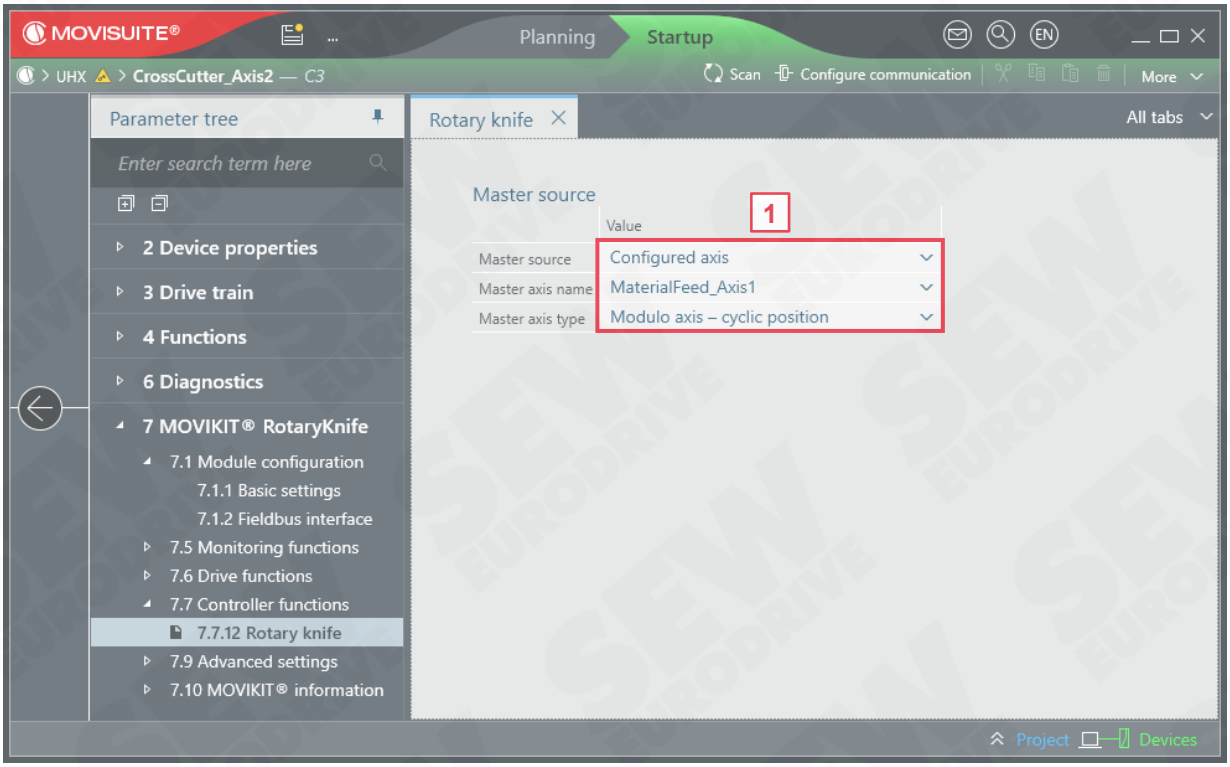
3. Configure the Cycle limit



1 Configure the Cycle limit as shown.

4. Configure the Master source



1 Set the master source as shown.

MOVIKIT® RotaryKnife requires a modulo axis as the master.

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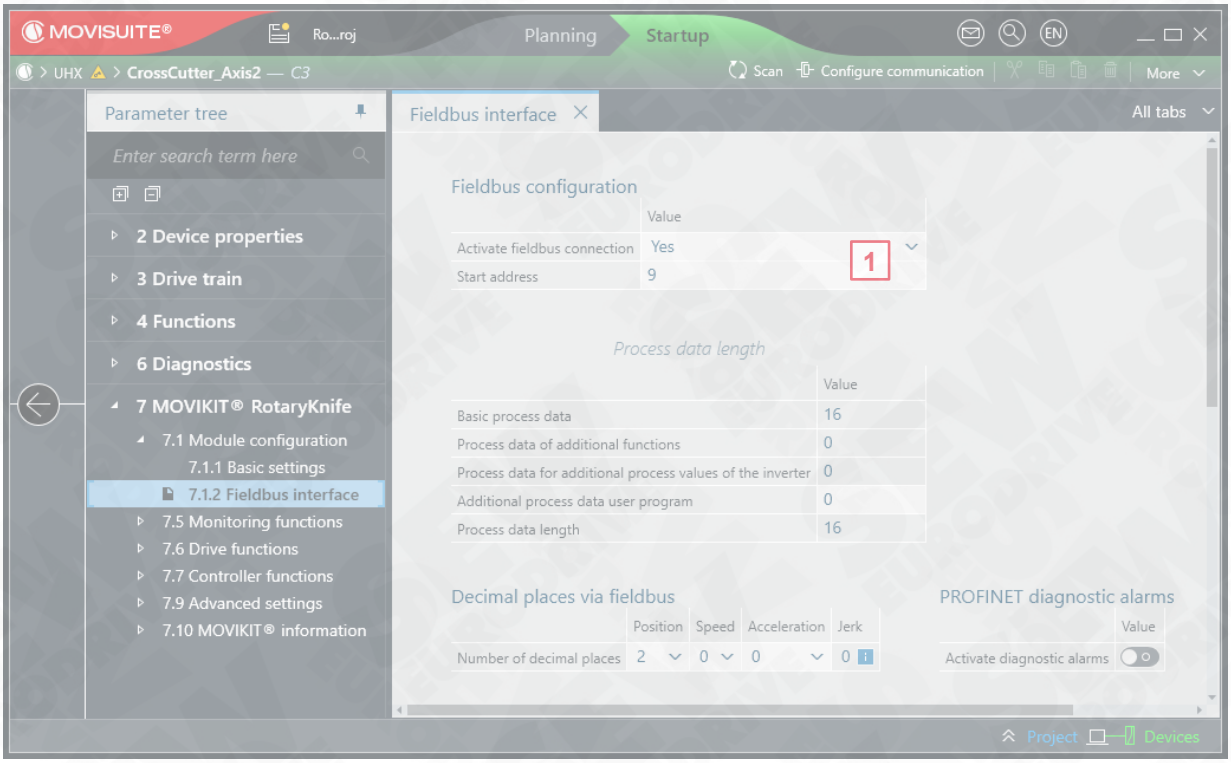
5. Activate the fieldbus interface

