Application Note

FESTO

YJKP - application example using Web-Visu

Complete application example of pressing a spring using YJKP system

YJKP

- Configure sequencer
- Record a reference curve
- Configure monitoring
- Operate

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1 Components/Software

Type/Name	Version Software/Firmware	Date of manufacture
Servo press kit YJKP	general	--
Application software YJKP (GSAY-A4-F0-Z4-1.3.5)	V1.3.5	--
Firmware controller (CECC-X)	V3.4.6	--
Firmware motor controller (CMMP-AS)	V4.0.1501.2.4	--

Table 1.1: 1 Components/Software used

1.1 Application description

This application note describes how to create and edit a spring press program using Webvisu control and how to add evaluation methods to monitor the press process.

Following descriptions are part of the application note:

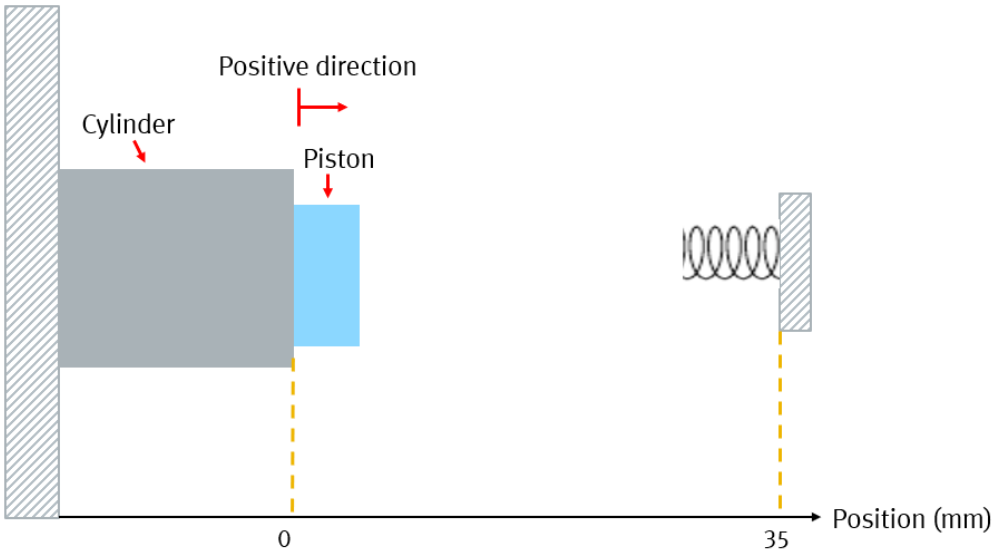
1. Configure sequencer
2. Record curves
3. Configure monitoring
    - Windowing
    - Threshold
    - Envelope
4. Graphical illustration of the cylinder movement

2 Press process description

In this example the YJKP should fulfill the following functions:

1. Move the Cylinder from the actual position to position 10 mm at speed of 8 mm/s.
2. Eliminate the weight of mechanical parts mounted on the cylinder as a sensor by using tare function.
3. Move the cylinder from the position 10 mm to 20mm at speed of 5 mm/s , then reduce the speed to 3 mm/s until it reaches the desired force 370 N.
4. Press for 3 seconds at this force value (370 N).
5. Return to the position 3 mm after finishing the pressing process.
6. Return to the position 3 mm in case the press process fails.
7. Monitor the pressing process with appropriate evaluation methods.

An illustrative shape showing the cylinder and the spring is used in this application note:



3 Working steps

3.1 Open Servo_Press Visu

Open a browser and start the WebVisu of the YJKP.

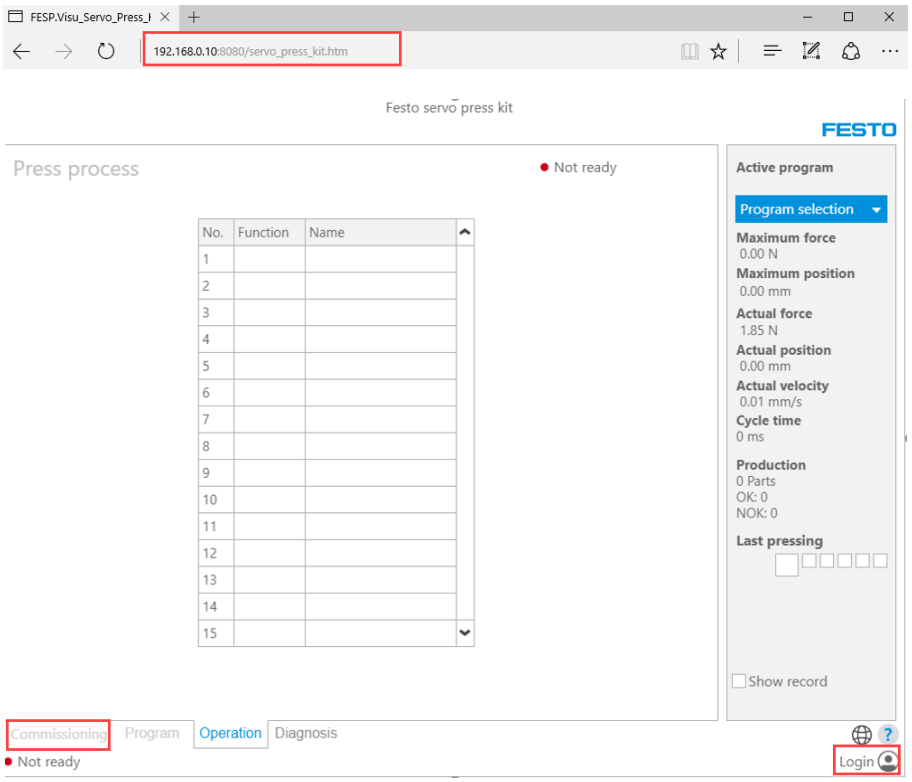
In Browser: ‹IP of the CECC-X›:8080/servo_press_kit.htm

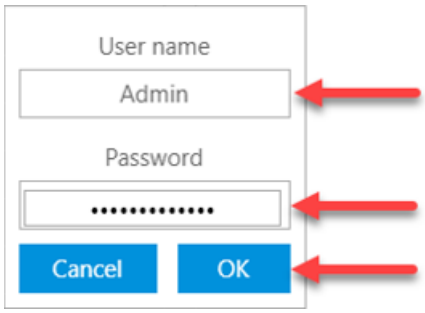
The visualization of the servo-press kit is opened with 4 tabs :

- Commissioning , Program : Not active
- Operation , Diagnosis: Active

Click on **Login** to active the commissioning and program tabs. A new pop-up window appears and a password must be entered to login.

