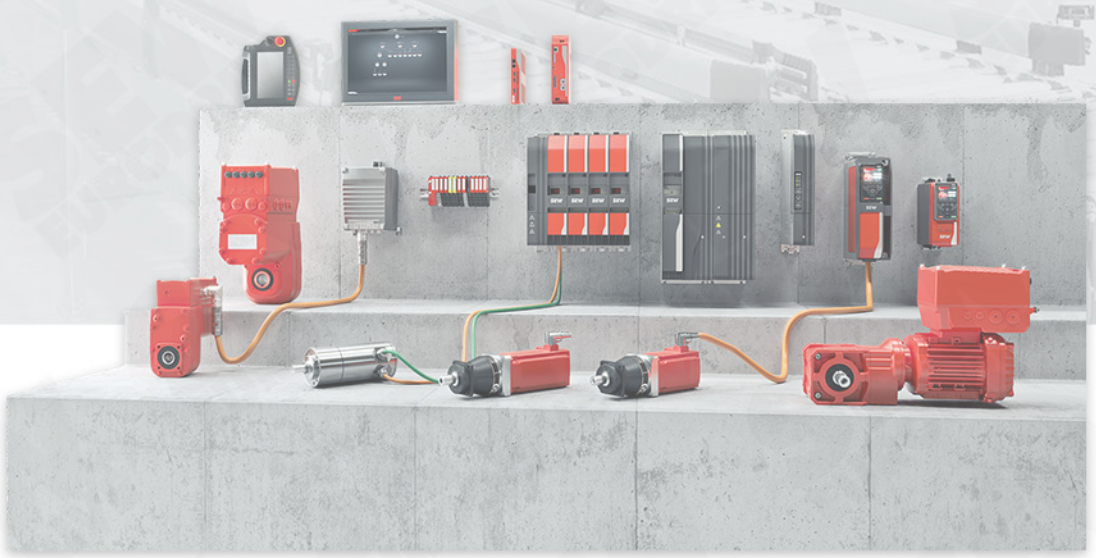
SEW EURODRIVE

Product Training Workbook



MOVI-C® Automation System

MOVIKIT® FilmFeeder Software Module

Parameterization and Diagnostics

C142

DRIVE ACADEMY®

Exclusion of liability
This training document supplements the existing training documents of SEW-EURODRIVE GmbH & Co KG.. Our informative, training-related documents have been created to the best of our knowledge and ability.

The first priority is to observe the operating instructions of the devices specified in the training document "Basic requirement for safe operation". The safety regulations specified therein apply.
SEW-EURODRIVE GmbH & Co KG assumes no liability for personal injury, damage to property or financial loss caused by non-compliance with the operating instructions. Liability for defects is excluded in such cases.
Make sure that the operating instructions are made available in a legible condition to the system and operating managers, as well as to persons who work on the device under their own responsibility.

Objectives of this training document
- Knowing the startup process of the film transportation application on a training model.
- Being able to control the film transportation application via the process data interface.

Other documents
- MOVIKIT® FilmFeeder manual
- Brief information about MOVIKIT® FilmFeeder

If you have any questions or suggestions, please do not hesitate to contact the product training department.

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Meaning of the symbols:


Operating notes


Information


Safety-relevant information

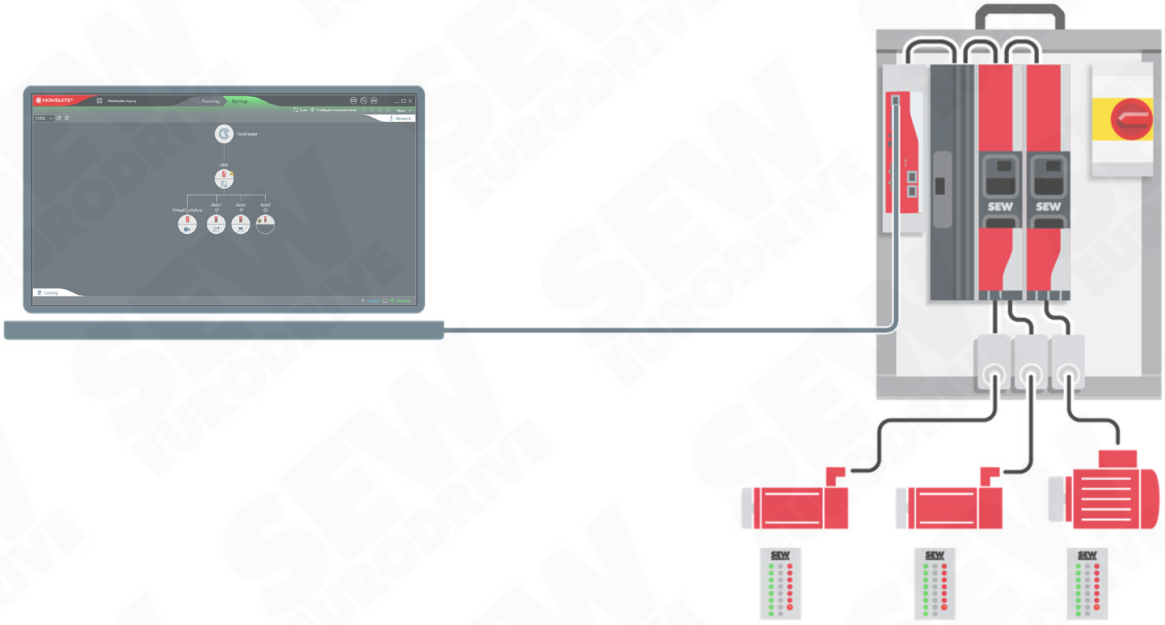

Tip


Diagnostics and troubleshooting


Practical task


Additional documentation

Workbook steps

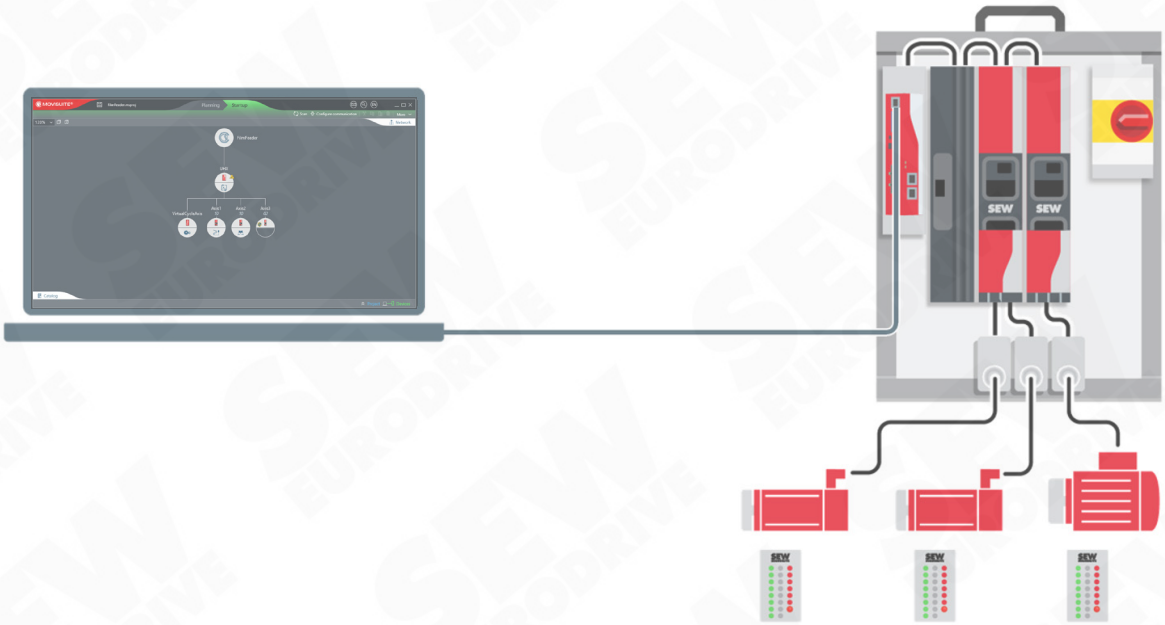


1. 2. 3. 4.

1. **Introduction to the Vertical Form Fill Seal Machine application**
2. **Project setup and device configuration in MOVISUITE®**
3. **Creation and start of the IEC project**
4. **Control via the MOVIKIT® Process data monitor**

1 Introduction to the Vertical Form Fill Seal Machine application

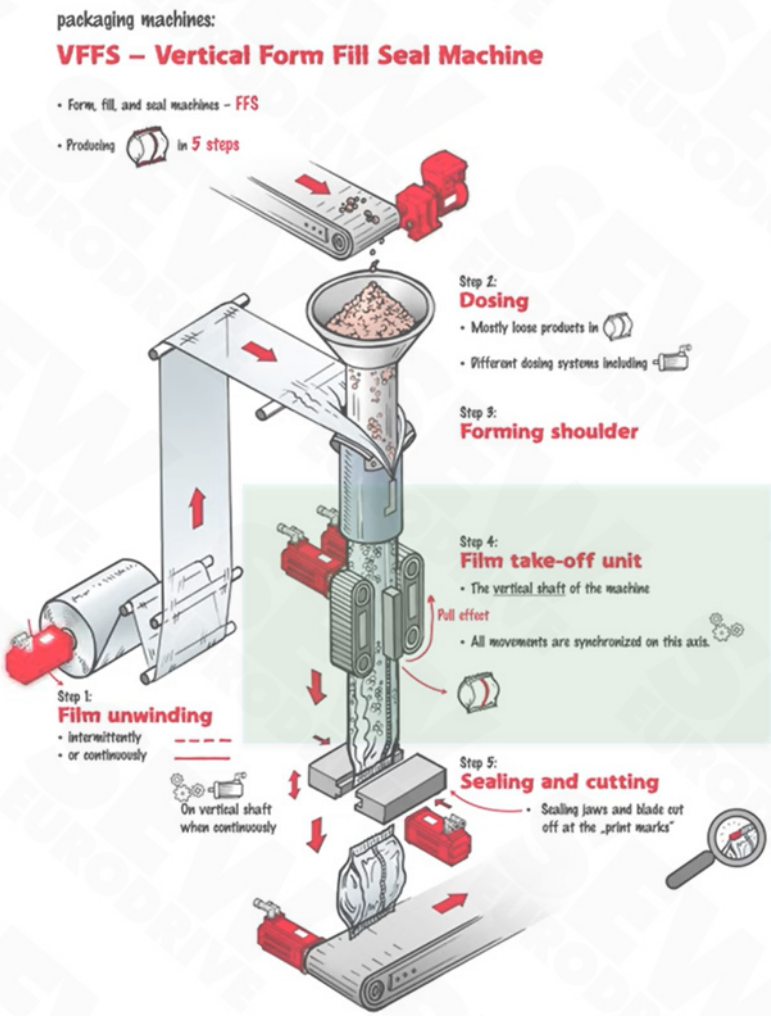
Objectives:
- Knowing a typical application of the MOVIKIT® FilmFeeder software module
- Knowing the system configuration with the training model and the software used



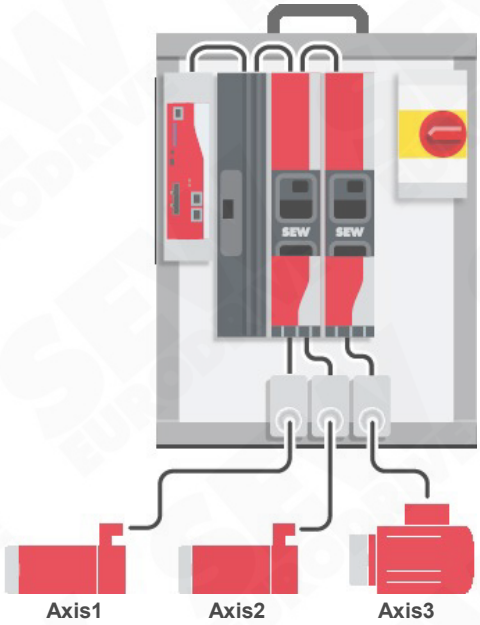
In the following exercises, the MOVIKIT® FilmFeeder software module is used in combination with the MOVIKIT® RotaryKnife software module. For more information, refer to **Workbook C140 MOVIKIT® RotaryKnife software module.**

1.1 Application example Vertical Form Fill Seal Machine

The MOVIKIT® FilmFeeder software module implements film transport by a belt drive, for example in HFFS and VFFS machines (horizontal/vertical form fill seal machines). The software module provides the film feed function and the additional print mark control function for this purpose.



1.2 Training model



Hardware:

- MOVI-C® CONTROLLER
- MOVIDRIVE® modular
- Axis1 / CMP50S/BK/KY/AK0H/SB1: MOVIKIT® FILMFEEDER
- Axis2 / CMP50S/BK/KY/RH1M/SB1: MOVIKIT® ROTARYKNIFE:
- Axis3 / DRN71M4/BE05HR/FI/IS/TF/AK8W: Not used

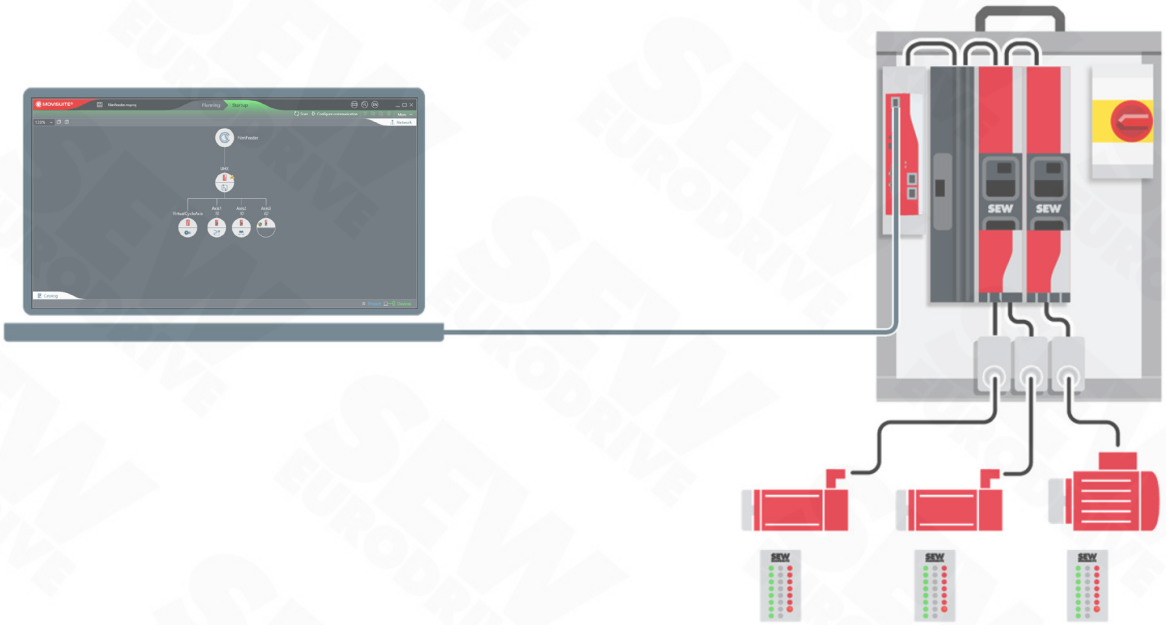
Software:

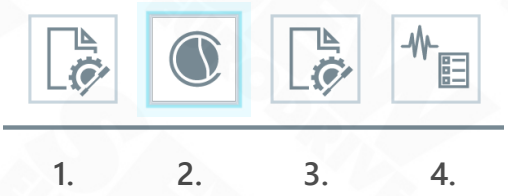
- MOVISUITE 2.5
- IEC Editor 3.5.18.2
- MOVIRUN® 9.0.8.200
- MOVIKIT® Gearing 9.0.22.200
- MOVIKIT® FilmFeeder 9.0.22.200
- MOVIKIT® RotaryKnife 9.0.16.200

If the training model shown is not available, the following exercises can also be performed with any MOVI-C® CONTROLLER, MOVIDRIVE® modular/system and synchronous or asynchronous motors with encoder feedback. The hardware configuration must then be adjusted according to the hardware used. If no inverters are available as hardware, the axes can also be operated in simulation.