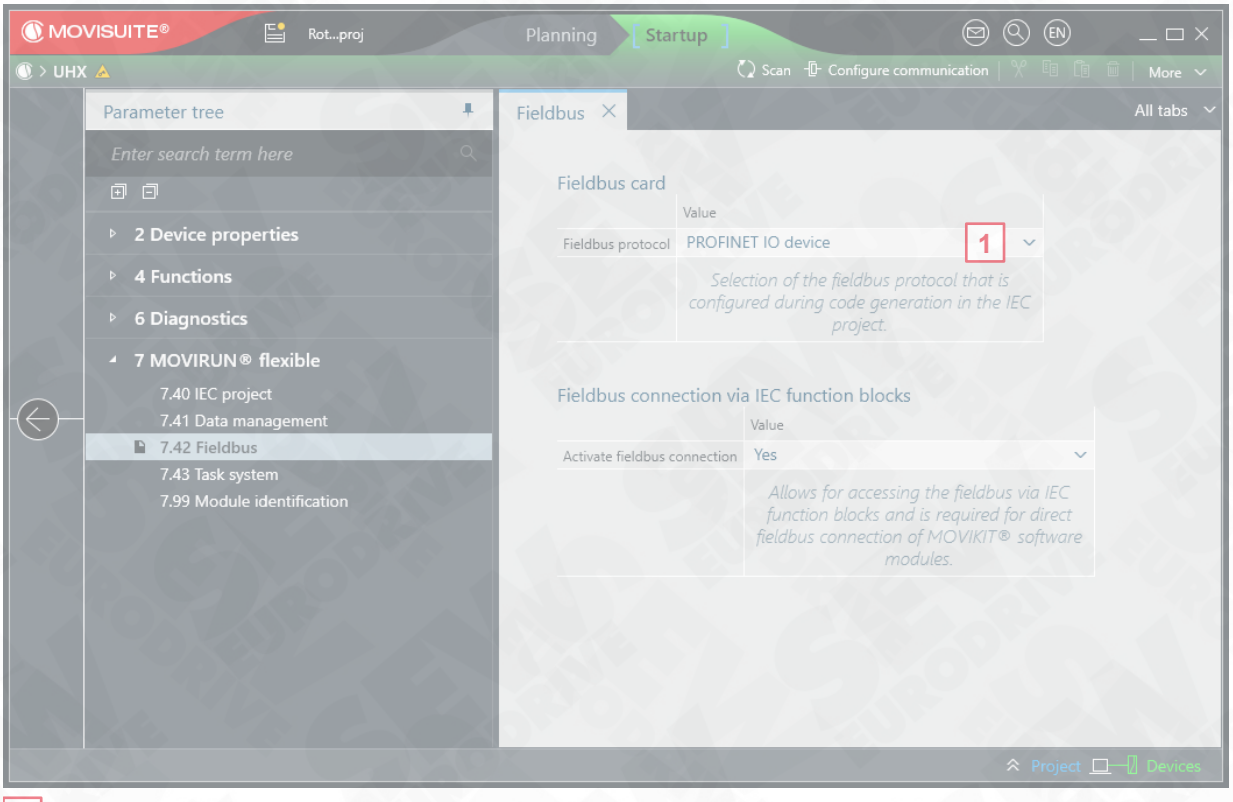


1 Activate the fieldbus connection and set the start address 9.

The start address 9 results from the start address (1) plus the number of process data words (8) of the previous axis MaterialFeed_Axis1 .

2.4 Configuring MOVI-C® CONTROLLER

1. Configure the fieldbus interface



1 Select the appropriate **Fieldbus protocol**. The fieldbus connection will be automatically activated.

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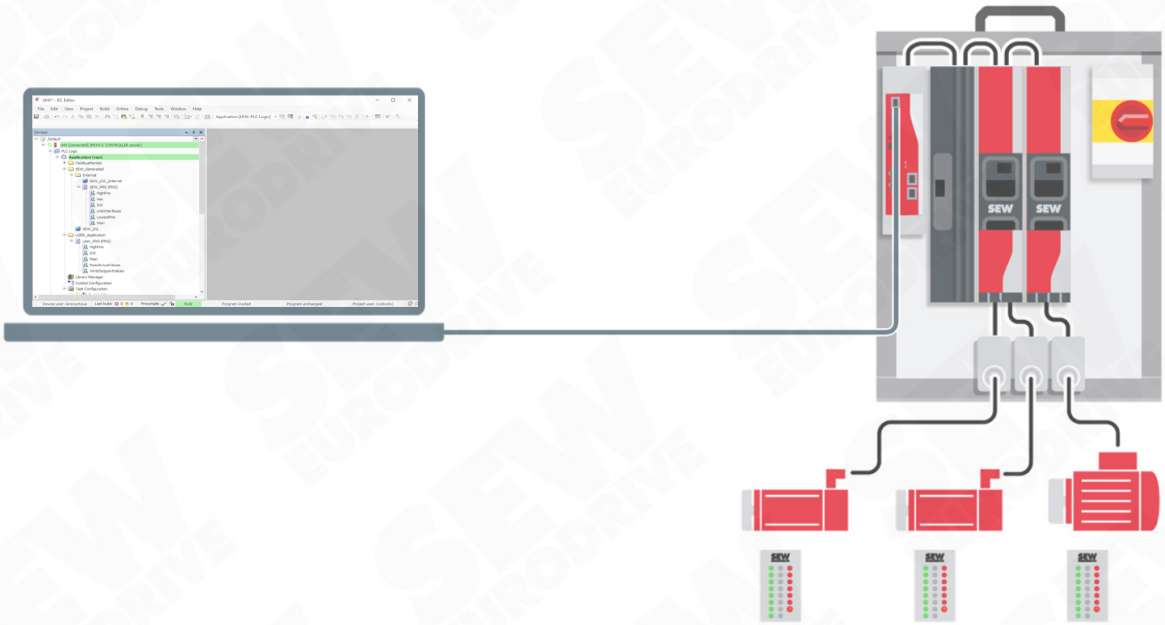
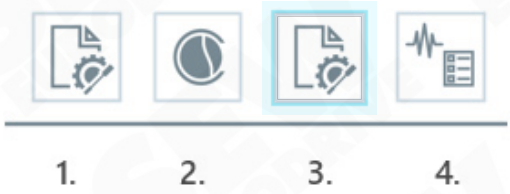
3 Creation and start of the IEC project

Objectives:

- Being able to configure the fieldbus interface of the MOVI-C® CONTROLLER
- Being able to select and activate the appropriate licenses
- Be able to create and start an IEC project





