Application Note

FESTO

YJKP - Quick Start Guide EVO3 and EVO3+

Quick startup of the servo press kit YJKP:

- Scope of delivery
- Mechanical commissioning
- Electric commissioning
- Basic software steps

YJKP

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1 Components/Software used

Type/Name	Version Software/Firmware	Date of manufacture
Servo press kit YJKP	general	--
Application software YJKP (GSAY-A4-F0-Z4-1.1.1)	V1.3.x	--
Firmware controller (CECC-X)	V3.4.6 + V3.8.14	--
Firmware motor controller (CMMP-AS)	V4.0.1501.2.4	--

Table 1.1: 1 Components/Software used

1.1 Application description

This application note shows the necessary mechanical, electrical and software steps to get the YJKP-kit to operational status. After finishing these steps, you can start with configuration of your specific press process.
It's valid for hardware with motor controller CMMP-AS and motor EMMS-AS as well as motor controller CMMT-AS and motor EMMT-AS. The chapters are divided.
This example is based on a IO-communication with WebVisu-program selection. Using any different settings, please refer to the manual and further application notes.
All local links to any documents are not updated in the same cycle, like the online documents. Please check, if there are any updated files.
All documents for the parts of the scope of delivery can be found in the support portal under the heading of "YJKP".

Support portal: www.festo.com

2 Scope of delivery

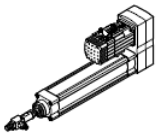
2.1 What is included?

Inside this servo press kit, the following parts are included:

- Electric cylinder ESBF
- Force sensor SKDA
- Motor EMMS-AS (single-/multi-turn)
- Axial/parallel mounting EAMM
- Motor controller CMMP
- Servo press controller CECC-X
- Connecting cable motor controller NEBC
- Connecting cable CANopen NEBC
- Motor cable NEBM
- Encoder cable NEBM
- MicroSD-card

Included in the scope of delivery of the servo press kit

Electric drive



- With force sensor
- Connecting cable to controller (cable lengths of 5, 10, 15 m)

Optionally with:

- Motors with absolute displacement encoder:
  - Singleturn
  - Multiturn
- Motors with/without holding brake
- Axial or parallel motor attachment (preassembled if required)

Motor controller

- For servo motor

Controller

- With special software
- With connecting cable to motor controller

Motor cable

- Pre-assembled cable

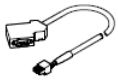
Encoder cable

- Pre-assembled cable

Connecting cable

- Preassembled cable for commissioning the controller

Connecting cable



- Preassembled cable for CANopen interface

Connecting cable

- Screened cable for force sensor

Micro SD memory card

- 32 GB micro SD card for storing the created press programs and log files

2.2 What needs to be provided by the customer?

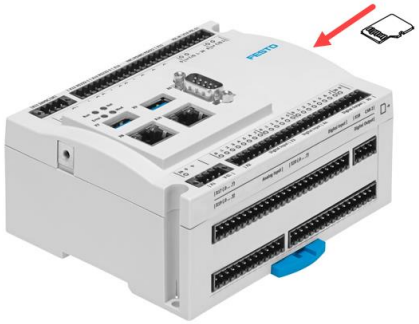
Beside the included parts, you will need some additional ones, which partially are only necessary for the commissioning.

- Switch
- PC
- Standard patch cables (CMMP -› switch; CECC-X -› switch; PC -› switch)

3 Mechanical commissioning

3.1 MicroSD-card (important, because easy to lose)

The MicroSD-card is essential for the operation of the YJKP.
Plug the microSD-card in at the CECC-X. The slot is located on the side of the device.