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





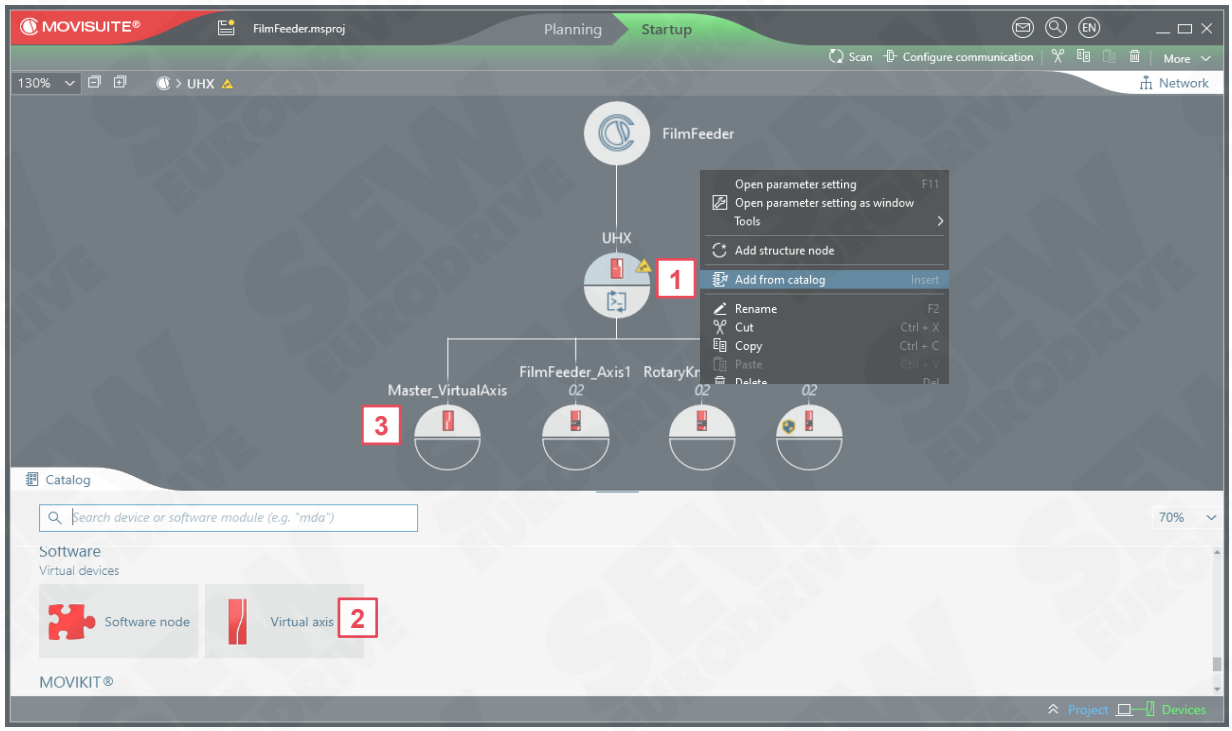
For the following exercises, the drives must be started up and optimized correctly in the CFC or VFC^{PLUS} control mode. For information on startup and operation of MOVISUITE®, refer to **Workbook C101 MOVISUITE® – Practice on the inverters.**

2.1 Creating the MOVISUITE® project

1. Create a new project and rename the devices

1 Create a new project and rename the devices as shown.

2. Insert virtual axis



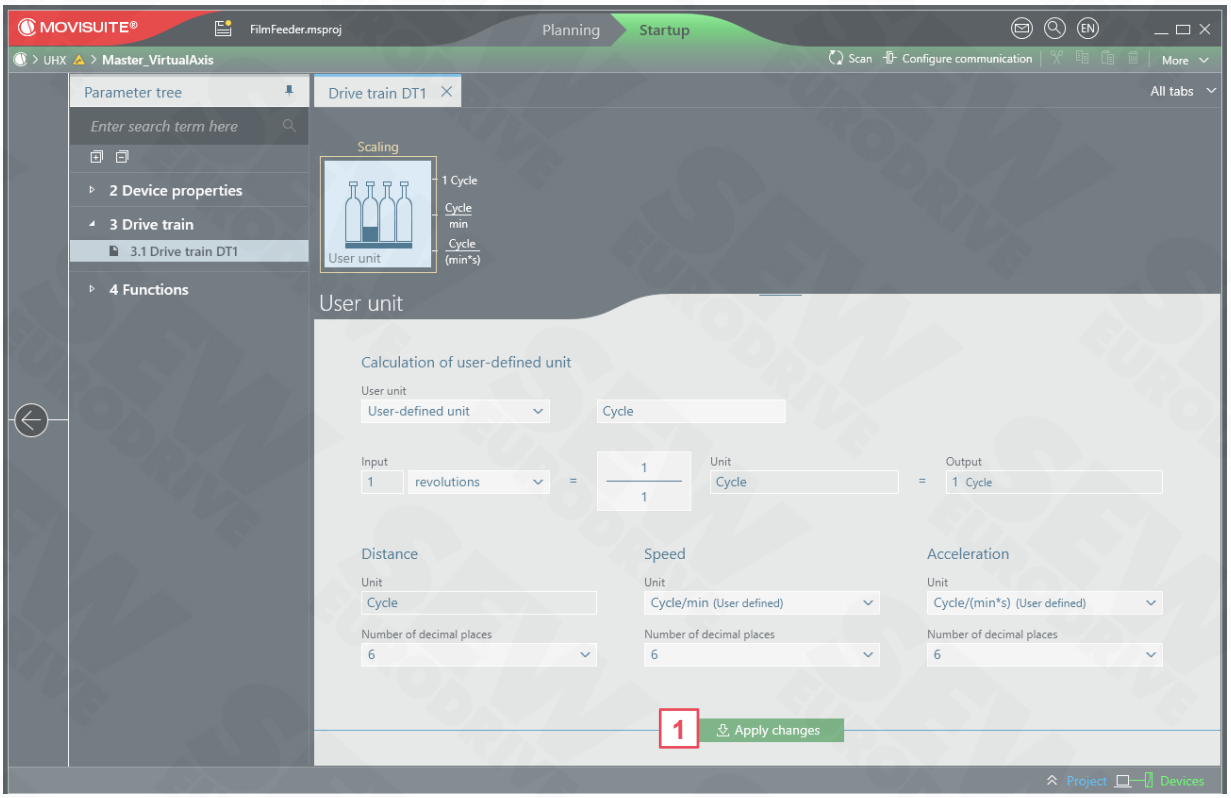
1 Right-click the upper semicircle of the MOVI-C® CONTROLLER and select **Add from catalog.**

2 Insert a virtual axis with the current version into the project.

3 Place the virtual axis with drag and drop as shown.

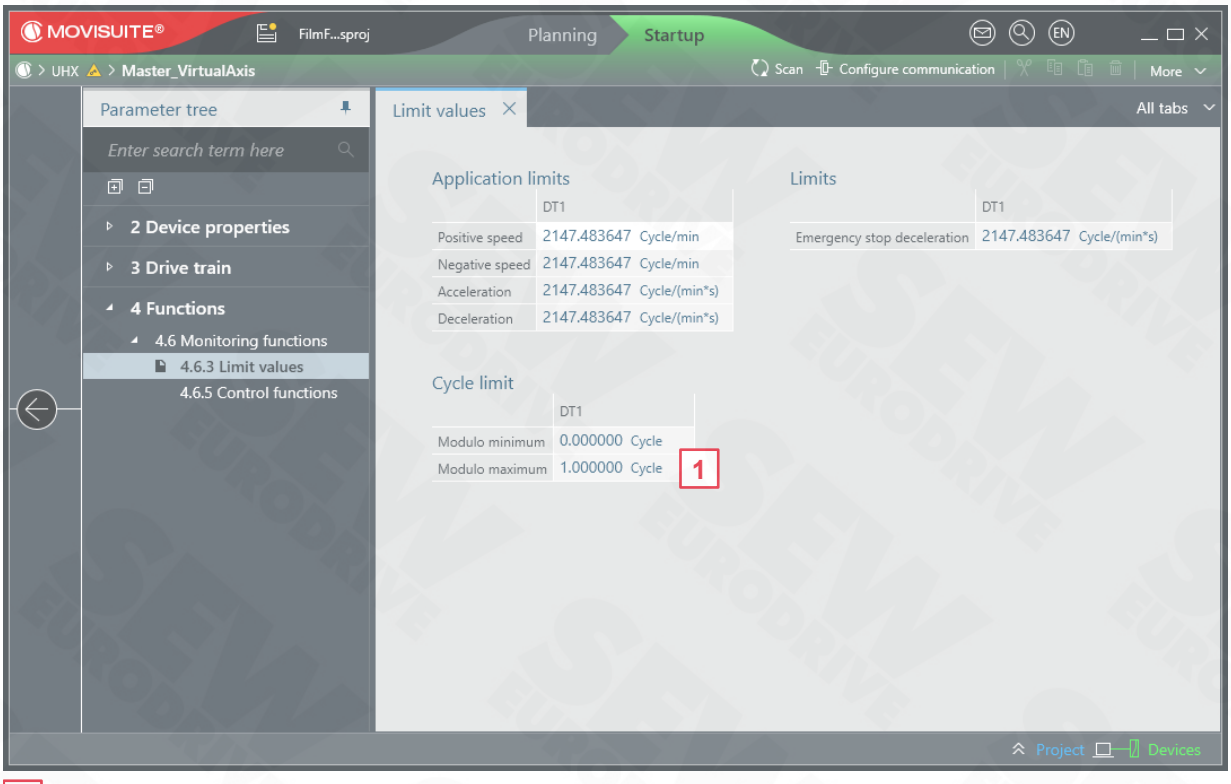
2.2 Configuring Master_VirtualAxis

1. Configure the drive train



1 Configure the drive train as shown and apply the settings.
Set 6 decimal places for all user units!

2. Parameterize the Cycle limit

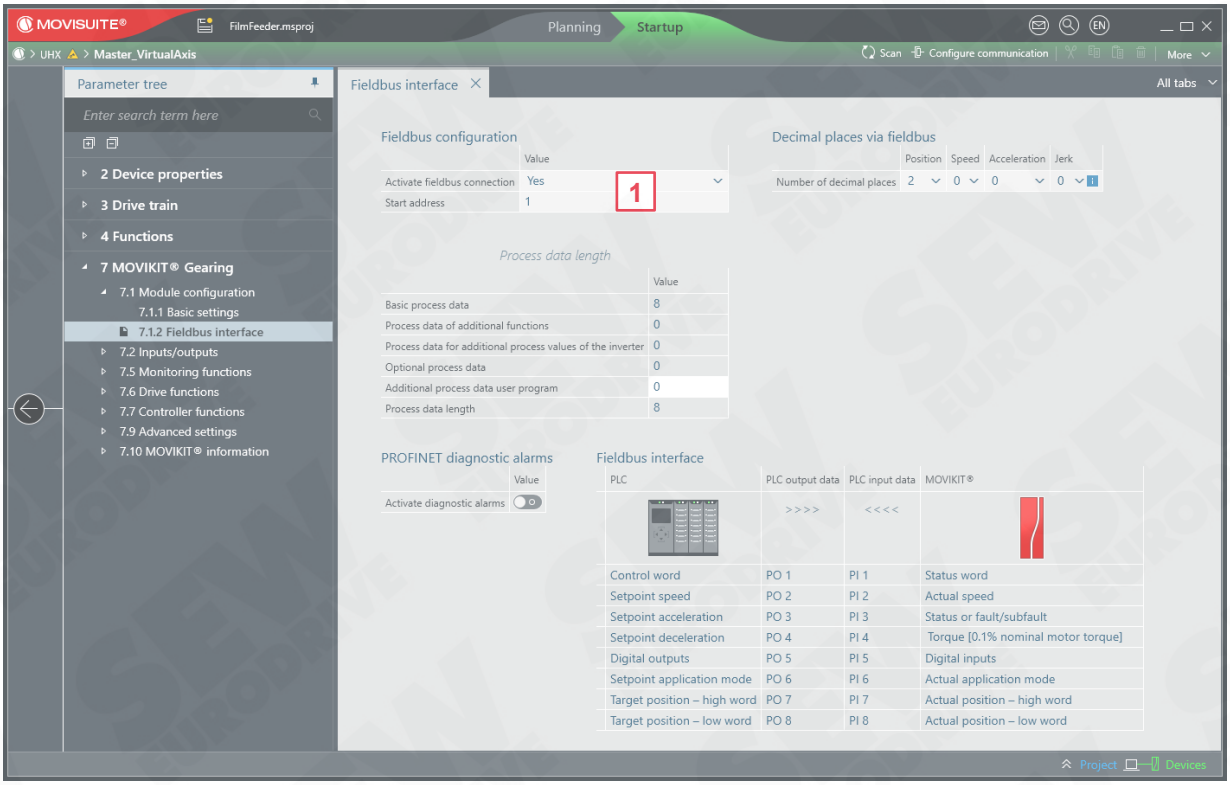


1 Parameterize **Modulo maximum > 1.000000 cycle**.

3. Add MOVIKIT® Gearing software module

1 Right-click the virtual axis and add the MOVIKIT® Gearing software module with the current version using **Add from catalog** and acknowledge the following error E-34.01.

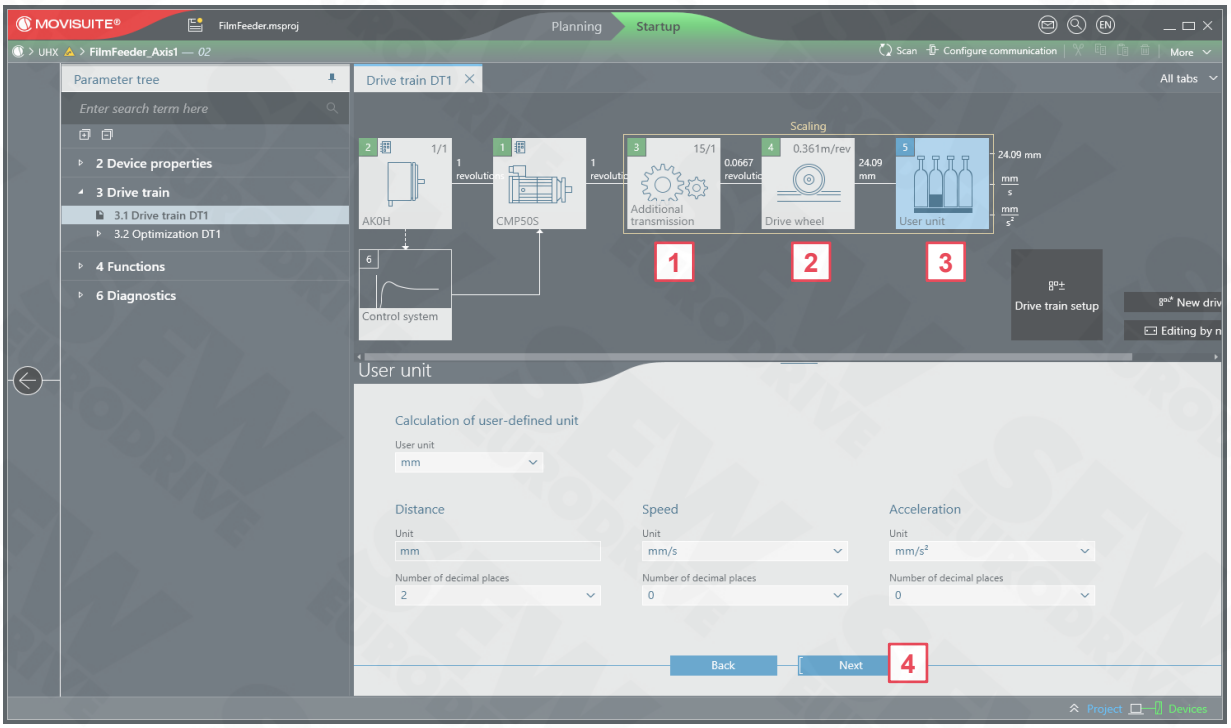
4. Configure the fieldbus interface



1 If you activate the fieldbus connection, keep the start address 1.

2.3 Configuring FilmFeeder_Axis1

1. Configure the drive train



1 Add an additional transmission to the drive train with i=15.

2 Insert a drive unit with a diameter of 115 mm.

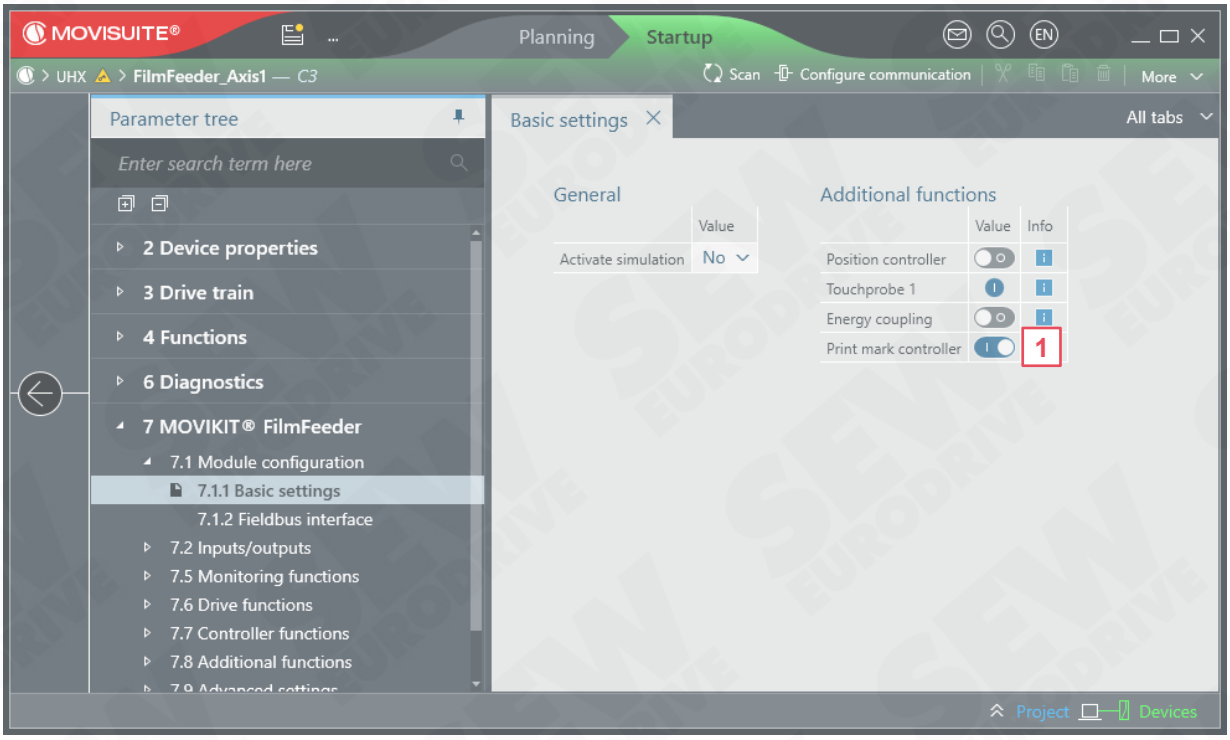
3 Insert user units and configure them as shown. The decimal places are subsequently adjusted automatically by the MOVIKIT® software module.