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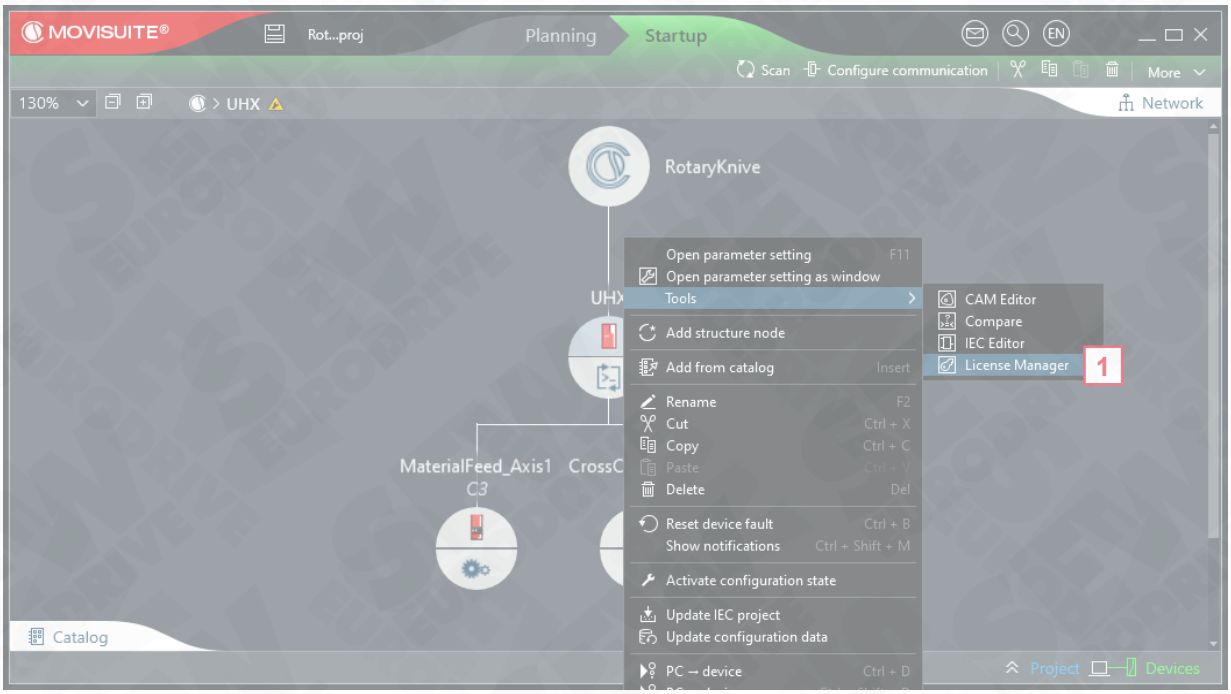
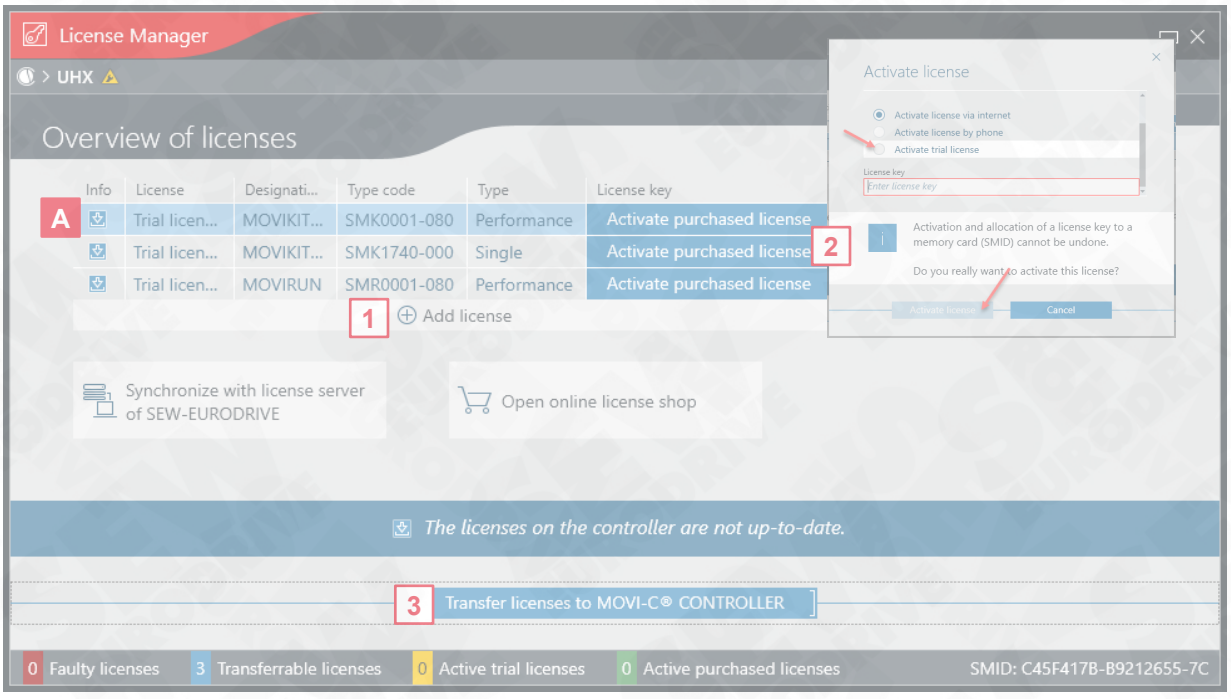
3.1 Licensing the MOVI-C® CONTROLLER

1. Start the License Manager



1 Right-click the MOVI-C® CONTROLLER and select the **License Manager**.

2. Select, activate and transfer the licenses



1 Click **Add license** and select the required licenses as shown.

2 Click **Activate purchase license** and activate trial licenses.

3 Transfer the licenses.

A The MOVIKIT® MultiMotion Camming license contains the license for MOVIKIT® Gearing.

A trial license allows software functions to be tested before purchase. It is valid for 7 days and can be reactivated at any time. After the trial license expires, the program continues to run.
A message regarding the expired trial license will be displayed on the MOVI-C® CONTROLLER.

