

YJKP Servo Press – Programming and Sequencer Functions

Description of how to create and edit a servo press program with descriptions of sequencer functions, such as position mode, force control, etc.

YJKP

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1 Components/Software used

Type/Name	Version Software/Firmware
Servo press kit YJKP	General
Application software YJKP (GSAY-A4-F0-Z4)	All
Firmware controller (CECC-X)	3.4.6, 3.8.14
Firmware motor controller (CMMP, CMMT)	All compatible versions

Table 1-1: Applicable components / software

GSAY	CECC-X Firmware	CMMT-AS Firmware
GSAY-A4-F0-Z4-2.1.3	3.8.14	32.0.9.9
GSAY-A4-F0-Z4-2.1.5	3.8.14	32.0.9.9
GSAY-A4-F0-Z4-2.1.7	3.8.14	33.0.9.10
GSAY-A4-F0-Z4-2.1.9	3.8.14	33.0.9.10
GSAY-A4-F0-Z4-2.1.11	3.8.14	33.0.9.10
GSAY-A4-F0-Z4-2.1.12	3.8.14	34.0.13.18
GSAY-A4-F0-Z4-2.2.0	3.8.14	34.0.13.18
GSAY-A4-F0-Z4-2.3.0	3.8.14	36.12.0

Table 1-2: Recommended firmware for each GSAY in EVO 4.1

1.1 Application description

This application note describes how to create and edit a servo press program using the WebVisu control. It also outlines the requirements that must be verified before the program can be started. Furthermore, the document explains the available functions and provides practical examples of their use.

2 Prerequisites

1. Open a browser and start the WebVisu of the YJKP.

In Browser: <IP of the CECC-X>:8080/servo_press_kit.htm

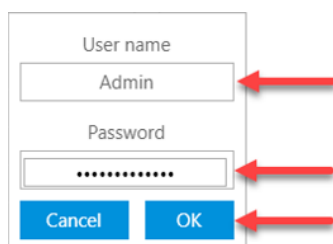
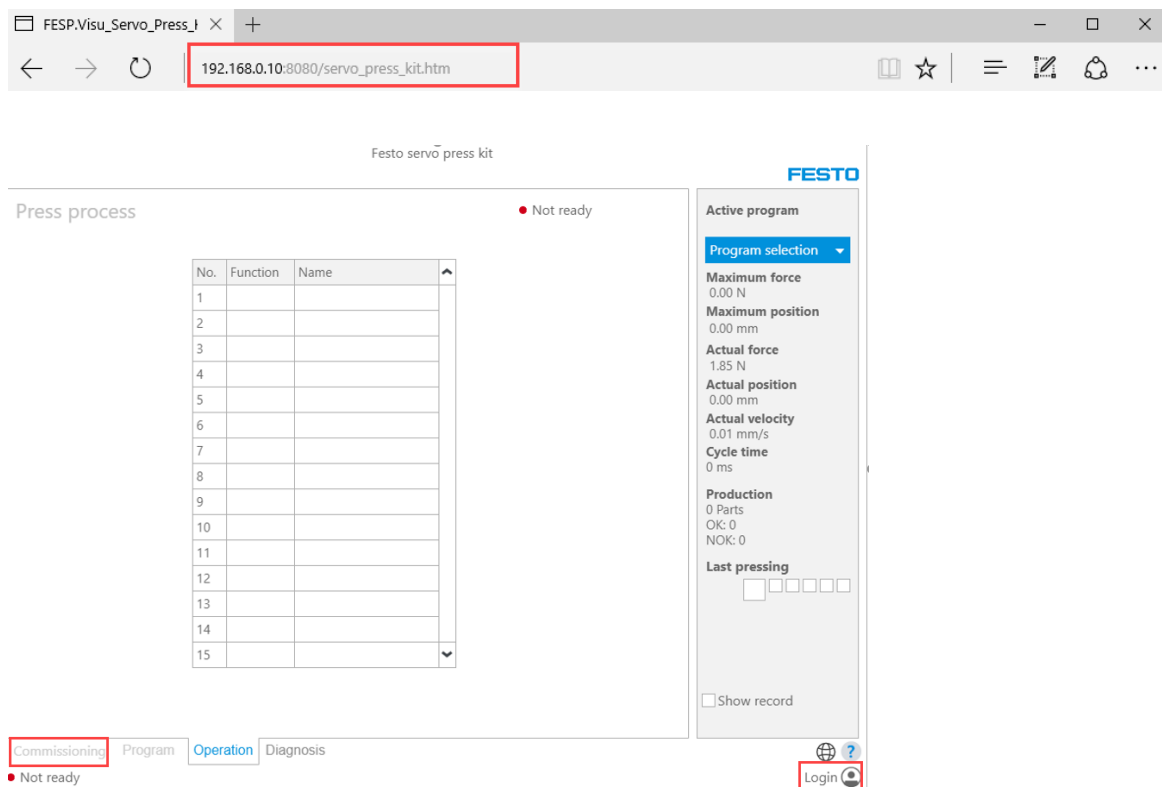
The visualization of the servo-press kit is opened with 4 tabs :

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

2. Click **Login** to activate the Commissioning and Program tabs. A pop-up window will appear, prompting you to enter the password required to log in and start a new program, as shown in the figures below.

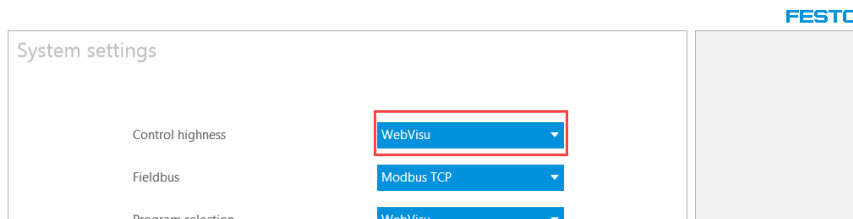
Default password:

- User name: Admin
- Password: ServoPressKit



3. Go to **Commissioning** → **System settings** tab.

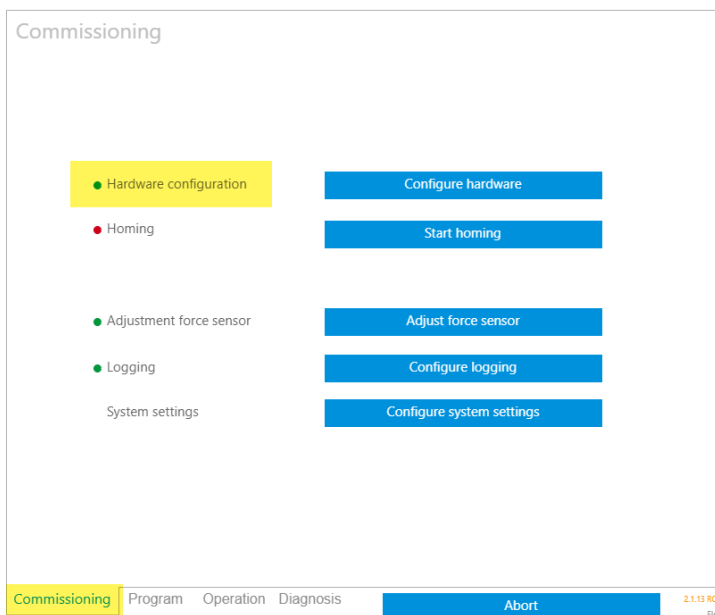
Set the control highness according to your system. In this example it is WebVisu.



Note:

Programming of press sequencer is only possible with control highness **WebVisu**.

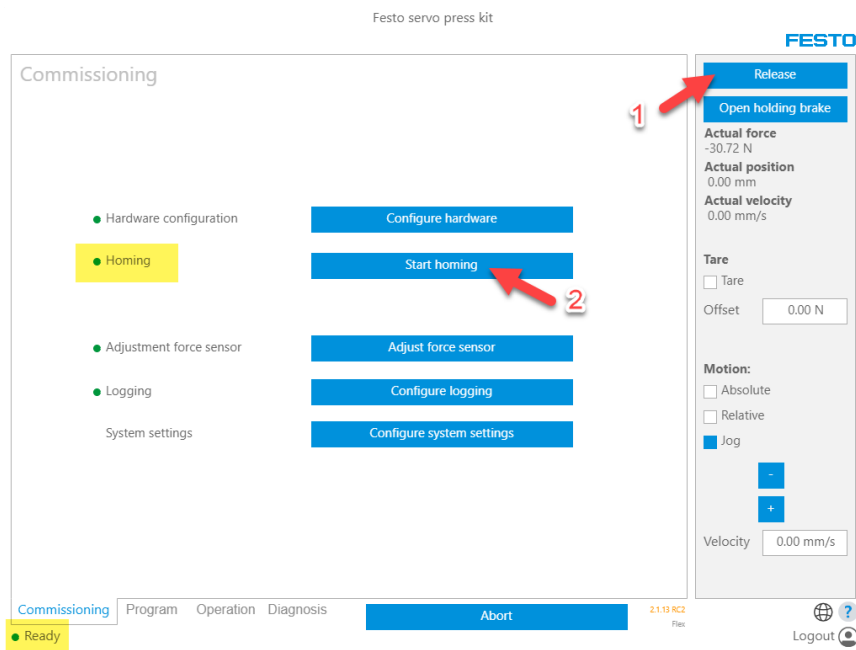
4. In the commissioning tab, check if the hardware is configured successfully and the status indicates that it is valid (**green**).



Prerequisites

5. Verify that the system is homed. If the system is not homed, click **Release** and then **Start Homing**.

After successful homing, the homing status indicator turns **green** and the servo press status displays ready. The system is now ready for operation.



3 Program

Click on **Program** to navigate to program tab , you will see this screen which consists of these parts:

Program selection

No.	Program
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Commissioning **Program** Operation Diagnosis

New program 2
Edit program 3
Copy program 4
Delete program 5

1. **LIST of programs:** this list shows you the all program created in the controller.



Note:

- The maximum number of programs is limited to 99 from GSAY 2.1.12. In older versions the max. number of programs is 20.

2. **New program:** to create a new program.

- Select a blank field in the list and click on **New Program**.
- A Popup window will show up, type your program name and click **OK**.

Name

Test

Cancel OK



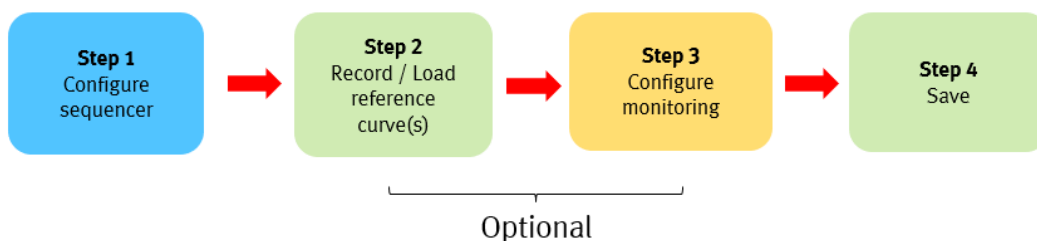
Note:

- After clicking on OK , the WebVisu will navigate automatically to the edit program screen, where you can start editing your press program.

3. Edit Program: to edit the selected program.

Select a program in the program's list and click on **Edit Program**. This screen will appear:

Edit program screen consists of 4 main steps to complete a servo press program. These steps must be configured in order to be ready for operation:



- **Step 1: configure sequencer**

Create a sequencer program using the functions available in the Servo Press Kit.

- **Step 2 (optional): Record/ loading reference curves**

The sequencer program created in Step 1 is executed step by step. During execution, a sample is pressed and the corresponding reference curves are recorded. These reference curves are then used to configure the evaluation methods.

(For more information on recording and loading reference curves, see the application note “Servo Press Kit YJKP – Evaluation Methods based on a Reference Curves [\(⇒\)](#)”.)

- **Step 3 (optional): Configure monitoring**

Add and configure evaluation methods for monitoring and evaluating the process curves of each press cycle.

- **Step 4: Save program**

4. **Copy program:** to copy the selected program.
5. **Delete program:** to delete the selected program.

4 Configure sequencer

A sequencer program consists of several steps that together define the complete pressing process. Each step is configured as a function. These functions allow you to define the press sequence, set force limits, configure cylinder velocity limits, and use additional features required for the process.

In the program tab, select the program you want to edit. Then click **Edit program** to open the first step of the program configuration.

In this screen we can define 4 parts:

The screenshot shows the 'Edit program' screen with the 'Step 1/4: Configure sequencer' tab selected. The interface is divided into four numbered parts:

- Step name and number:** A box at the top left containing 'Step 1/4: Configure sequencer' and the number '1'.
- Sequencer function list:** A table with columns 'No.', 'Function', and 'Name'. It contains 15 rows, with the number '2' indicating the list area.
- Edit sequencer functions:** A box containing five buttons: 'Insert step', 'Delete step', 'Copy step', 'Insert copied step', and 'Configure failure reaction'. The number '3' is placed over the 'Copy step' button.
- Step navigation:** A box at the bottom right containing three buttons: 'Cancel', 'Save', and 'Next'. The number '4' is placed over the 'Save' button.

On the right side, there is a panel for motion parameters under the 'Released' status:

- Actual force:** 17.95 N
- Actual position:** 0.00 mm
- Actual velocity:** 0.01 mm/s
- Tare:** ☐ Tare
- Offset:** 0.00 N
- Motion:**
 - ☐ Absolute
 - ☐ Relative
 - ☒ Jog
- Velocity:** 0.00 mm/s

At the bottom of the screen, there are tabs for 'Commissioning', 'Program' (selected), 'Operation', and 'Diagnosis'. A globe icon and a help icon are also visible.

- Step name and number:** Shows the name and number of the selected step.
- Sequencer function list:** Shows all configured functions. The list can contain up to 100 functions. At startup, the system executes the steps from top to bottom.
- Edit sequencer functions:** Use these buttons to insert, delete, copy, or paste sequencer functions.
 - Insert step:** Add a new function.
 - Delete step:** Delete the selected function.
 - Copy step:** Copy the selected function.
 - Insert copied step:** Paste the copied function.
 - Configure failure reaction:** Define a specific cylinder movement for error situations during operation.
Note: Use a failure reaction in press applications whenever possible.
- Step navigation**
 - Next:** Navigate between the four steps: Configure sequencer, record/load reference curves, configure monitoring, and save.
 - Save:** Save the sequencer program.
 - Cancel:** Cancel the current screen and return to the **Program** tab.

5 Create a sequencer program

1. Select a blank field in the list and click **Insert Step**. A new position mode function is added to the list.

Edit program

Step 1/4: Configure sequencer

No.	Function	Name
1	PM	POSITION MODE
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Insert step

Delete step

Copy step

Insert copied step

Configure failure reaction

Function: Position mode

☐ Record

Position method

☒ Absolute ☐ Relative

Target position: 0.00 mm

Maximum force: 0.00 N

Velocity: 0.00 mm/s

Cancel Save Next

Commissioning Program Operation Diagnosis

2. Click the function name on the right side of the screen. A list of all available Servo Press Kit functions opens.

Edit program

Step 1/4: Configure sequencer

No.	Function	Name
1	PM	POSITION MODE
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Insert step

Delete step

Copy step

Insert copied step

Configure failure reaction

Function: Position mode

☐ Record

Position method

☒ Absolute ☐ Relative

Target position

Maximum force

Velocity

- Position mode
- Force mode
- Advanced force mode
- Force control
- Digital signal mode
- Delay time
- Tare
- Read input
- Set output
- Variable
- Jump

Cancel

Commissioning Program Operation Diagnosis

3. Select the required function. Then enter the values for this function to complete the first step of the press program.



Note

- All functions are explained later with usage examples.

4. Repeat the previous steps until all pressing steps have been created.
5. Add a failure reaction, if possible.

Click **Configure failure reaction**. Then activate the error reaction to display the target position and velocity fields.

Set the target position and velocity. If an error occurs, the cylinder moves to this position at the defined velocity.

☒ Activate error reaction

Target position 0.00 mm

Velocity 0.00 mm/s

Cancel OK

Next steps: After creating the sequencer steps, choose one of the following options:

- **Start pressing:** Save the program. Then select it in the operation tab and start the pressing process. (For more information, see the application note “Servo Press YJKP – Operation Screen in WebVisu ([→](#))”.)
- **Configure evaluation methods:** Click **Next** to record reference curves. (For more information, see the application note “Servo Press Kit YJKP – Evaluation Methods based on a Reference Curve ([→](#))”.)

6 Sequencer Functions

6.1 Position mode (PM)

Position mode moves the cylinder to a defined position. The movement observes the configured maximum force limit. The CMMT uses Profile Position Mode (PP) for this function.

Configuration

Function: Position mode

1 ☒ Record

2 Position method
☒ Absolute ☐ Relative

3 Target position: 0.00 mm

4 Maximum force: 800.00 N

5 Velocity: 50.00 mm/s

1. **Record:** Activate this option to record a force/position curve during cylinder movement. The curve is recorded while this function is executed.
2. **Position method:** Select the movement method for the cylinder.
 - **Absolute:** Move the cylinder to a target position based on the homing position.
 - **Relative:** Move the cylinder by a defined distance based on the current position.
3. **Target position / Target distance:** Define the target position or target distance in mm.

Function: Position mode

☐ Record

Position method
☒ Absolute ☐ Relative

Target position: 10.00 mm

Maximum force

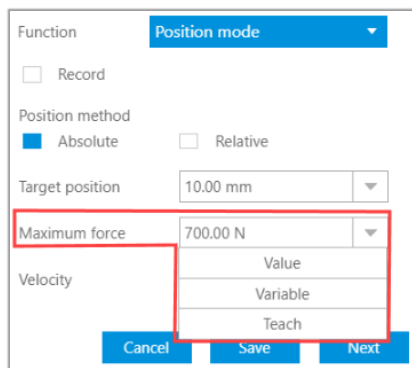
Velocity

Value
Variable
Teach

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual position as the target position or target distance.

4. **Maximum force:** If this value is exceeded before the target position is reached, the selected failure reaction is executed or the process is interrupted.

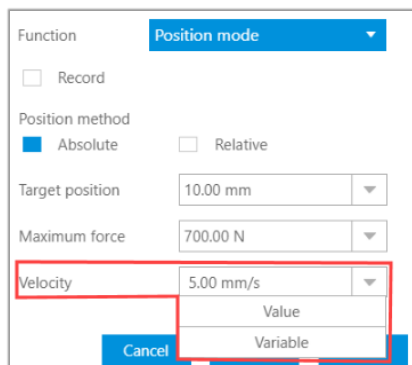


The screenshot shows the 'Position mode' configuration window. The 'Function' dropdown is set to 'Position mode'. The 'Record' checkbox is unchecked. The 'Position method' has 'Absolute' selected and 'Relative' unchecked. The 'Target position' is set to '10.00 mm'. The 'Maximum force' dropdown is highlighted with a red box, and its menu is open, showing options: 'Value', 'Variable', and 'Teach'. The 'Velocity' field is visible below. At the bottom are 'Cancel', 'Save', and 'Next' buttons.