4 Transfer the drive train to the device using **Next > Transfer data to device**.

2. Add MOVIKIT® FilmFeeder software module

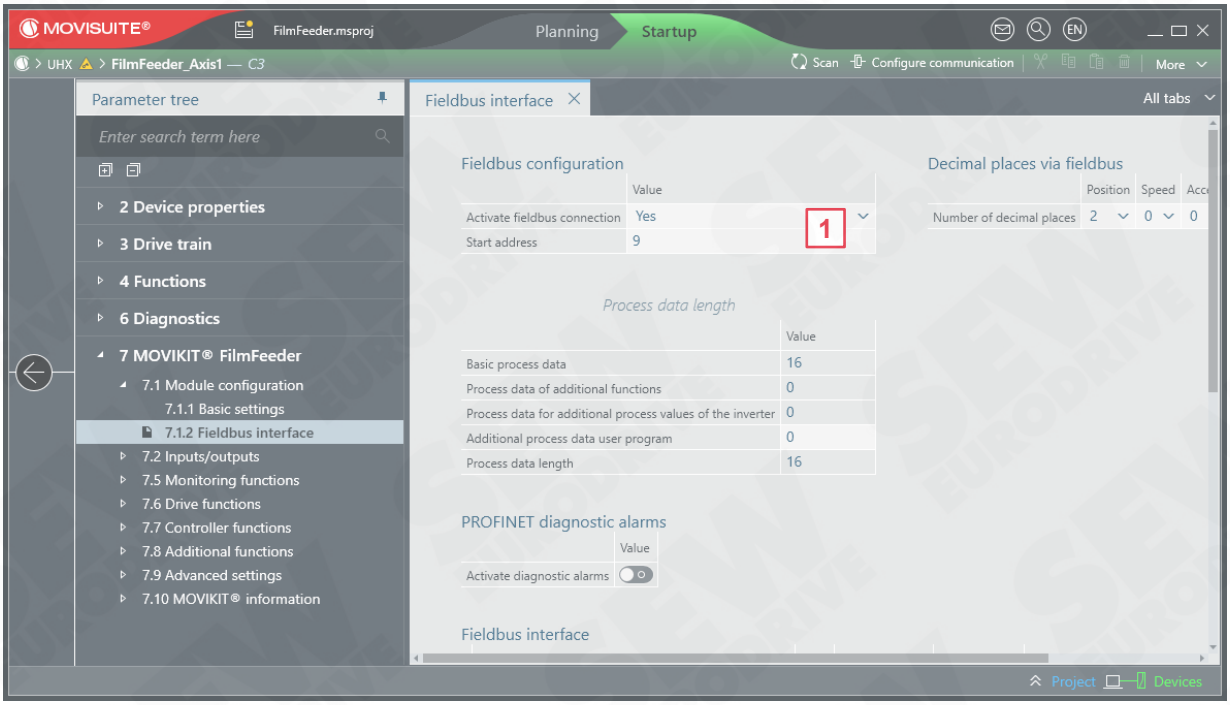
1 Insert the MOVIKIT® FilmFeeder software module with the current version into the device and acknowledge the following error E-34.01 again.

3. Configure asic settings



1 Activate the print mark controller.

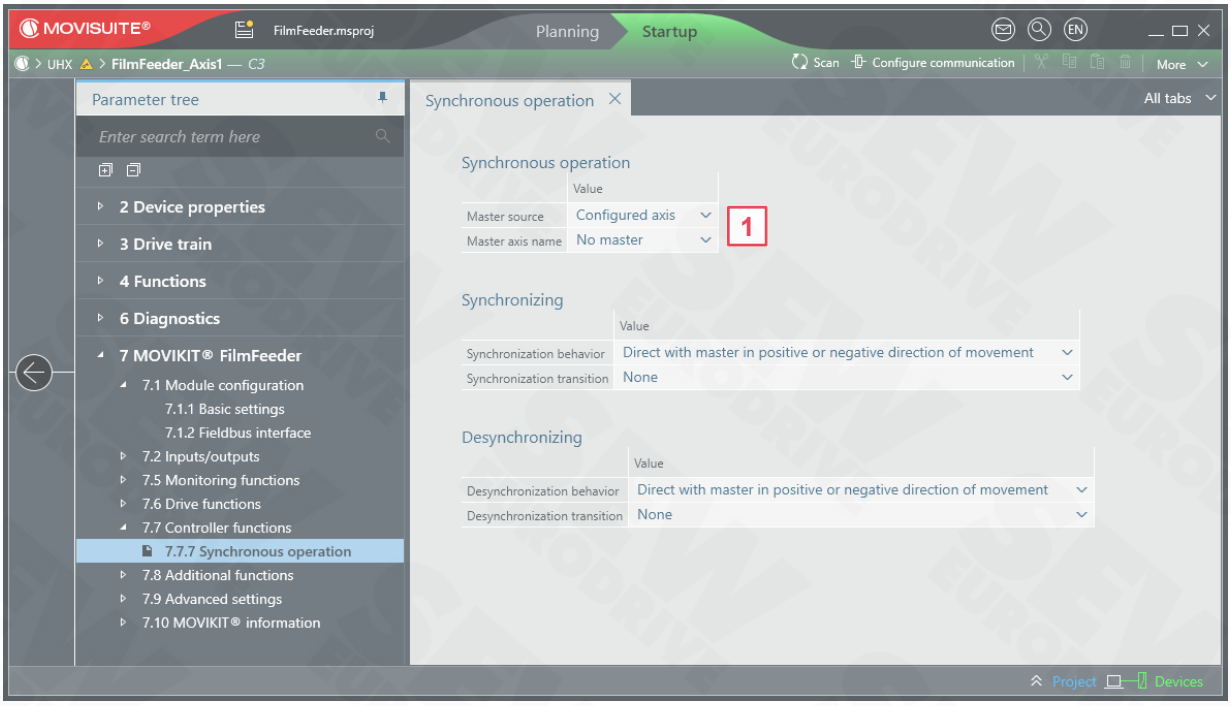
4. Configure the fieldbus interface



1 Activate the fieldbus connection and assign 9 as the start address.

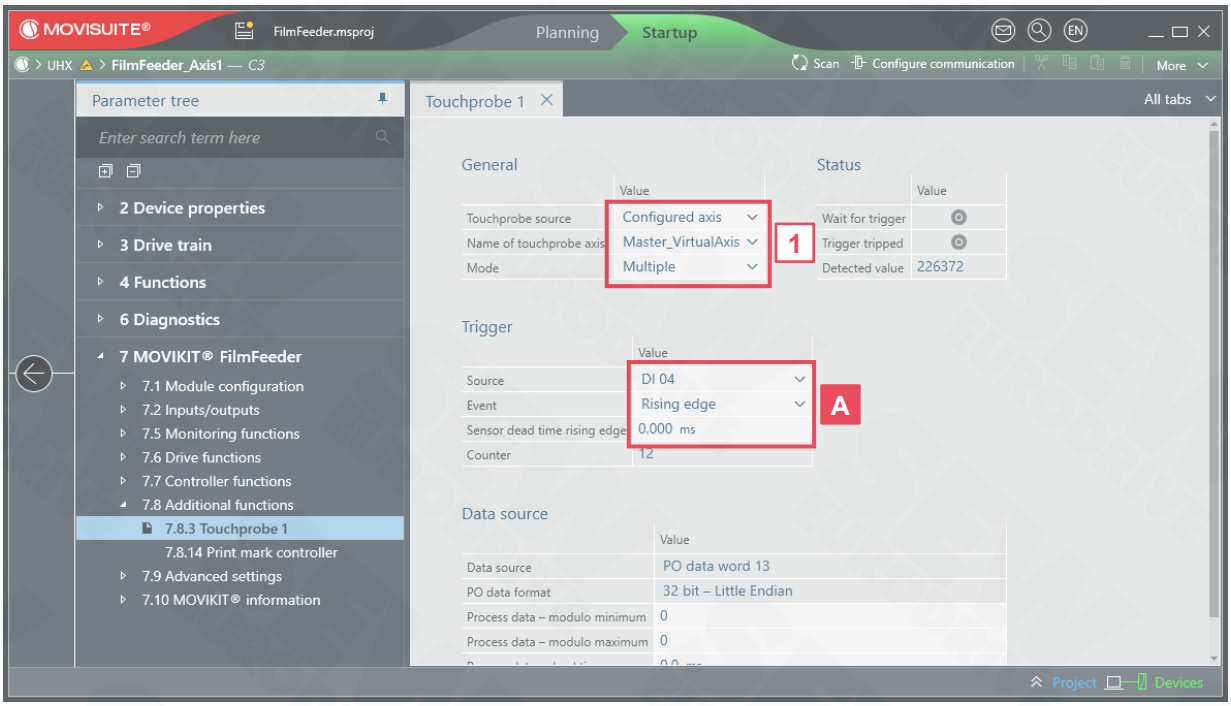
The start address 9 results from the start address (1) plus the number of process data words (8) of the previous axis Master_VirtualAxis.

5. Configure synchronous operation



1 Configure synchronous operation as shown.

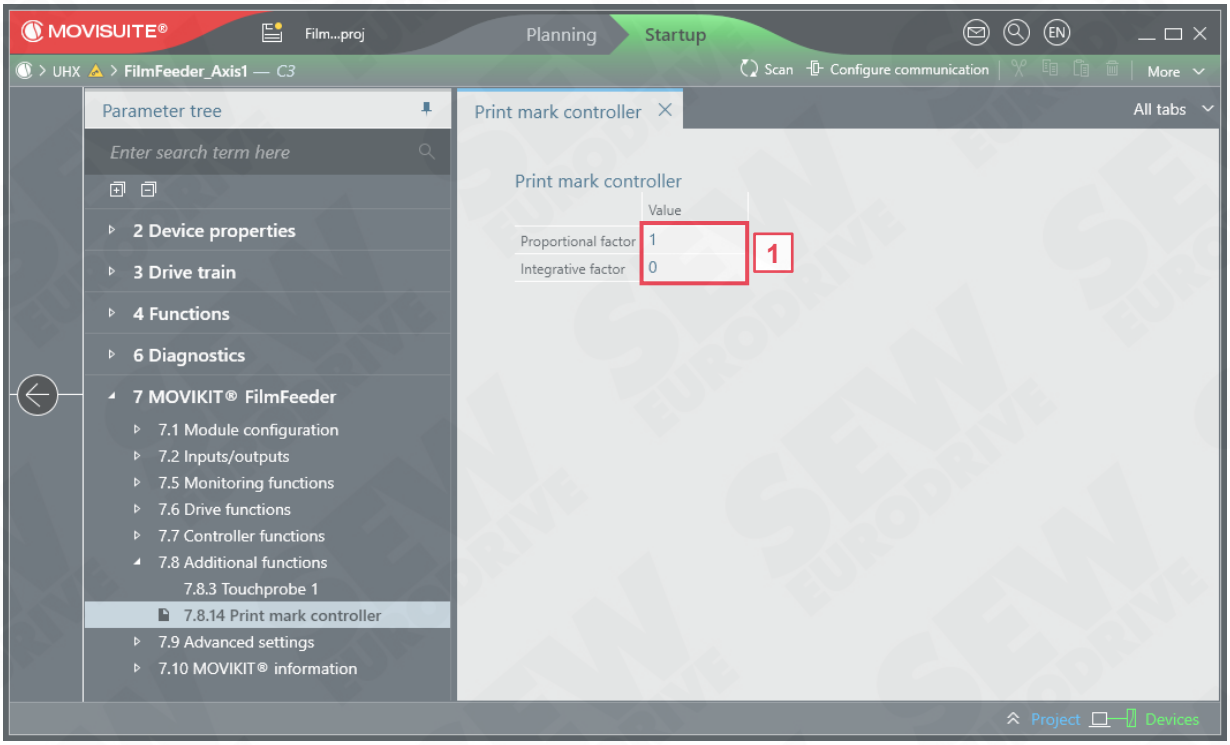
6. Configure touchprobe



1 Configure Touchprobe 1 as shown.

A You can configure the trigger for the touchprobe here; DI04 is the default setting.

7. Configure print mark controller



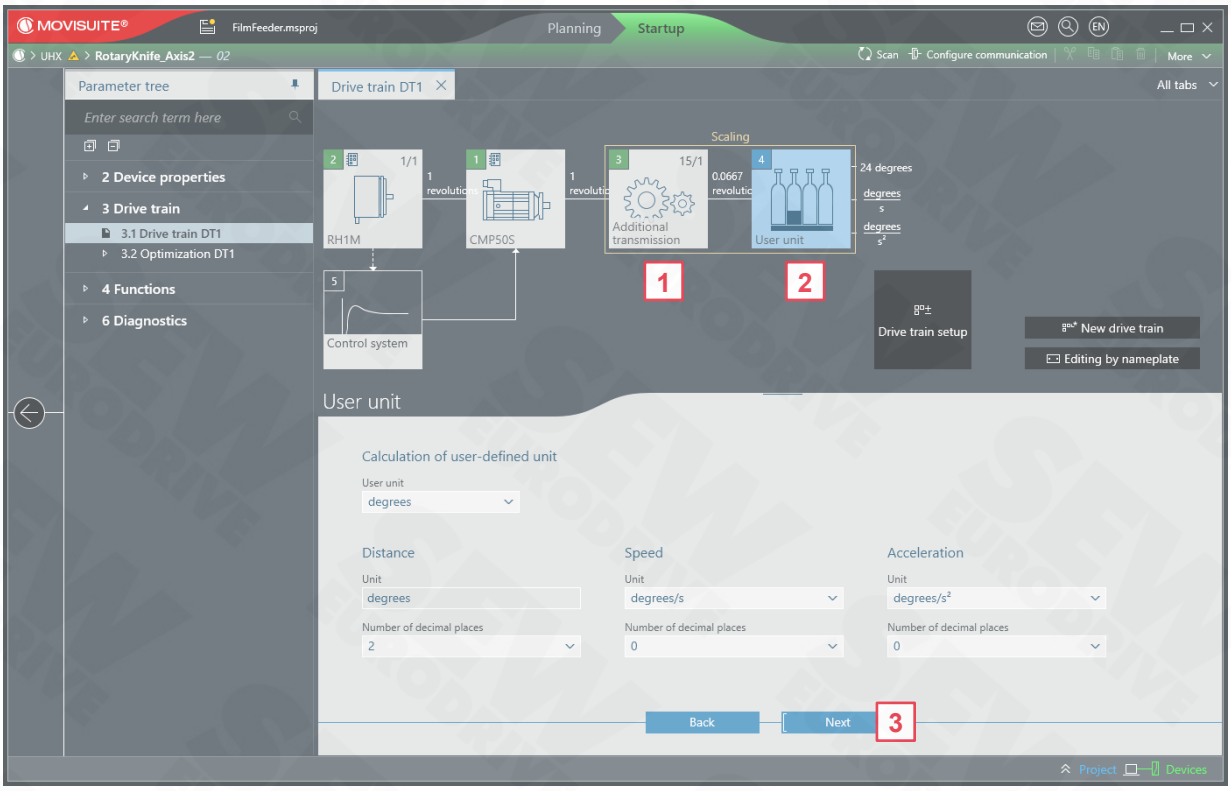
1 Configure the print mark controller as shown.