3.2 Commissioning of actuator ESBF, motor EMMS and force sensor SKDA

3.2.1 SKDA

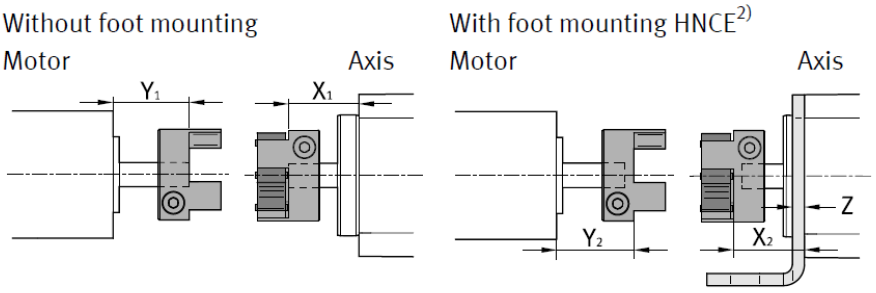
Mount the force sensor SKDA to the piston of the electric cylinder (detailed information in the support portal or here).
Important:
Tension and/or compression force is introduced via two axial threads. The supplied lock nuts must not come into contact with the deformation body.

Connect the cable NEBU to the sensor.

3.2.2 Electric cylinder ESBF to motor EMMS

The ESBF can be mounted to the EMMS axial or parallel.
Depending on the used mounting kit, you'll find detailed instruction in the support portal (search for the part number) or local using the following links.

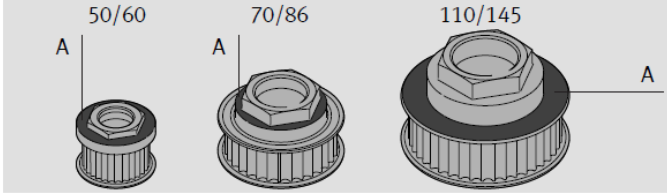
Axial kit:
Documentation
Please have a closer look especially on the alignment of the coupling hubs and their distances under point 6.

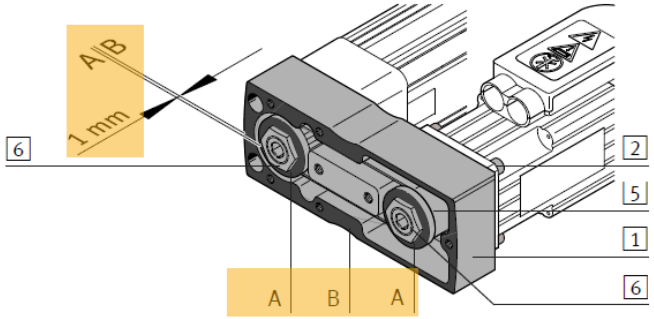


Parallel kit:
Documentation
Please have a closer look especially on the position of the toothed belt pulleys to the lower body part under point 7.

Information

The position of the surface (A) depends on the size.