Default password: User name: Admin
Password: ServoPressKit

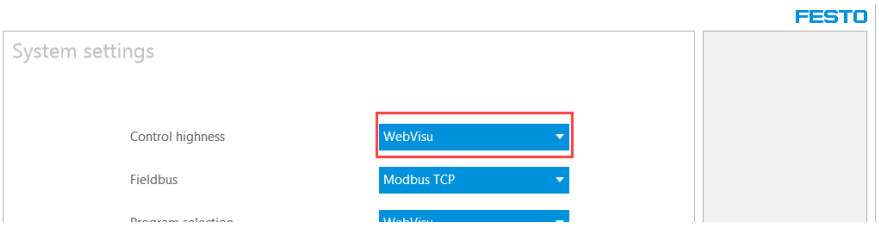




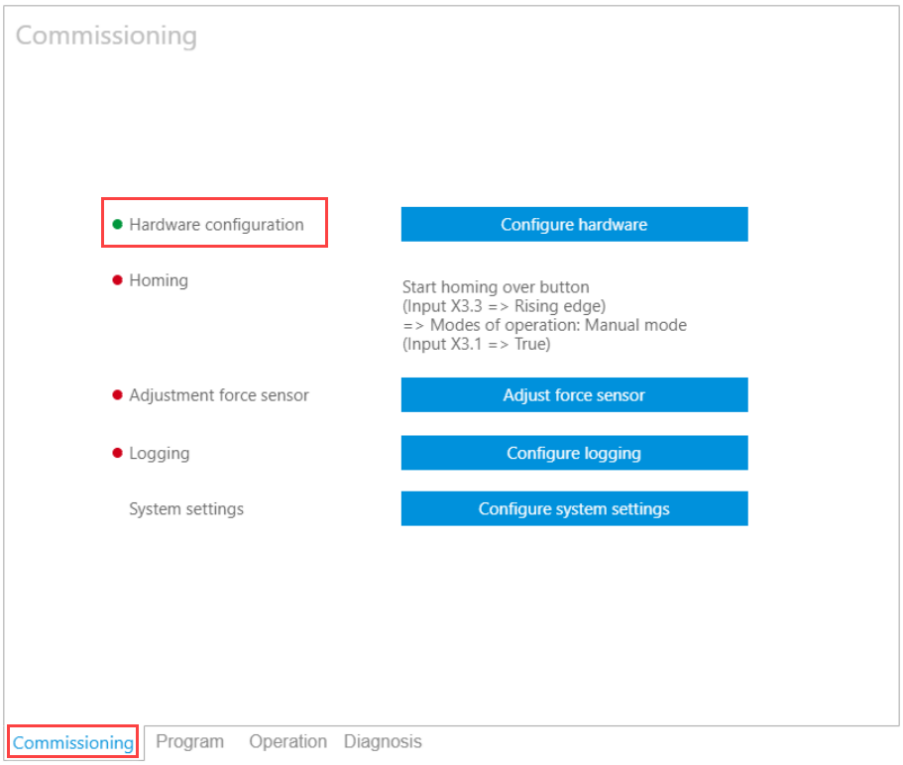
3.2 Commissioning

- Go to **commissioning** -› **System settings tab**

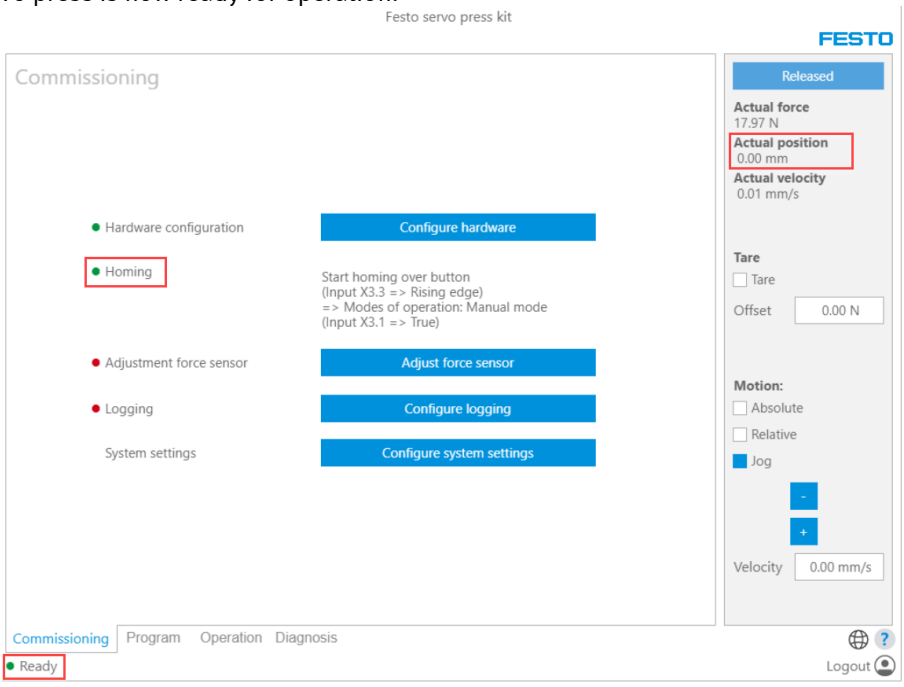
  The control highness in the system settings is set to **WebVisu**.



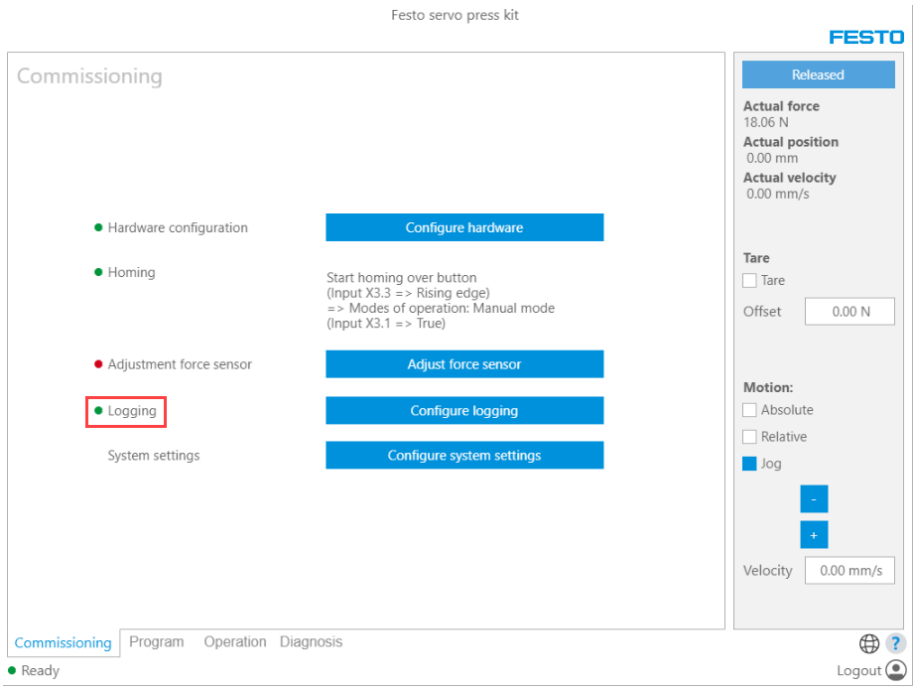
- In the commissioning tab, check if the hardware is configured successfully (Green).
  (Further information about hardware configuration, please read AppNote Servo Press Kit YJKP_ Hardware Configuration).



- Check if the system is already homed. Otherwise start homing over the button **Input X3.3**.
  If it's done, the homing status indicates that it is valid (Green) and the status of the servo press turns to "Ready".
  The servo press is now ready for operation.

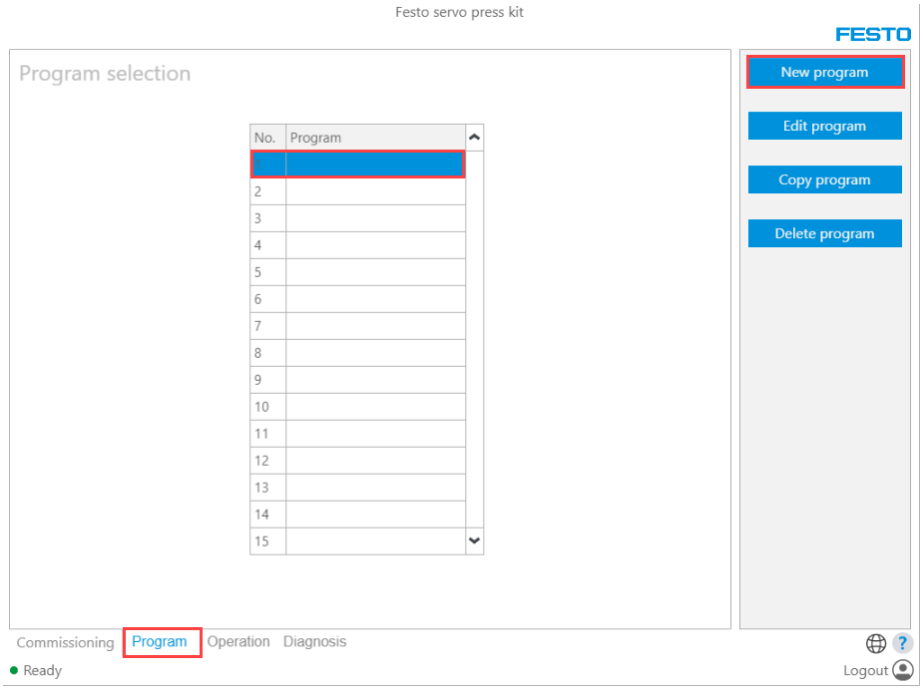


- Optional: If you like to log your press processes or you want to load optional records later on, please configure the logging.
  (Further information about Logging, see AppNote Servo Press Kit YJKP-Configure logging).

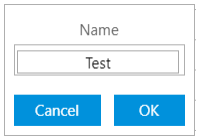


3.3 Program

- Go to **program** tab, select a blank field in the list and click on **New Program.**



- A popup window will show up. Type a program name of your choise (here: “Test”) and click **ok** .