- Proportional factor: Affects the speed of the film feed in the cycle
- Integration factor: Affects the speed step by step over several cycles

For a system or machine, the print mark controller must be adapted to the application.

2.4 Configuring RotaryKnife_Axis2

1. Configure the drive train

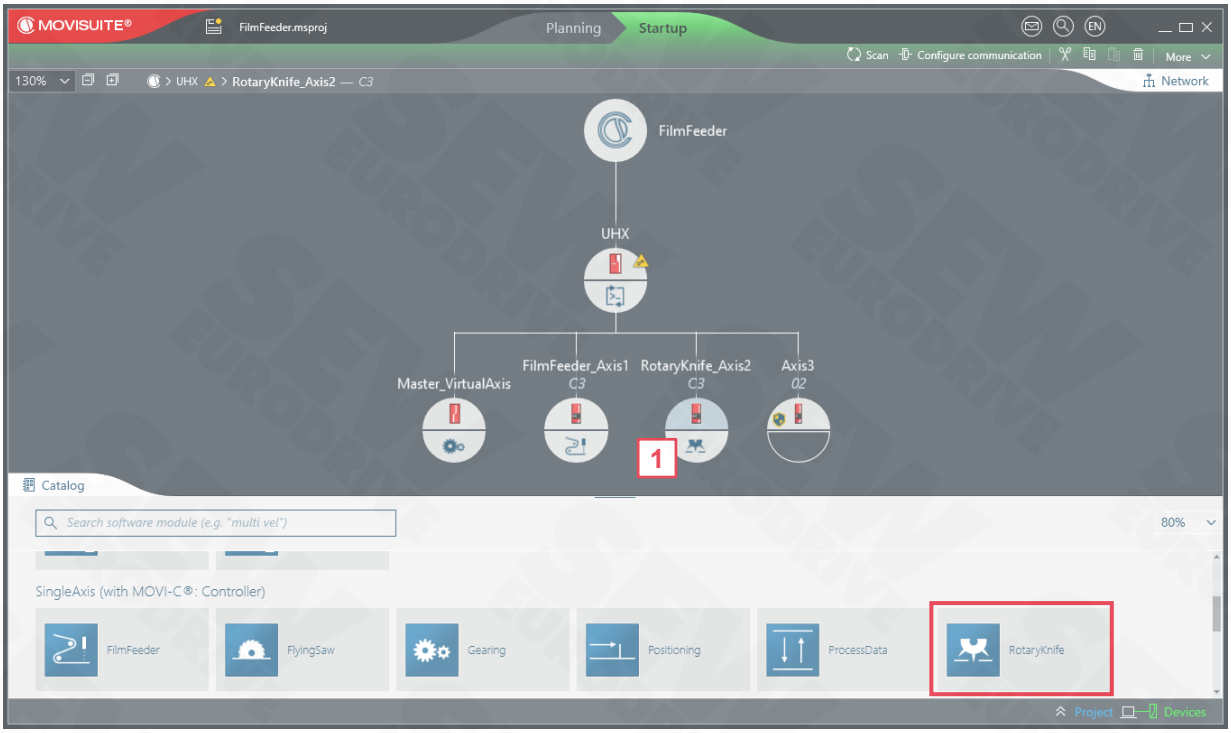


1 Add an additional transmission to the drive train with i=15.

2 Insert user units and configure them as shown. The decimal places are automatically adjusted again by the MOVIKIT® software module.

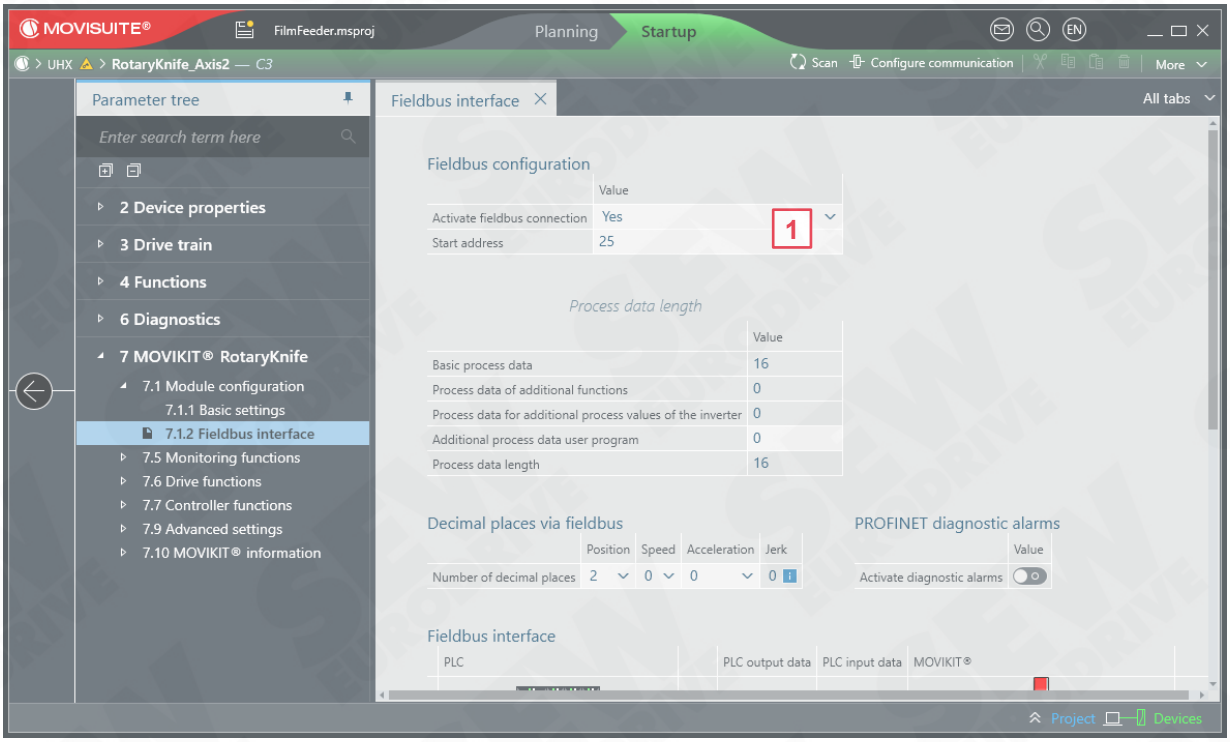
3 Transfer the drive train to the device using **Next > Transfer data to device**.

2. Add MOVIKIT® RotaryKnife software module



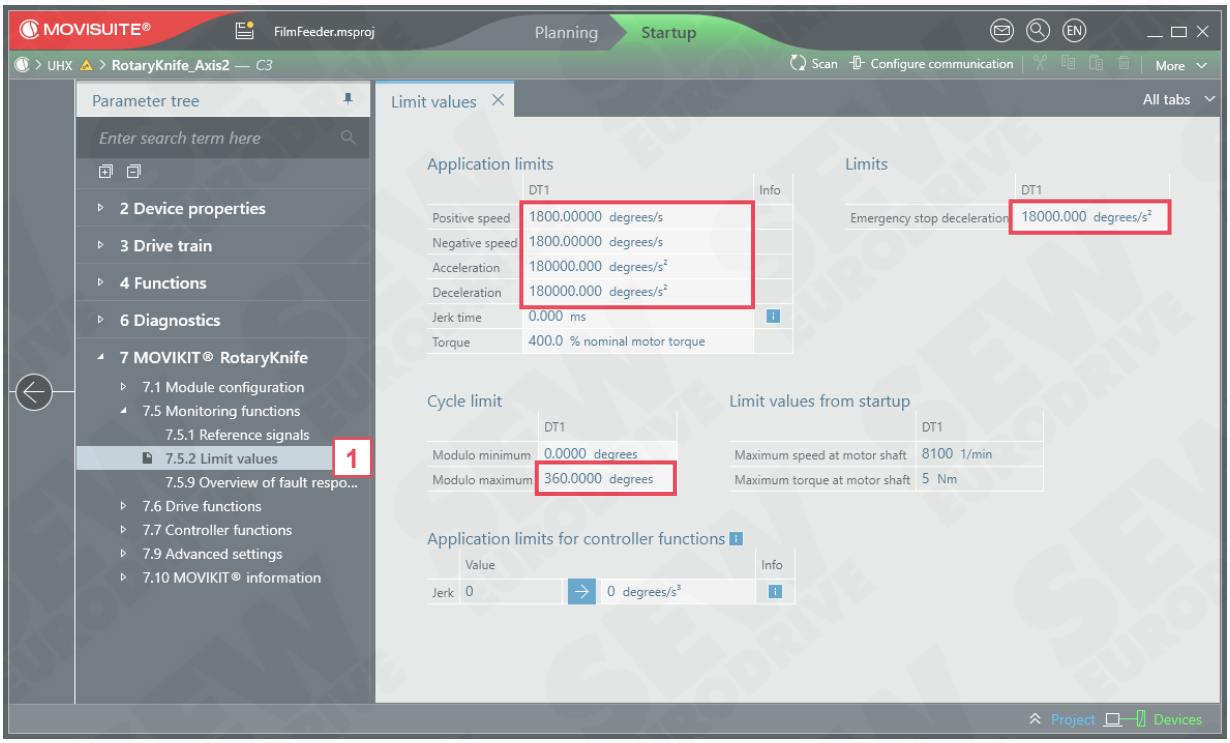
1 Insert the MOVIKIT® RotaryKnife software module with the current version into the device and acknowledge the following error E-34.01 again.

3. Configure the fieldbus interface



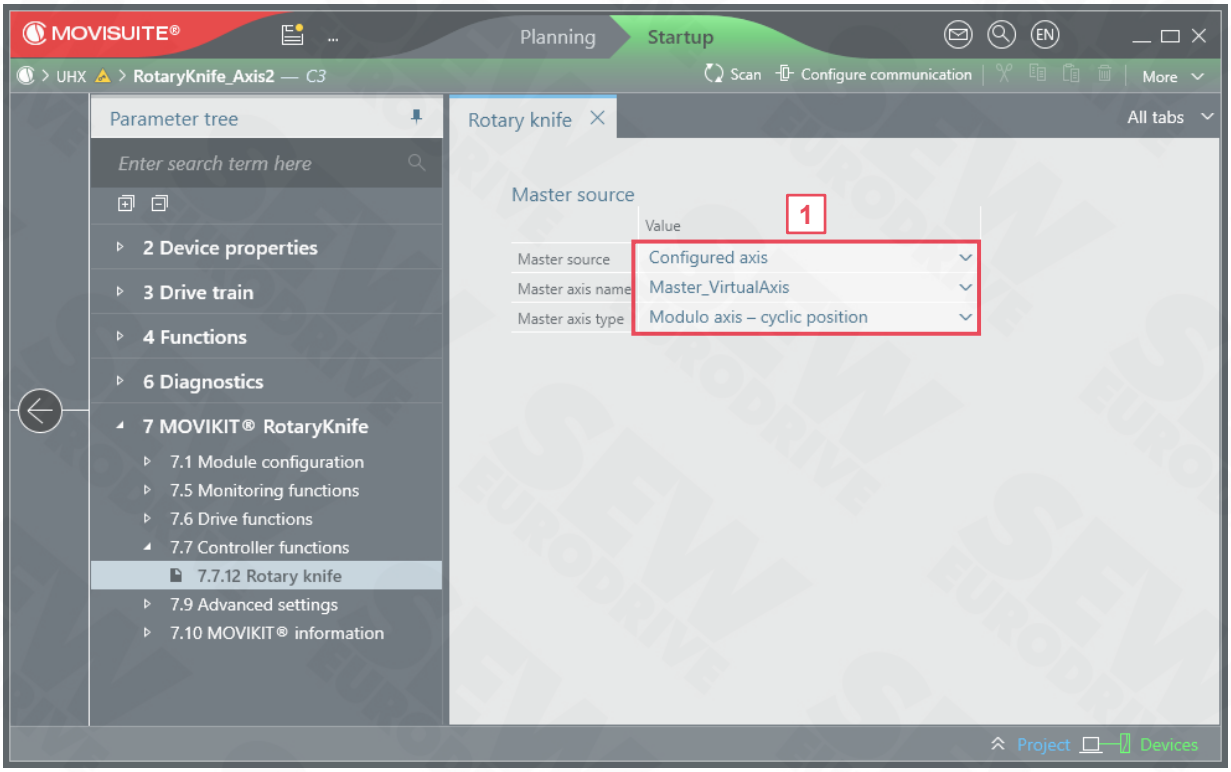
1 Activate the fieldbus connection and assign 25 as the start address.

4. Configure limit values



1 Parameterize the limit values as shown.

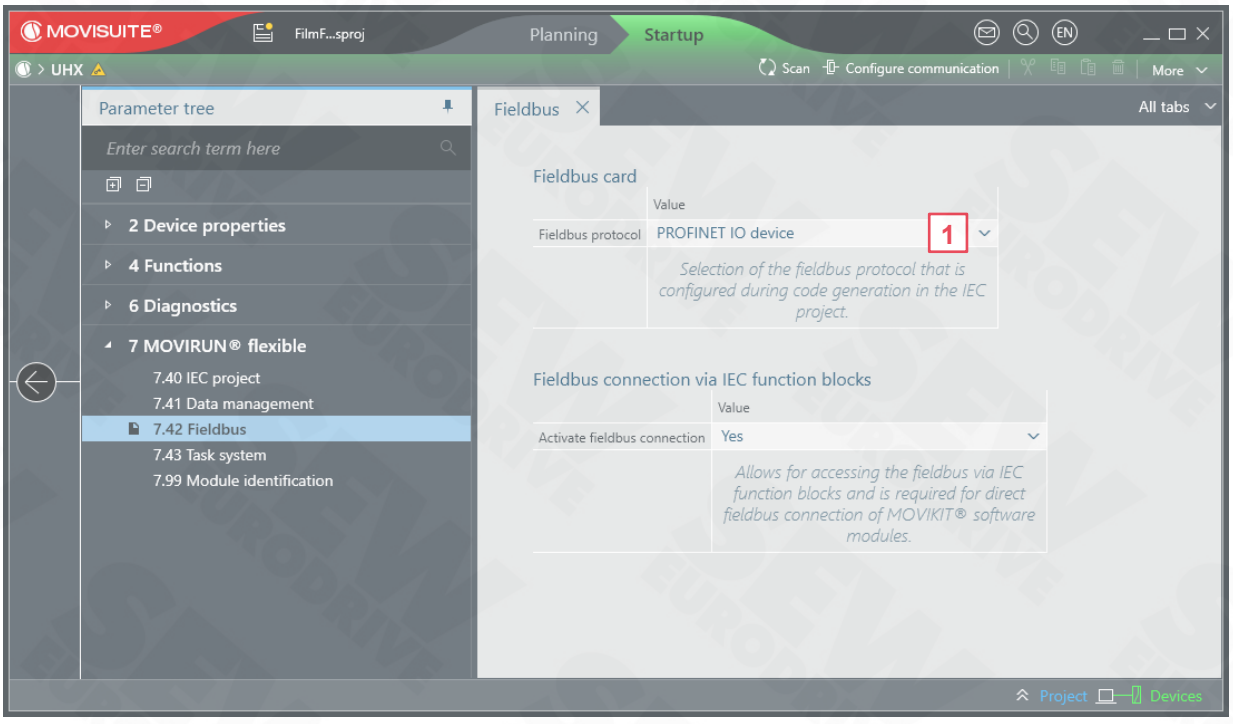
5. Configure Rotary knife



1 Parameterize the master source as shown.

2.5 Configuring MOVI-C® CONTROLLER

1. Configure the fieldbus interface

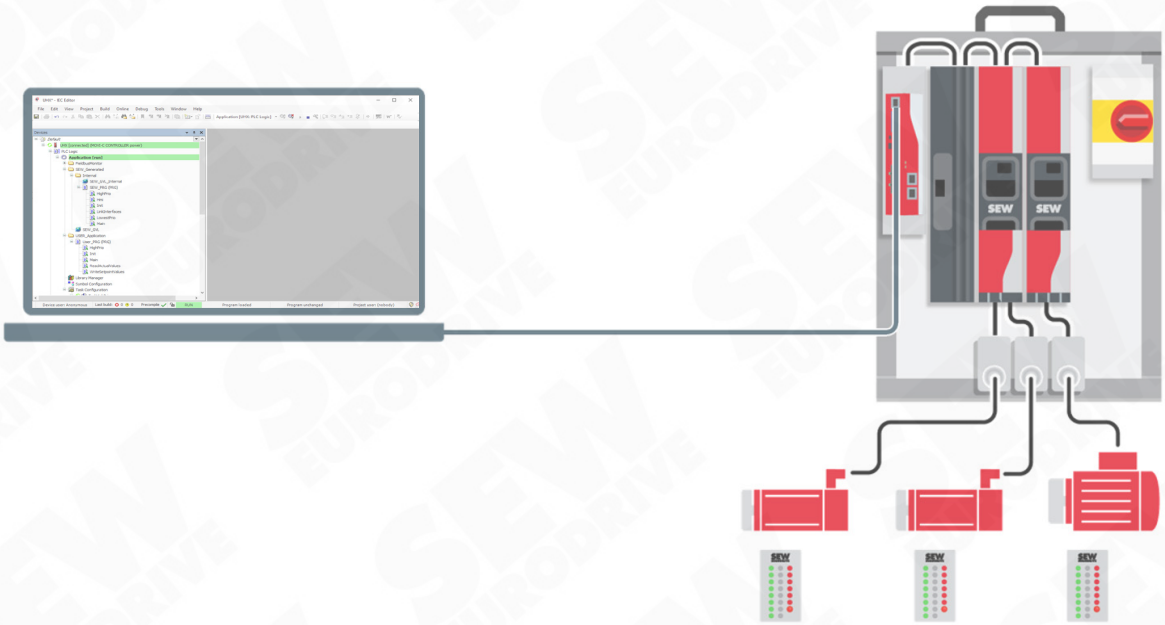


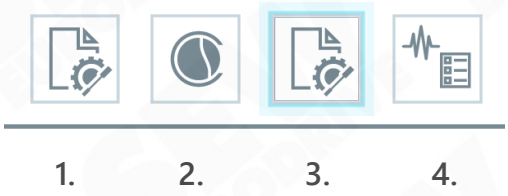
1 Select the corresponding **Fieldbus protocol**, which also automatically activates the fieldbus connection via IEC function blocks.