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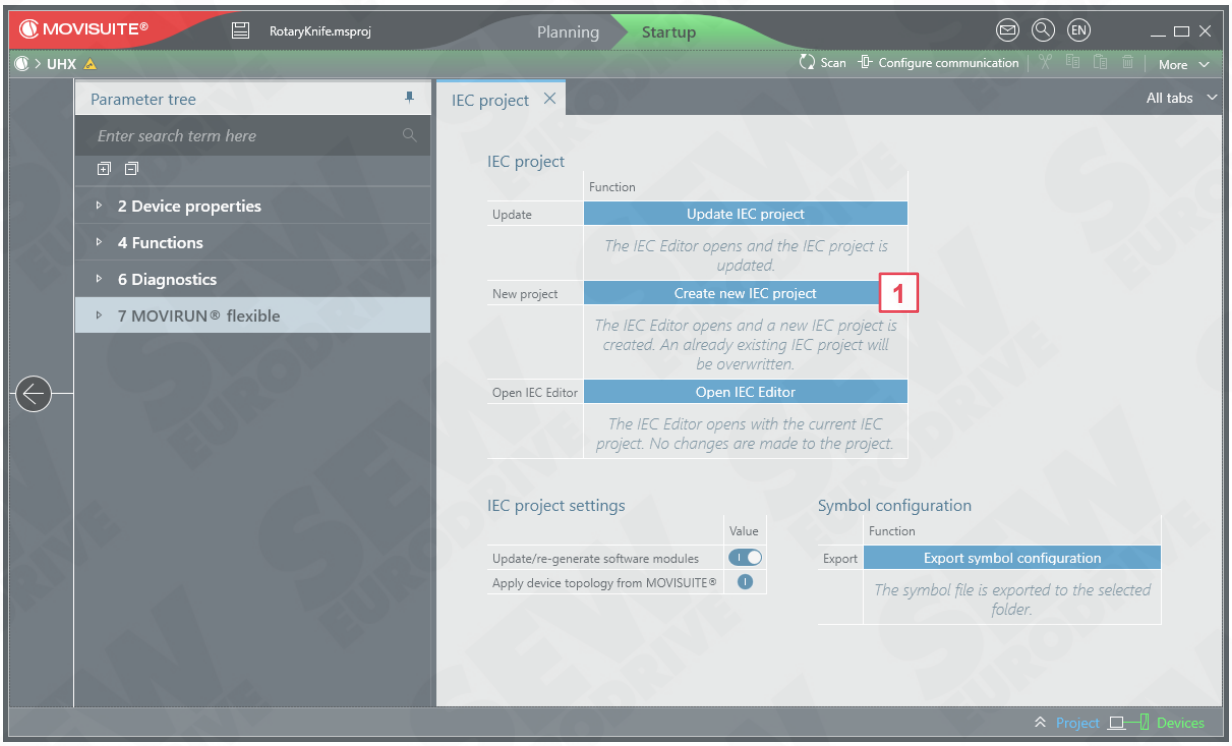
3.2 Creating and starting the IEC project

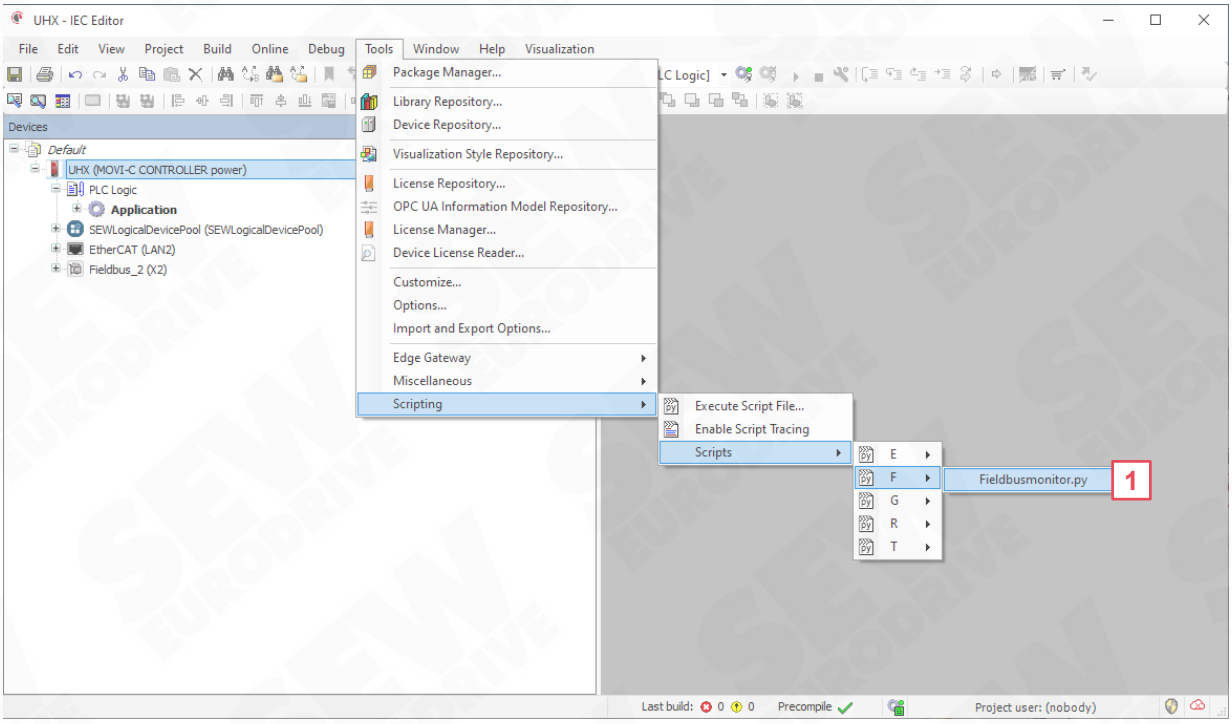
1. Create a new IEC project



1 Click **Create new IEC project** to start the code generation process.

When you create a new IEC project, the existing project will be deleted. A self-programmed part then will also be overwritten/deleted.