➔ **Note:**

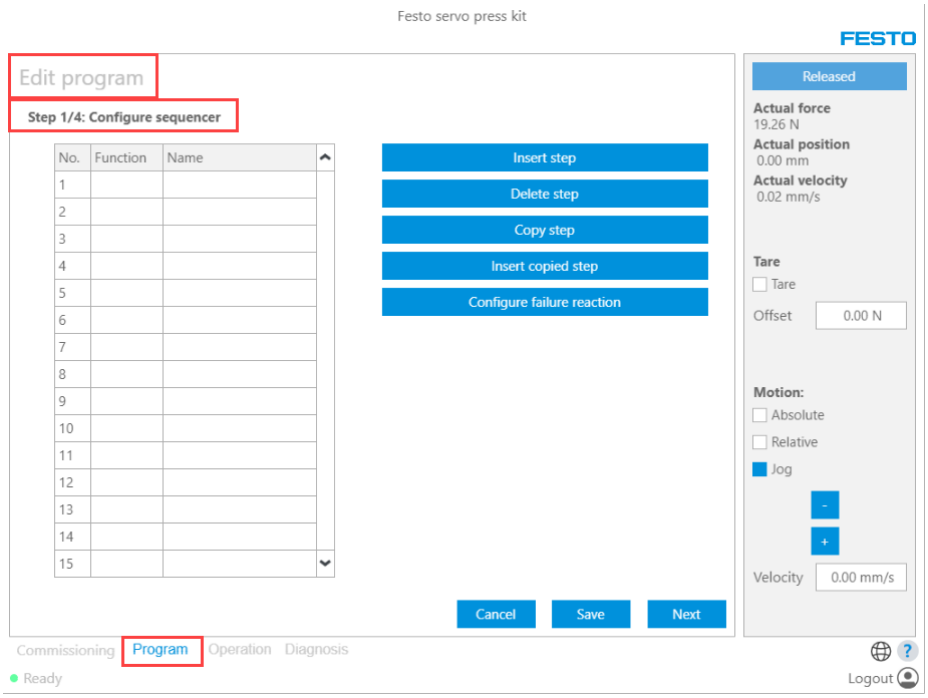
- After clicking on “OK” , the WebVisu will navigate automatically to the edit program screen.

3.3.1 Step 1/4 : Configure sequencer

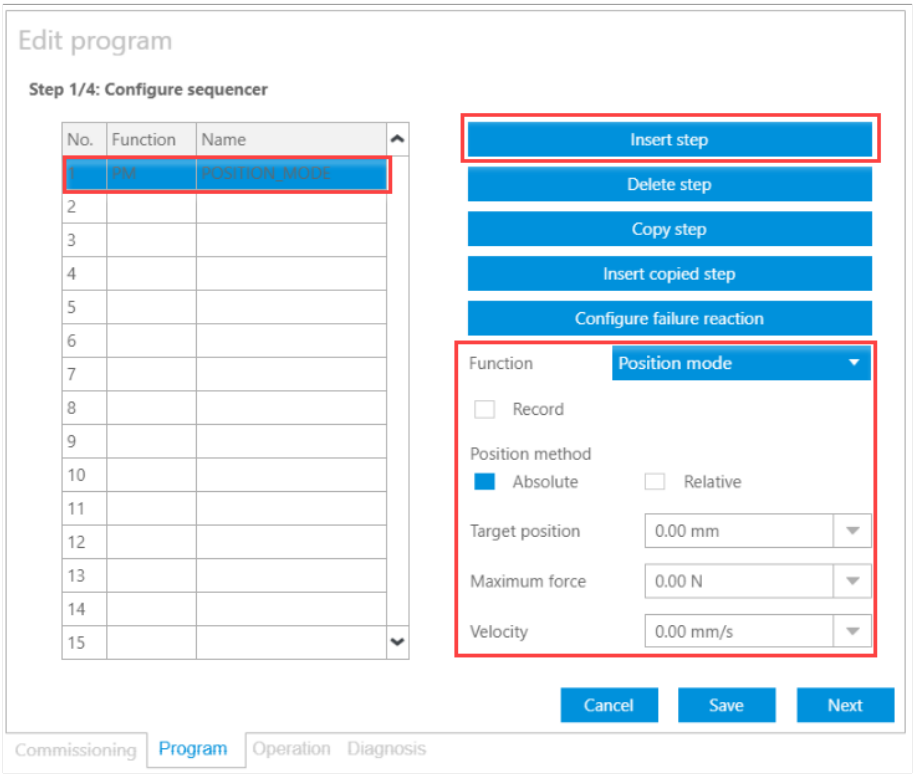
In this step all sequencer steps are parametrized to fulfill all requirement of the press application.

Note:

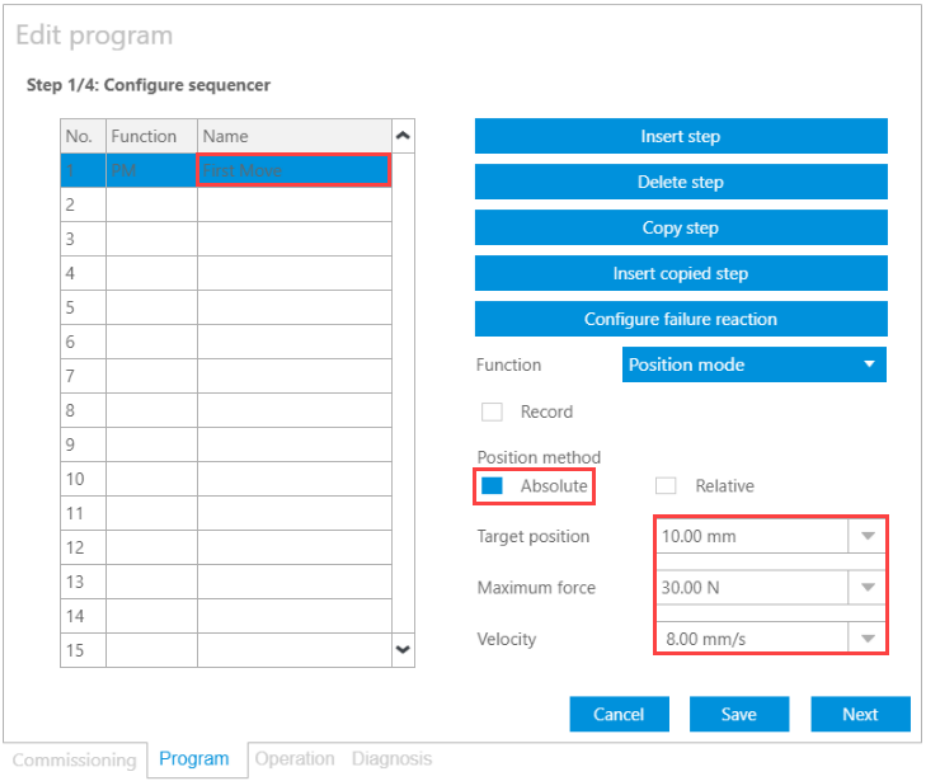
- Further information about the sequencer functions , please read AppNote Servo Press Kit YJKP configure sequencer.



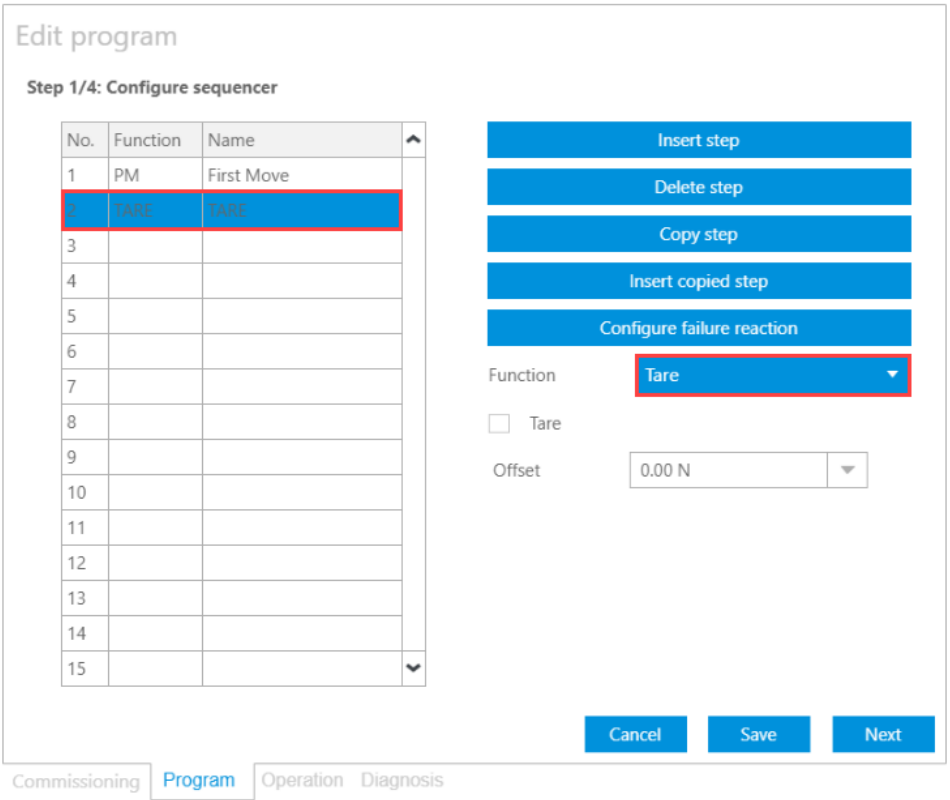
- Select the first blank field in the list and click on **Insert Step**. A new Position mode function will be created.