3 Creation and start of the IEC project

Objectives:

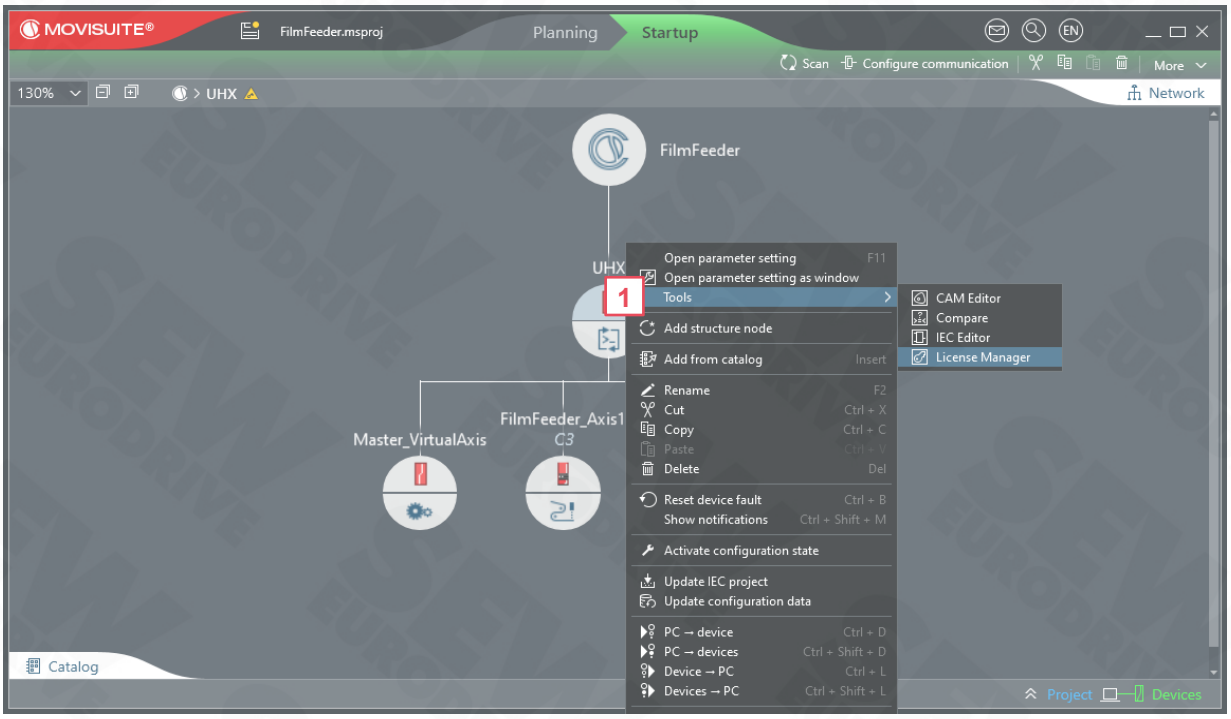
- Being able to use the License Manager tool and select the appropriate licenses
- Being able to activate the trial licenses and load them onto the MOVI-C® CONTROLLER
- Being able to create and start an IEC project





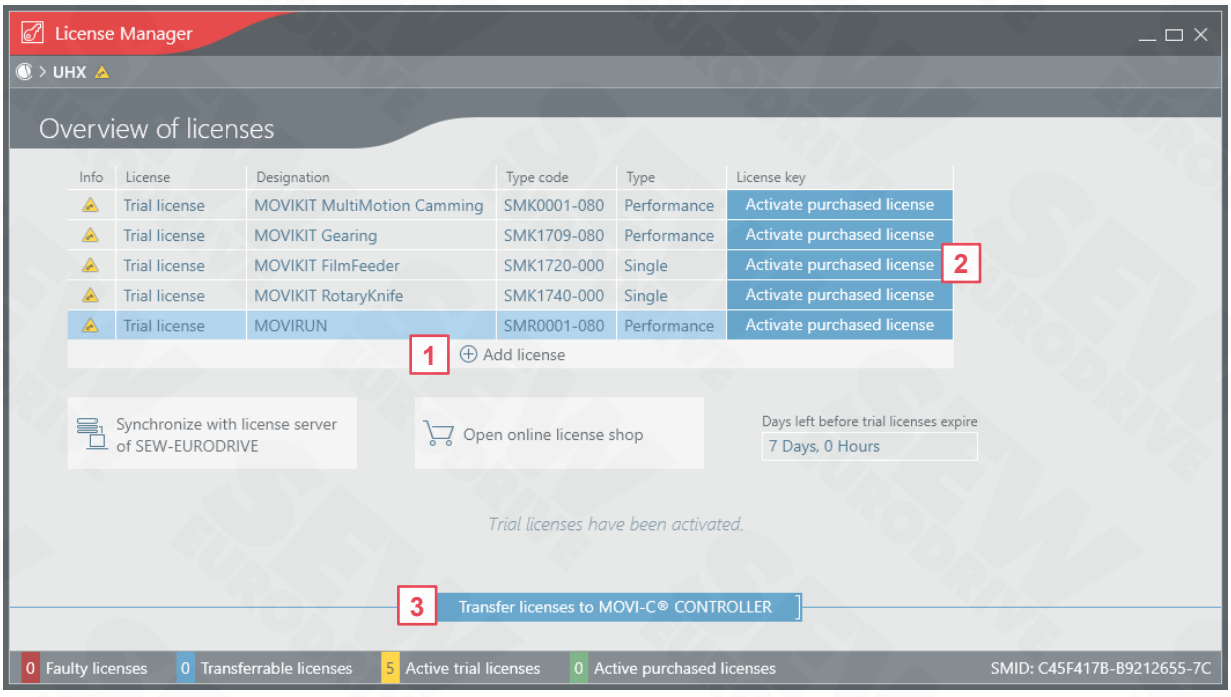
3.1 Licensing the MOVI-C® CONTROLLER

1. Start the license manager



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

2. Select licenses



1 Add the licenses shown.

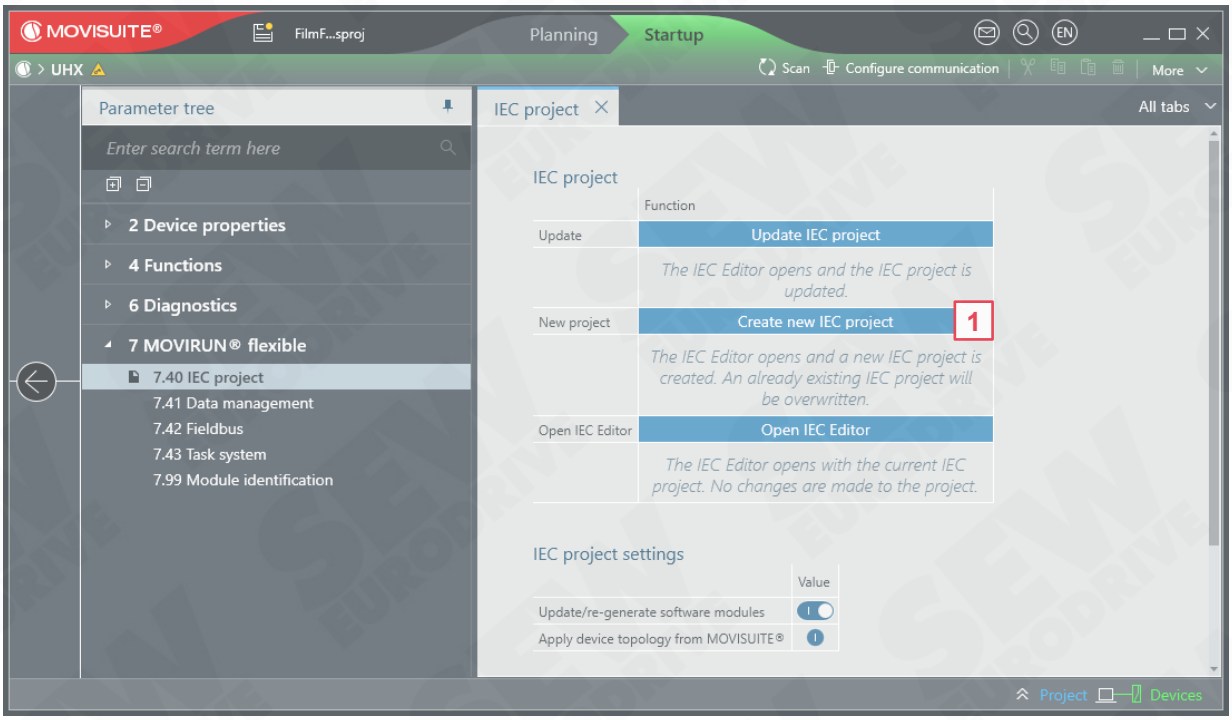
2 Activate trial licenses.

3 Transfer the licenses to the MOVI-C® CONTROLLER.1

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 has expired, the program continues to run and is not switched off. A message is displayed on the MOVI-C® CONTROLLER regarding the expired trial license.

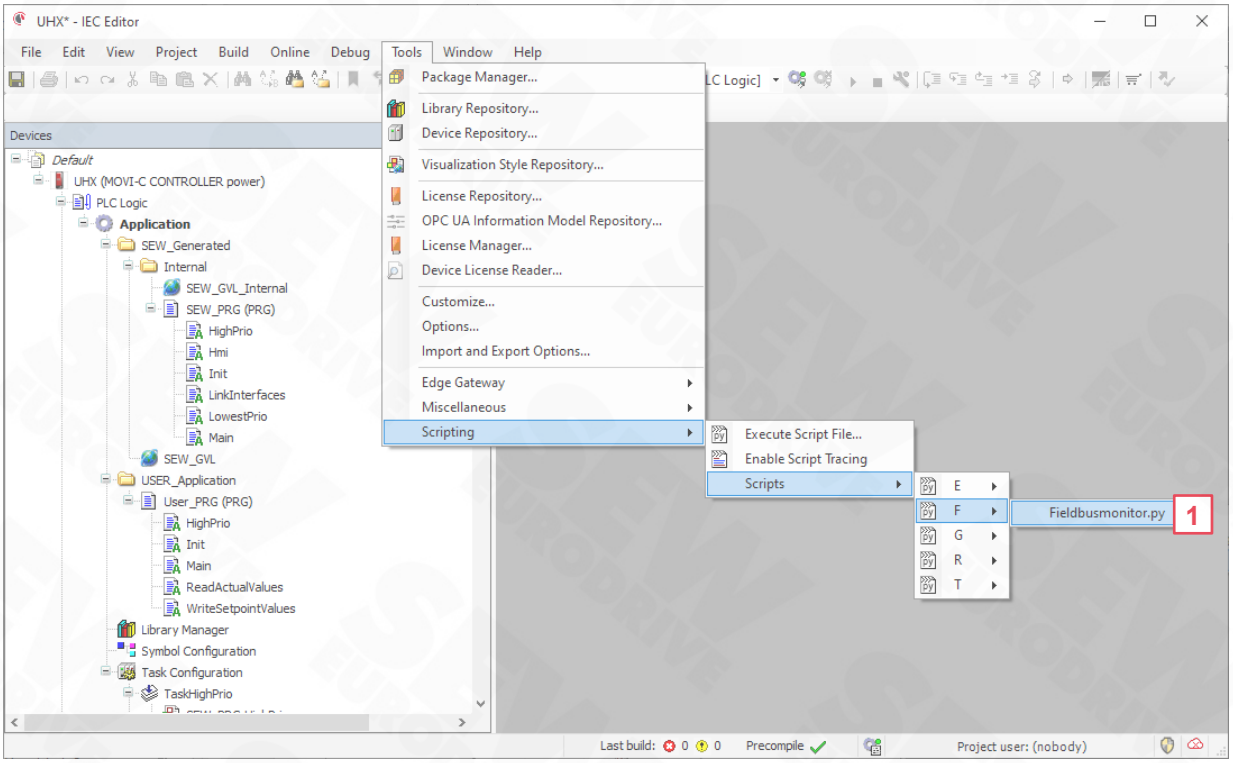
3.2 Creating and starting the IEC project

1. Generate a new IEC project



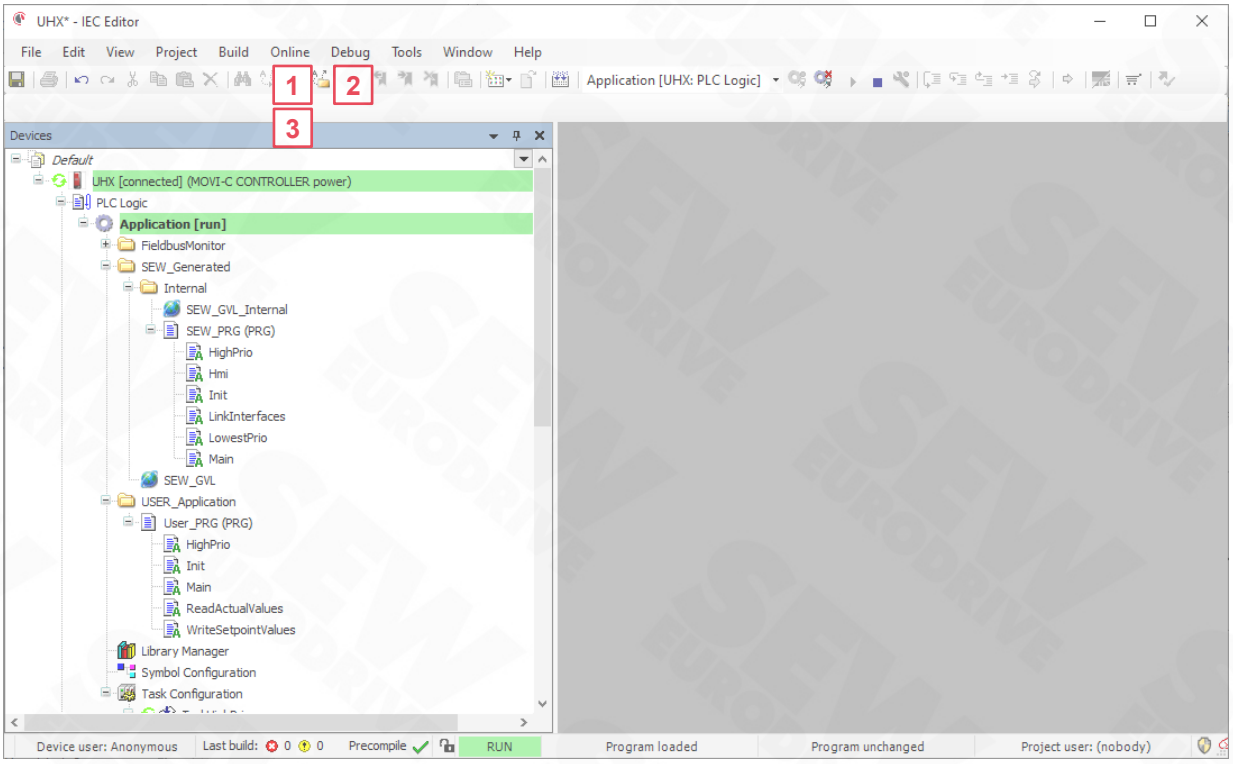
1 Activate code generation with **Create new IEC project**.