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual position as the target position or target distance.

5. **Velocity:** Defines the cylinder speed for movement to the target position.



The screenshot shows the 'Position mode' configuration window. The 'Function' dropdown is set to 'Position mode'. The 'Record' checkbox is unchecked. The 'Position method' has 'Absolute' selected and 'Relative' unchecked. The 'Target position' is set to '10.00 mm'. The 'Maximum force' is set to '700.00 N'. The 'Velocity' dropdown is highlighted with a red box, and its menu is open, showing options: 'Value' and 'Variable'. At the bottom are 'Cancel', 'Save', and 'Next' buttons.

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.

Examples

This example uses position mode to move the cylinder by 20 mm.

Example 1: Absolute positioning

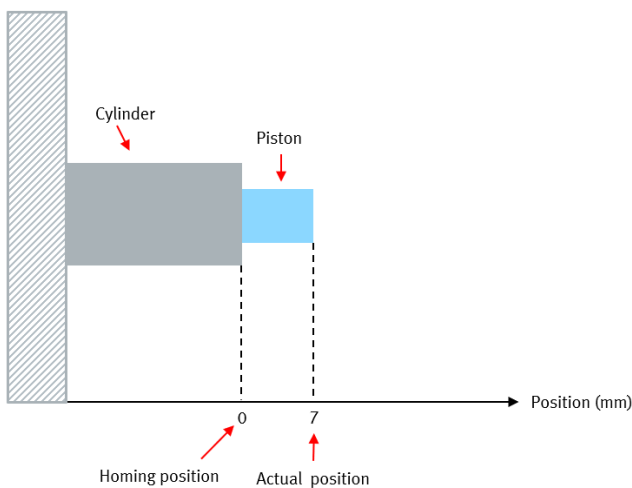
Add position mode to the sequencer list. Then set the following values:

Position method : Absolute
 Target position : 20 mm
 Maximum force : 700 N
 Velocity : 5 mm/s

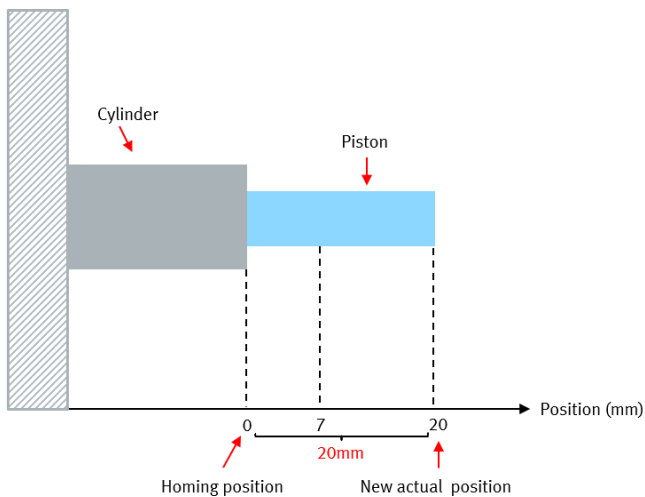
Function	Position mode	
☐ Record		
Position method	☒ Absolute ☐ Relative	
Target position	20.00 mm	
Maximum force	700.00 N	
Velocity	5.00 mm/s	

The following figures show the cylinder behavior in this mode. Initial actual position: 7 mm.

Before execution:



After execution: The cylinder moves from absolute position 7 mm to absolute position 20 mm. The travel distance is 13 mm. The new actual position is 20 mm.



Example 2: Relative positioning

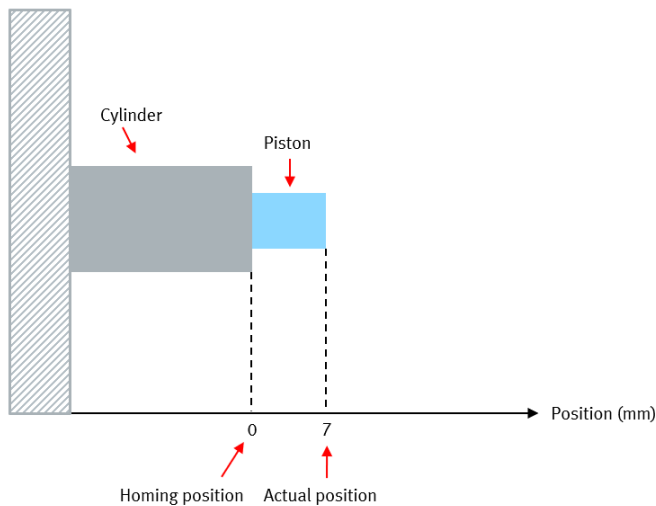
Add position mode to the sequencer list. Then set the following values:

Position method : Relative
 Target distance : 20 mm
 Maximum force : 700 N
 Velocity : 5 mm/s

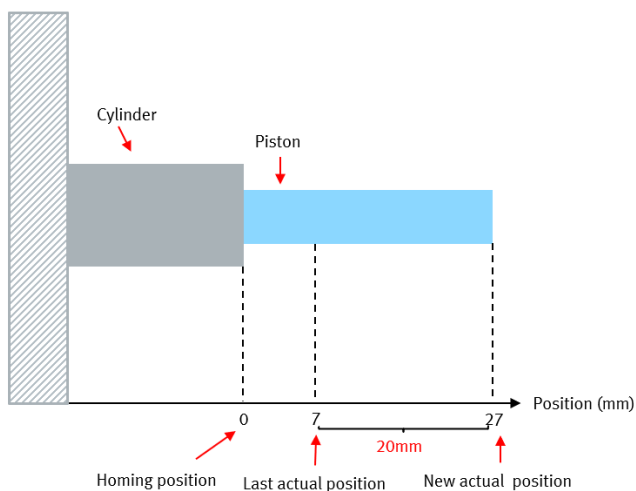
Function	Position mode
☐ Record	
Position method	☒ Relative
Target distance	20.00 mm
Maximum force	700.00 N
Velocity	5.00 mm/s

The following figures show the cylinder behavior in this mode. Initial actual position: 7 mm.

Before execution:



After execution: The cylinder moves by 20 mm, from absolute position 7 mm to absolute position 27 mm. The new actual position is 27 mm.



Example 3: Limit exceeded

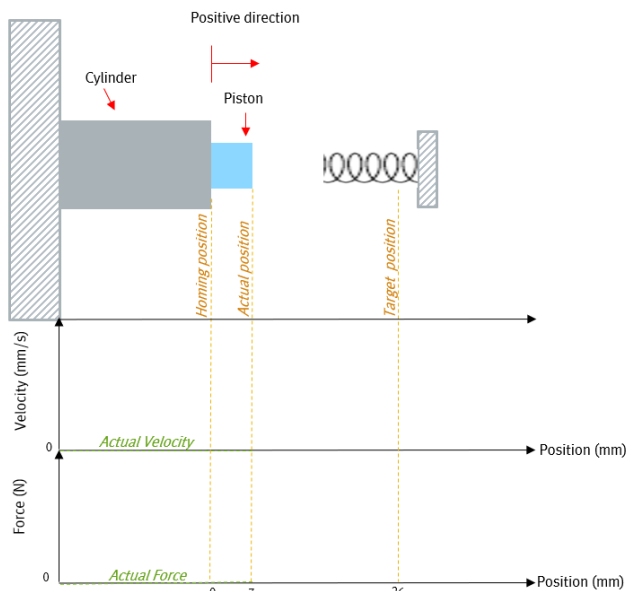
This example shows the cylinder behavior when the maximum force is exceeded before the target position is reached.

Add position mode to the sequencer list and set the following values:

Position method : Absolute
 Target position : 26 mm
 Maximum force : 200 N
 Velocity : 5 mm/s

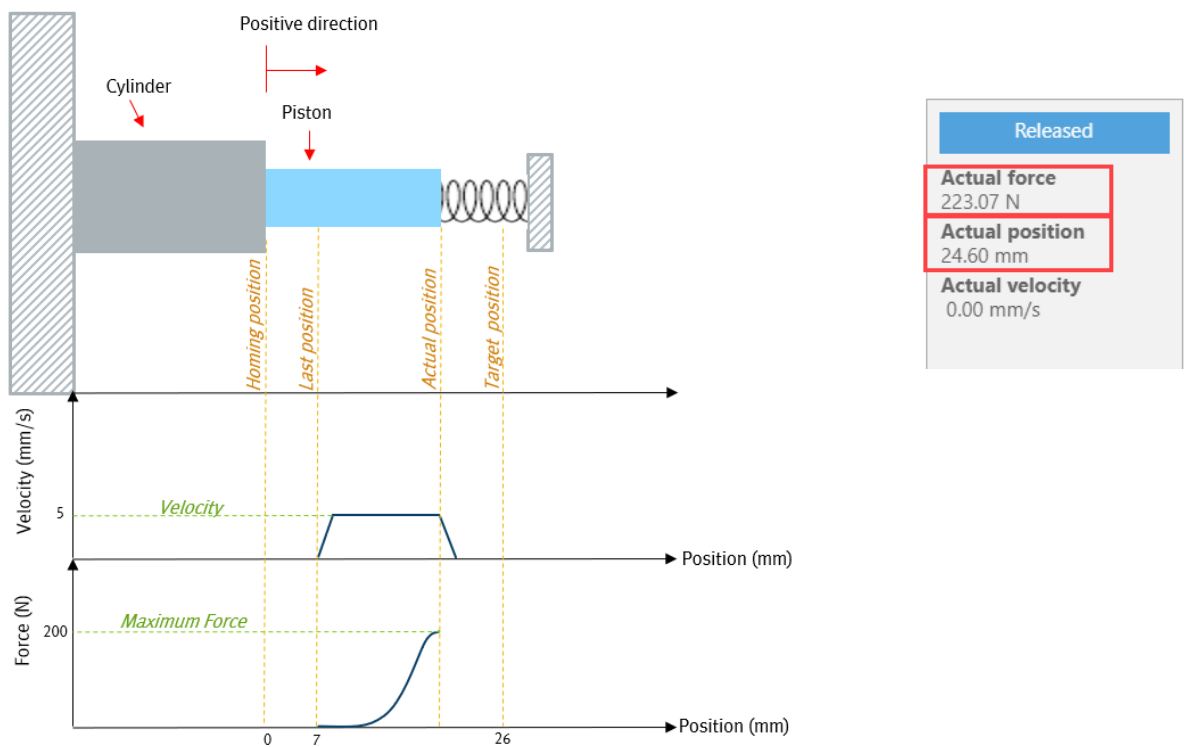
Function	Position mode	
☐ Record		
Position method	☒ Absolute	☐ Relative
Target position	26.00 mm	▼
Maximum force	200.00 N	▼
Velocity	5.00 mm/s	▼

Before execution: The actual position is 7 mm.



Released
Actual force 0.68 N
Actual position 7.00 mm
Actual velocity 0.02 mm/s

After execution: The cylinder moves from the actual position of 7 mm toward the target position of 26 mm. When the force exceeds the configured maximum force of 200 N, the process is terminated before the target position is reached. In this example, the movement stops at 24.60 mm.



6.2 Force Modes

Servo press provides different kinds of force related functions as below:

- Force mode (FM)
- Advanced force mode (AFM)
- Force control (FC)
- Smart force control (SFC)

6.2.1 Force mode (FM)

Force mode moves the cylinder until the configured target force is reached. The movement is limited by the configured maximum position or maximum distance. The CMMT uses Profile Position Mode (PP) for this function.

Configuration

Function	Force mode ▼	
1	☒ Record	
2	Position method	
	☒ Absolute	☐ Relative
3	Target force	200.00 N ▼
4	Maximum position	18.00 mm ▼
5	Velocity	1.00 mm/s ▼

1. **Record:** Activate this option to record a force/position curve during cylinder movement. The curve is recorded while this function is executed.
2. **Position method:** Select the movement method for the cylinder.
 - **Absolute:** Move the cylinder to a target position based on the homing position.
 - **Relative:** Move the cylinder by a defined distance based on the current position.

3. **Target force:** Define the desired press force to be applied.

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual force value as the target force.

4. **Maximum position / maximum distance:** If this value is exceeded before the target force is reached, the selected failure reaction is executed or the process is interrupted.

Enter this value in one of the following ways:

- **Value:** Enter the value directly using the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. It can be adjusted before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual position as the target position or target distance.

5. **Velocity:** Defines the cylinder speed while moving toward the target force.

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.

Examples

The following examples show how to use force mode in a YJKP system to apply a press force of 200 N.

Example 1: Absolute position method

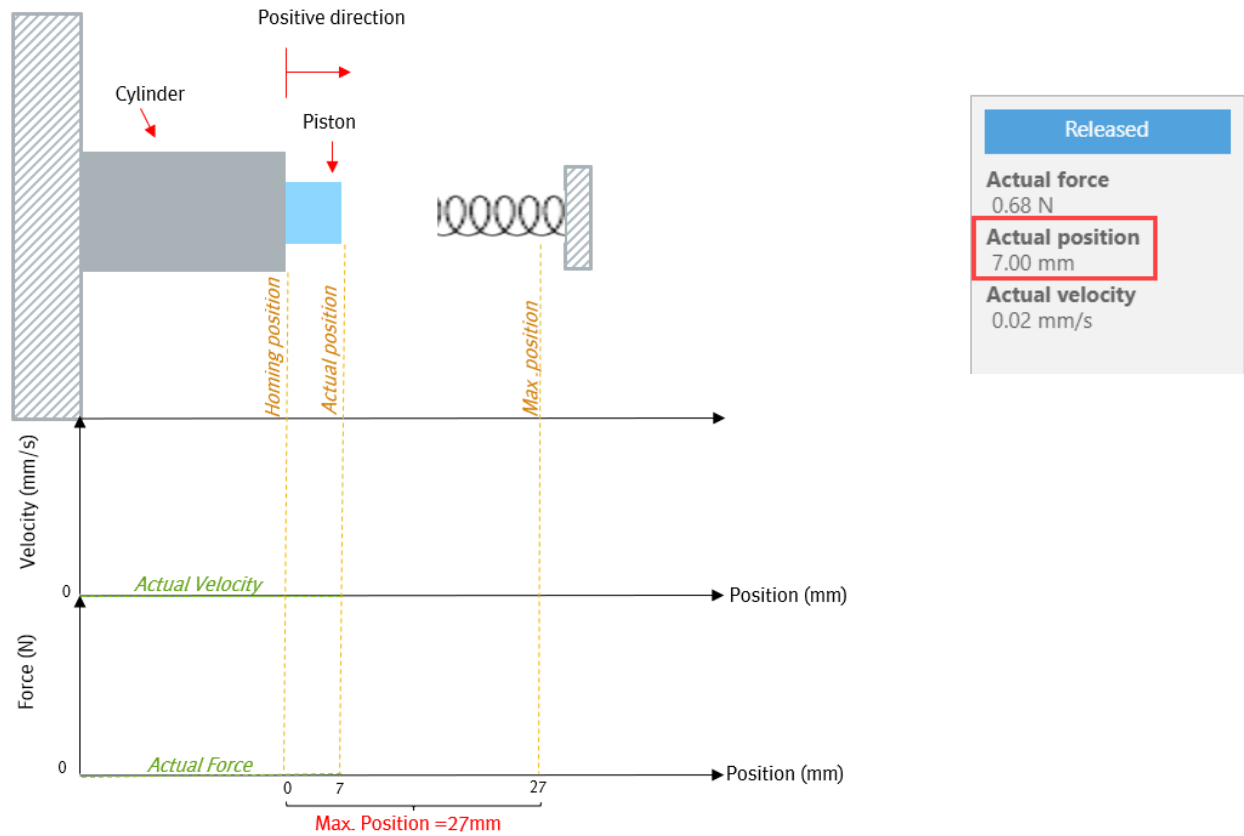
Add force mode to the sequencer list and set the following values:

Position method : Absolute
 Target force : 200 N
 Maximum position : 27 mm
 Velocity : 5 mm/s

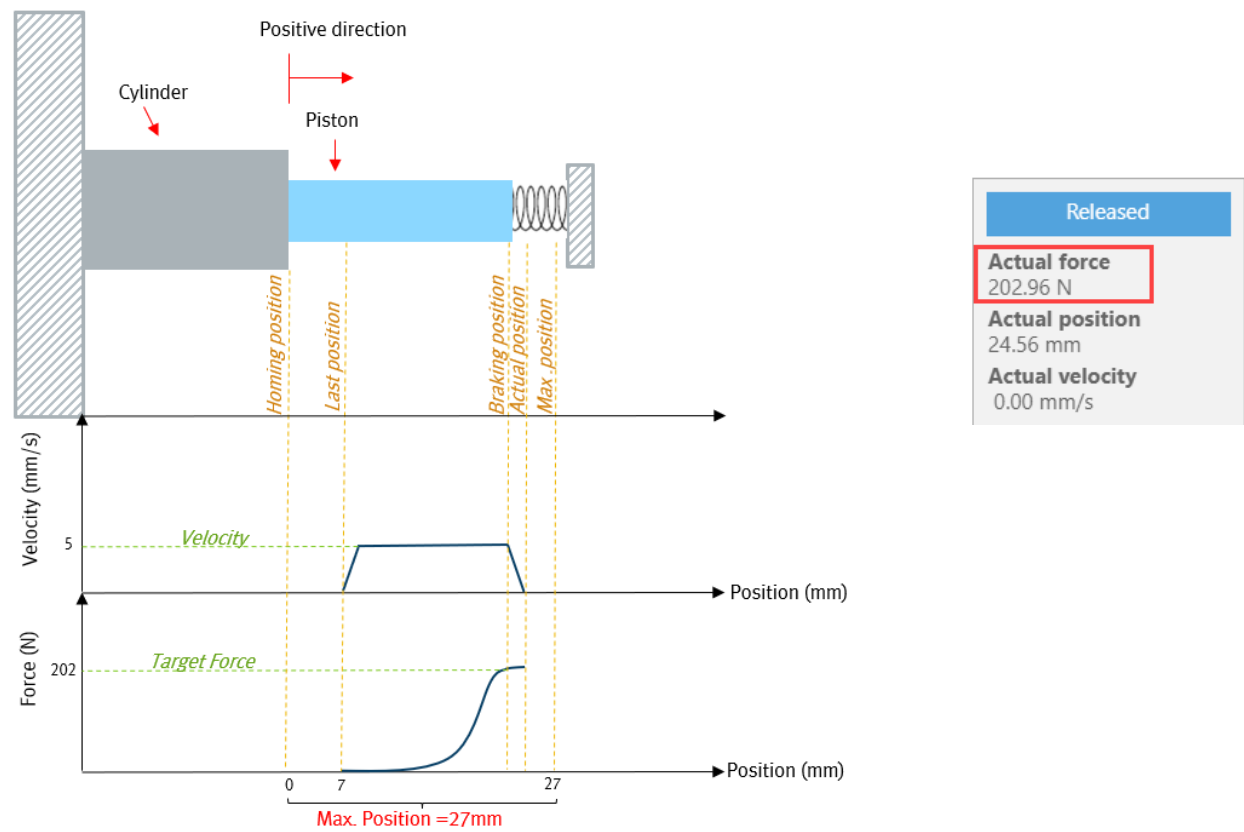
The following figures show the cylinder behavior in this mode.