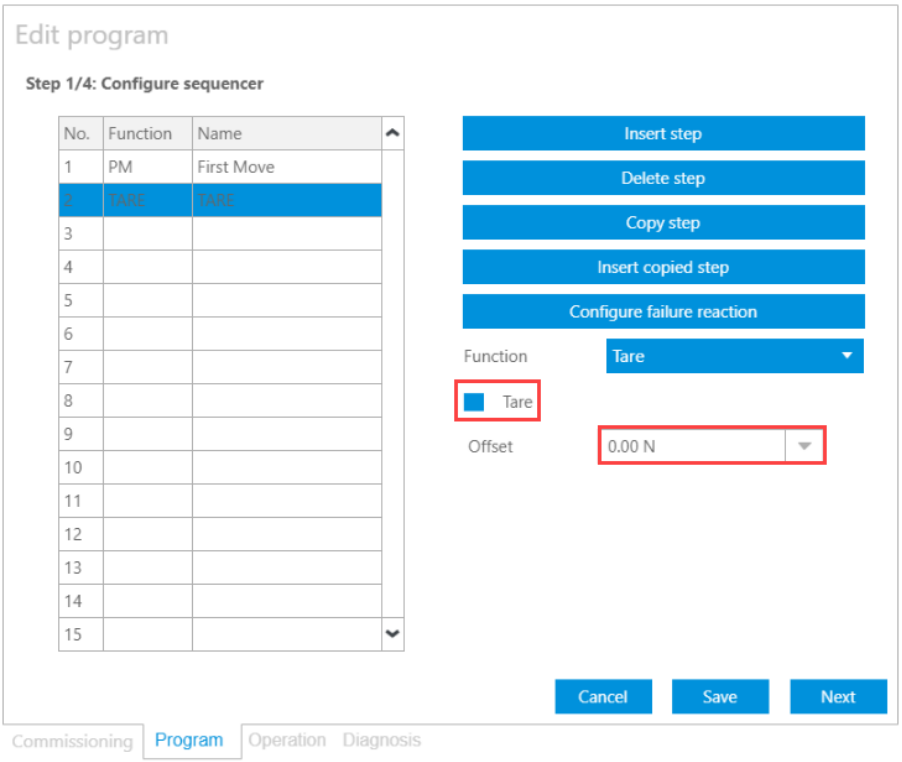
- Double click on “POSITION_MODE” in the list and change the name to “First Move”.
  Set these values:
  - Position method : Check Absolute
  - Target position: 10 [mm]
  - Maximum force : 30 [N]
  - Velocity : 8 [mm/s]



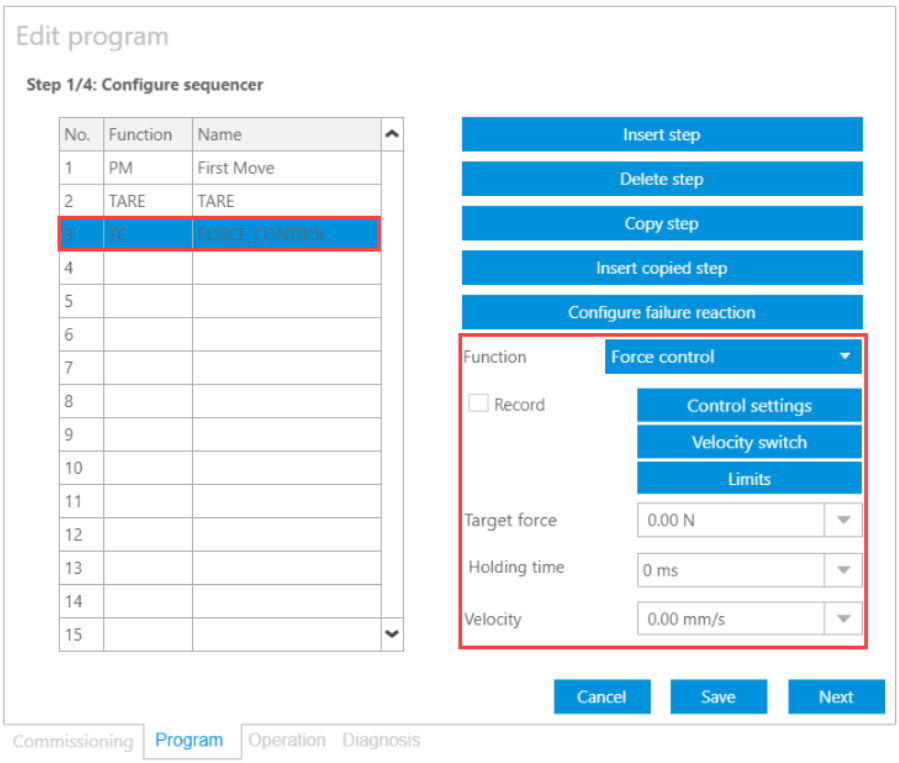
- Select the next blank field in the list and click on **Insert Step.** Select “**Tare**” from the function list.



- Set the Tare function values as follows:
  - Tare : Active
  - Offset: 0 N



- Select the next blank field in the list and click on **Insert Step**. Select “Force control” from the function list.

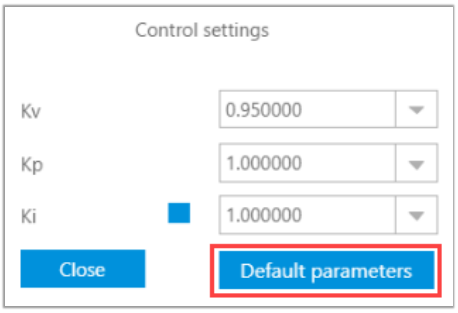


- Set this function values as follows:

I. Click on control settings.
Click on Default parameters to set default parameters

- Kv : 0.950000
- Kp : 1.000000
- Ki : (Active) 1.000000

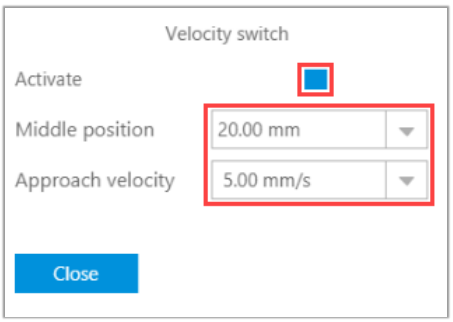
Depending on the application, it might be necessary to adapt these values.
Close this window.



II. Click on velocity switch and set these values:

- Check activate
- Middle position: 20 mm
- Approach velocity: 5 mm/s

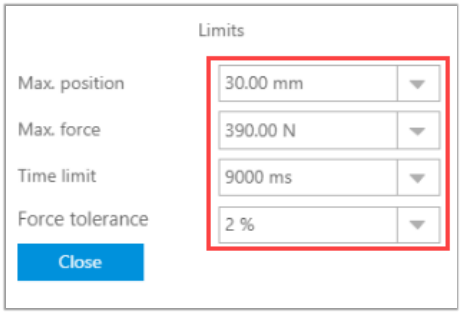
Close this window.



III. Click on limits and set these values:

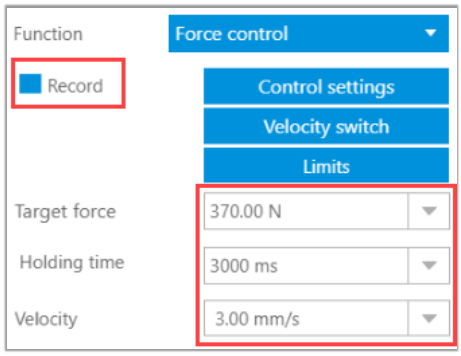
- Max.position: 30 mm
- Max.Force: 390 N
- Time limit : 9000 ms
- Force tolerance: 2%

Close this window.