2. Activate Fieldbusmonitor



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

3. Start the IEC program



1 Compile and load the IEC program with **Online > Login**.

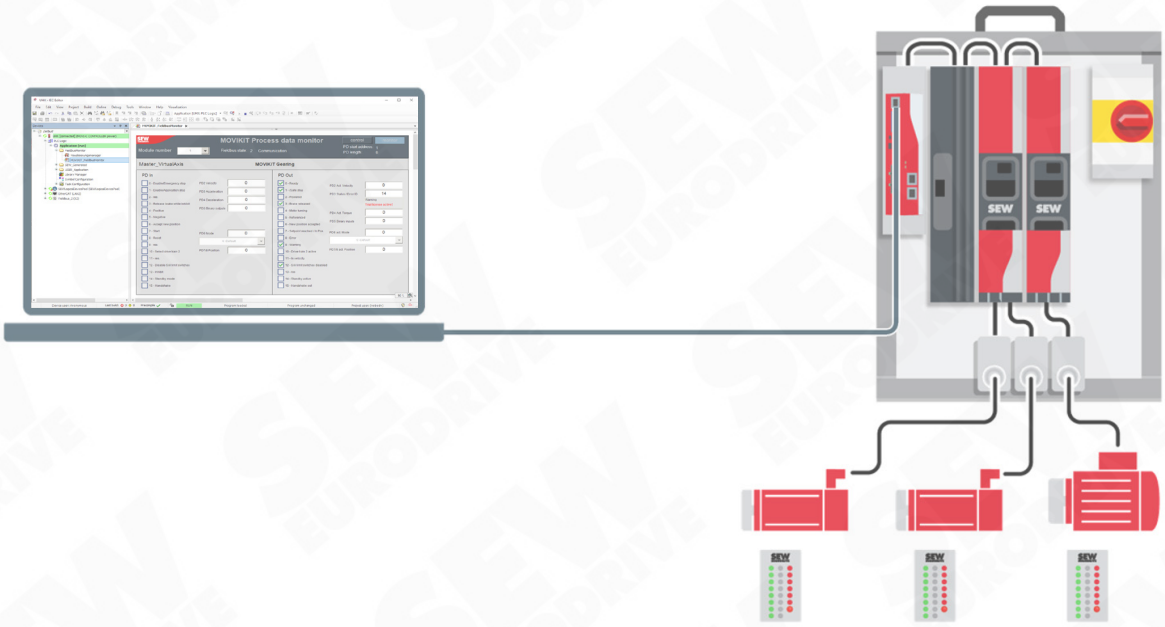
2 Start the IEC program with **Debug > Start**.

3 Save the program to the MOVI-C® CONTROLLER in a fail-safe manner **Online > Create Boot Application**.

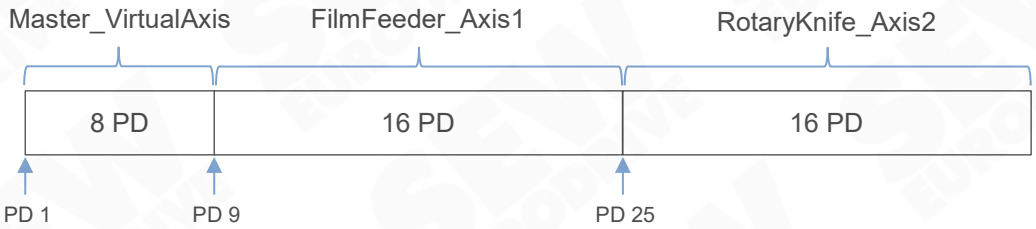
4 Control via the MOVIKIT® Process data monitor

Objectives:

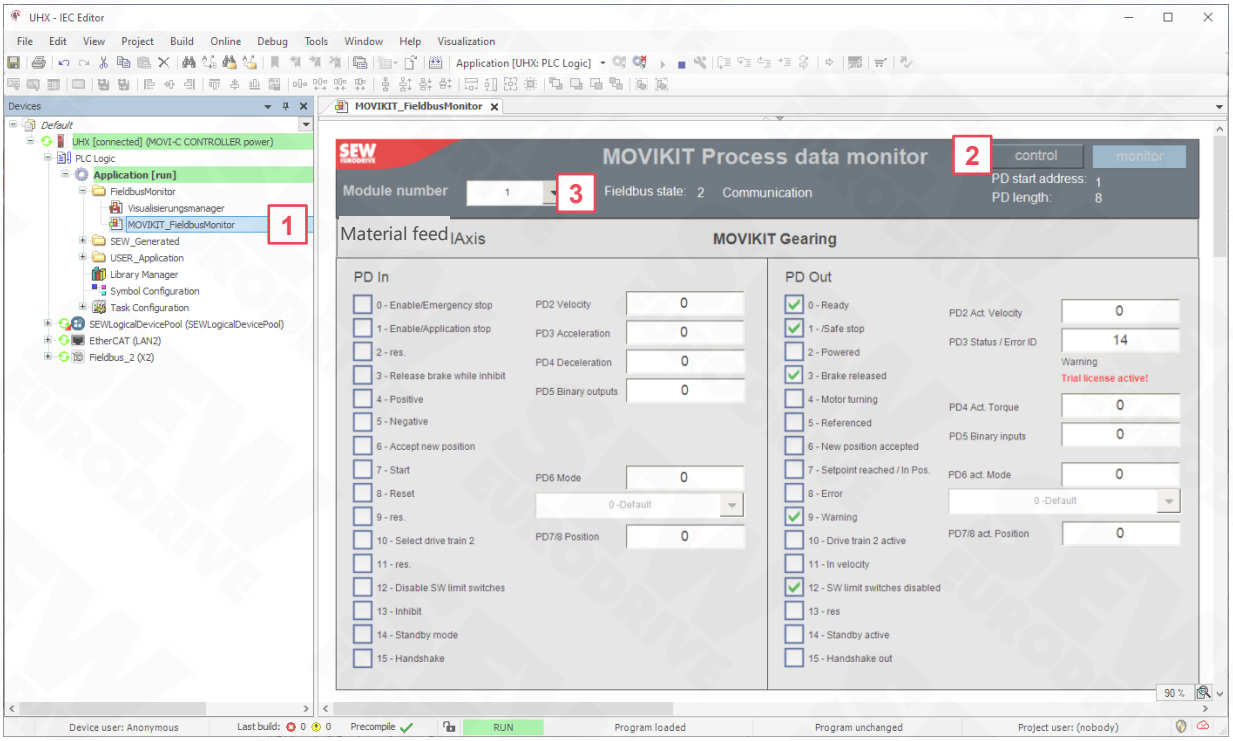
- Being able to control of the application with the MOVIKIT® Process data monitor



The configuration results in the following process data assignment:



1. Open the MOVIKIT® Process data monitor



1 Open the MOVIKIT® Process data monitor by double-clicking **MOVIKIT® FieldbusMonitor**.

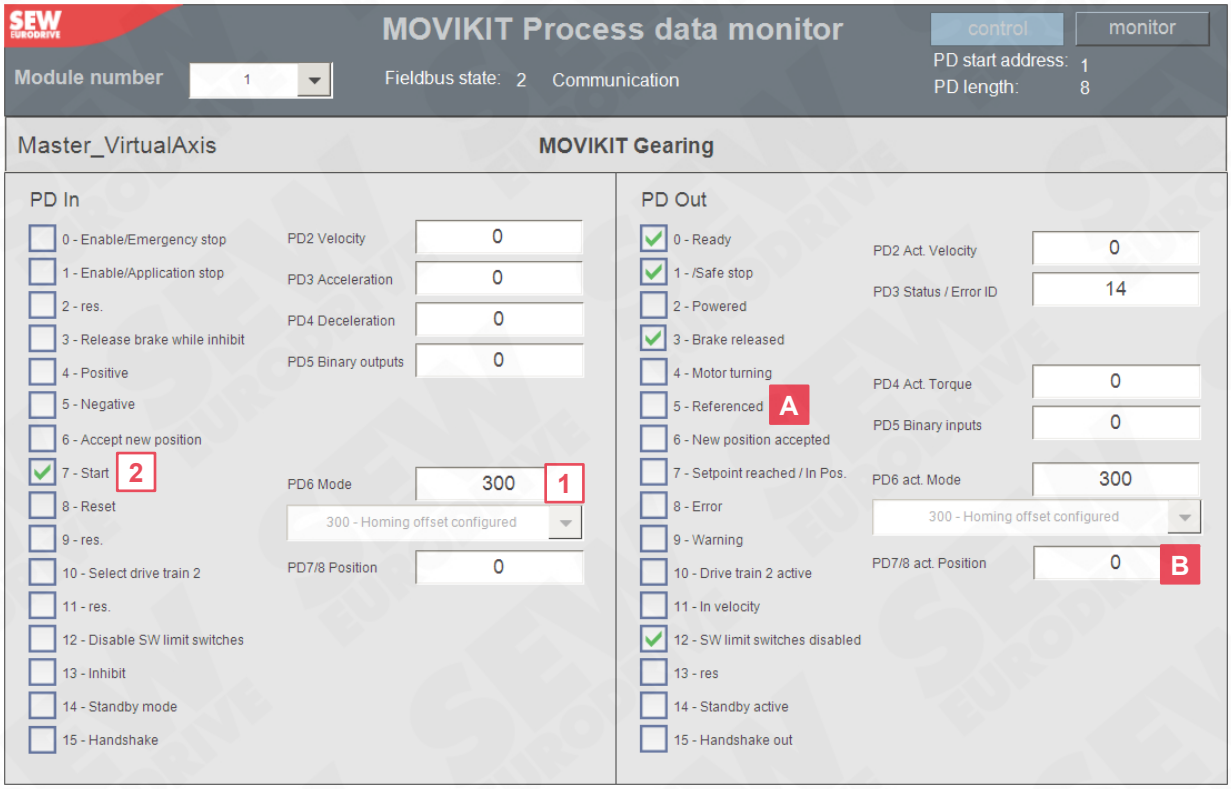
2 Switch to control mode with **control**.

3 You can select the control of the axes using the respective module number:

Master_VirtualAxis / MOVIKIT® Gearing: Module number: **1**
FilmFeeder_Axis1 / MOVIKIT® FilmFeeder: Module number: **2**
RotaryKnife_Axis1 / MOVIKIT® RotaryKnife: Module number: **3**

4.1 Referencing the axes

1. Reference RotaryKnive_Axis1



1 Set the mode with **PD6 Mode = 300**.

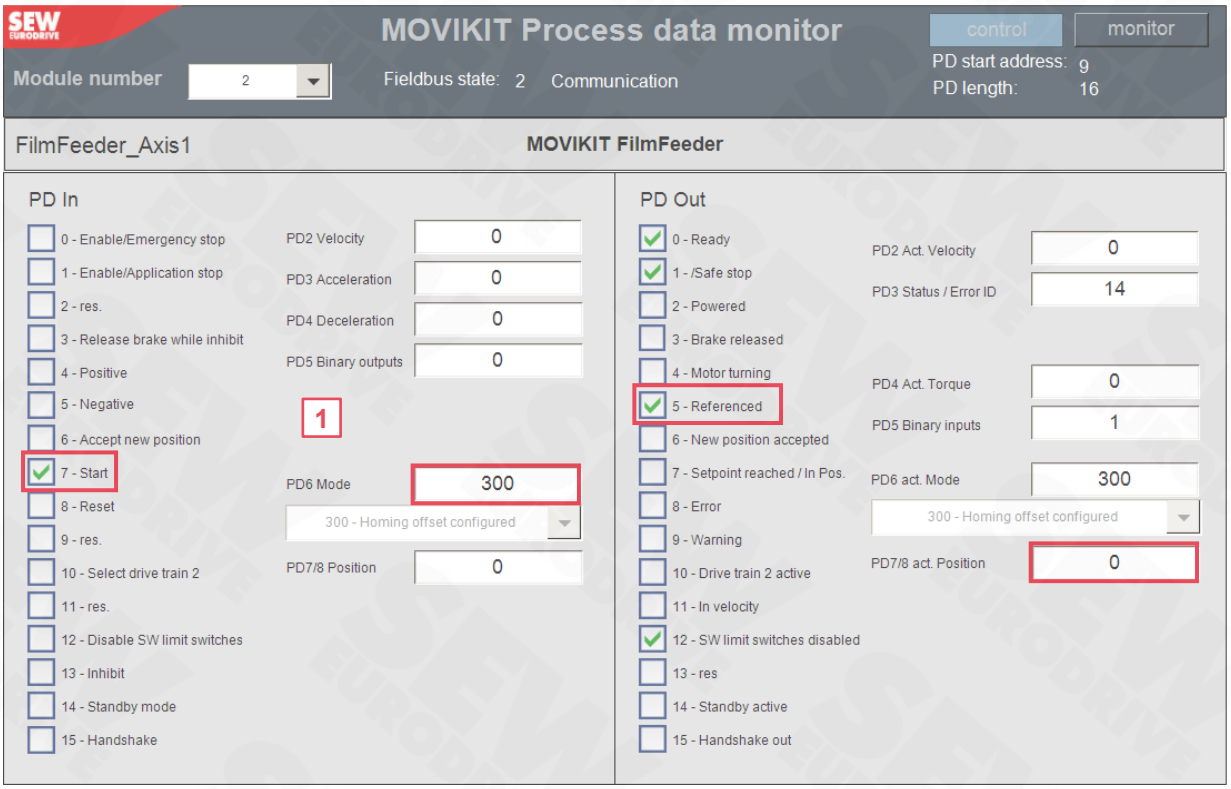
2 Start referencing.

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

B Here you can see the actual position of the axis. After referencing, this value is 0° or the value of the set reference offset.

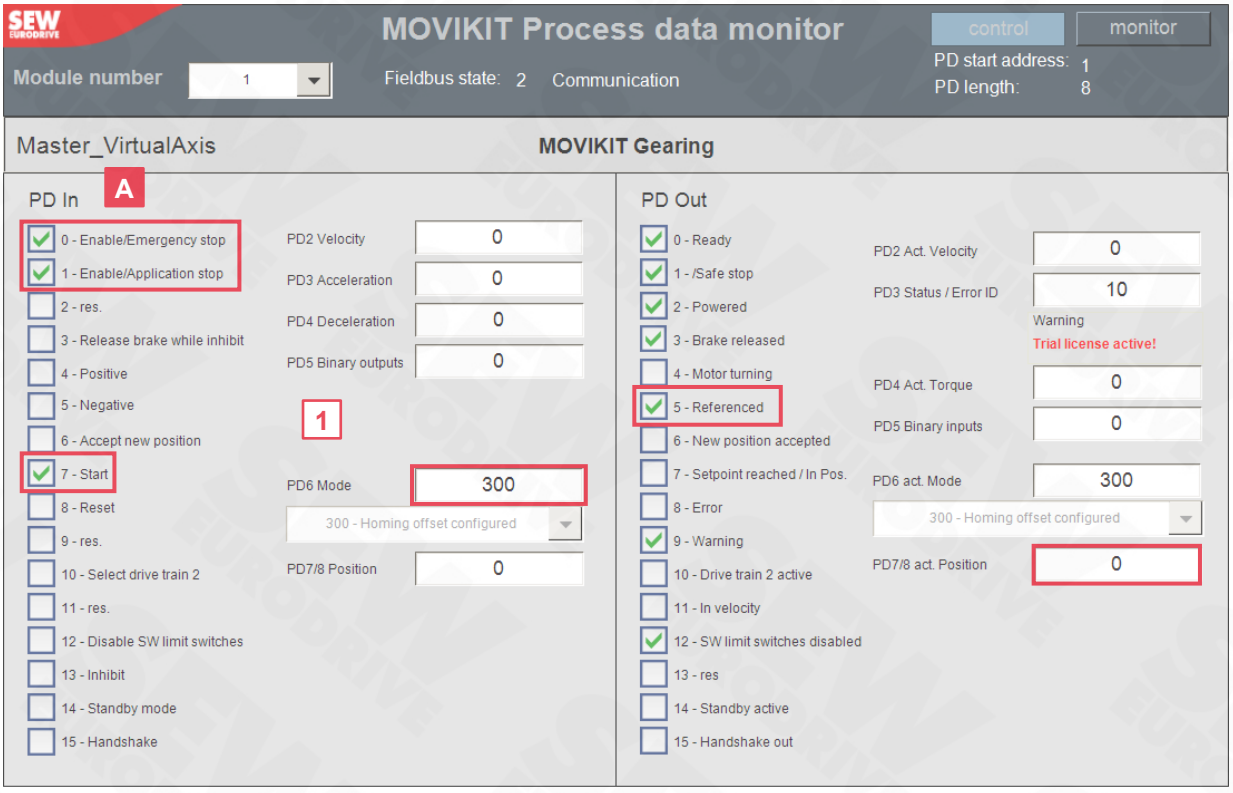
By default, the reference travel type is set as **Referencing without reference travel**, which means that no further settings are required for referencing the axes.