- Initial actual position: 7 mm.
- Initial actual force: 0 N.

Before execution:



After execution: The new actual position is 24.56 mm and the actual force is 202 N.



Example 2: Relative position method

First, add force mode to the sequencer list. Then, adjust it as the following:

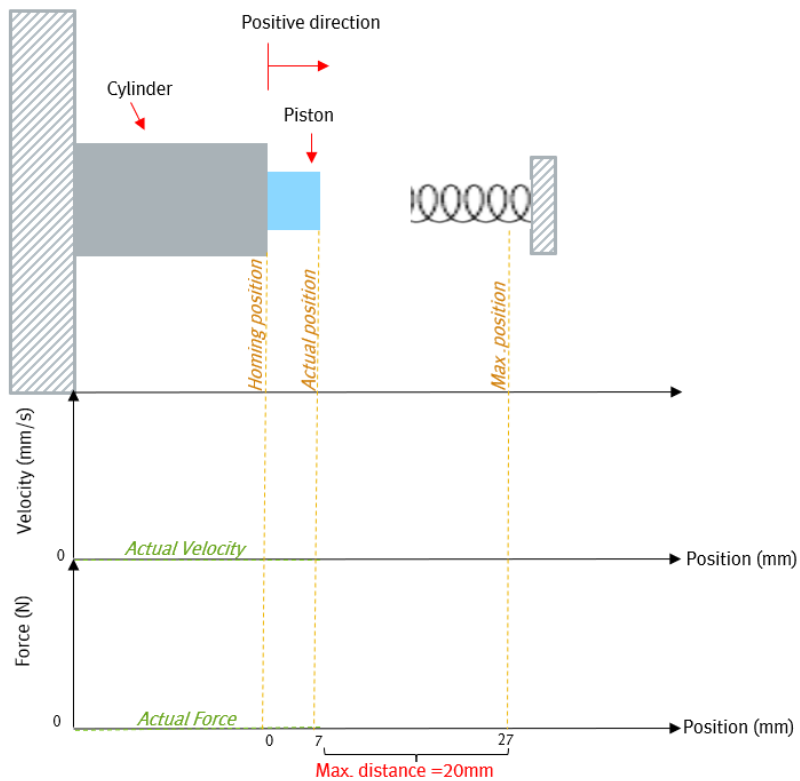
Position method : Relative
 Target force : 200 N
 Target distance : 20 mm
 Velocity : 5 mm/s

Function	Force mode	
☐ Record		
Position method	☐ Absolute ☒ Relative	
Target force	200.00 N	▼
Maximum distance	20.00 mm	▼
Velocity	5.00 mm/s	▼

The following figures show the cylinder behavior in this mode. Initial conditions:

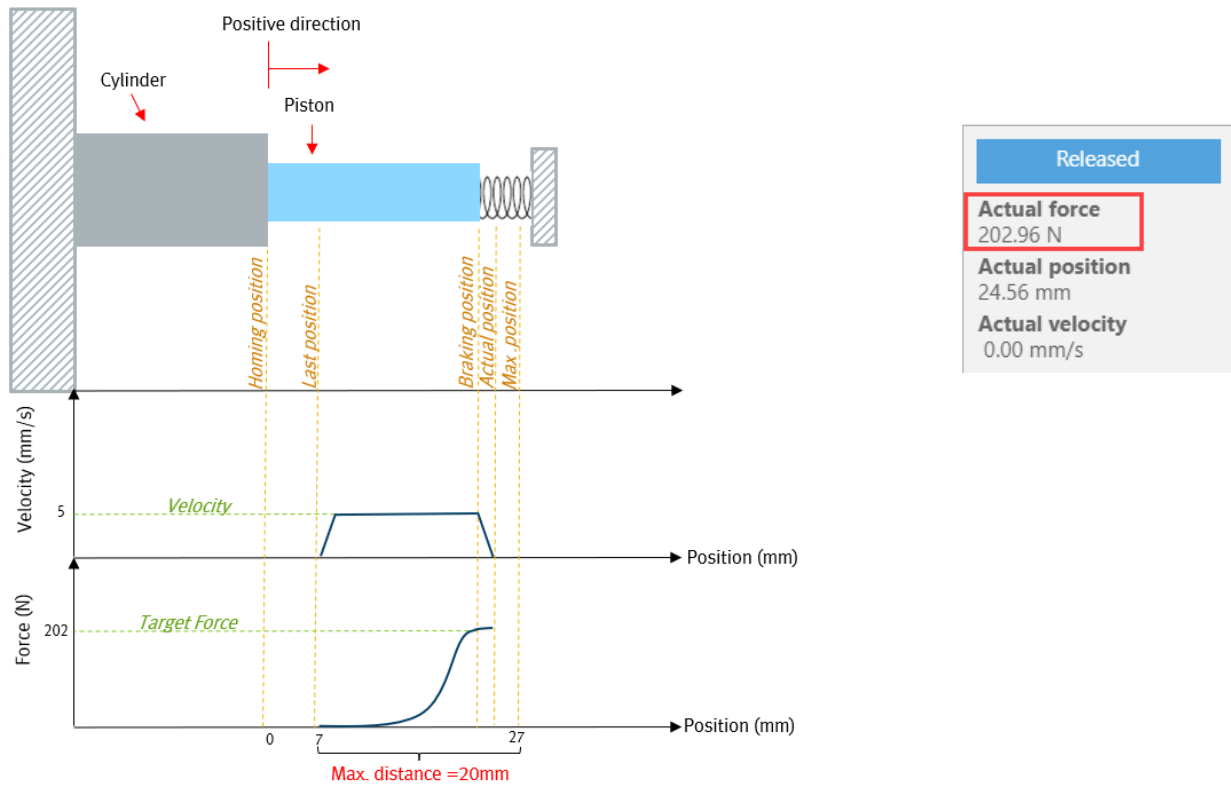
- Actual position: 7 mm
- Actual force: 0 N

Before execution:



Released
Actual force 0.68 N
Actual position 7.00 mm
Actual velocity 0.02 mm/s

After execution: The new actual position is 24.56 mm and the actual force is 202 N.



Example 3: Limit exceeded

This example shows the cylinder behavior when the maximum position is exceeded before the target force is reached.

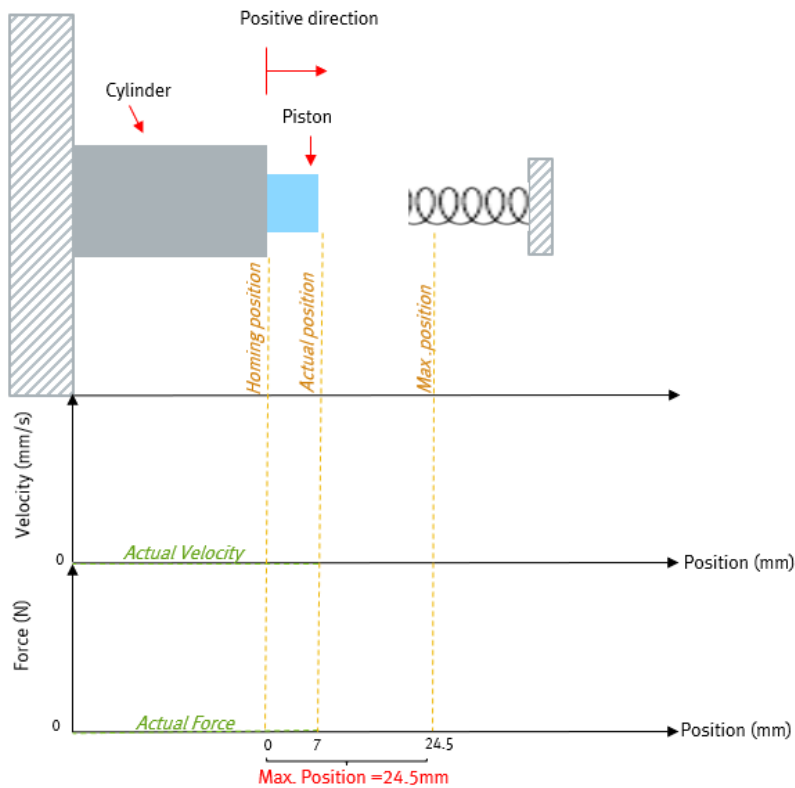
Add force mode to the sequencer list and set the following values:

Position method : Absolute
 Target force : 200 N
 Maximum position : 24.5 mm
 Velocity : 5 mm/s

Function	Force mode
☐ Record	
Position method	☒ Absolute ☐ Relative
Target force	200.00 N
Maximum position	24.50 mm
Velocity	5.00 mm/s

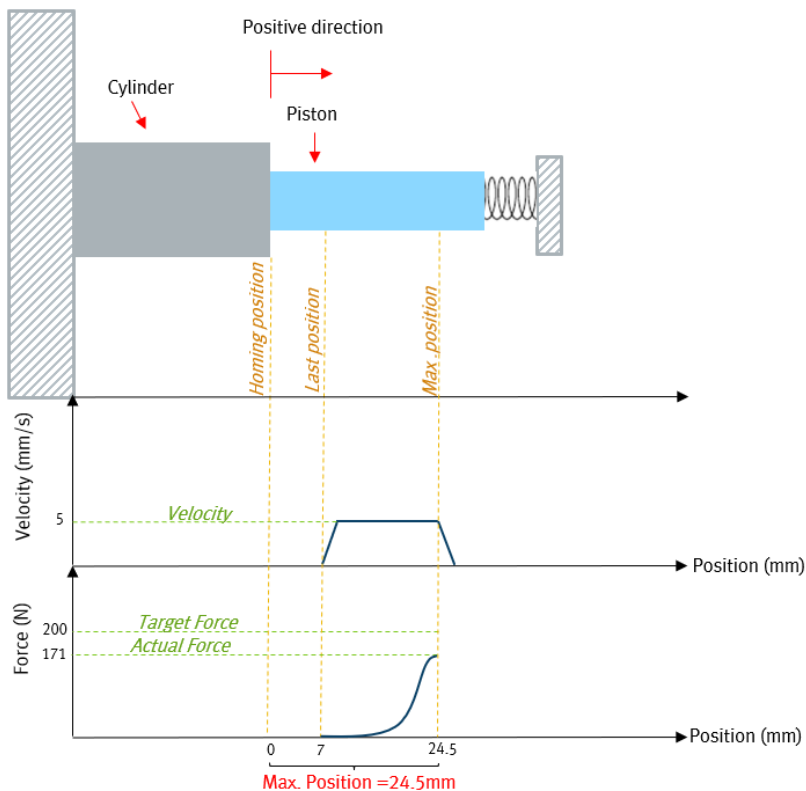
Before execution:

- Actual position: 7 mm
- Actual force: 0 N



Released	
Actual force	0.68 N
Actual position	7.00 mm
Actual velocity	0.02 mm/s

After execution: The cylinder moves from the actual position of 7 mm in the positive direction. When the configured maximum position of 24.5 mm is reached, the process is terminated before the target force is achieved. In this example, the process stops at 171 N.



Released	
Actual force	171.15 N
Actual position	24.53 mm
Actual velocity	0.01 mm/s

Issues

- **Force regulation behavior:**

Force mode is not a force regulation function. It does not actively regulate the force to one exact value. Instead, the step is considered successful when the actual force reaches or exceeds the configured target force.

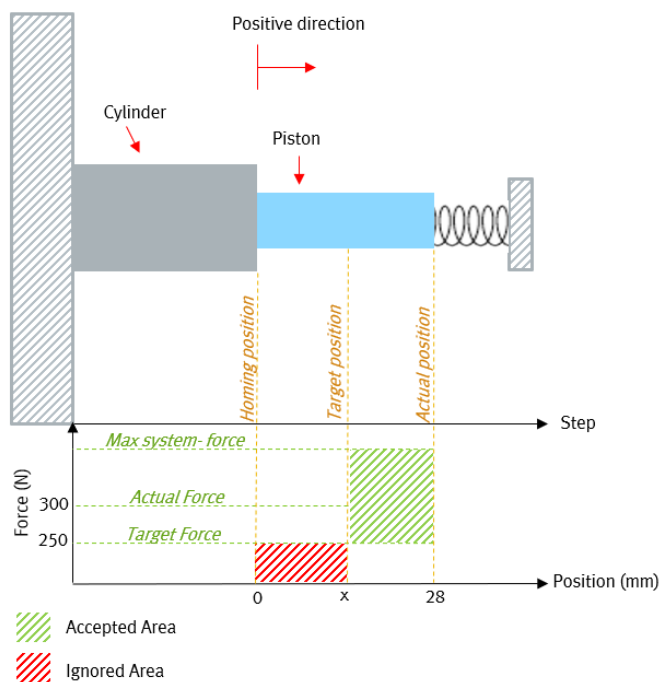
The accepted force range starts at the target force and extends up to the maximum system force.

If the actual force is already higher than the target force, the cylinder does not move in the negative direction to reduce the force.

Example: In a YJKP system, the actual position is 28 mm, the actual force is 300 N, and the configured target force is 250 N.

As shown in the figure below, the function accepts force values from 250 N up to the maximum system force. Since the actual force of 300 N is already higher than the target force, the cylinder does not move in the negative direction. The step is therefore completed successfully.

Depending on the application, this function may therefore not be suitable for direct use.



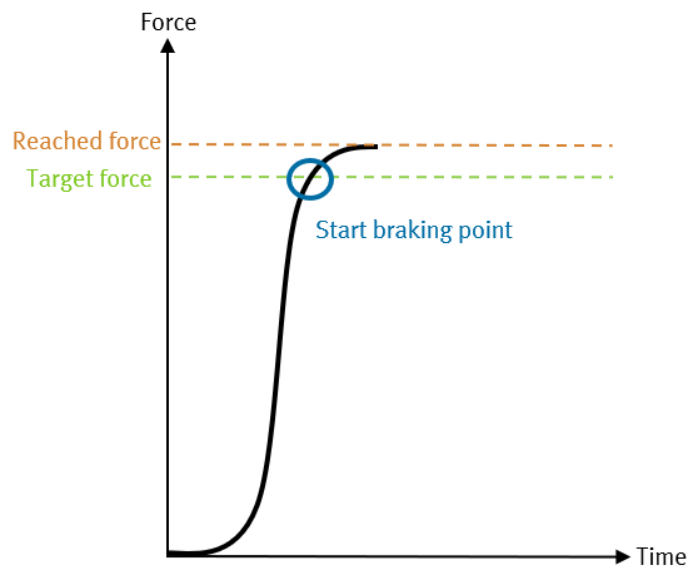
Possible solutions:

- Before using Force mode, add a Position mode step to move the cylinder back into the permitted range. Then use Force mode to move the cylinder in the positive direction until the target force is reached.
- Use a force regulation function, such as advanced force mode.

- **Overshooting**

This function always produces a system-dependent overshoot of the target force. The system starts braking only after the configured target force has been reached. The higher the cylinder velocity, the greater the expected overshoot.

As shown in the diagram, braking starts at the target force. Due to braking delay, the final reached force is higher than the configured target force.



Possible solutions:

- Reduce the cylinder velocity to the lowest practical value when using this function.
- Use advanced force mode if a more precise approach to the target force is required.

6.2.2 Advanced Force Mode (AFM)

Advanced Force Mode is used to reach a defined target force. If the target force is reached without exceeding any configured limit, the step is completed successfully. The CMMT uses Profile Velocity (PV) for this function.

Unlike Force Mode, Advanced Force Mode uses a parameterizable braking ramp. The velocity is reduced from 100% of $v_{\max}$ to 1% of $v_{\max}$ before the target force is reached. This allows the target force to be approached more precisely and efficiently.

Advanced Force Mode is a force regulation function. The cylinder can move in both the positive and negative directions to reach the desired force.



Note :

- Further information about advanced force mode , please see „ AppNote Servo Press Kit YJKP-Advanced Force Mode [➔](#)“.

Configuration

Function	Advanced force mode ▼	
1 ☒ Record		
2	Velocity switch	
3	Limits	
4 Target force	500.00 N	▼
5 Force start braking	300.00 N	▼
6 Velocity	10.00 mm/s	▼

1. **Record:** Activate this option to record the force/position curve generated by the cylinder movement while this function is executed.

2. **Velocity switch:** Activate this option to move the cylinder using two velocity levels: $v_{\max_2}$ and $v_{\max}$.
- **$v_{\max_2}$ (approach velocity):** Defines the velocity from the start of force control up to the middle position.
 - **$v_{\max}$ (velocity):** Defines the velocity from the middle position to the position where the actual force reaches the braking value.

The 'Velocity switch' dialog box is shown. It has a title bar 'Velocity switch'. Inside, there is an 'Activate' checkbox which is checked. Below it, there are two input fields: 'Middle position' with the value '16.00 mm' and 'Approach velocity' with the value '30.00 mm/s'. At the bottom left is a 'Close' button. At the bottom right are three buttons: 'Cancel', 'Save', and 'Next'.

Click velocity switch to set the middle position and the approach velocity $v_{\max_2}$.

- **Activate:** Enables or disables the velocity switch.
 - **Middle position [mm]:** Defines the position where the velocity changes from $v_{\max_2}$ to $v_{\max}$.
 - **Approach velocity [mm/s]:** Defines the velocity from the start of force control up to the middle position.
3. **Limits:** If a configured limit is exceeded, the selected failure reaction is executed or the process is interrupted.