2. Activate the Fieldbusmonitor



1 Select **Tools > Scripting > Scripts > F > Fieldbusmonitor.py**.

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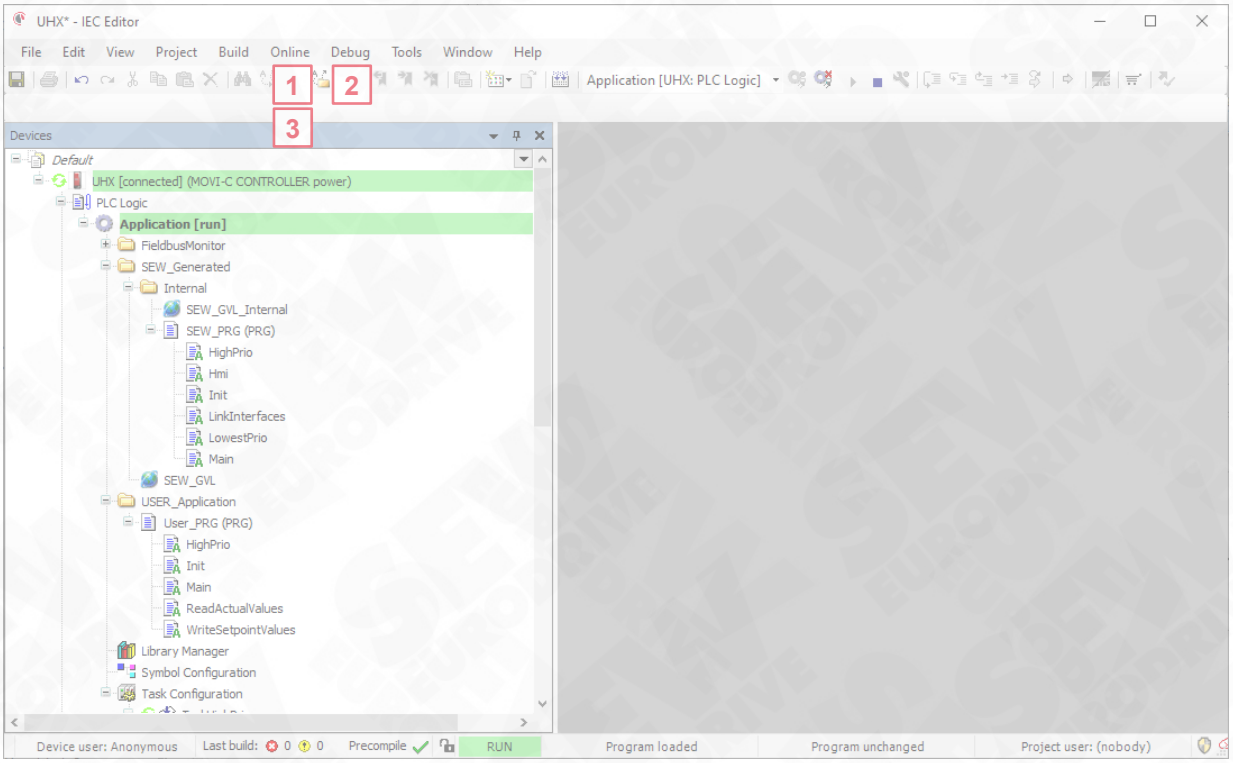
3. Start the IEC program



1. Compile and load the IEC program by clicking **Online > Login**.
2. Start the IEC program by clicking **Debug > Start**.
3. Save the program to the MOVI-C® CONTROLLER in a fail-safe manner **Online > Create Boot Application**.

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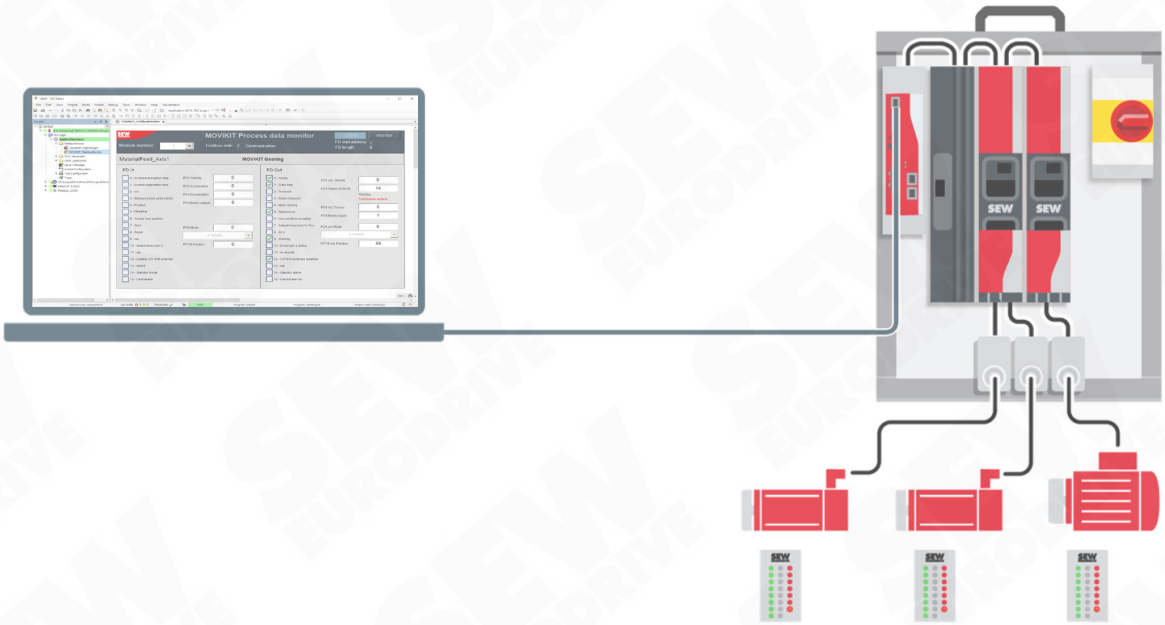
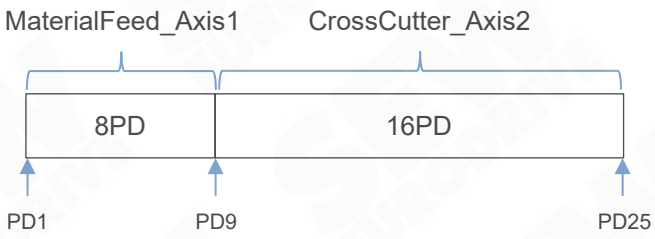
4 Control via MOVIKIT® Process data monitor

Objectives:

- Control of the cross cutter application using the MOVIKIT® Process data monitor



The configuration results in the following process data assignment:



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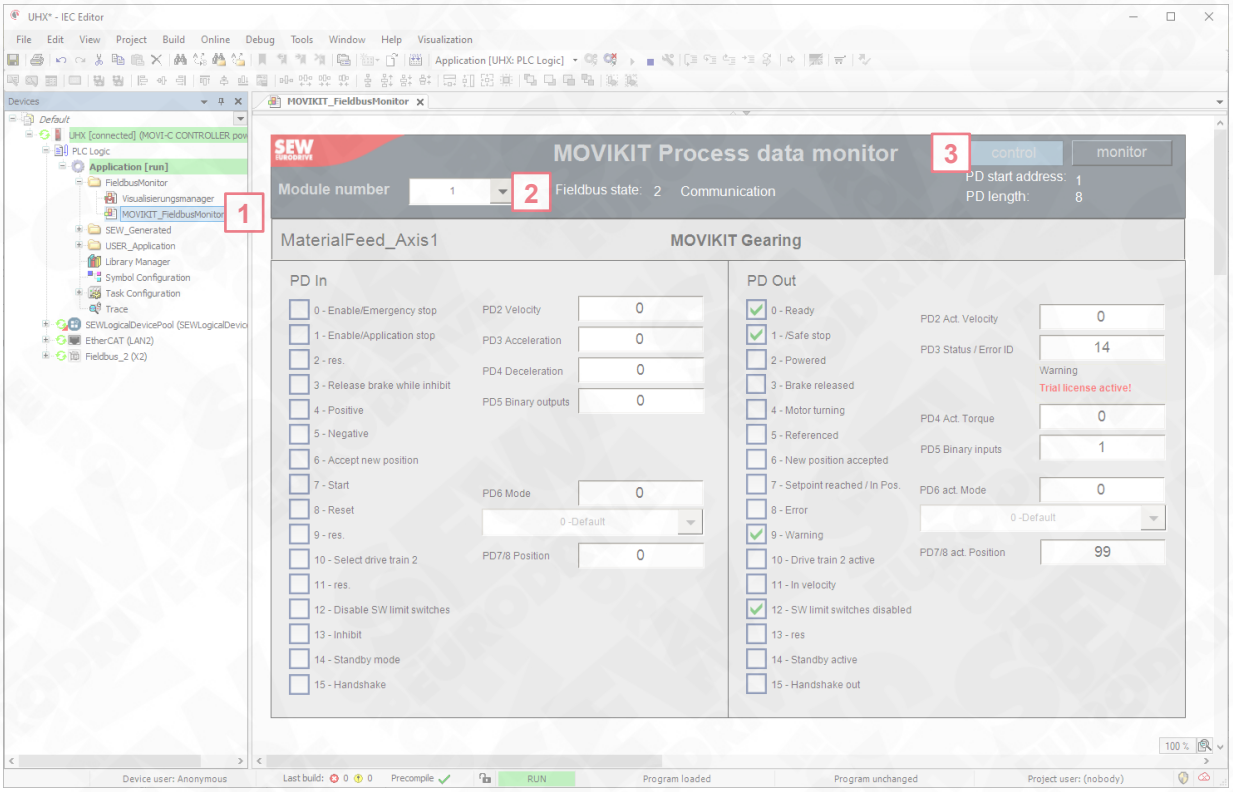
1. Open the MOVIKIT® Process data monitor