2. Reference FilmFeeder_Axis1



1 Reference the axis as shown.

3. Reference Master_VirtualAxis

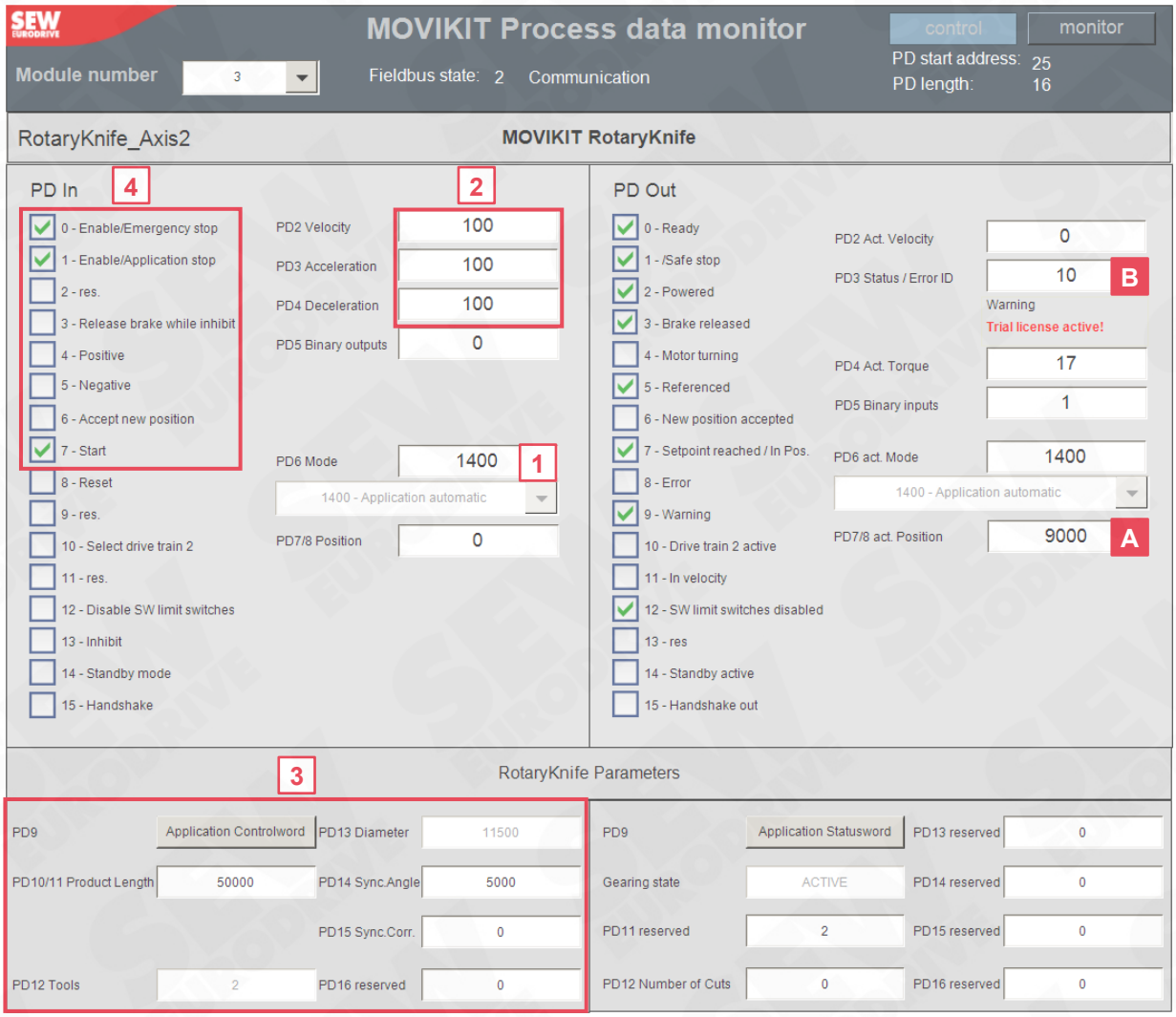


1 Reference the axis as shown.

A To start the referencing of the virtual axis you also have to set the enable bits **Bit 0 / Bit 1**.

4.2 Controlling the axes in Automatic mode

1. Control RotaryKnive_Axis1 in automatic mode



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

2 Set the travel parameters as shown.

3 Set the the RotaryKnife Parameters:

- **PD10/11 Product Length = 50000** > nominal cut length in [mm] with 2 decimal places
- **PD12 tools = 2** > number of tools on the rotary knife
- **PD13 diameter = 11500** > knife diameter in [mm] with 2 decimal places
- **PD14 Sync.Angle = 5000** > angle at which the rotating knife moves synchronously to the product. User unit [degrees] with two decimal places

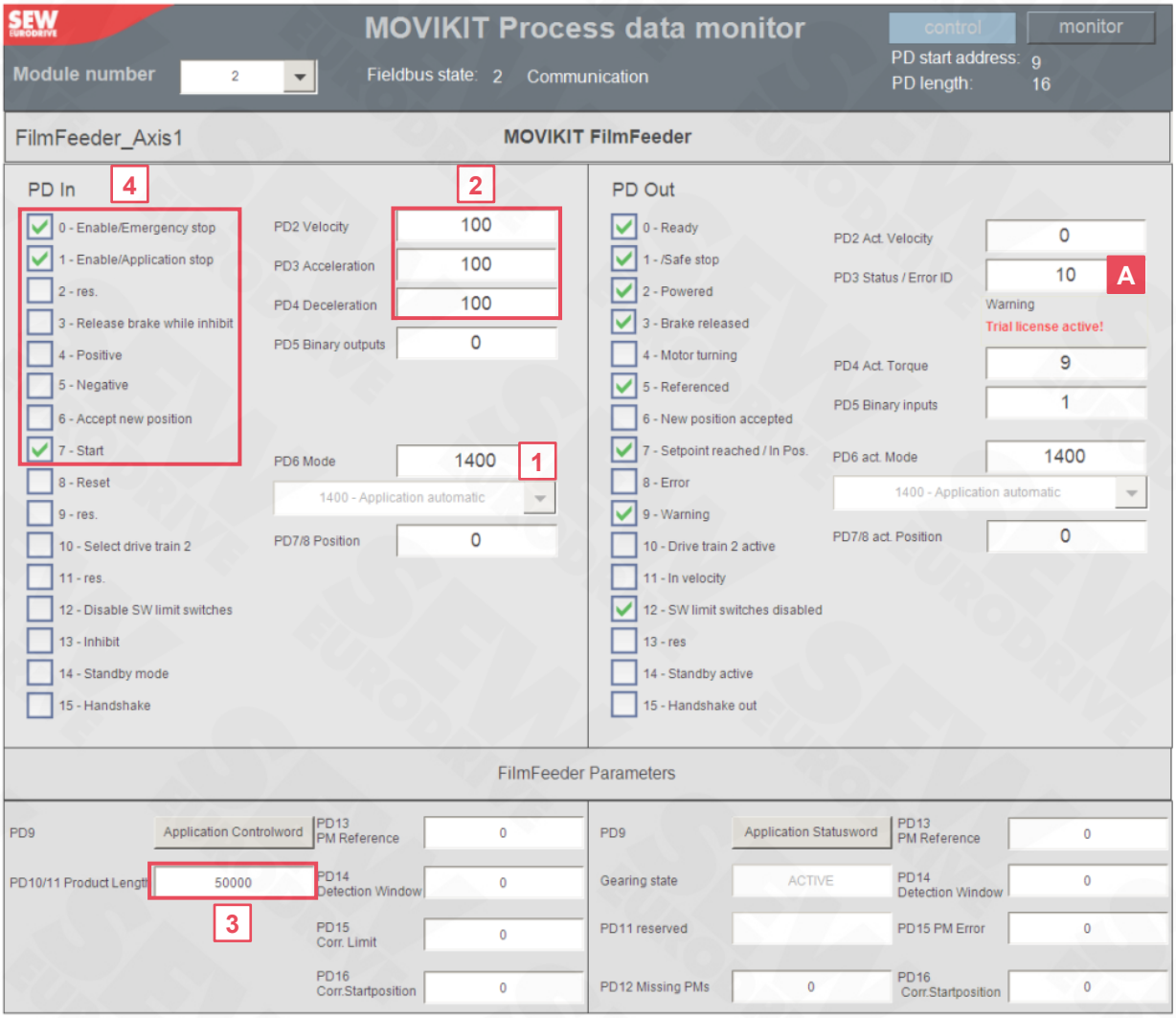
4 Set the two enable bits **Bit 0 / Bit 1** and start automatic mode with **Bit 7**.

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.

Note: Automatic mode may only be activated at standstill; the master must be stopped!

2. Control FilmFeeder_Axis1 in automatic mode



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

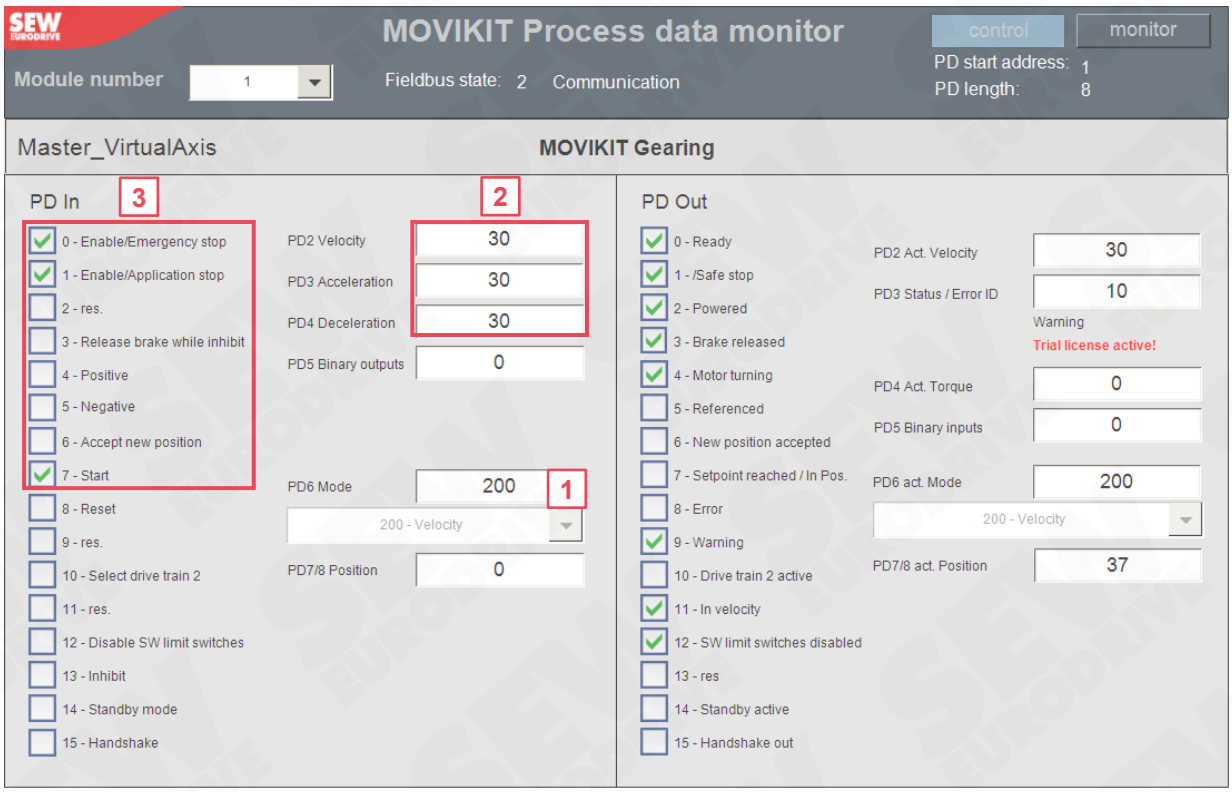
2 Set the travel parameters.

3 Set the nominal cut length here in [mm] with 2 decimal places.

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

A The **FCB10 Interpolated position control** is also activated on the FilmFeeder.

3. Control Master_VirtualAxis 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**.

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

4.3 Performing Trace measurement of Automatic mode

1. Configure a trace measurement with the following variables from SEW_GVL_Internal

Master_VirtualAxis:

- Master_VirtualAxis_AxisDriver._fbVelocityProfile._stOUTSignals.lrSetpPositionModulo

RotaryKnife_Axis2:

- RotaryKnife_Axis2_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualPosition
- RotaryKnife_Axis2_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualVelocity

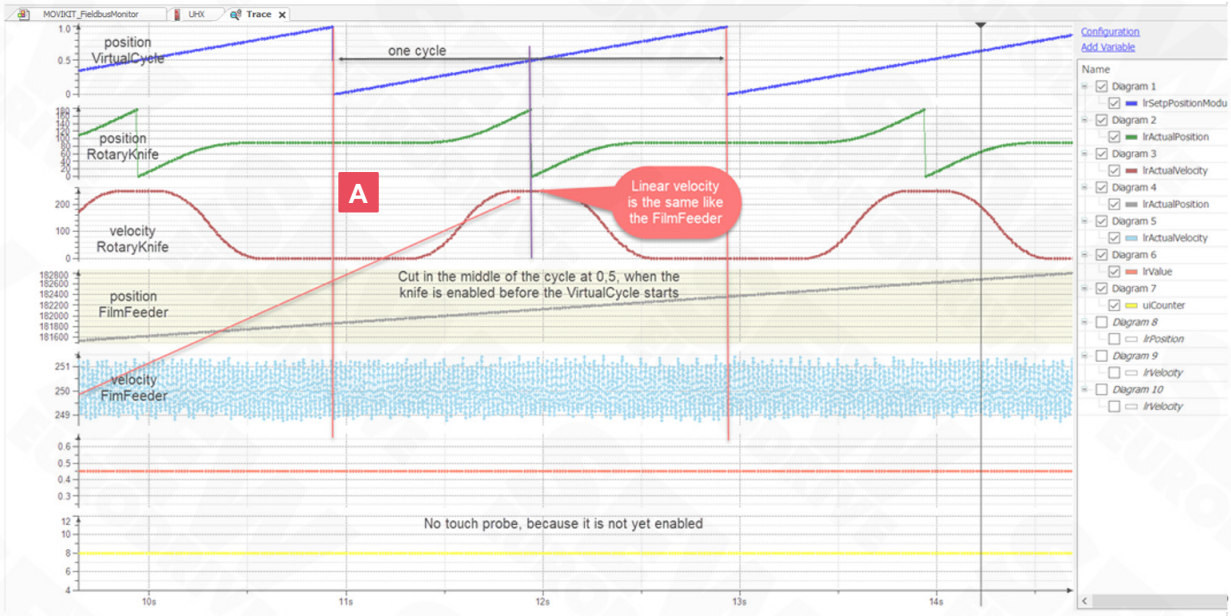
FilmFeeder_Axis1:

- FilmFeeder_Axis1_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualPosition
- FilmFeeder_Axis1_AxisDriver.DeviceAdapter16PD.stBasicOUT.lrActualVelocity

FilmFeeder_Axis1 Touch probe position and counter:

- FilmFeeder_Axis1_AxisDriver._fbTouchProbe._stOUTSignals.lrValue
- FilmFeeder_Axis1_AxisDriver._fbTouchProbe._stOUTSignals.uiCounter