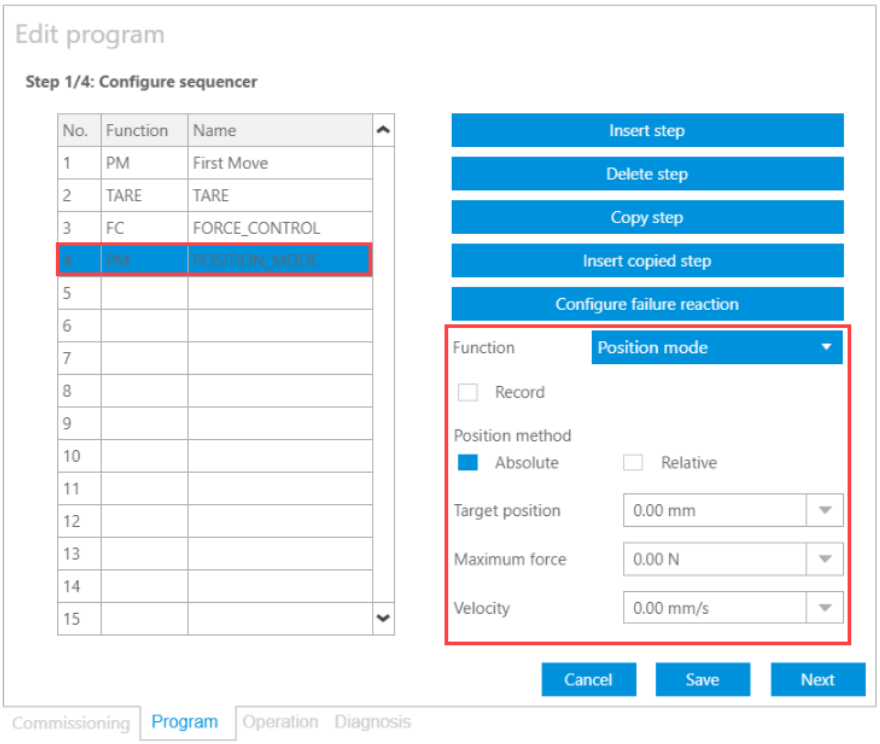


IV. Set the following values:

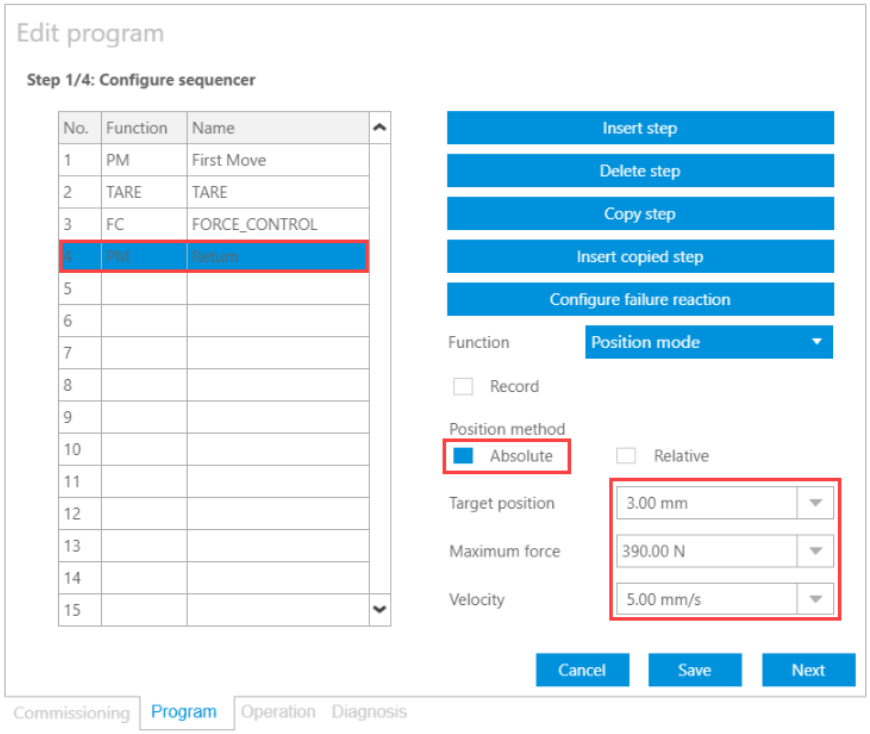
- Target force: 370N
- Holding time: 3000 ms
- Velocity: 3 mm/s



- Select the next blank field in the list and click on **Insert Step**. A new Position mode function will be created.

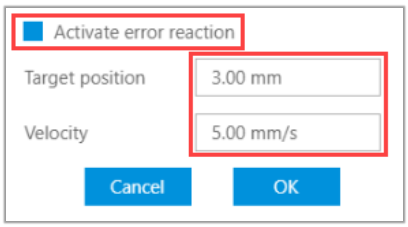


- Double click on “POSITION_MODE” in the list and change the name to “return”.
  Set these values:
  - Position method : Check Absolute
  - Target position: 3 [mm]
  - Maximum force : 390[N]
  - Velocity : 5[mm/s]



Click on “Configure failure reaction” and set these values:

- Activate error reaction : Active
- Target position: 3 mm
- Velocity: 5 mm/s



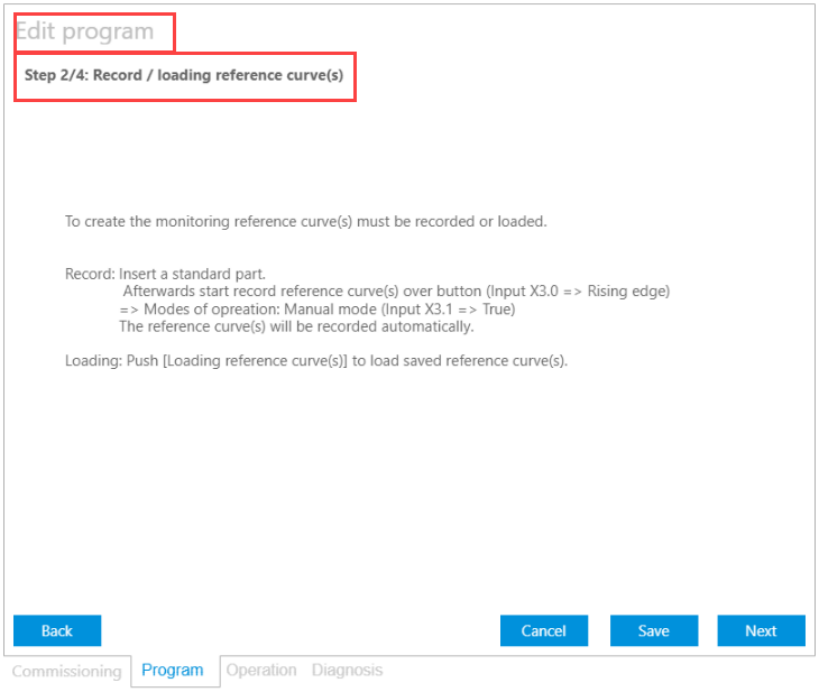
After finishing to edit the sequencer program , click on next to navigate the step 2/4 (Record /loading reference curves).

3.3.2 Step 2/4: Record/ Loading reference curve(s)

In this step, a reference curve will be recorded by running the sequencer program that was created in the previous step.

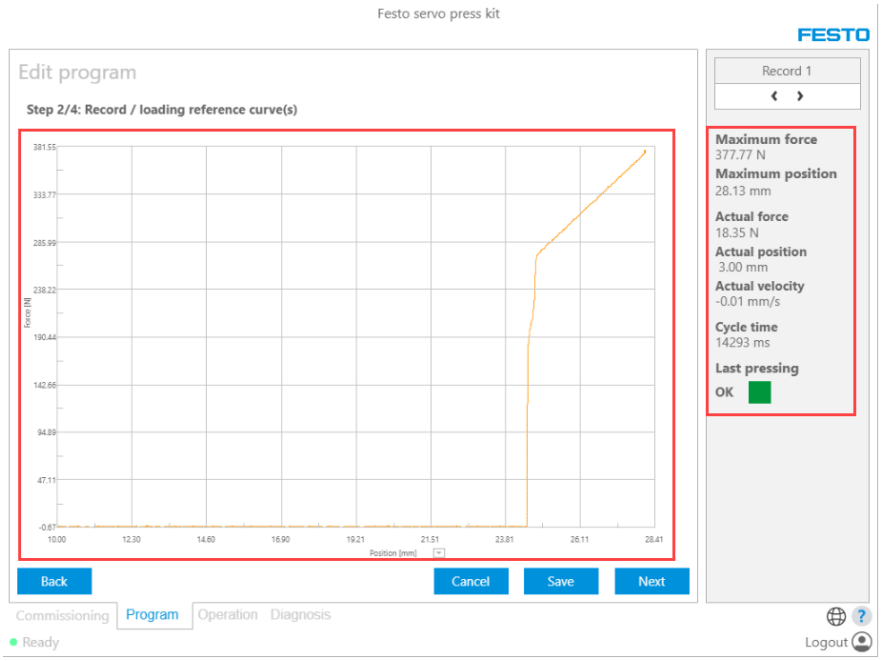
Note:

- Further information about recording reference curves , please read AppNote Servo Press Kit – Record_ Load reference curve.



1. Prepare the YJKP system with a sample to be pressed.
2. Check if the system is set to manual mode (Input X3.1 high, Input X3.2 low).
3. Start pressing process (Input X3.0 => Rising edge).