1 Double-click **MOVIKIT_FieldBusmonitor**.

2 Select the process data monitor by selecting the module number:
MaterialFeed_Axis1 / MOVIKIT® Gearing: Module number: **1**
CrossCutter_Axis2 / MOVIKIT® RotaryKnife: Module number: **2**

3 Click **control** to switch to the control mode.

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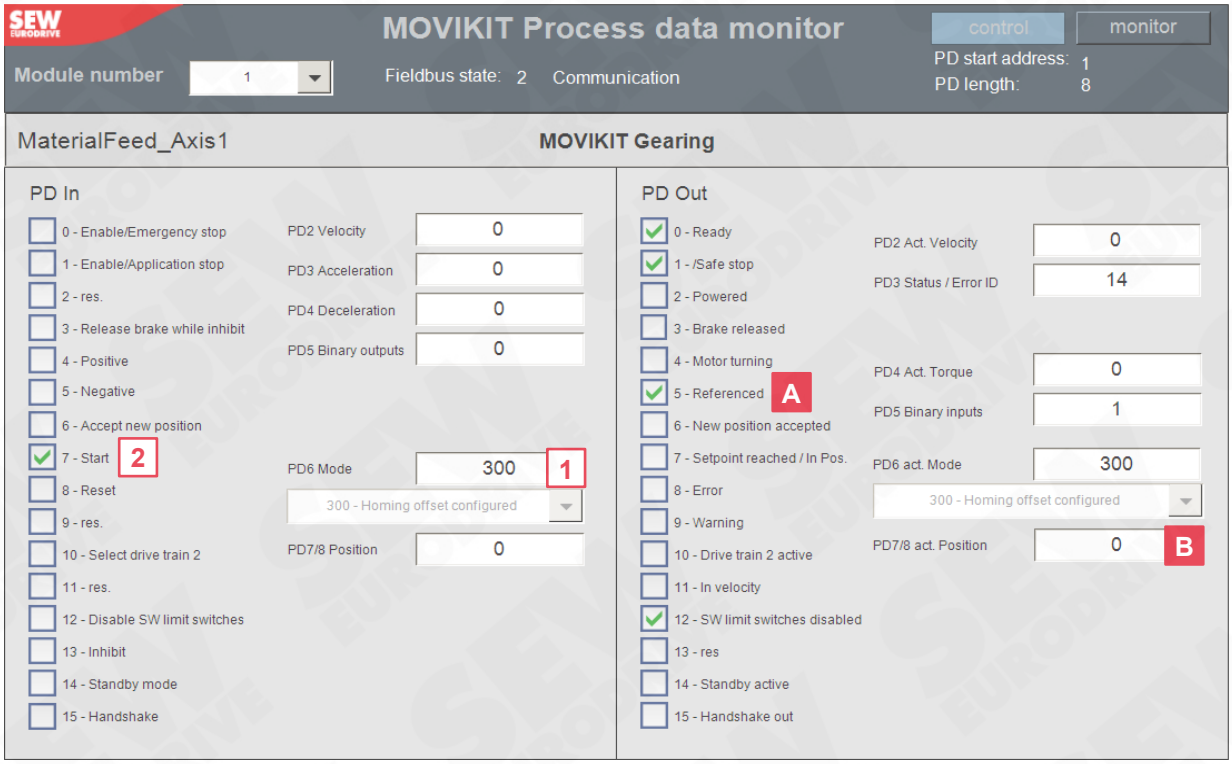
4.1 Referencing the axes