The 'Limits' dialog box is shown. It has a title bar 'Limits'. Above the dialog, there is a 'Function' dropdown menu set to 'Advanced force mode' and a 'Record' checkbox which is checked. Inside the dialog, there are two input fields: 'Max. position' with the value '80.00 mm' and 'Max. force' with the value '800.00 N'. At the bottom left is a 'Close' button. At the bottom right are three buttons: 'Cancel', 'Save', and 'Next'.

- **Max. position [mm]:** Aborts the function if the absolute maximum position is exceeded.
- **Max. force [N]:** Aborts the function if the configured maximum force is exceeded.

4. **Target force [N]:** Defines the desired press force to be applied.

Function: Advanced force mode

☐ Record

Velocity switch

Limits

Target force: 0.00 N

Force start braking: Value, Variable, Teach

Velocity: Value, Variable, Teach

Enter this value in one of the following ways:

- **Value:** Enter the value directly with the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. Adjust it before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual force value as the target force.

5. **Force start braking [N]:** Defines the force value at which the velocity reduction begins.

Function: Advanced force mode

☐ Record

Velocity switch

Limits

Target force: 0.00 N

Force start braking: 0.00 N

Velocity: Value, Variable, Teach

Cancel Save Next

Enter this value in one of the following ways:

- **Value:** Enter the value directly using the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. It can be adjusted before each cycle without editing the program. For more information, see the section “Variable”.
- **Teach:** Use the current actual force value as the force start braking value.

6. Velocity [mm/s]: Defines the maximum velocity during the pressing process (v_{max}).

Enter this value in one of the following ways:

- **Value:** Enter the value directly using the keyboard. This value is fixed in the sequencer and can only be changed by editing the program.
- **Variable:** Set the value in the sequencer or via the host PLC. It can be adjusted before each cycle without editing the program. For more information, see the section “Variable”.

Examples

Example 1: Advanced force mode without velocity switch

1. Click on velocity switch and set the following:

Activate: Uncheck

2. Click on limits and set the following:

Max. position : 30 mm

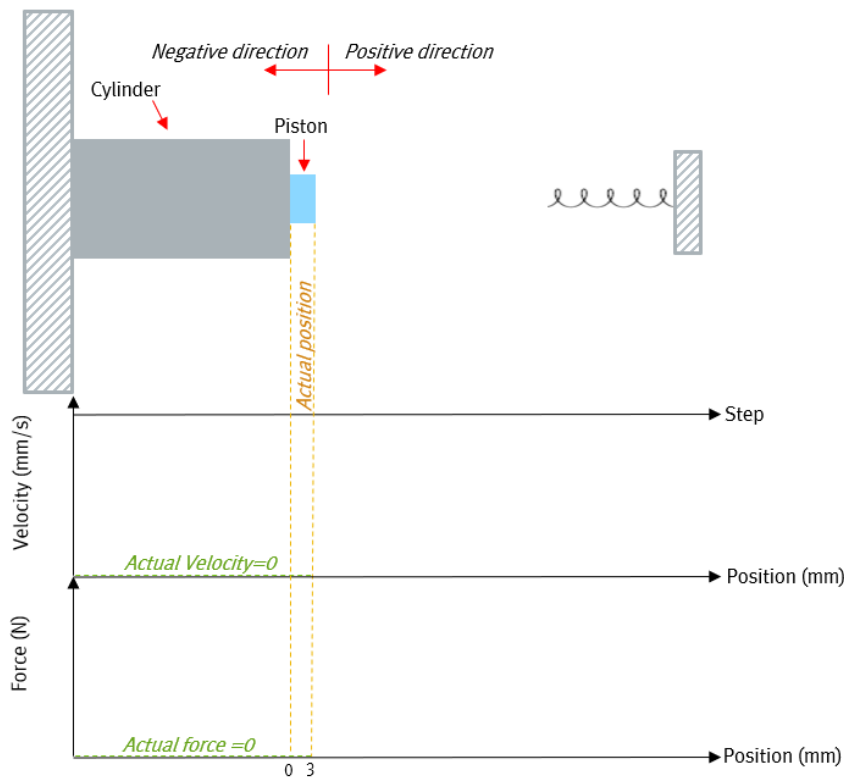
Max. force : 300 N

3. Set the following:

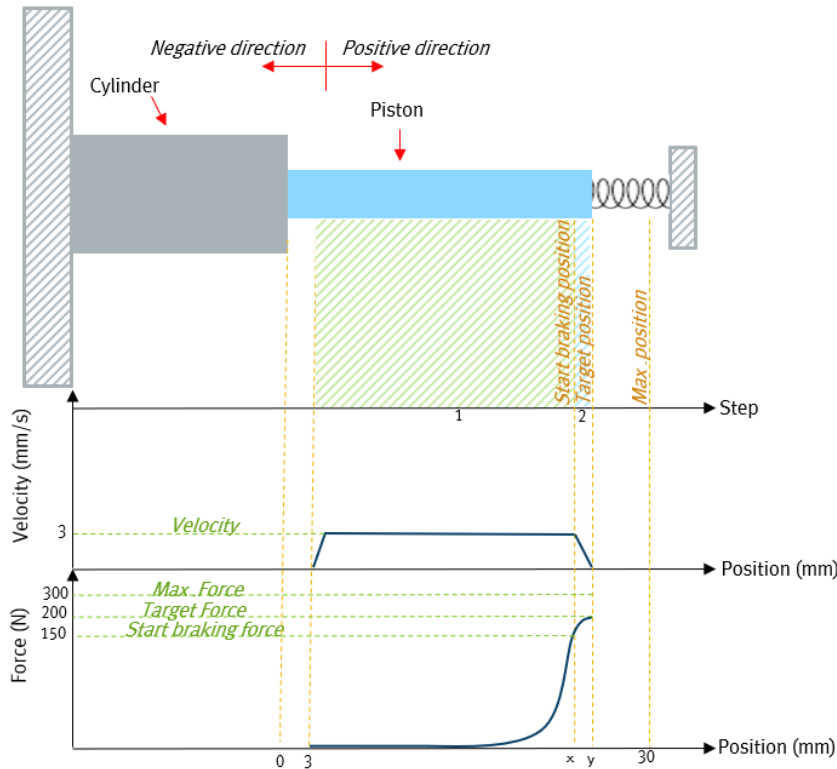
Target force : 200 N
Force start braking : 150 N
Velocity : 3 mm/s

Function	Advanced force mode	
☐ Record		
	Velocity switch	
	Limits	
Target force	200.00 N	▼
Force start braking	150.00 N	▼
Velocity	3.00 mm/s	▼

Before execution:



After execution: The cylinder behavior is shown in the figure below.



The movement consists of two phases:

Phase 1: Movement up to the braking force

- **Position:** The cylinder moves from the actual position of 3 mm to position x, where the actual force reaches the configured braking force.
- **Velocity:** The cylinder accelerates from 0 mm/s to the configured Advanced Force Mode velocity of 3 mm/s.
- **Force:** After the cylinder contacts the spring, the force increases from 0 N to the configured braking force of 150 N.

Phase 2: Braking and approach to target force

- **Position:** The cylinder moves from position x, where the actual force equals the braking force, to position y, where the actual force reaches the target force.
- **Velocity:** The cylinder decelerates from 3 mm/s to 0 mm/s.
- **Force:** The force increases from 150 N, the braking force, to the target force of 200 N.

Example 2: Advanced force mode with velocity switch

1. Open velocity switch and set the following values:

Activate : Checked
 Middle position : 15 mm
 Approach velocity : 10 mm/s

Velocity switch

Activate ☒

Middle position 15.00 mm ▼

Approach velocity 10.00 mm/s ▼

Close

2. Open limits and set the following values:

Max. position : 30 mm
 Max. force : 300 N

Limits

Max. position 30.00 mm ▼

Max. force 300.00 N ▼

Close

3. Set the process parameters as follows:

Target force : 200 N
 Force start braking : 150 N
 Velocity : 3 mm/s

Function Advanced force mode ▼

☐ Record

Velocity switch

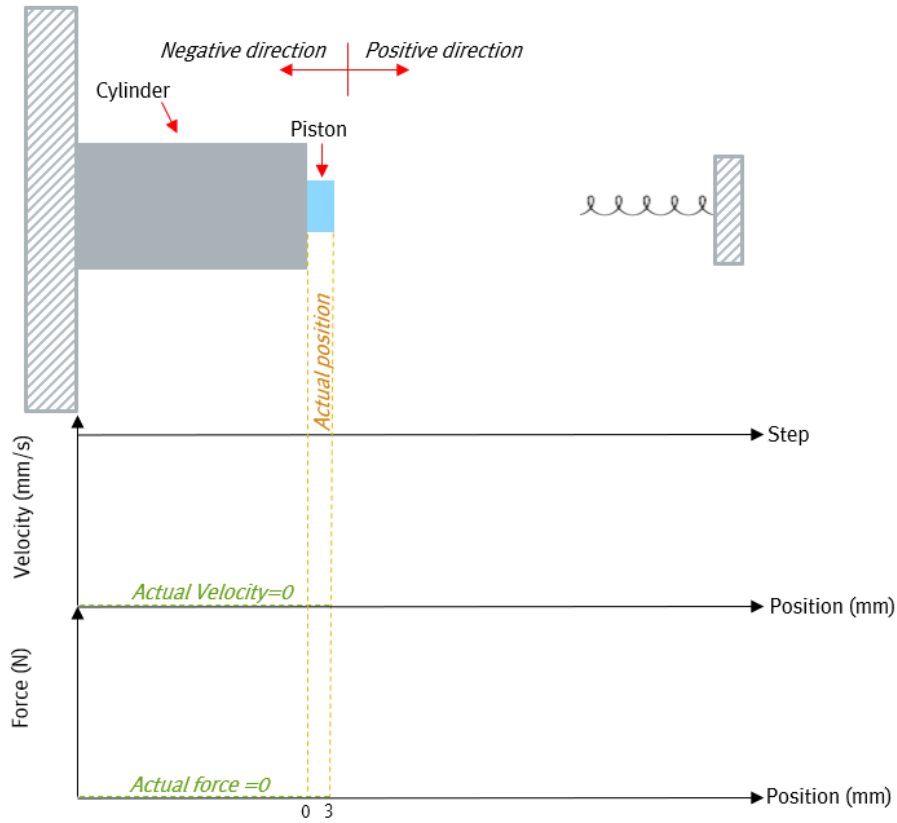
Limits

Target force 200.00 N ▼

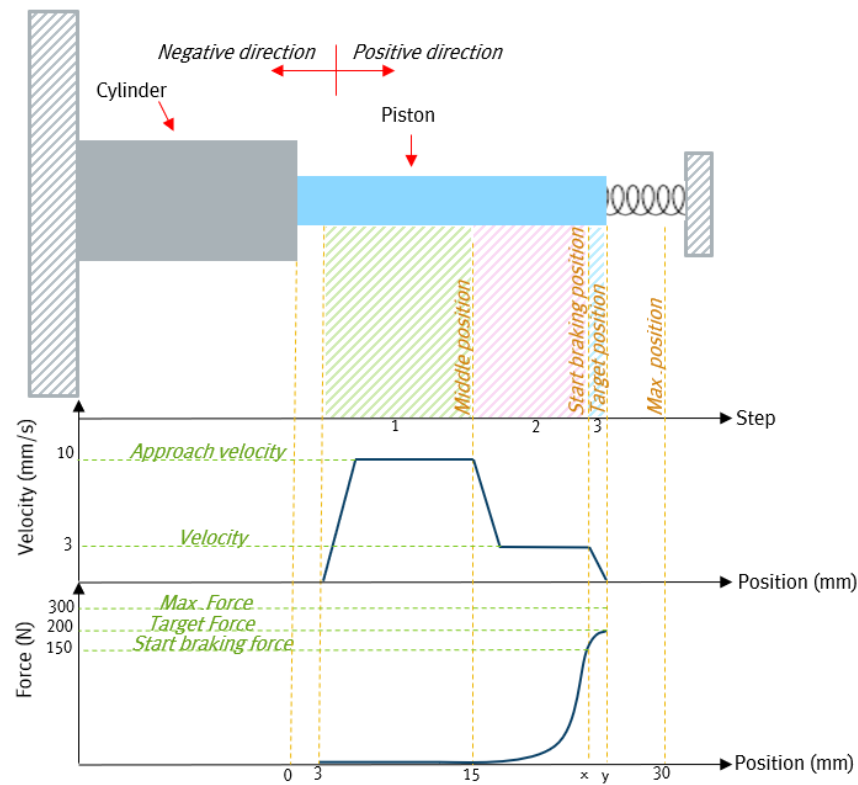
Force start braking 150.00 N ▼

Velocity 3.00 mm/s ▼

Before execution:



After execution: The cylinder behavior is shown in the figure below.



The movement consists of three phases:

Phase 1: Movement to the middle position

- Position: The cylinder moves from the actual position of 3 mm to the configured middle position of 15 mm.
- Velocity: The cylinder accelerates from 0 mm/s to the configured approach velocity of 10 mm/s.
- Force: The press force remains at 0 N during this phase.

Phase 2: Movement up to the braking force

- Position: The cylinder moves from the middle position of 15 mm to position x, where the actual force reaches the configured braking force.
- Velocity: The cylinder decelerates from 10 mm/s to the configured Advanced Force Mode velocity of 3 mm/s.
- Force: After the cylinder contacts the spring, the force increases from 0 N to the configured braking force of 150 N.

Phase 3: Braking and approach to target force

- Position: The cylinder moves from position x, where the actual force equals the braking force, to position y, where the actual force reaches the target force.
- Velocity: The cylinder decelerates from 3 mm/s to 0 mm/s.
- Force: The force increases from the braking force of 150 N to the target force of 200 N.

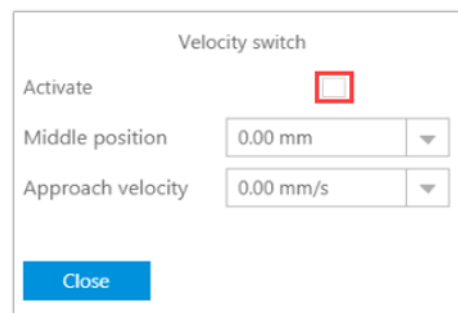
Example 3: Limit exceeded

This example shows the cylinder behavior when the maximum position is exceeded before the target force is reached.

Add Advanced Force Mode to the sequencer list and set the following values:

1. Open velocity switch and deactivate this option:

Activate: Unchecked



The image shows a 'Velocity switch' configuration dialog box. It has a title bar 'Velocity switch'. Inside, there is a section 'Activate' with an unchecked checkbox. Below this are two input fields: 'Middle position' with a value of '0.00 mm' and a dropdown arrow, and 'Approach velocity' with a value of '0.00 mm/s' and a dropdown arrow. At the bottom left is a blue 'Close' button.

2. Open limits and set the following values:

Max. position : 20 mm

Max. force : 300 N

Limits	
Max. position	20.00 mm
Max. force	300.00 N
Close	

3. Set the process parameters as follows:

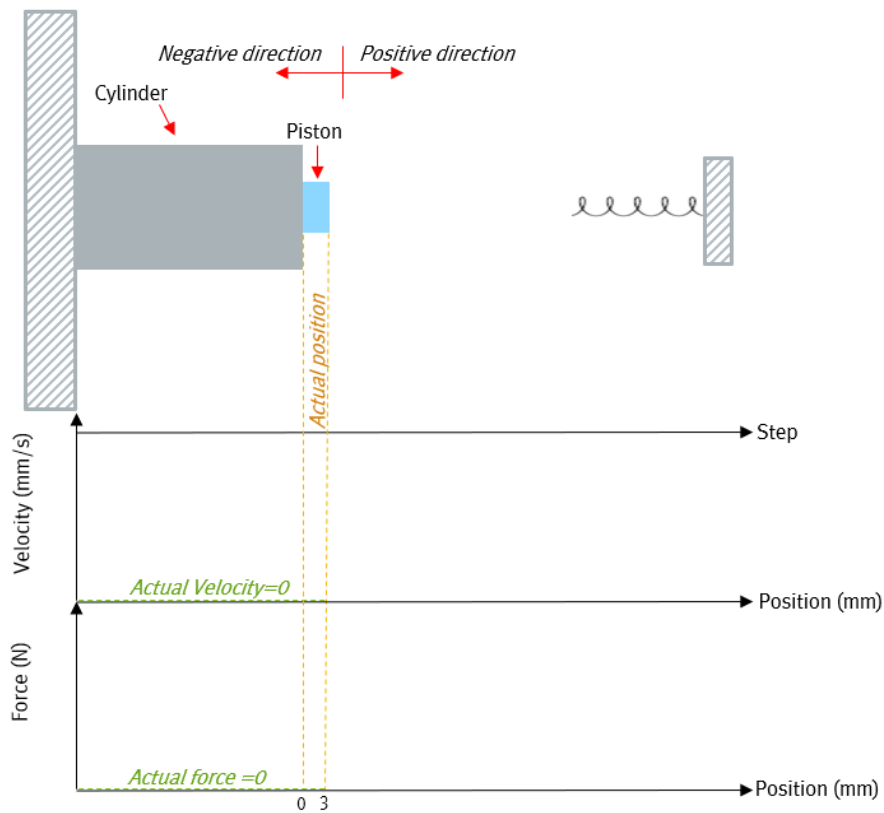
Target force : 200 N

Force start braking : 150 N

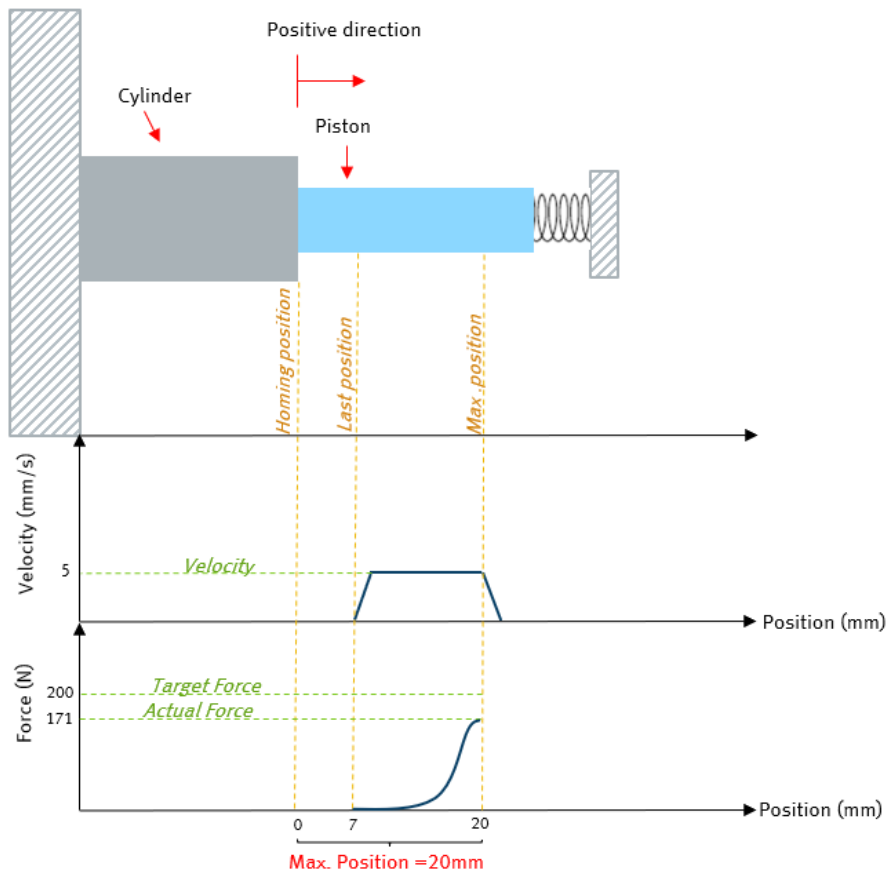
Velocity : 3 mm/s

Function	Advanced force mode
☐ Record	
Velocity switch Limits	
Target force	200.00 N
Force start braking	150.00 N
Velocity	3.00 mm/s

Before execution:



After execution: The cylinder moves from the actual position of 7 mm in the positive direction. When it reaches the configured maximum position of 20 mm, the process is terminated before the target force is reached. In this example, the process stops at 171 N.