After running the press cycle a curve will appear with additional information about the process as shown:



- Click on next to go to the next step (Configure monitoring).

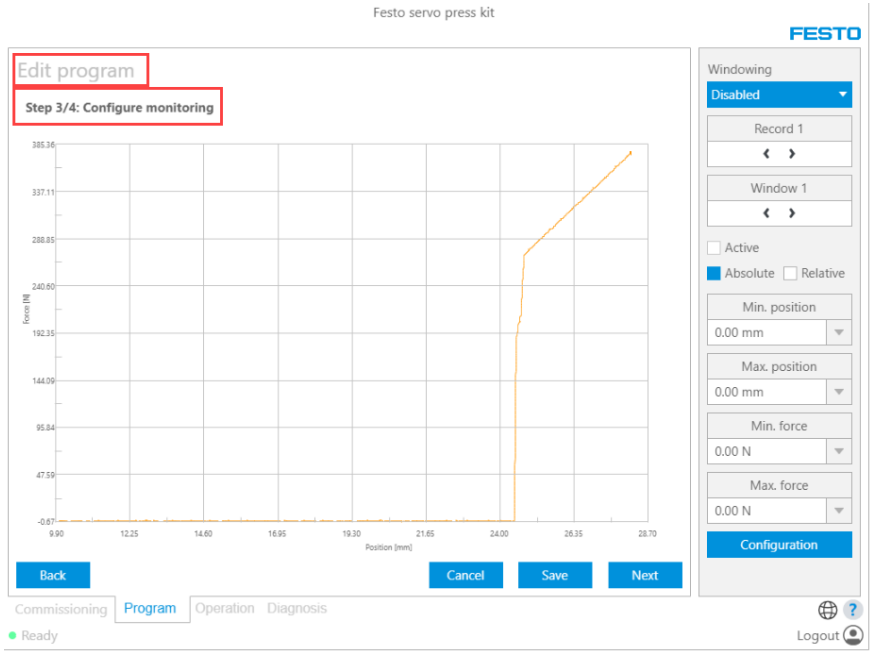
3.3.3 Step 3/4: Configure monitoring

In this step , the following three evaluation methods will be added and configured

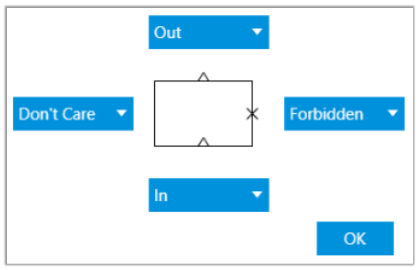
- Windowing
- Threshold
- Envelope

Note:

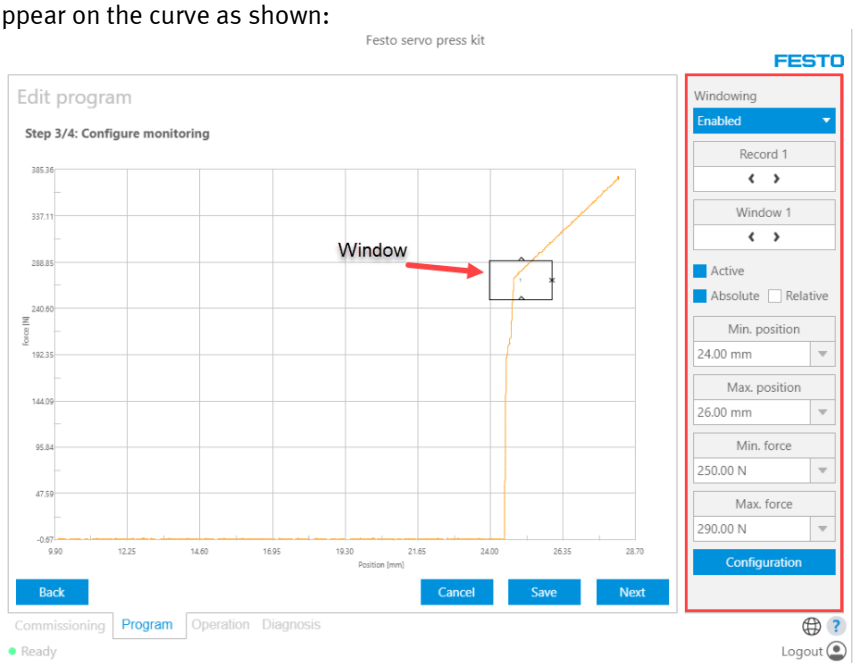
- Further information about the evaluation methods, please read AppNote Servo Press Kit YJKP Configure monitoring.



- Set the first tool values (windowing) as follows:
    1. Windowing : Enabled
    2. Record 1
    3. Window 1
    4. Check the following :
        - Active
        - absolute
    5. Set these values:
        - Min.position : 24 mm
        - Max. position :26mm
        - Min.Force: 250 N
        - Max. Force: 290 N
    6. Configuration :



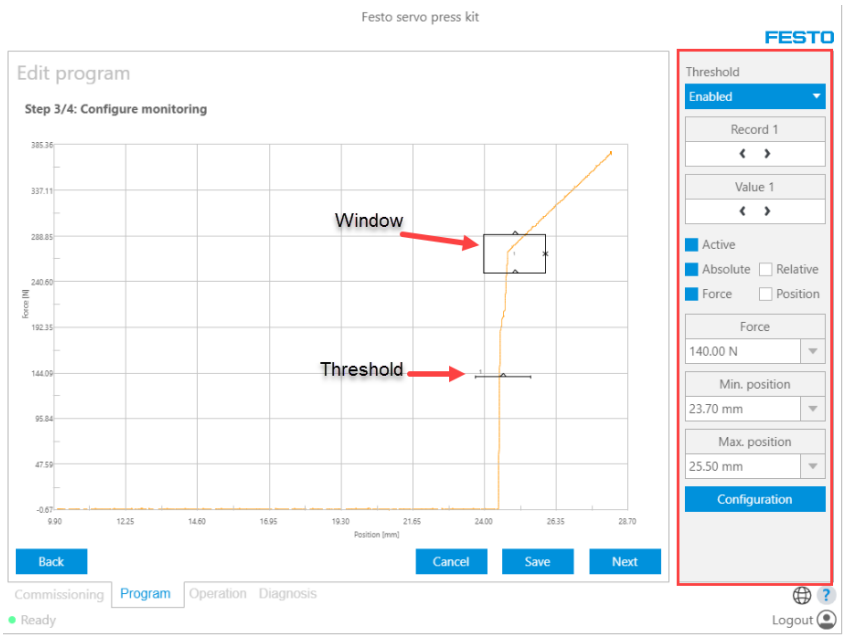
The window will appear on the curve as shown:



- Click on “Next” to navigate to the next evaluation method (Threshold).

  Set these values:
    1. Threshold: Enabled
    2. Record 1
    3. Value 1
    4. Check the following :
        - Active
        - Absolute
        - Force
    5. Set these values:
        - Force: 127 N
        - Min.Position : 23 mm
        - Max.Position : 26 mm
    6. Configuration: Up

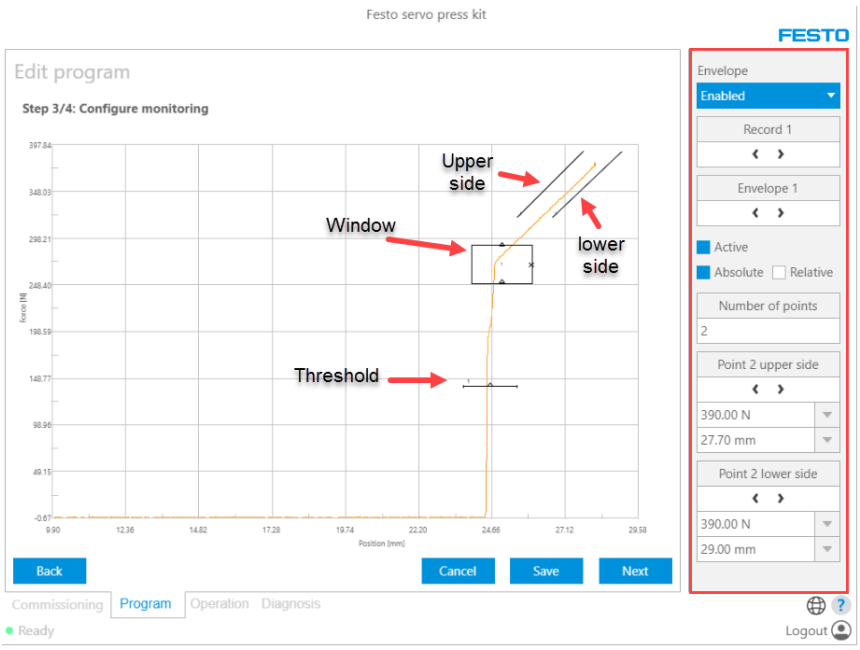
The threshold will appear on the curve as shown:



- Click on “Next” to navigate to the next evaluation method (Envelope).