1. Reference MaterialFeed_Axis1



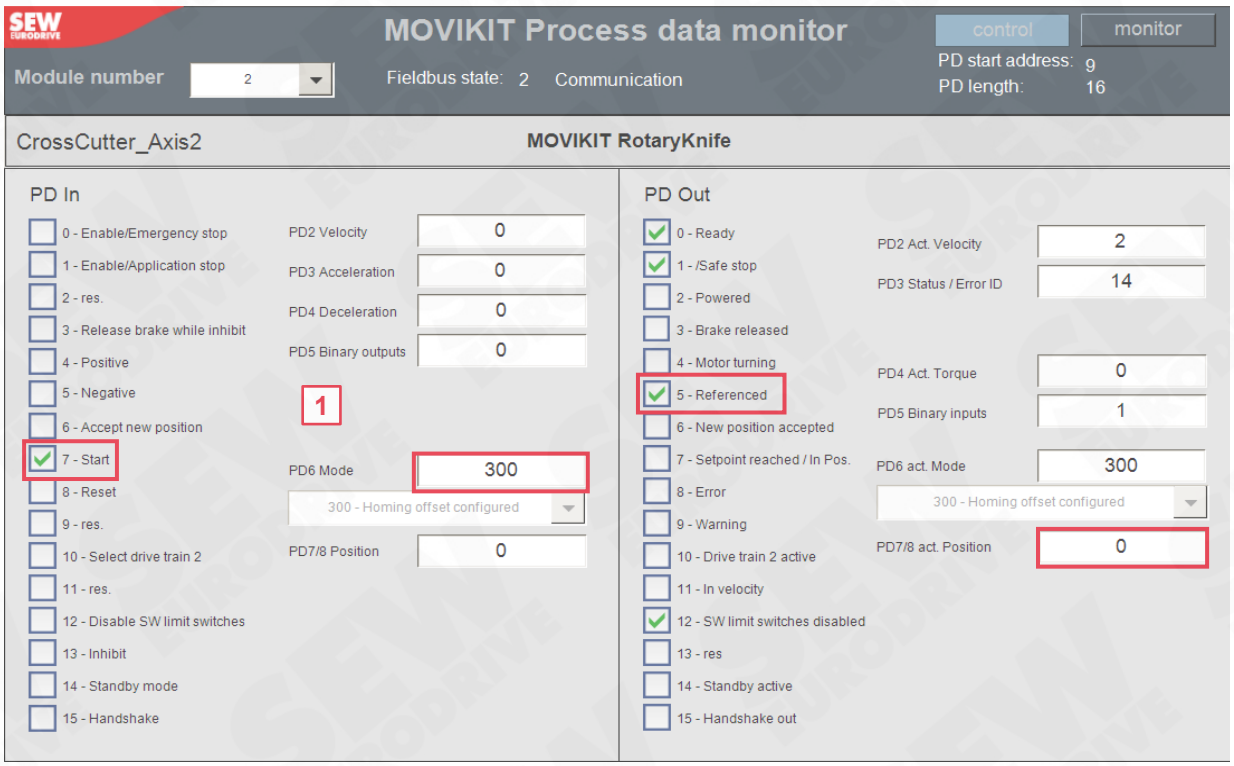
1 Select the operating mode **PD6 Mode = 300**.

2 Start referencing.

A Here you can see the reference status of the drive.

B Here you can see the actual position of the axis (0 after referencing).

2. Reference CrossCutter_Axis2



1 Reference the axis as shown.

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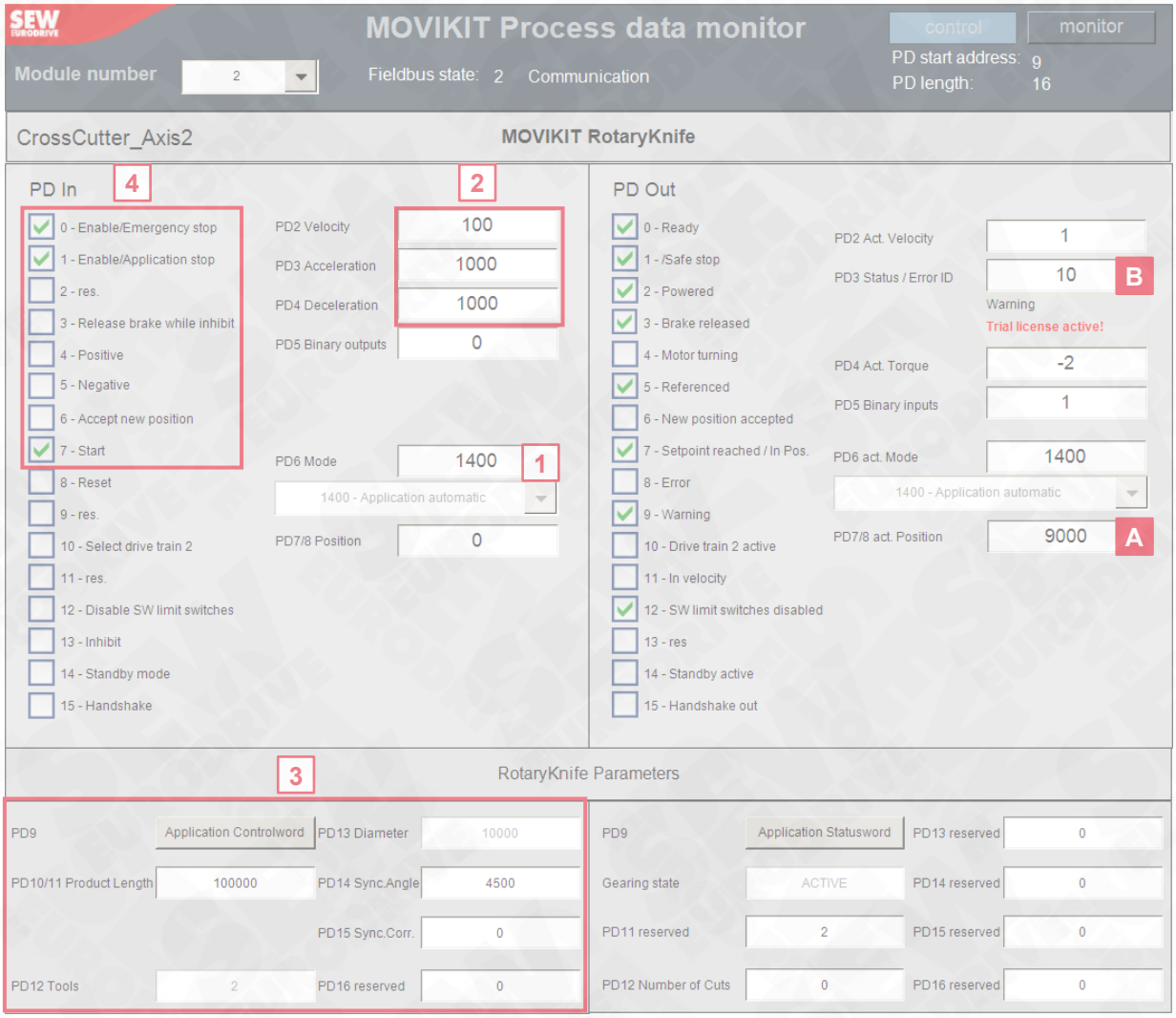
4.2 Controlling axes in Automatic mode

1. Control CrossCutter_Axis2 in automatic mode



1 Set the mode with **PD6 Mode = 1400**.

2 Set the travel parameters.

3 Set the parameters for the RotaryKnife:

- **PD10/11 Product Length = 100000** > nominal cut length in [mm] with 2 decimal places
- **PD12 Tools = 2** > number of tools on the rotating knife
- **PD13 Diameter = 10000** > knife diameter in [mm] with 2 decimal places
- **PD14 Sync.Angle = 4500** > angle at which the rotating knife moves synchronously to the product. User unit [degrees] with two decimal places

4 Set the two enable bits **Bit 0 / Bit 1** and start automatic mode with **Bit 7**.

A When automatic mode is activated, the axis automatically aligns with the specified travel parameters to the start position 90°.

B In automatic mode, the **FCB10 Interpolated position control** is activated.