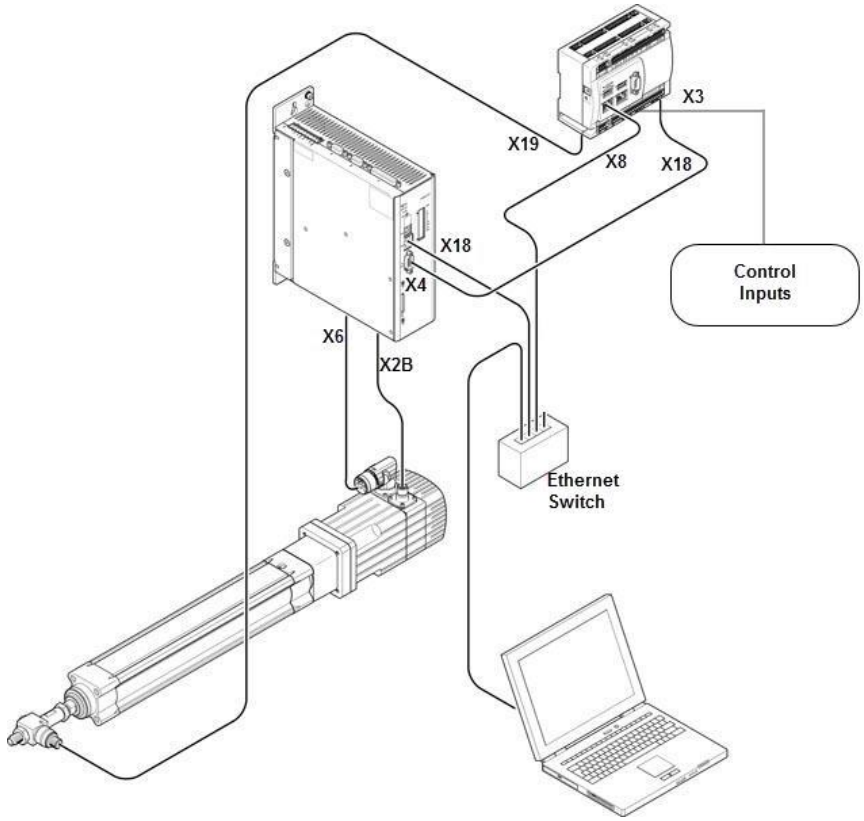




4 Electrical commissioning

4.1 Interconnection overview

The following image shows the connection between all used components.
Details are described in the next chapters.



➔ **Note:**

- Festo Configuration Tool (FCT) is not needed for the commissioning of the YJKP.

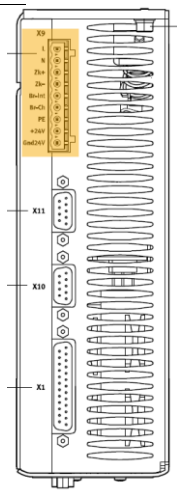
4.2 Electrical wiring of CMMP

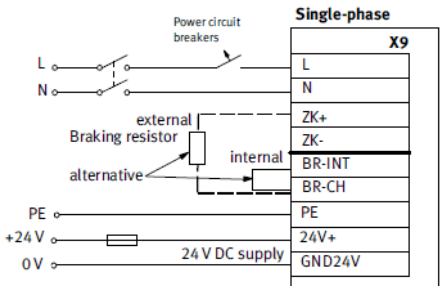
A complete mounting and installation description can be found in the support portal (search for the part number) or local using the following link.
CMMP-AS-M0-HW

4.2.1 Power supply [X9]

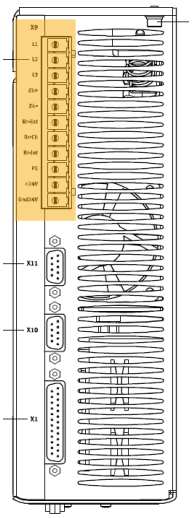
Connect the power supply in accordance with the following diagram and table.

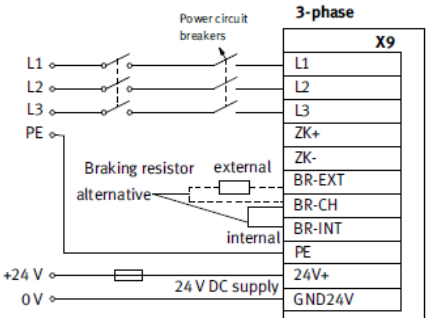
1-phase controller





3-phase controller

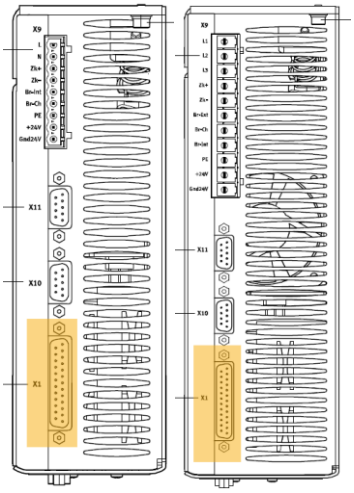


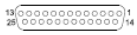


Force range	Power supply
Up to 4 kN	230 V AC
7 kN and more	3 x 230 V AC

4.2.2 Digital control interface [X1]

Connect the X1 interface according to the following table using the included cable from the scope of delivery NEBC-S1G25-P-_-LE6.