  Set the values as follows:
  - Envelope: Enabled
  - Record 1
  - Value 1
  - Active
  - Number of points:2
  - Point 1 upper side :320 N
    25.50 mm
    Point 2 upper side : 390 N
    27.70 mm
  - Point 1 lower side : 320 N
    26.70 mm
    Point 2 lower side : 390 N
    29 mm

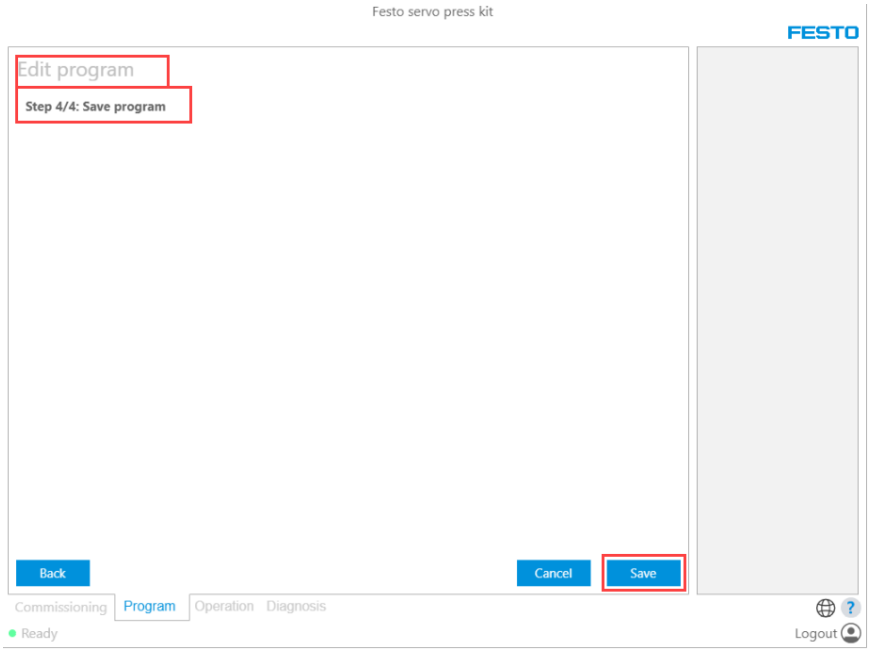
The upper/lower side of the envelope will appear on the curve as shown:



- Click on “Next” to Navigate to the next step (Save).

3.3.4 Step 4/4: Save program

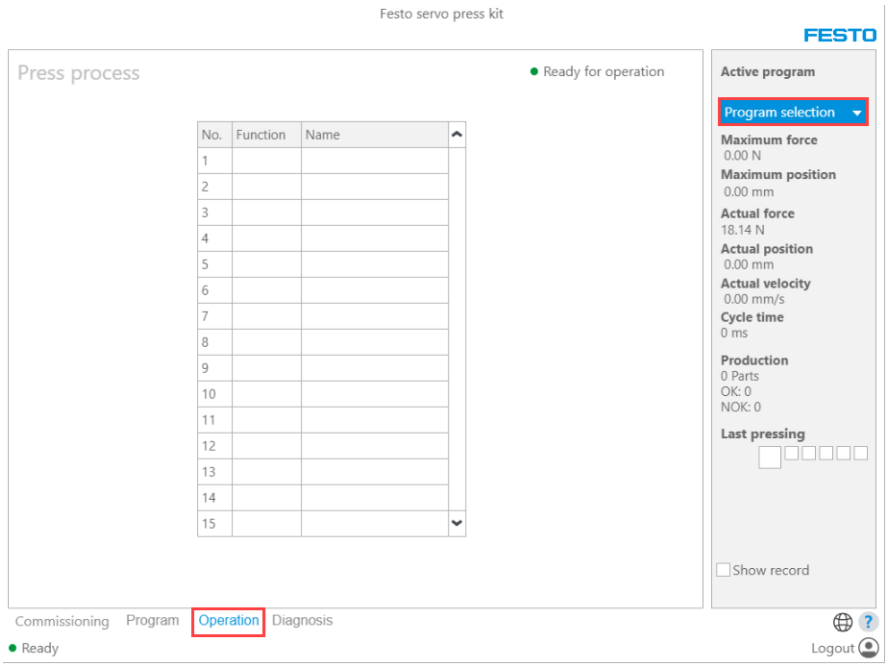
Click on „ Save“ to save the program.



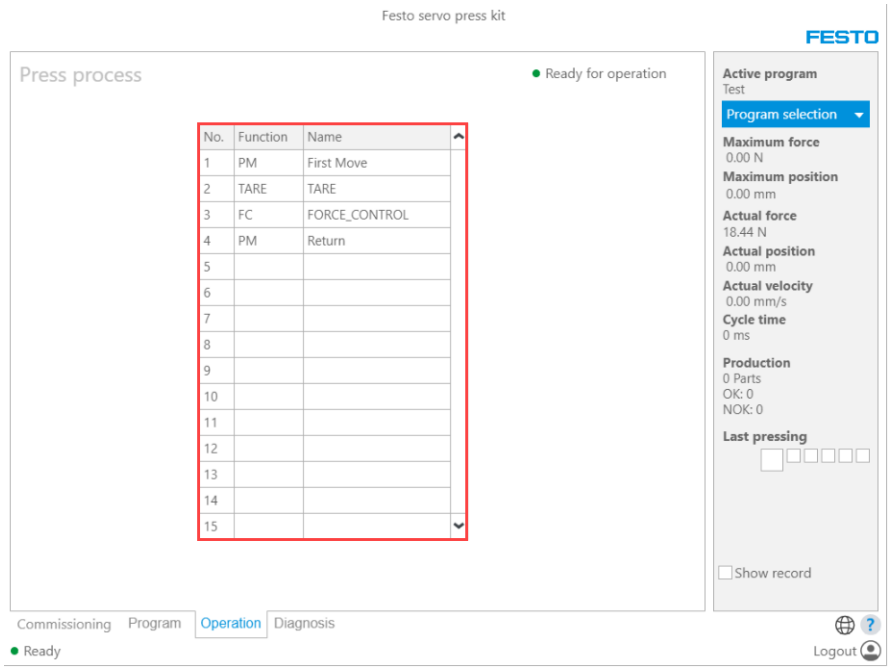
3.4 Operation

To start a press cycle, the created program must be selected in the operation screen.

- Navigate to operation tab and click on „ program selection“.



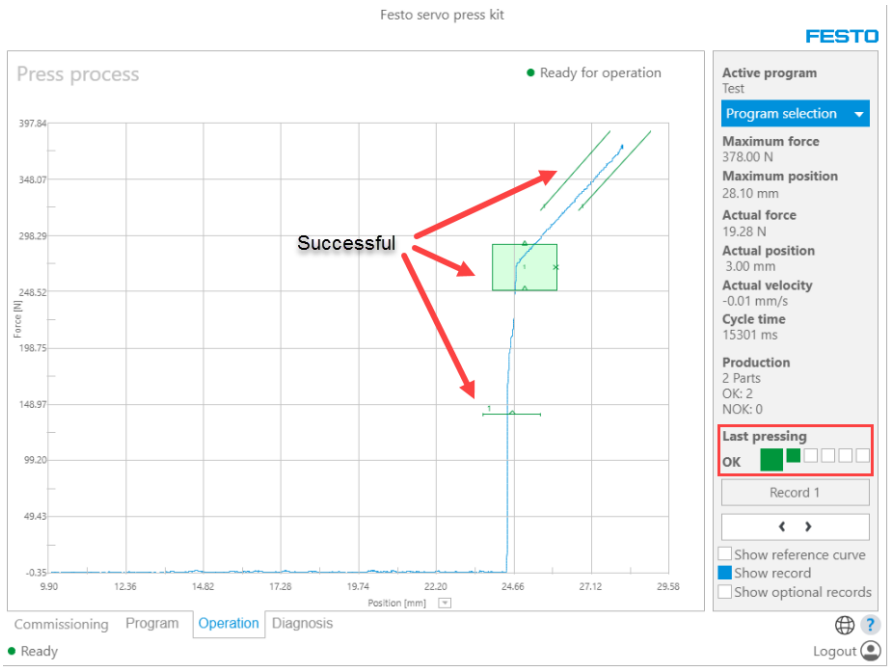
- Select the created program (Test). All steps of this program will appear in the list.