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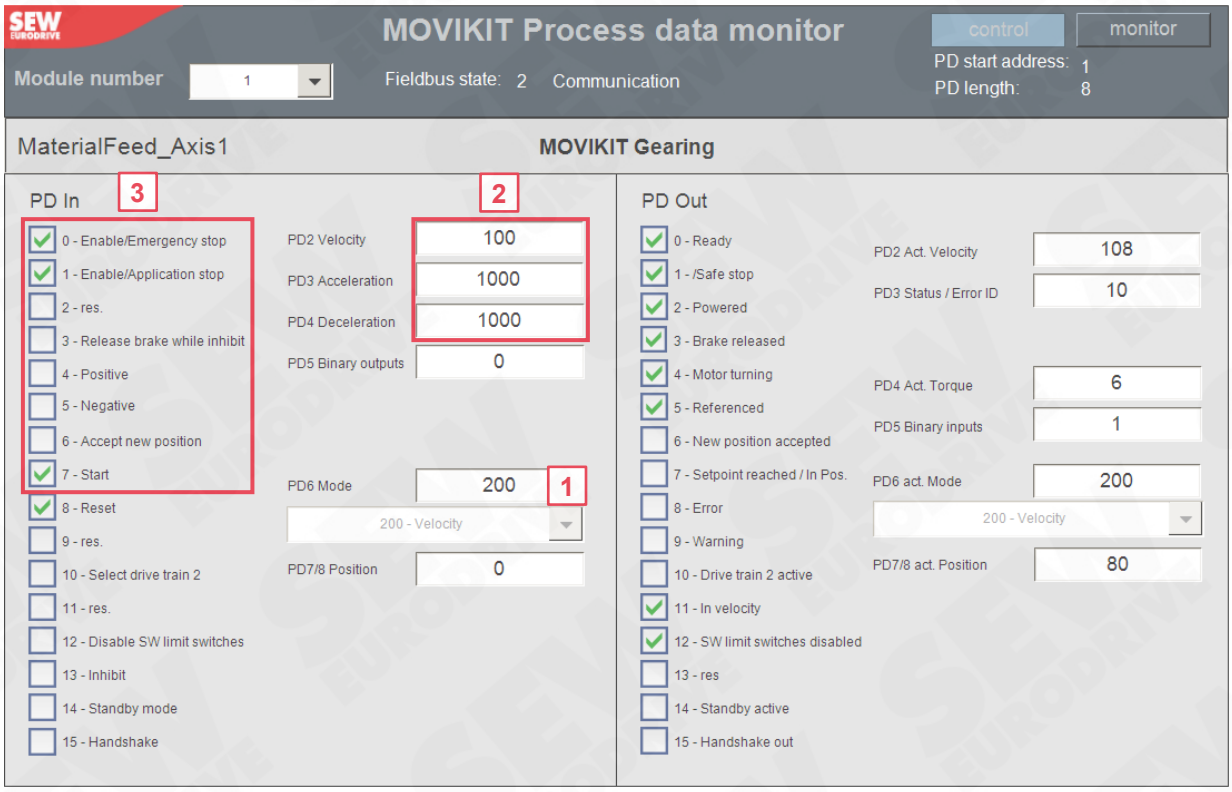
2. Control MaterialFeed_Axis1 in velocity mode



1 Set the mode with **PD6 Mode = 200**.

2 Set the travel parameters.

3 Set the two enable bits **Bit 0 / Bit 1** and start velocity mode with **Bit 7**.

MaterialFeed_Axis1 is the master axis for automatic mode of the application.

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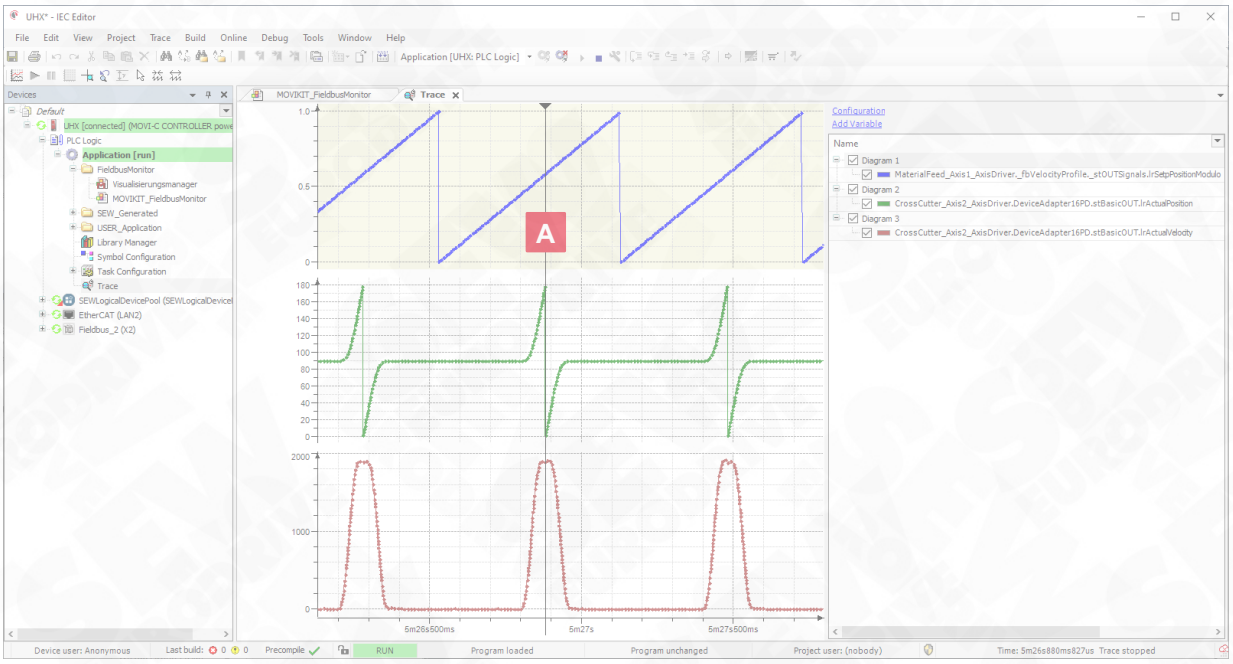
4.3 Performing Trace measurement of automatic mode

1. Configure a Trace measurement with the following variables from SEW_GVL_Internal:

- MaterialFeed_Axis1_AxisDriver._fbVelocityProfile._stOUTSignals.lrSetpPositionModulo
- CrossCutter_Axis2_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualPosition
- CrossCutter_Axis2_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualVelocity

2. Perform the Trace measurement



A The cut starts in the middle of the cycle because the rotary knife was at the position of 90° before the master axis started.

For more information on Trace, refer to **Workbook C105 Basics of IEC Programming / Workbook C103 MOVIKIT® Software Modules MultiMotion Category.**

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