Conclusion: Velocity switch

The velocity switch allows the cylinder to move quickly at the beginning of the process and then reduce speed at a defined position. This can reduce the overall cycle time.

Without the velocity switch, only one velocity value is used. If this value is too high, the risk of overshooting increases. If it is too low, the cycle time increases.

6.2.3 Force Control (FC)

Force Control is used to reach a defined target force and maintain this force for a specified holding time. This function actively regulates the force. The cylinder can move in both positive and negative directions to reach and maintain the target force.

Configuration

1. **Record:** Activate this option to record the force/position curve generated by the cylinder movement while this function is executed.
2. **Control settings:** Force Control uses pre-control with a PI controller. Only the integrator can be deactivated. Further information about parameter configuration is provided in the application note “Servo Press Kit YJKP – Force Control ([➔](#))”.

- **K_v:** Pre-control gain
- **K_p:** Proportional gain
- **K_i:** Integrator gain
- **Act_I:** Activates or deactivates the integrator.
- **Default parameters:** Apply standard control parameters for the selected servo press size.

Following values are intended as reference values and may need to be adapted to the application.

3. **Velocity switch:** Activate this option to move the cylinder with two velocity levels: $v_{\max_2}$ and $v_{\max}$.
 - **$v_{\max_2}$ / Approach velocity:** Defines the velocity from the start of Force Control up to the middle position.
 - **$v_{\max}$ / Velocity:** Defines the velocity from the middle position to the position where the actual force reaches the braking value.

Open Velocity switch to set the middle position and the approach velocity $v_{\max_2}$.

- **Act:** Activates or deactivates the velocity switch.
- **Middle position [mm]:** Defines the position where the velocity changes from $v_{\max_2}$ to $v_{\max}$.
- **Approach velocity [mm/s]:** Defines the velocity from the start of Force Control up to the middle position.

4. **Limits:** If any of the limits is exceeded (other than the force tolerance), either the selected “failure reaction” is executed or the process is interrupted.

- **Max. position [mm]:** The process is interrupted if this position (absolute) is exceeded.
- **Max. force [N]:** The process is interrupted if this force value is exceeded.
- **Time limit [ms]:** Specifies the maximum permissible duration of force control. If the selected duration is exceeded, force control is interrupted.
- **Force tolerance [%]:** Maximum deviation from target force as of which the tolerance is deemed complied with and holding time begins. Later non-compliance with the specified tolerance range has no effect.



Note:

No evaluation method! If applicable, compliance with a tolerance range must be evaluated separately.

5. **Target force** : The desired press force to be applied .

Function: Force control

☐ Record

Control settings

Velocity switch

Limits

Target force: 0.00 N

Holding time

Velocity

Value

Variable

Teach

You may enter this value in one of three ways :

- **Value:** Input the value directly from the keyboard. It's a fixed value in the sequencer, which only can be changed by editing the program.
- **Variable:** The value has to be set either in the sequencer or via the host-PLC. It can be adjusted before each cycle without editing the program itself.
- **Teach:** The system will use the actual position value as a target position / target distance.

6. **Holding time:** The time period to maintain the desired force.

Function: Force control

☐ Record

Control settings

Velocity switch

Limits

Target force: 0.00 N

Holding time: 0 ms

Velocity

Value

Variable

Cancel Save Next

You may enter this value in one of two ways :

- **Value:** Input the value directly from the keyboard. It's a fixed value in the sequencer, which only can be changed by editing the program.
- **Variable:** The value has to be set either in the sequencer or via the host-PLC. It can be adjusted before each cycle without editing the program itself.

7. **Velocity:** The maximum possible velocity during the pressing procedure (v_{max}).

You may enter this value in one of two ways :

- **Value:** Input the value directly from the keyboard. It's a fixed value in the sequencer, which only can be changed by editing the program.
- **Variable:** The value has to be set either in the sequencer or via the host-PLC. It can be adjusted before each cycle without editing the program itself.

Examples

Example 1: Force Control without velocity switch.

1. Open control settings and apply the default parameters:

K_v : 0.950000
 K_p : 1.000000
 K_i : 1.000000, active

2. Open velocity switch and deactivate this option:

Activate: unchecked

3. Open limits and set the following values:

Max. position : 25 mm
Max. force : 300 N
Time limit : 7 000 ms
Force tolerance : 3%

Limits	
Max. position	25.00 mm
Max. force	300.00 N
Time limit	7000 ms
Force tolerance	3 %

Close

4. Set the process parameters as follows:

Target force : 280 N
Holding time : 3 000 ms
Velocity : 3 mm/s

Function **Force control**

☐ Record

Control settings

Velocity switch

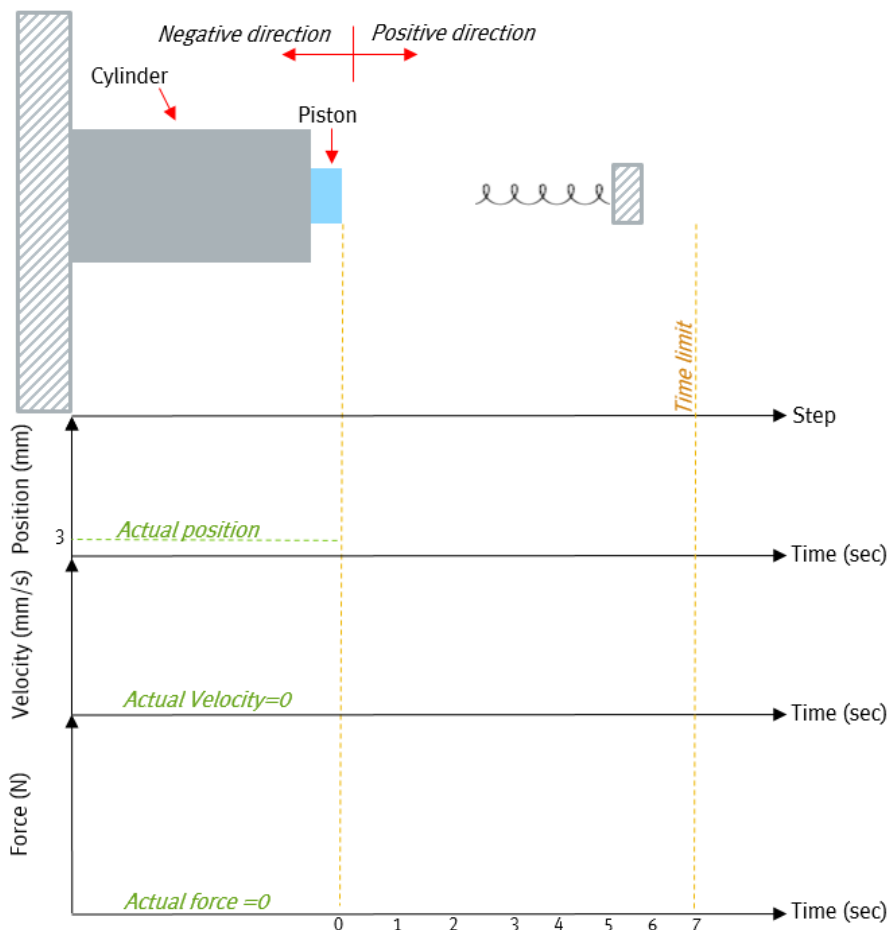
Limits

Target force 280.00 N

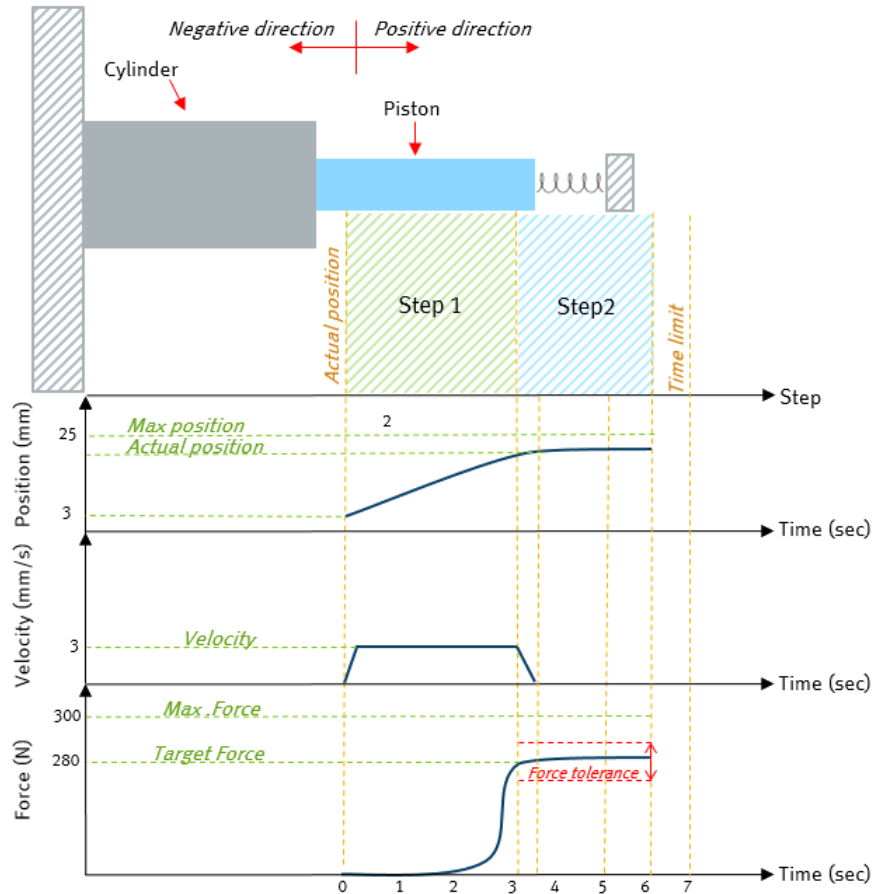
Holding time 3000 ms

Velocity 3.00 mm/s

Before execution:



After execution: The cylinder behavior is shown in the figure below.



The movement consists of two phases:

Phase 1: Approach to target force

- Position: The cylinder moves from the actual position of 3 mm to position x, where the actual force reaches the target force.
- Velocity: The cylinder accelerates from 0 mm/s to the configured Force Control velocity of 3 mm/s.
- Force: After contact with the spring, the force increases from 0 N to the target force of 280 N.

Phase 2: Hold target force

- Position: The cylinder remains at position x for the configured holding time of 3 seconds.
- Velocity: The cylinder decelerates from 3 mm/s to 0 mm/s.
- Force: The PI controller maintains the target force of 280 N for 3 seconds by moving the cylinder in positive or negative direction within the configured force tolerance.

Example 2: Force Control with velocity switch

1. Open control settings and apply the default parameters. Click default parameters to set the control parameters automatically.

K_v : 0.950000

K_p : 1.000000

K_i : 1.000000, active

2. Open velocity switch and set the following values:

Activate : Checked

Middle position : 12.5 mm

Approach velocity : 6 mm/s

3. Open limits and set the following values:

Max. position : 25 mm

Max. force : 300 N

Time limit : 7 000 ms

Force tolerance : 3%

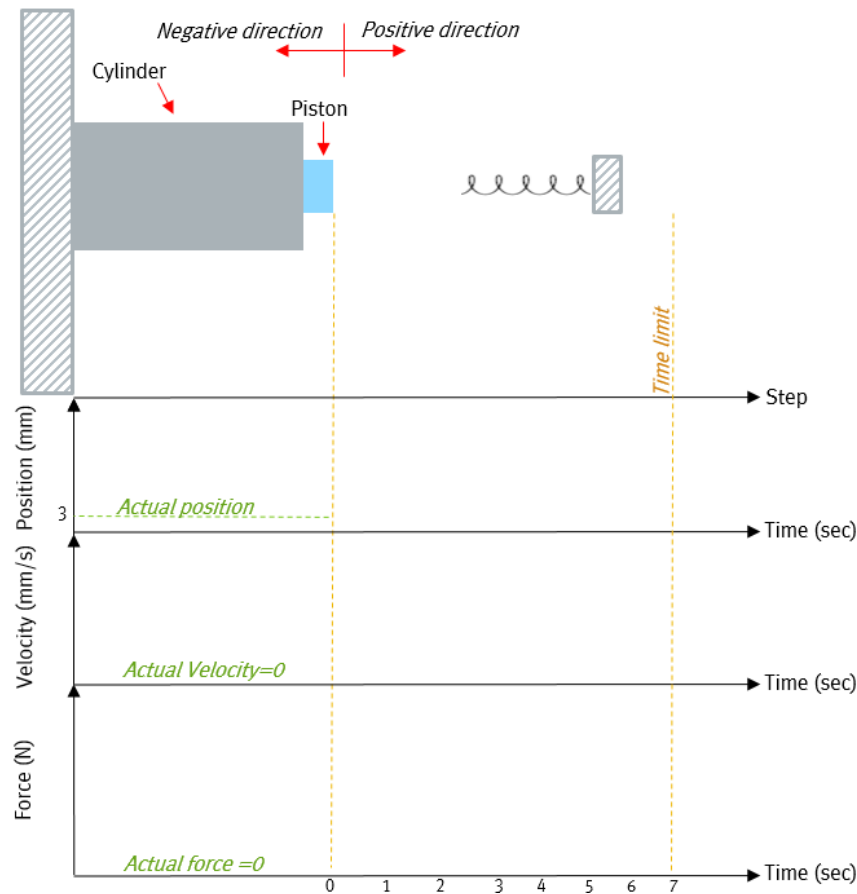
4. Set the process parameters as follows:

Target force : 280 N

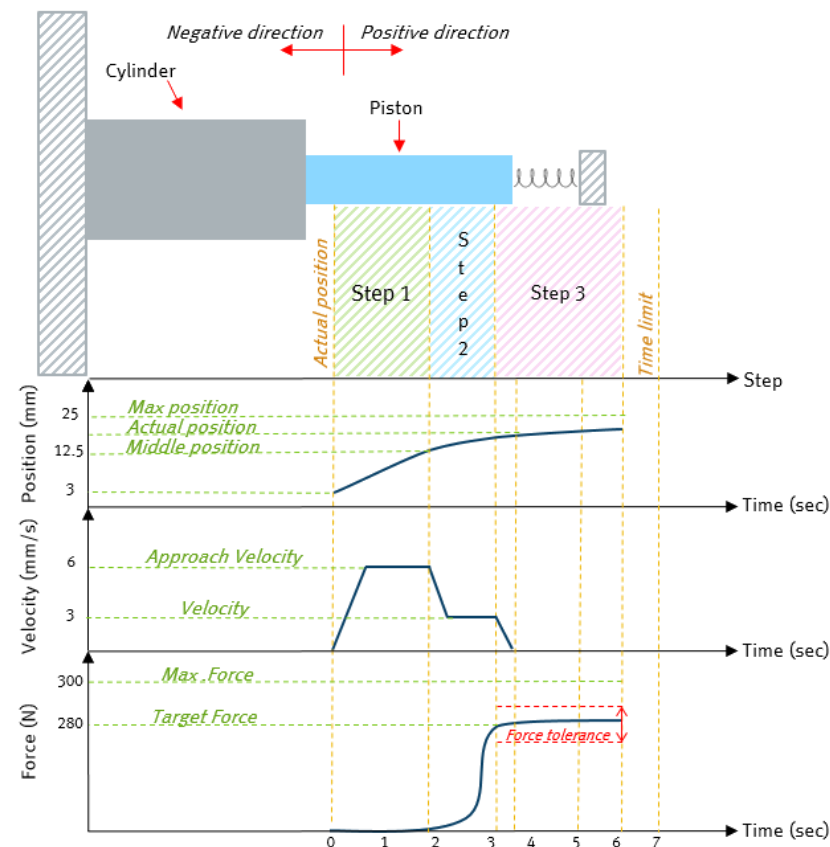
Holding time : 3 000 ms

Velocity : 3 mm/s

Before execution:



After execution: The cylinder behavior is shown in the figure below.



The movement consists of three phases:

 Phase 1: Movement to middle position

- Position: The cylinder moves from the actual position of 3 mm to the middle position of 12.5 mm.
- Velocity: The cylinder accelerates from 0 mm/s to the configured approach velocity of 6 mm/s.
- Force: The press force remains at 0 N during this phase.

 Phase 2: Approach to target force

- Position: The cylinder moves from the middle position of 12.5 mm to position x, where the actual force reaches the target force.
- Velocity: The cylinder decelerates from the approach velocity of 6 mm/s to the configured Force Control velocity of 3 mm/s.
- Force: After contact with the spring, the force increases from 0 N to the target force of 280 N.

 Phase 3: Hold target force

- Position: The cylinder remains at position x for the configured holding time of 3 seconds.
- Velocity: The cylinder decelerates from 3 mm/s to 0 mm/s.
- Force: The PI controller maintains the target force of 280 N for 3 seconds by moving the cylinder within the configured force tolerance.

Conclusion: Velocity switch

The velocity switch allows the cylinder to move quickly at the beginning of the process and then reduce speed at a defined position. This can reduce the overall cycle time.

Without the velocity switch, only one velocity value is used. If this value is too high, the risk of overshooting increases. If it is too low, the cycle time increases.