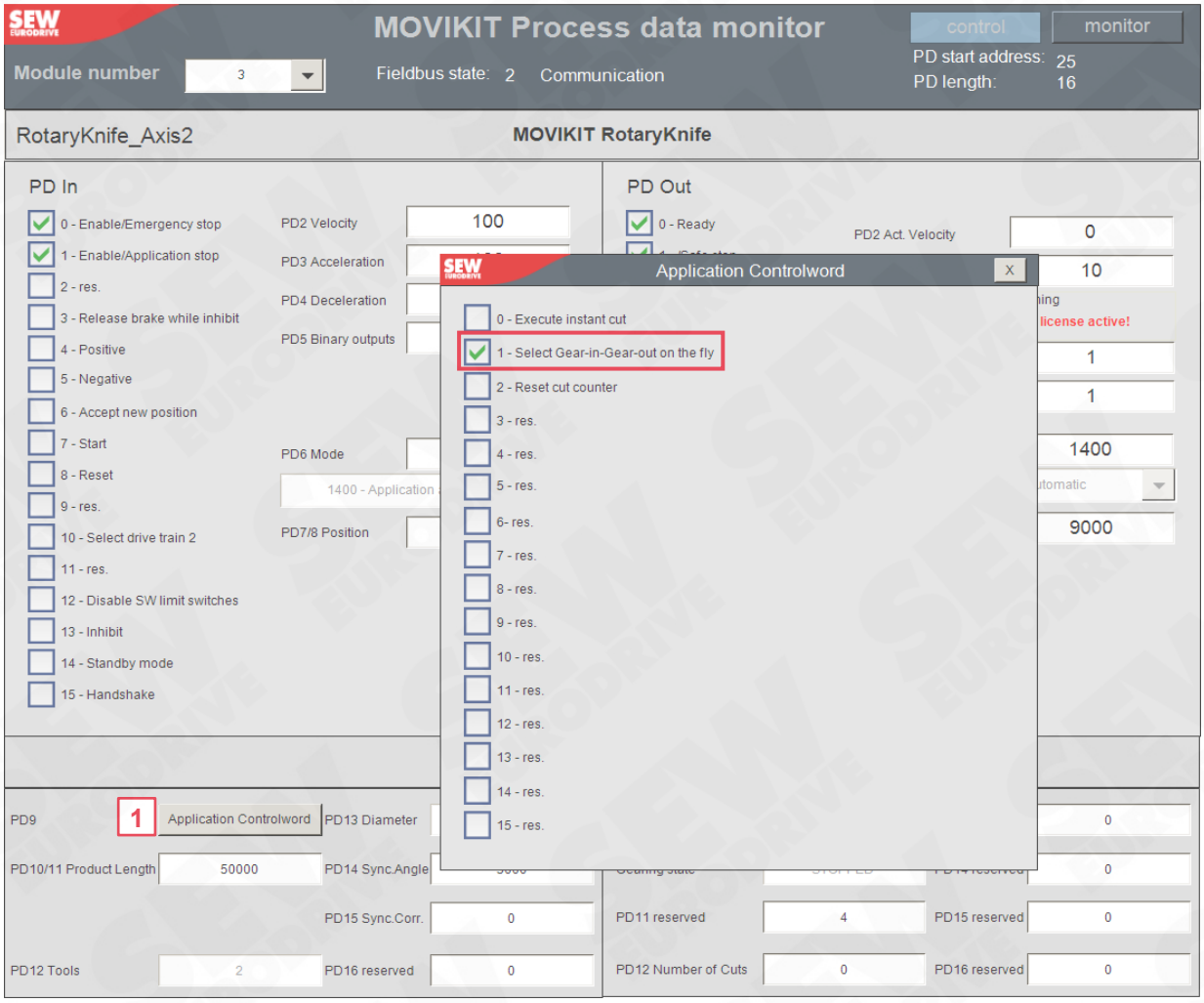
2. Perform the trace measurement



A The cut starts in the middle of the cycle because the RotaryKnife has been enabled and at position 90° before the start of the master axis.

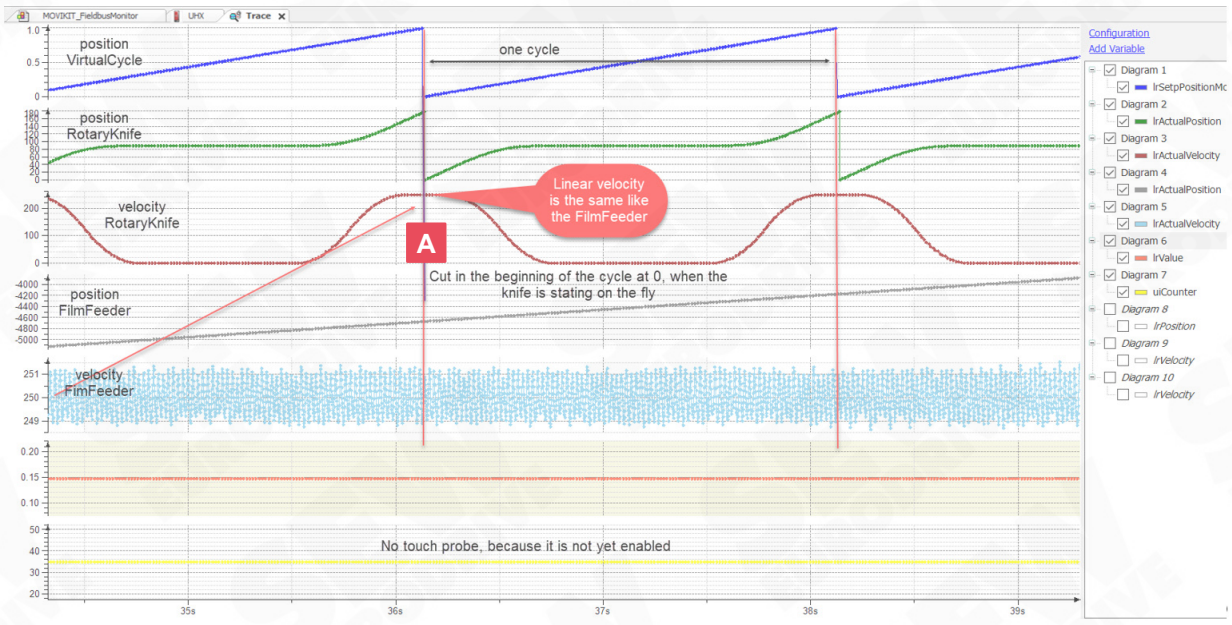
4.4 Activating Automatic mode with Gear-in-Gear-out on-the-fly

1. Activate Gear-in-Gear-out on-the-fly



1 With the master deactivated, set **PD9 Application Controlword > Bit1** at RotaryKnife_Axis2 . The change is applied by toggling the start bit **PD In > Bit 7**.

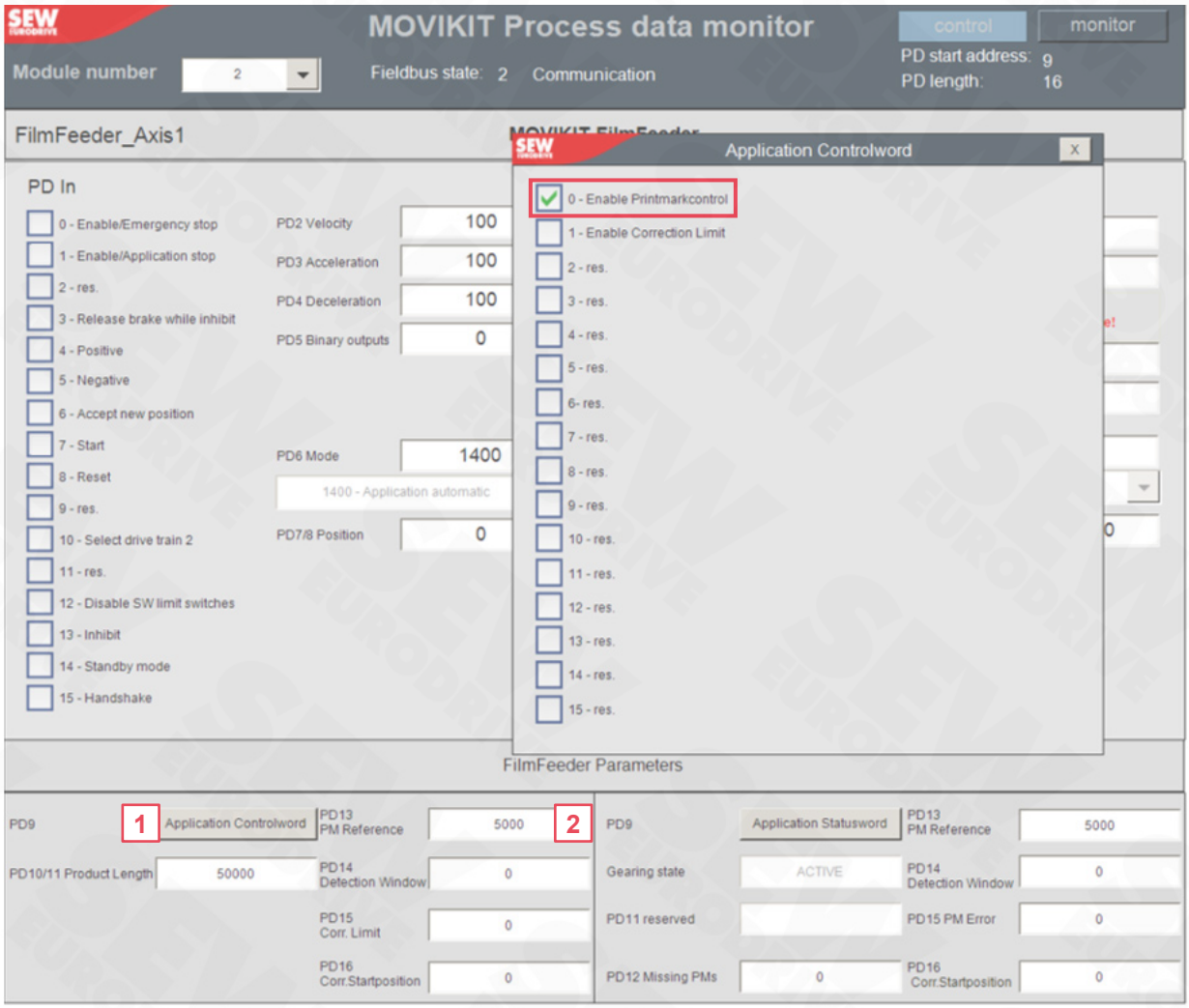
2. Perform a trace measurement with the current settings



A The cut is made at the beginning of the cycle.

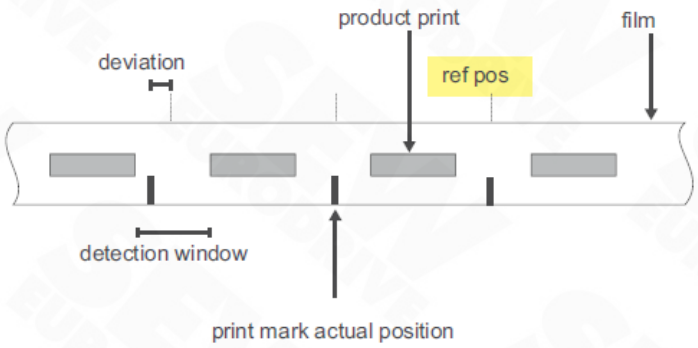
4.5 Activating Automatic mode with print mark control

1. Activate print mark control



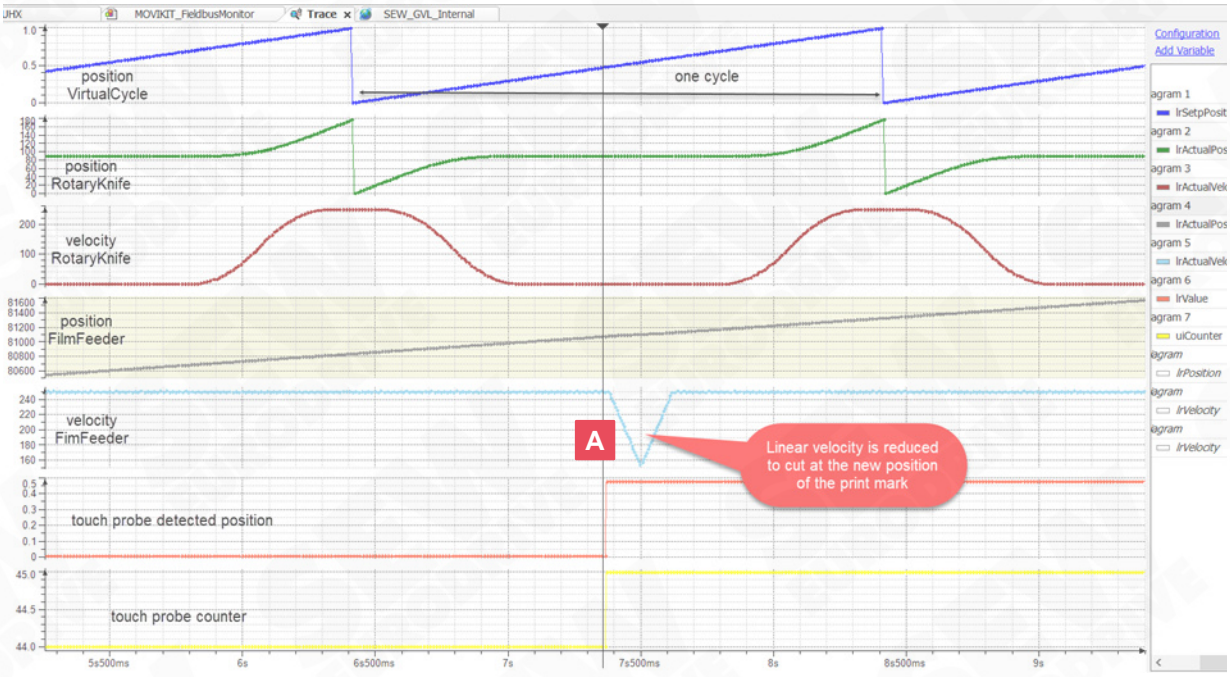
1 Open **PD9 Application Controlword** at FilmFeeder_Axis1 and activate print mark control **Bit 0**.

2 Parameterize **PD13 PM Reference = 5000**. This is the setpoint for the reference position of the print mark. This is the user unit of the master axis with four decimal places **=> The print mark is expected at position 0.5.** Then start automatic mode again and activate print mark control several times by toggling DI04.

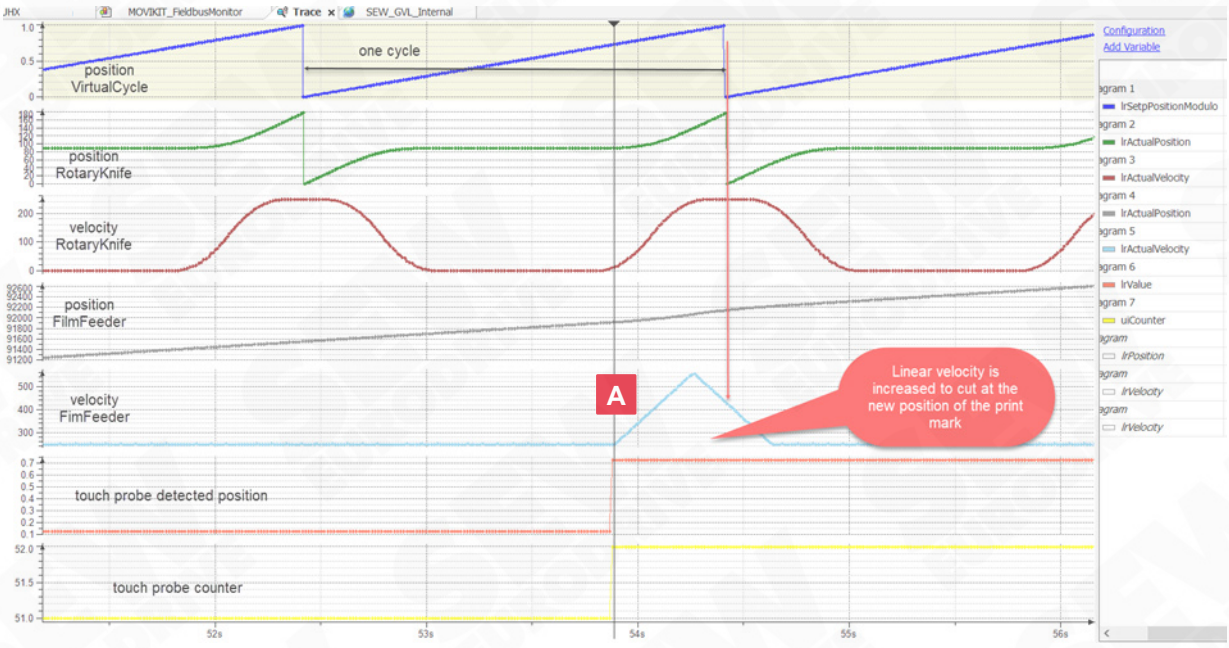


When activating print mark control, all drives must be stopped/deactivated!

2. Examples of trace measurements with activated print mark control



A In this measurement, the print mark is detected at position 0.47, so the FilmFeeder reduces the speed somewhat to reach the new position.



A Here, the print mark at position 0.73 was detected. The FilmFeeder drive increases the speed to reach the new position.

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