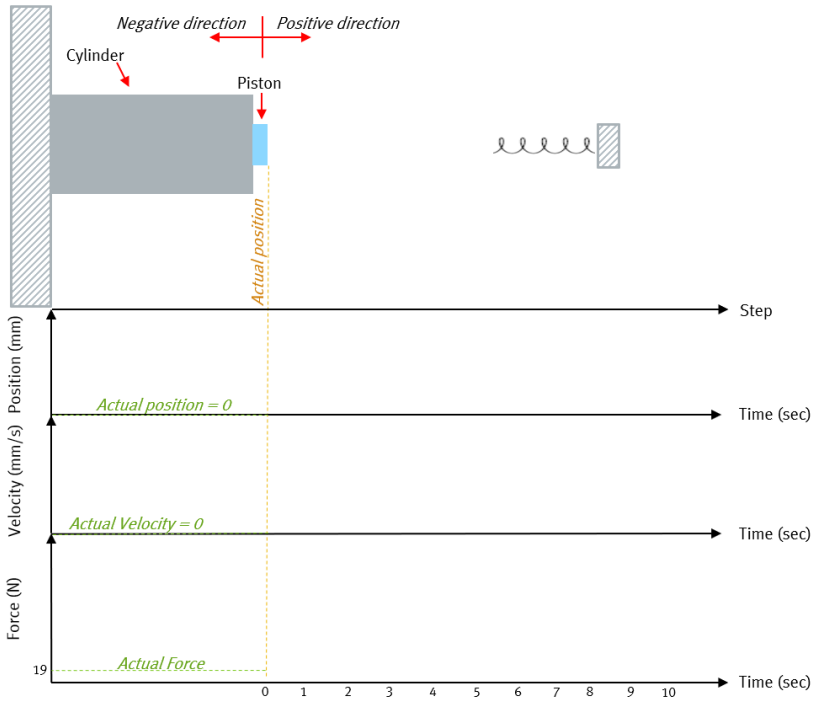
- Activate “show record” to display the recorded curves of the press after each operation.
- Change the system mode to automatic (Input X3.1 low, Input X3.2 high).
- Start pressing process (Input X3.0 => Rising edge).

The system starts pressing according to the sequencer steps. The currently executed step is shown during the operation.

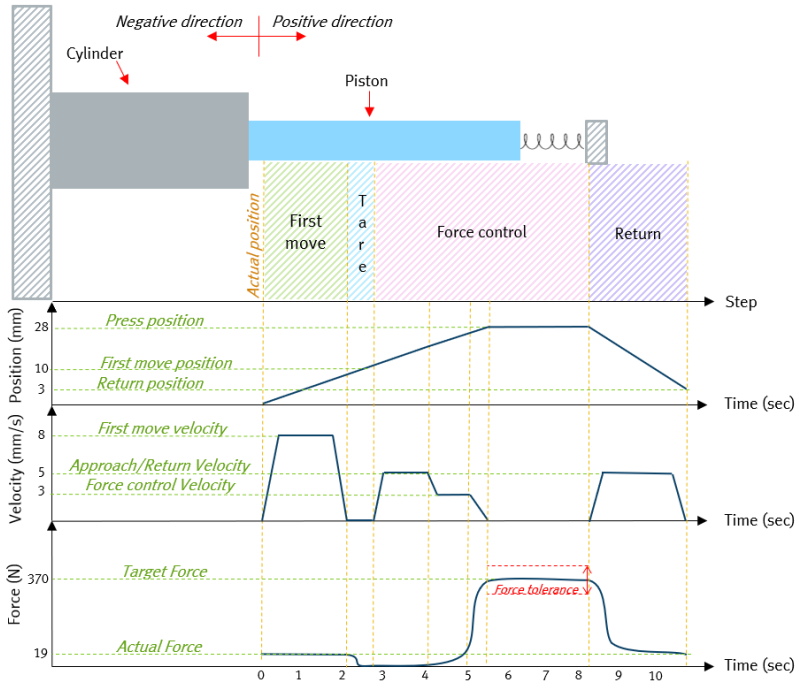
At the end of the process the recorded curve of the “force control” function will appear. On the right side of the screen, you can see the status of the last process (here: successful).
All evaluation methods show that the curve did not exceed any limits.



The following graphical illustration shows the movement of the cylinder:
Before executing the program:



After executing the program:



The press process steps :

1. **First Move :** the cylinder moves from the position 0 mm to 10 mm at a velocity of 8 mm/s and stops. The force value remains at 19 N .

2. **Tare:** the system tares the current force value (Actual force = 0 N).

3. **Force control:** The cylinder velocity changes 2 times in this step :
   i. Cylinder moves with 5mm/s up to the middle position. After that the velocity decreases from 5mm/s to 3 mm /s .
   ii. When the cylinder reaches the required force, the velocity drops to 0. The cylinder remaines at this position for 3 seconds.

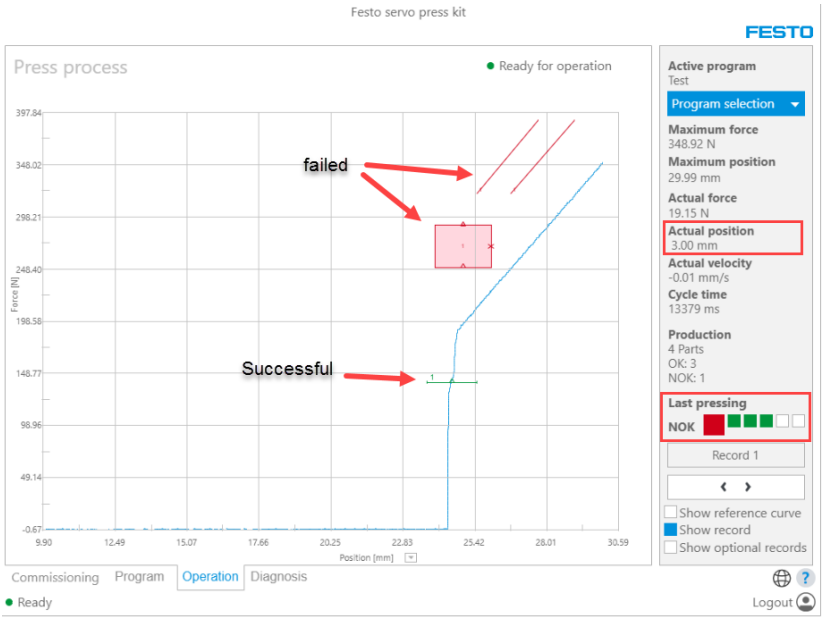
4. **Return:** After completing the previous step, the cylinder moves back to position 3 mm at a velocity of 5 mm/s.

5.

Note:

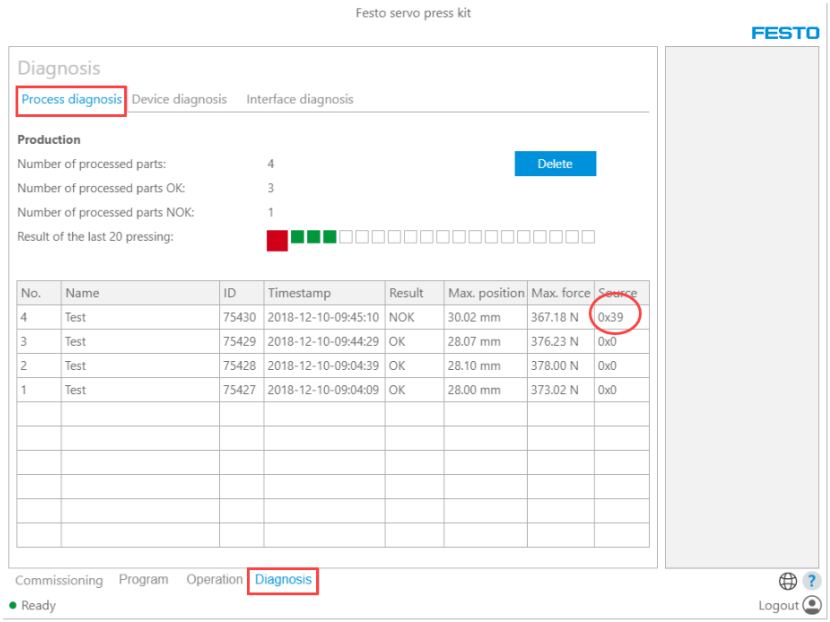
- If the spring characteristics changes for some reason, the process might be evaluated as NOK.

The following figure shows the system reaction if the spring characteristic changes significantly.



The WebVisu indicates that the process status (**NOK**).

Go to the **Diagnosis tab** -› **Process diagnosis** where you can check the NOK reason.



Move the mouse over the source ID to see the reason of the result.

As you see in this example, the third step terminated the process (violation of a limit).