Example 3: Time limit exceeded

This example shows how the system responds when the configured time limit is exceeded.

1. Open control settings and configure the following parameters. Click Default parameters to apply the following values automatically:

K_v: 0.950000

K_p: 1.000000

K_i: 1.000000 (active)

2. Open velocity switch and configure the following setting.

Clear the Activate checkbox.

3. Open limits and set the following values.

Max. position : 25 mm

Max. force : 300 N

Time limit : 3 000 ms

Force tolerance : 3%

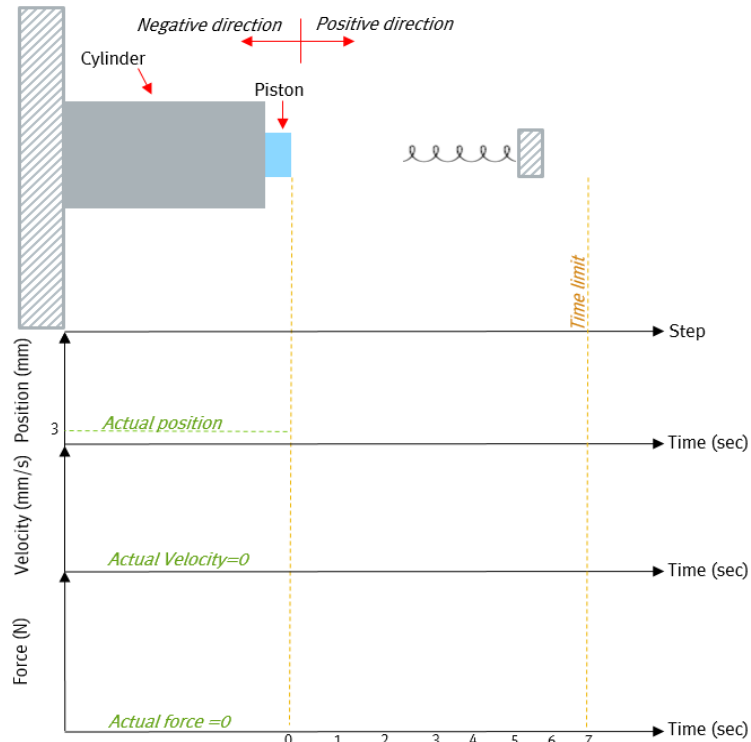
4. Set the following process parameters:

Target force : 280 N

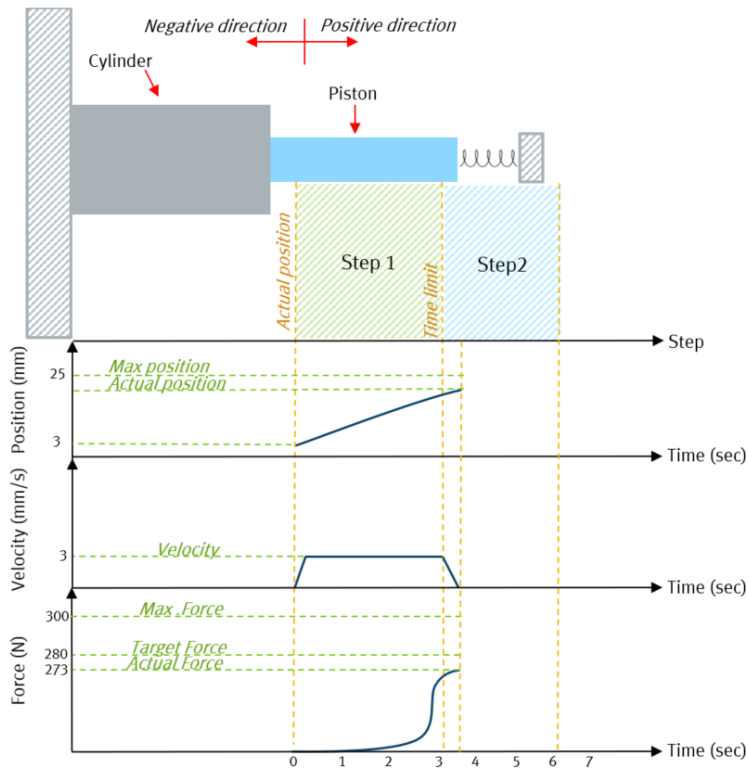
Holding time : 3 000 ms

Velocity : 3 mm/s

Before execution:



After execution: The cylinder moves from the actual position of 7 mm in the positive direction. When the configured time limit of 3000 ms is exceeded, the process is terminated at 273 N before the target force of 280 N is reached.



6.2.4 Smart Force Control (SFC)

Smart Force Control is an alternative to Force Control with a simplified user interface. The system calculates the PI closed-loop control parameters automatically. The underlying control process is the same as for Force Control.

Configuration

The configuration interface for Smart Force Control (SFC) includes the following elements:

- Function:** A dropdown menu set to "Smart force control".
- 1** ☐ **Record**: A checkbox to enable recording.
- 2** **Limits**: A button to open the limits configuration window.
- 3** **Target force**: A text input field showing "0.00 N" with a dropdown arrow.
- 4** **Target reached criteria**: A button to configure target reached criteria.
- 5** **Velocity**: A text input field showing "0.00 mm/s" with a dropdown arrow.
- 6** ☐ **Expert options**: A checkbox to enable expert options.
- Control settings**: A button to access control settings.
- Velocity switch**: A button to toggle velocity control.

1. **Record:** Activate this option to record the force / position curve while the function is executed.
2. **Limits:** If a configured limit is exceeded, the selected failure reaction is executed or the process is interrupted.

The Limits configuration window contains the following settings:

- Max. position:** 0.00 mm
- Max. force:** 0.00 N
- Time limit:** 0 ms
- Close**: A button to close the window.

- **Maximum position [mm]:** Interrupts the process if the absolute maximum position is exceeded.
- **Maximum force [N]:** Interrupts the process if the maximum force is exceeded.
- **Time limit [ms]:** Defines the maximum duration of force control. If this time is exceeded, force control is interrupted.

3. **Target force:** Defines the force to be applied.

Target force	0.00 N	▼
	Value	
	Variable	
	Teach	

Enter the target force using one of the following methods:

- **Value:** Enter a fixed value with the keyboard. To change it later, edit the program.
- **Variable:** Set the value in the sequencer or through the host PLC. Adjust it before each cycle without editing the program.
- **Teach:** Use the current actual force as the target force.

4. **Target criteria:** Define when the target force is considered reached and when the function ends.

Target reached criteria	
Timer	
- Starts when force is in tolerance - Step finishes after holding time	
Force tolerance - Standard value 2 %	2.00 % ▼
Holding time	0 ms ▼
OR digital input "force control continue"	
Close	

- **Force tolerance [%]:** Defines the maximum permitted deviation from the target force. The holding time starts when the actual force enters this tolerance range. Leaving the range afterward does not affect the holding time.
- **Holding time:** Defines how long the target force is maintained.

Enter the holding time using one of the following methods:

- **Value:** Enter a fixed value with the keyboard. To change it later, edit the program.
- **Variable:** Set the value in the sequencer or through the host PLC. Adjust it before each cycle without editing the program.
- **Force Control Continue:** Set the digital input to TRUE to end the function immediately and continue with the next sequencer step. This applies even if the target force has not been reached or the holding time has not elapsed.

5. **Velocity:** Defines the maximum velocity during the pressing process ($v_{\max}$).

Velocity	0.00 mm/s	▼
	Value	
	Variable	

Enter the velocity using one of the following methods:

- **Value:** Enter a fixed value with the keyboard. To change it later, edit the program.
- **Variable:** Set the value in the sequencer or through the host PLC. Adjust it before each cycle without editing the program.

6. **Expert options:** Select the **Expert options** checkbox to access the following settings:

- Control settings
- Velocity switch

Expert options

Control settings

Velocity switch

1. **Control settings:** Configure the Speed Intensity and K_p values for the force controller.

Control settings

Speed Intensity

0.00 % ▼

Kp

1.000000 ▼

▼

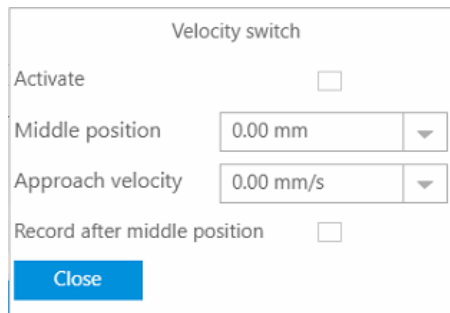
Close

- **Speed Intensity [%]:** Controls how quickly and strongly the force increases as the difference between the target and actual force is reduced.
 - Range: 0 – 100%
 - Value too high:
 - The axis moves aggressively into the workpiece to reduce the force difference.
 - Force overshoot may occur and can trigger peak-force or following-error faults in the CMMT.
 - Value too low:
 - The press contacts the workpiece, but builds up the target force slowly.
 - The time limit may be exceeded before the target force is reached.
- **K_p – proportional gain:** Provides velocity-dependent damping during the approach.
 - Range: 0 – 100%
 - High value (for example, 70 – 100%):
 - Strongly reduces the velocity as soon as the force begins to increase.
 - Prevents the ram from contacting a rigid workpiece at full speed.
 - Produces gentle, well-damped contact with minimal overshoot, but may increase the cycle time.

- Low value (for example, 0 – 20%):
 - Provides little velocity damping during contact.
 - Allows the axis to maintain a high velocity until contact. With rigid workpieces, this can cause impact shocks and force overshoot.

2. **Velocity switch:** Activate this option to use two velocity levels: $v_{\max_2}$ and $v_{\max}$.

- $v_{\max_2}$ / Approach velocity: Defines the velocity from the start of Smart Force Control to the middle position.
- $v_{\max}$ / Velocity: Defines the velocity from the middle position to the point at which force control takes effect.



The image shows a 'Velocity switch' configuration dialog box. It contains the following elements:

- Activate:** A checkbox that is currently unchecked.
- Middle position:** A text input field showing '0.00 mm' with a dropdown arrow to its right.
- Approach velocity:** A text input field showing '0.00 mm/s' with a dropdown arrow to its right.
- Record after middle position:** A checkbox that is currently unchecked.
- Close:** A blue button at the bottom left of the dialog.

- **Activate:** Enables or disables the velocity switch.
- **Middle position [mm]:** Defines the position where the velocity changes from $v_{\max_2}$ to $v_{\max}$.
- **Approach velocity [mm/s]:** Defines the velocity from the start of Smart Force Control to the middle position.
- **Record after middle position:** Starts curve recording only after the cylinder reaches the middle position.

6.2.5 Comparison of Force Functions

The following comparison highlights the key differences between Force Mode, Advanced Force Mode, and Force Control:

- **Force Mode:** Moves the cylinder in the positive direction only. The step is completed when the target force is reached, and the sequencer continues with the next function. The movement stops after the target force is reached.
- **Advanced Force Mode:** Moves the cylinder in both positive and negative directions. The step is completed when the target force is reached, and the sequencer continues with the next function. An internal braking ramp reduces the velocity before the target force is reached.
- **Force Control:** Moves the cylinder in both positive and negative directions. After the target force is reached, a PI controller maintains it for the configured holding time.
- **Smart Force Control** is an alternative to Force Control which provides a simplified configuration interface and automatically calculates the control parameters based on application-specific inputs.

6.3 Digital signal mode (DSM)

Digital Signal Mode reads a digital input while the cylinder is moving. The cylinder moves at the configured velocity until the input becomes TRUE or the configured maximum position or distance is reached.

- **Input becomes TRUE:** If the digital input becomes TRUE before the cylinder reaches the maximum position or distance, the step is completed successfully and the sequencer continues with the next step.
- **Limit reached while input remains FALSE:** If the cylinder reaches the maximum position or distance before the digital input becomes TRUE, the process is aborted and the press status changes to NOK.

Use this function when an external sensor connected to a PLC input must be monitored during cylinder movement, for example a distance sensor.

Configuration

Function	Digital signal mode ▼	
1	☐	Record
2	Position method	
	☒	Absolute
	☐	Relative
3	Digital signal	DI 1
4	Maximum position	25.00 mm ▼
5	Velocity	5.00 mm/s ▼

1. **Record:** Activate this option to record the force/position curve generated by the cylinder movement while this function is executed.
2. **Position method:** Select how the cylinder movement is referenced.
 - **Absolute:** Move the cylinder to an absolute target position referenced to the homing position.
 - **Relative:** Move the cylinder by a defined distance referenced to its current position.
3. **Digital signal:** Select the digital input to be monitored.
 Select one of the following 16 inputs:
 - **Hardware inputs:** 8 inputs on the CECC-X-M1-YS press controller (X2.0 to X2.7).
 - **Virtual inputs:** 8 inputs provided through the host interface of the higher-level controller (digital input bits 9 to 16).

4. **Maximum position [mm] / Maximum distance [mm]:** Defines the movement limit. The process is interrupted if the configured position or distance is exceeded.

Function: Digital signal mode

☐ Record

Position method: ☒ Absolute ☐ Relative

Digital signal: DI 1

Maximum position: 0.00 mm

Velocity: (dropdown menu open showing Value, Variable, Teach)

Buttons: Cancel, Save, Next

Enter the value using one of the following methods:

- **Value:** Enter a fixed value with the keyboard. To change it later, edit the program.
- **Variable:** Set the value in the sequencer or through the host PLC. Adjust it before each cycle without editing the program. For more information, see “Variable” on page 58.
- **Teach:** Use the current actual position as the target position or target distance.

5. **Velocity [mm/s]:** Defines the cylinder velocity from the start of Digital Signal Mode until the maximum position (absolute) or maximum distance (relative) is reached.

Function: Digital signal mode

☐ Record

Position method: ☒ Absolute ☐ Relative

Digital signal: DI 1

Maximum position: 0.00 mm

Velocity: 0.00 mm/s

Buttons: Cancel, Save, Next

Enter the value using one of the following methods:

- **Value:** Enter a fixed value with the keyboard. To change it later, edit the program.
- **Variable:** Set the value in the sequencer or through the host PLC. Adjust it before each cycle without editing the program. For more information, see “Variable” on page 58.

Example

A servo press compresses a spring using the following two sequencer functions:

1. Digital Signal Mode: Monitors the workpiece position using a position sensor connected to controller input X2.0.
2. Force Mode: Applies the configured force after the sensor signal is detected.

The following examples show the difference between the Absolute and Relative position methods in Digital Signal Mode.

Example 1: Absolute position method

1. Add Digital Signal Mode to the sequencer and configure these values:

Position method : Absolute
 Digital signal : DI 1 (X2.0)
 Maximum position : 20 mm
 Velocity : 5 mm/s

Function: Digital signal mode

☐ Record

Position method: ☒ Absolute ☐ Relative

Digital signal: DI 1

Maximum position: 20.00 mm

Velocity: 5.00 mm/s

2. Add Force Mode and configure these values:

Position method : Absolute
 Target force : 200 N
 Maximum position : 27 mm
 Velocity : 5 mm/s

Function: Force mode

☐ Record

Position method: ☒ Absolute ☐ Relative

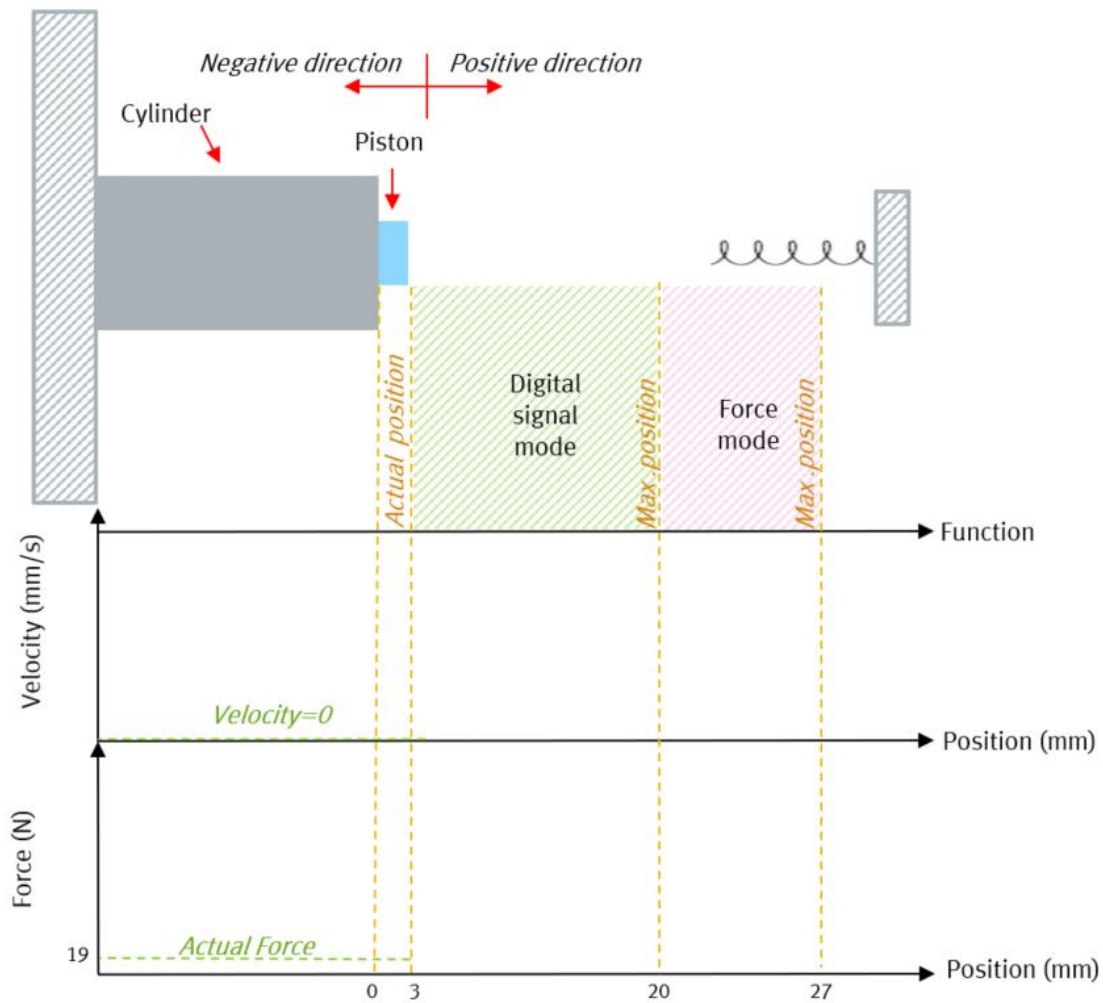
Target force: 200.00 N

Maximum position: 27.00 mm

Velocity: 5.00 mm/s

Initial conditions:

- Actual position: 3 mm
- Velocity: 0 mm/s



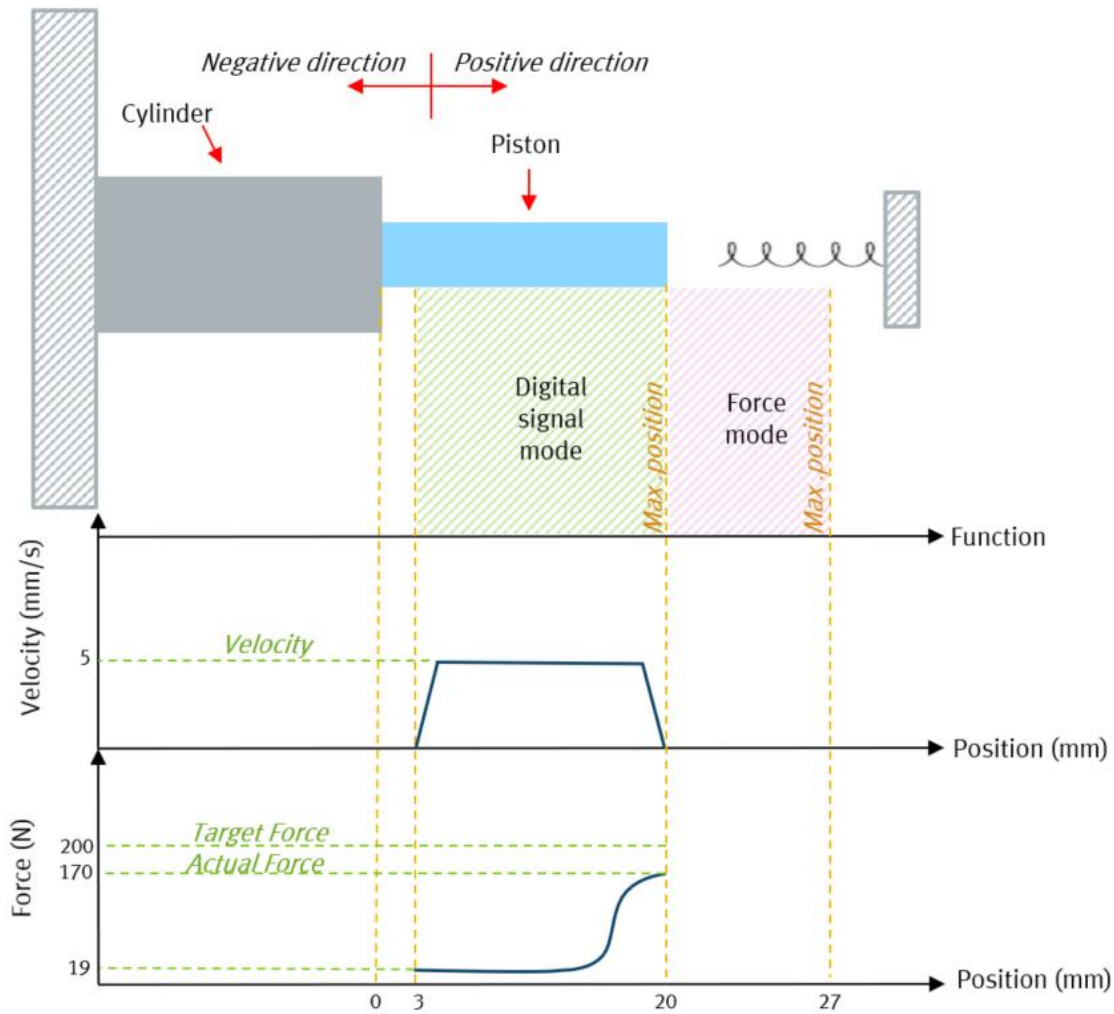
Possible results:

The system response depends on the signal state at controller input X2.0.

Case 1 — Input remains FALSE: The cylinder moves toward the maximum absolute position. Because no sensor signal is received at X2.0, the cylinder decelerates and stops at 20 mm. Force Mode is not executed.

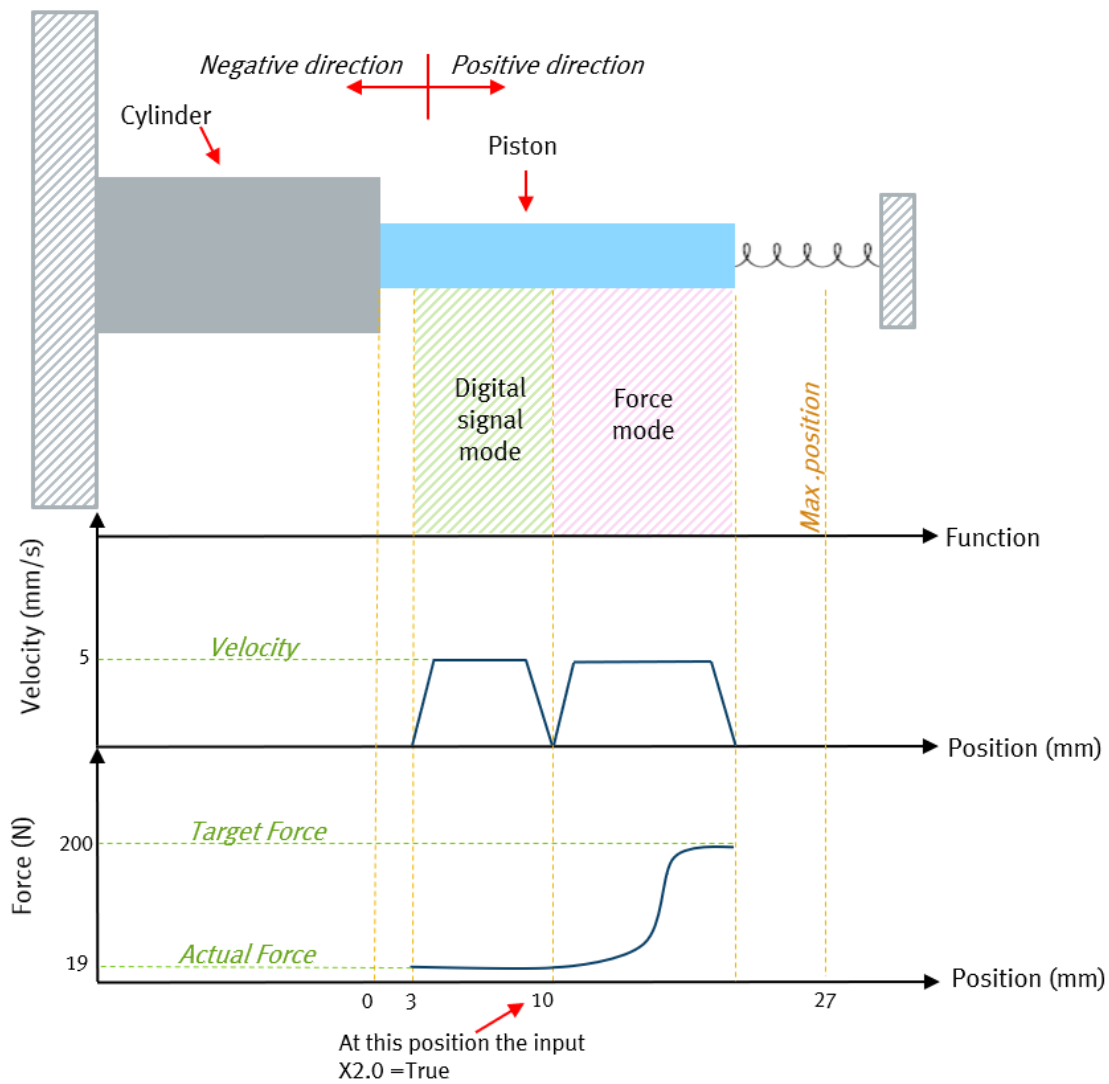
The process is aborted at this step with a NOK result.

The following figure shows the cylinder movement for this case.



Case 2 — Input becomes TRUE: The cylinder moves toward the maximum absolute position. When input X2.0 becomes TRUE at 10 mm, Digital Signal Mode is completed and Force Mode starts.

The following figure shows the cylinder movement and transition to Force Mode.



Example 2: Relative position method

1. Add Digital Signal Mode to the sequencer and configure these values:

Position method : Relative
 Digital signal : DI 1 (X2.0)
 Maximum distance : 20 mm
 Velocity : 5 mm/s

Function: Digital signal mode

☐ Record

Position method:
☐ Absolute
☒ Relative

Digital signal: DI 1

Maximum distance: 20.00 mm

Velocity: 5.00 mm/s

2. Add Force Mode and configure these values:

Position method : Absolute
 Target force : 200 N
 Maximum position : 27 mm
 Velocity : 5 mm/s

Function: Force mode

☐ Record

Position method:
☒ Absolute
☐ Relative

Target force: 200.00 N

Maximum position: 27.00 mm

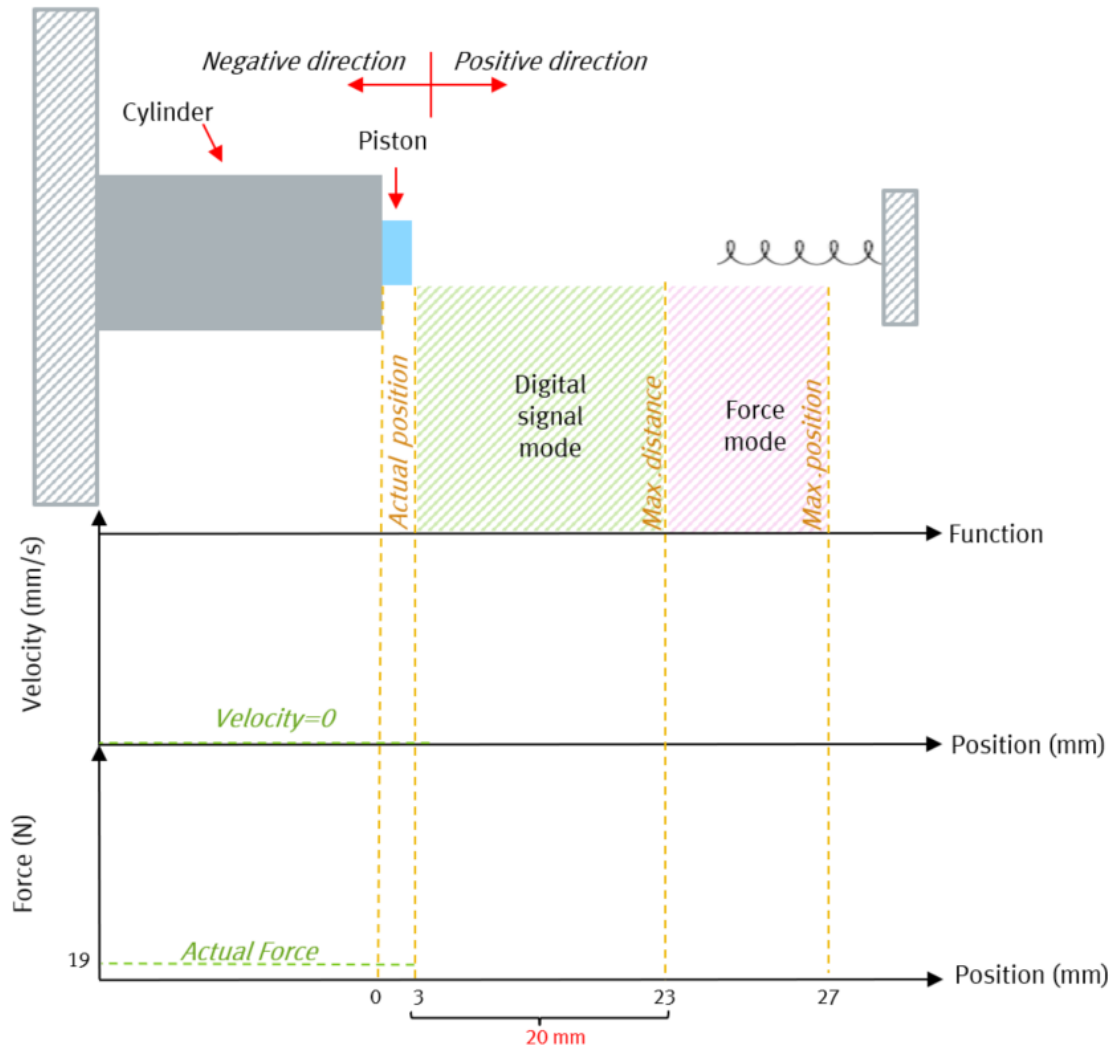
Velocity: 5.00 mm/s

The following figures show the YJKP system behavior when Digital Signal Mode uses the relative position method.

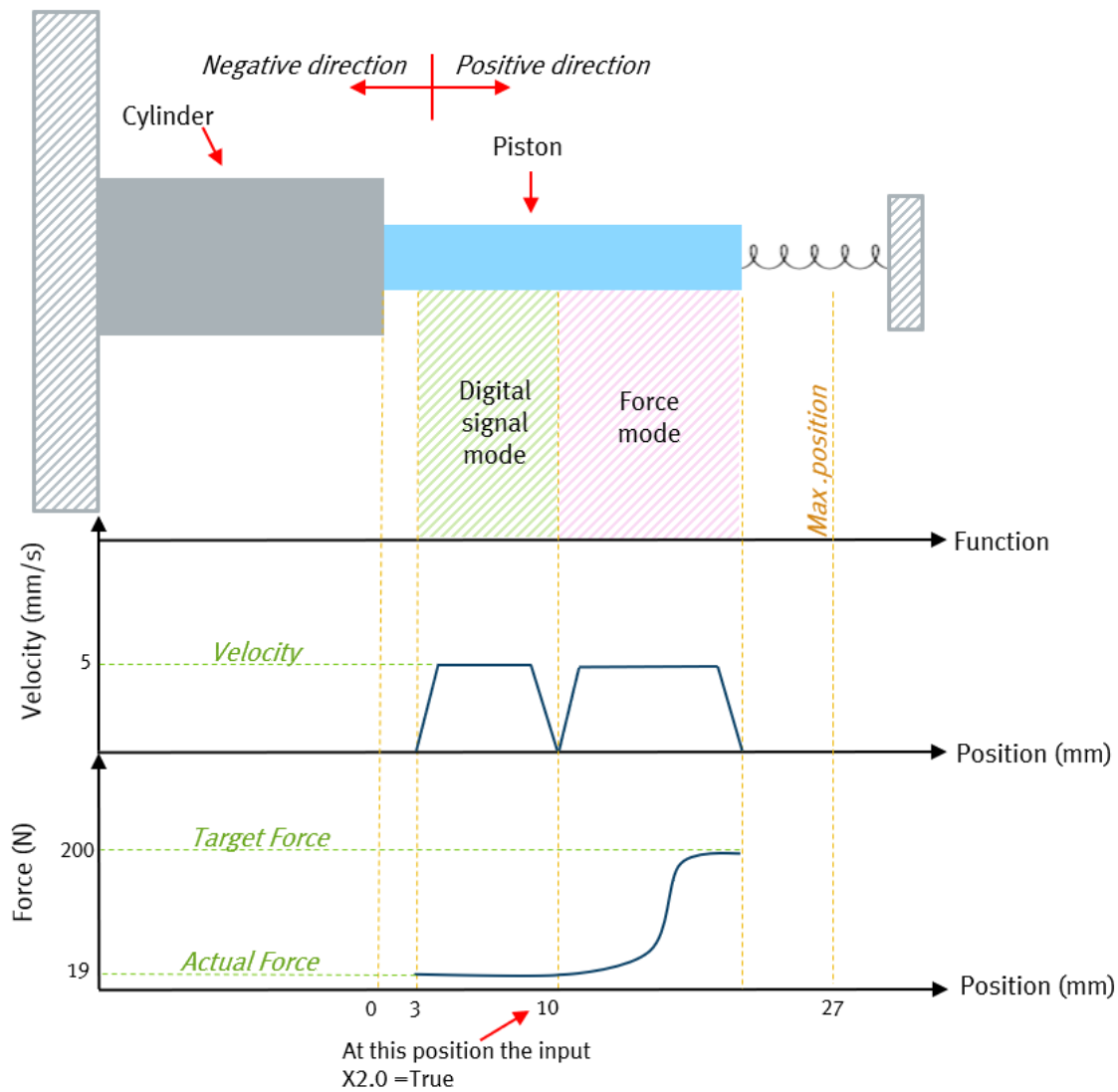
Initial conditions

- Actual position: 3 mm
- Velocity: 0 mm/s

Actual force: 19 N



Case 2 — Input becomes TRUE: The cylinder moves toward the maximum relative distance. When input X2.0 becomes TRUE at the absolute position of 10 mm, Digital Signal Mode is completed and Force Mode starts.



6.4 Delay Time (DT)

Delay time pauses the sequencer for a defined period before the next step is executed.

Function	Delay time ▼
Time	0 ms ▼

Example

In this example, delay time pauses the system for 3 seconds before position mode is executed.

1. Insert a delay time function and set the following value:

Time: 3 000 ms

Function	Delay time ▼
Time	3000 ms ▼

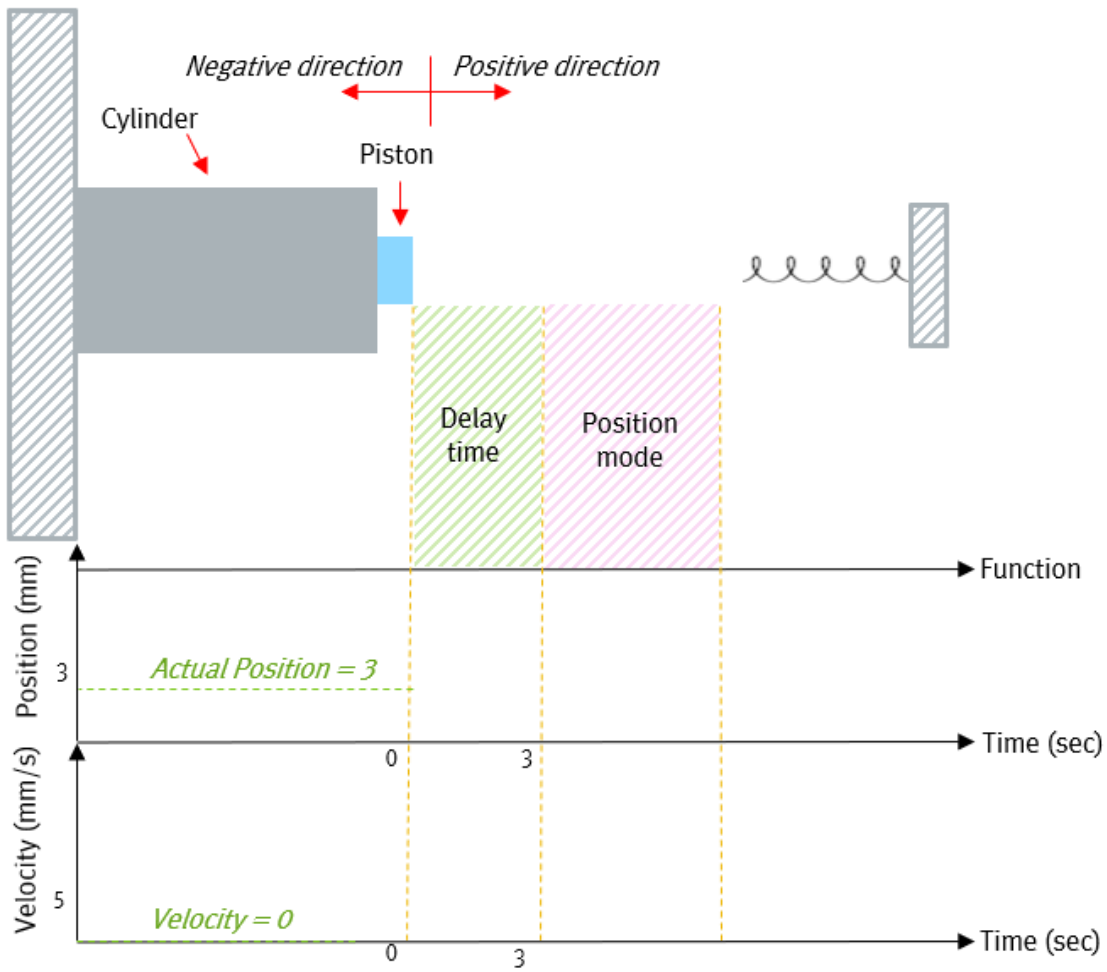
2. Insert a Position Mode function and set the following values:

Position method : Absolute
 Target position : 10 mm
 Maximum force : 30 N
 Velocity : 5 mm/s

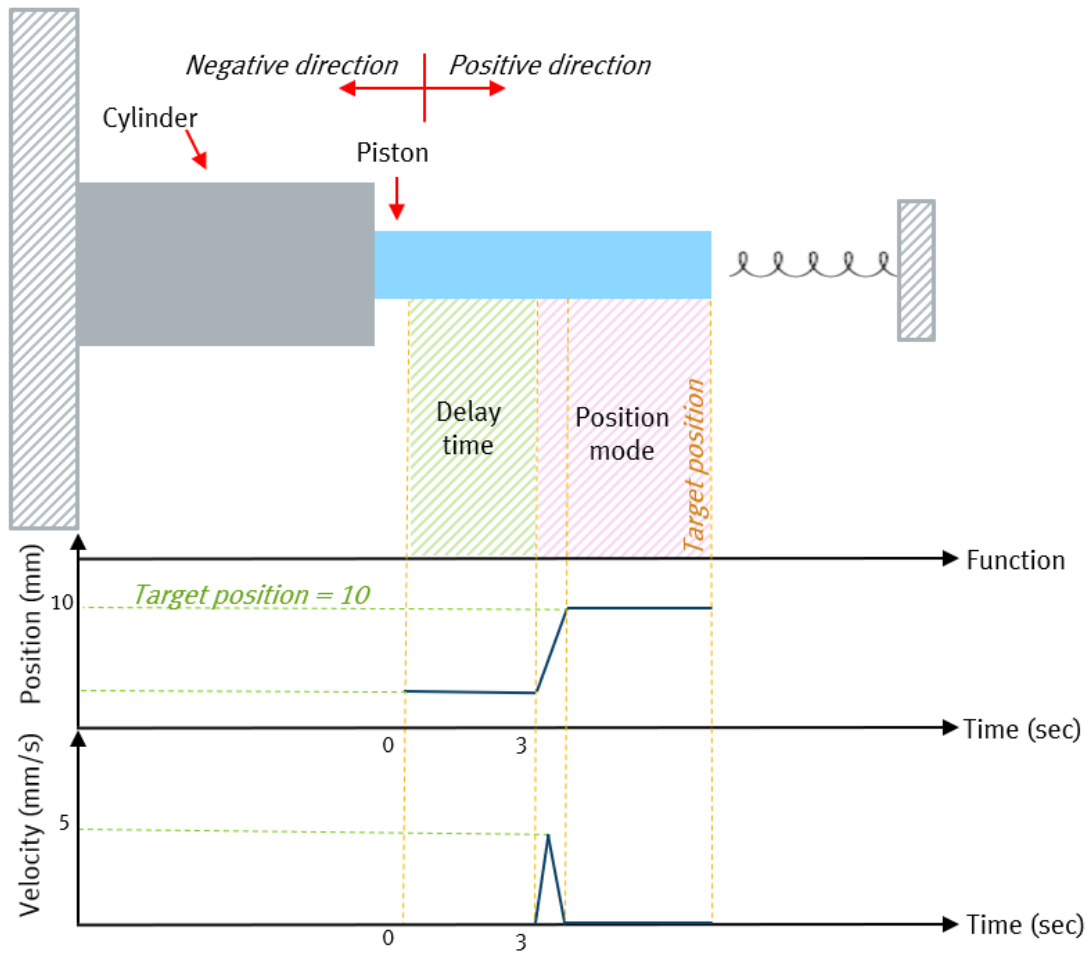
Function	Position mode ▼
☐ Record	
Position method	
☒ Absolute	☐ Relative
Target position	10.00 mm ▼
Maximum force	30.00 N ▼
Velocity	5.00 mm/s ▼

The following figures show the position and velocity curves before and after program execution.

Before execution:



After execution: The system remains at the 3 mm position for 3 seconds. It then moves to the 10 mm target position.



6.5 Tare

The Tare function adjusts the displayed actual force value by setting a new zero reference.

After the YJKP system is installed, the actual force displayed in WebVisu may not be 0 N. This offset depends on the installation orientation and the weight of the mechanical components attached to the press. Before applying a defined pressing force, use the Tare function to reset the actual force value.



Released

Actual force
18.91 N

Actual position
-0.02 mm

Actual velocity
0.00 mm/s

Tare
☐ Tare

Offset

Motion:
☐ Absolute
☐ Relative
☒ Jog

Velocity

Configuration



Function **Tare**

☐ Tare

Offset

- **Tare:** Activate or deactivate the function.
- **Offset:** Enter the value to be added to the actual force value.

Example

This example program contains two functions: Position Mode and Tare.

1. Position Mode

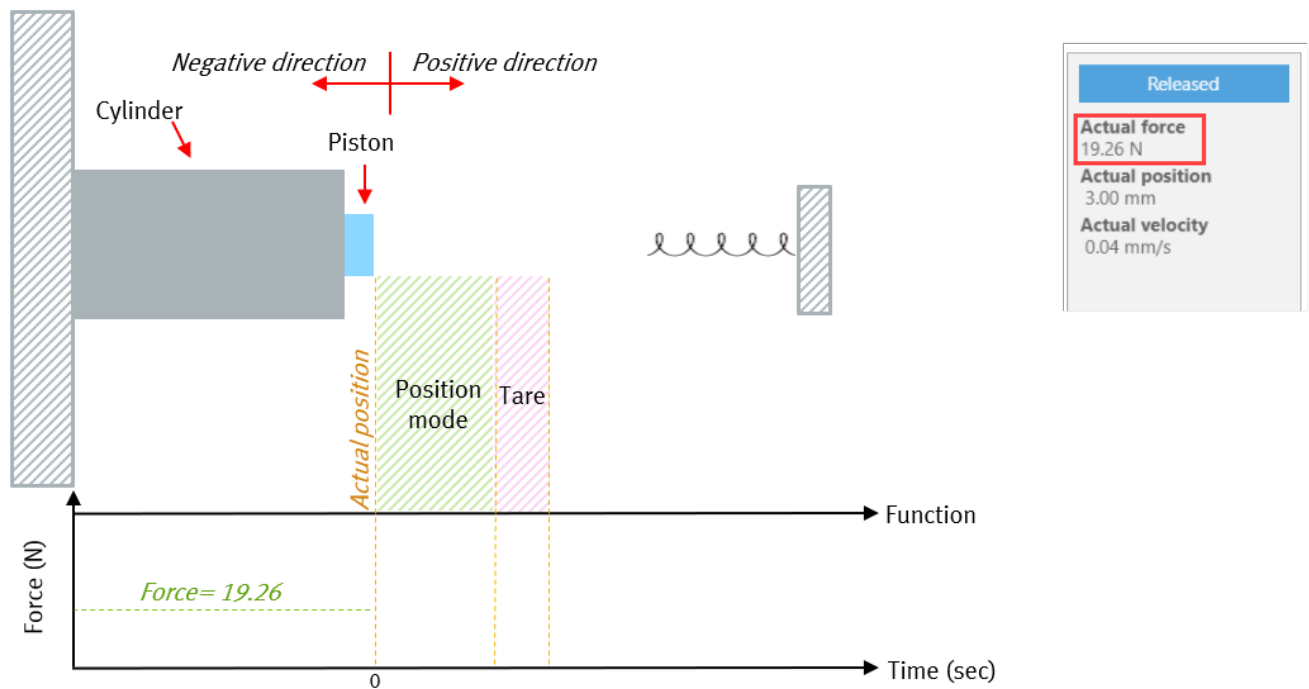
Position method : Absolute
 Target position : 10 mm
 Maximum force : 30 N
 Velocity : 50 mm/s

2. Tare

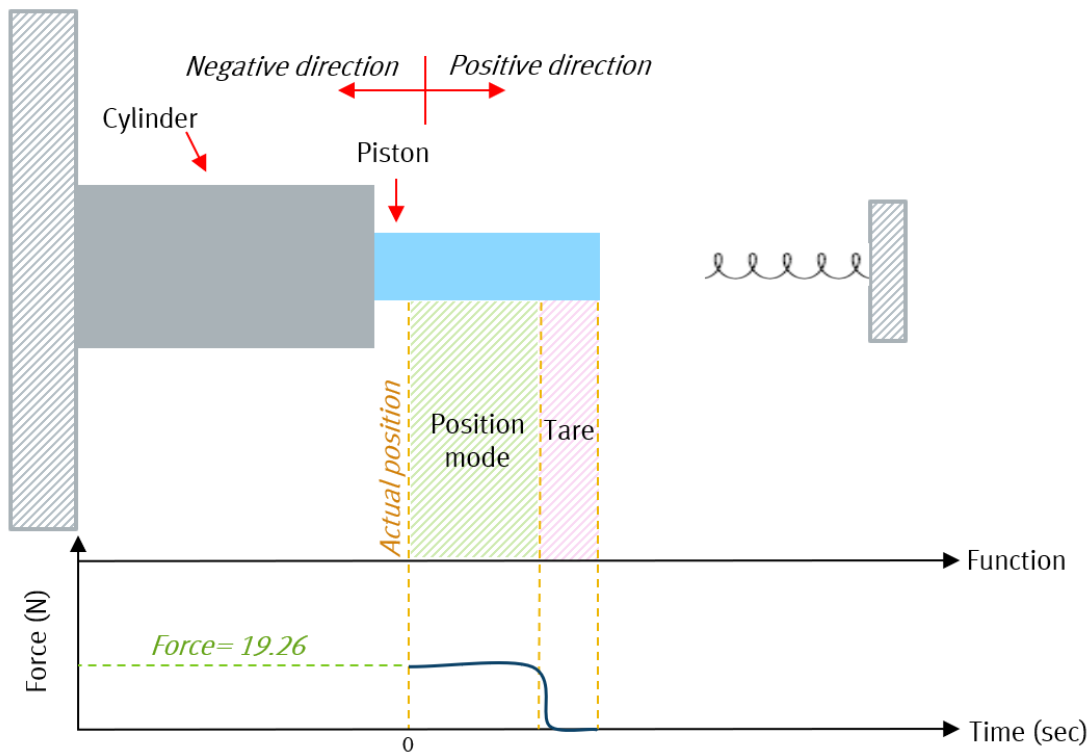
Tare : Active
 Offset : 0 N

Before execution: The actual force is 19.26 N. This value varies depending on the tools, workpiece, and other application-specific loads.

The following figure shows the cylinder state before program execution.



After execution



During Position Mode, the force curve remains at 19.26 N. When the Tare function is executed, the displayed force is reset to 0 N, which is the configured offset.



Important

Use the Tare function with caution. If it is executed in an undefined system state, the displayed force value becomes incorrect and can invalidate the press-cycle results.

Example: Tare as the first sequencer step

The following cases illustrate the effect of the system state when Tare is executed.

Case 1 — Defined state: The press is at its start position with no applied process force. An actual force of 20 N is tared to 0 N, creating a 20 N correction. The process can continue.

Case 2 — Undefined state:

The press still has an applied force because the previous cycle ended incorrectly. If the actual force is 200 N when Tare is executed, the displayed value is reset to 0 N even though the mechanical force remains. This creates a 200 N difference between the real force and the software value.

Recommendation: Execute Tare only at a sequencer step where a defined, force-free system state is guaranteed.

6.6 Read Input (RI)

Read Input uses a controller input as a condition for continuing or pausing the program.

Use this function to verify an external condition before the pressing process starts. For example, a position sensor connected to a controller input can confirm that a part is in the correct position.

Add Read Input to the pressing sequence and define the required input state. When the sequencer reaches this step, it reads the selected input:

- If the input state matches the configured value, the program continues.
- If the input state does not match the configured value, the program pauses until the required signal is present.

Function: Read input

Input: DI 1

=

FALSE

Configuration

Function: Read input

Input: DI 1

=

FALSE

1. Select the controller input to be monitored.
2. Set the input state that must be present when the function is executed.



Note:

Up to 16 controller inputs are available:

- 8 hardware inputs on the CECC-X-M1 press controller: X2.0 to X2.7.
DI 1 to DI 8 correspond to X2.0 to X2.7.
- 8 virtual inputs provided through the host interface of the higher-level controller: digital input bits 9 to 16.

6.7 Set Output (SO)

Set Output sets a selected controller output to TRUE or FALSE when the sequencer reaches this step.

Use this function to control external devices, such as pneumatic valves. For example, a valve can move a workpiece away from the pressing position after the pressing process is complete.

Function: Set output

Output: DO 1

=

FALSE

Configuration

Function: Set output

Output: DO 1

=

FALSE

1. Select the controller output to be controlled.
2. Set the output value to TRUE or FALSE.



Note:

Up to 12 controller outputs are available:

- 4 hardware outputs on the CECC-X-M1-YS press controller: X4.0 to X4.3.
DO 1 to DO 4 correspond to X4.0 to X4.3.
- 8 virtual outputs provided through the host interface of the higher-level controller: digital output bits 9 to 16.

6.8 Variable (VAR)

Use this function to assign a value to a variable. The variable can then be used as a parameter in other sequencer functions.

The image shows a configuration window for the 'Variable' function. The 'Function' dropdown menu is set to 'Variable'. Below it, the 'Variable' field contains 'Variable 1'. An equals sign '=' is positioned between the variable field and the value field. The value field contains '0.00'. Red boxes highlight the 'Variable' dropdown and the 'Variable 1' text.

Configuration

The image shows the same configuration window as before, but with annotations. The 'Variable' field now contains 'Variable 1' followed by a blue circle with the number '1'. The value field now contains '5.00' followed by a blue circle with the number '2'. Red boxes highlight the 'Variable 1 1' text and the '5.00 2' text.

1. Select the variable number to be assigned.
2. Enter the value to be stored in the selected variable.

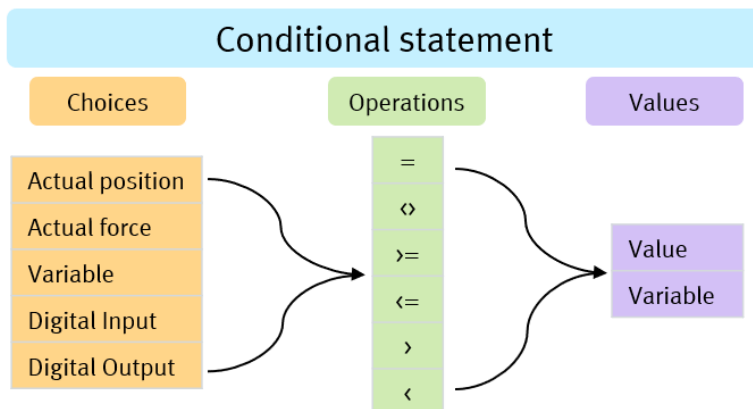
6.9 Jump (JP)

Use the Jump function to continue the sequencer at a different step when a defined condition is met.

Configuration

1. Condition: Define the condition that must be met for the jump to be executed.

Use the available operands and operators in WebVisu to create the condition, as shown in the following figure.



2. Jump target if the condition is TRUE: Select where the sequencer continues when the condition is met.
 - Step: Continue at the specified step number.
 - Next Step: Continue with the next sequencer step.
 - End: Continue with the final sequencer step.

3. Jump target if the condition is FALSE: Activate Else to define an alternative jump target. The following settings become available:

Function: **Jump**

IF condition: Actual position = 0.00 mm

THEN jump to: Step 1

☒ Activate ELSE

ELSE Jump To: Step 1, Step, Next step, End

Buttons: Cancel, Save, Next

- Step: Continue at the specified step number.
- Next Step: Continue with the next sequencer step.
- End: Continue with the final sequencer step.

Example

This YJKP sequencer contains three functions:

1. Position Mode
2. Jump: Configure the following values:
 - IF condition: Actual position = 10.00 mm
 - THEN jump to: Next Step
 - Activate Else: Enabled
 - ELSE jump to: Step 1
3. Force Control

Step 1/4: Configure sequencer

No.	Function	Name
1	PM	POSITION_MODE
2	JR	JUMP
3	FC	FORCE_CONTROL
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Insert step

Delete step

Copy step

Insert copied step

Configure failure reaction

Function Jump

IF condition

Actual position ▼ = ▼ 10.00 mm ▼

THEN jump to Next step ▼

☒ Activate ELSE

ELSE Jump To Step 1 ▼

Program behavior:

1. When the Jump step is executed, the system checks whether the actual position equals 10.00 mm.
2. If the condition is TRUE, the sequencer continues with the next step, Force Control.
3. If the condition is FALSE, it returns to Step 1, Position Mode.