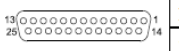
Motor controller CMMP-AS-...-M0			Provided by the customer	
Connection [X1]	Wire colour[1]	Usage	Type YJKP	Connection
	BN	Fieldbus: Offset node number bit 1	0.8/1.5/4	GND
			7/12/17	+24 V DC
	YE	Fieldbus: Offset node number bit 3	all	GND
	GY	Controller enable	all	+24 V DC
	WH	Fieldbus: Offset node number bit 0	0.8/1.5/7/12	GND
			4/17	+24 V DC
	GN	Fieldbus: Offset node number bit 2	all	GND
	PK	Output stage enable	all	+24 V DC

1) colour code in accordance with IEC 60575:1983-01

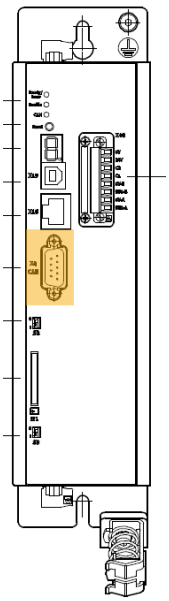
Important:
Reserved connections must not be used.
Marked connections please wire according to your type of YJKP.
All connections described with GND must be connected to GND. Don't leave them open.

➔ **Note:**

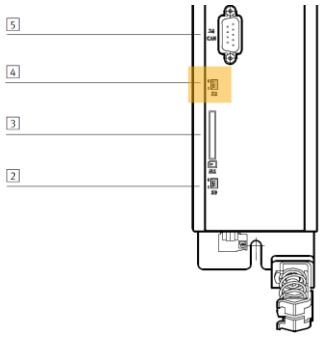
- If a customer-specific connecting cable is used, the following PINs must also be laid:

Motor controller CMMP-AS-...-M0				Provided by the customer
Connection [X1]	Pin	Wire colour[1]	Usage	Connection
	3, 11	-	-	GND
	16, 23	-	-	+24 V DC

4.2.3 CANopen interface [X4]
Connect the CMMP with the CECC-X [X18] using the included cable from the scope of delivery NEBC-S1WA9-P-_-BB-L2G4



Activate the resistor either on CMMP with S2 switch **or** on the slide switch of the CANopen cable.



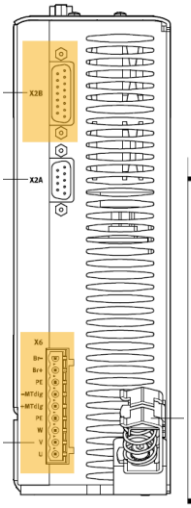
1 Digital I/O interface for control of the STO function [X40]
2 Activation of firmware download [S3]
3 SD-/MMC card slot [M1]
4 Activation of CANopen terminating resistor [S2]
5 CANopen interface [X4]
6 Ethernet interface [X18]
7 USB interface [X19]
8 7-segment display
9 Reset button
10 LEDs

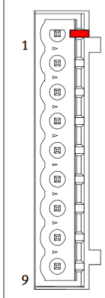
OR

Further information about the CANopen cable can be found in the documentation in the support portal or local under the following link:
NEBC-S1WA9-P-_-BB-L2G4

4.2.4 Motor cable [X6] and Encoder cable [X2B]

Use the motor and encoder cable included in the scope of delivery and connect the motor with the controller.



[X6]1)	Pin no.	Designation	Value	Specification
	1	Br-	0 V brake	Holding brake (motor), signal level dependent on switching status, high-side/low-side switch
	2	BR+	24 V brake	
	3	PE	PE	Cable shield for the holding brake and the temperature sensor (with Festo cables: n.c.)
	4	-MTdig	GND	Motor temperature sensor, N/C contact, N/O contact, PTC, KTY ...
	5	+MTdig	+3.3 V 5 mA	
	6	PE	PE	Protective earth conductor from the motor
	7	W	Technical data ➔ Tab. A.9	Connection of the three motor phases
	8	V		
	9	U		

Further information about the EMMS-AS and used cables can be found in the documentation in the support portal or local under the following links.

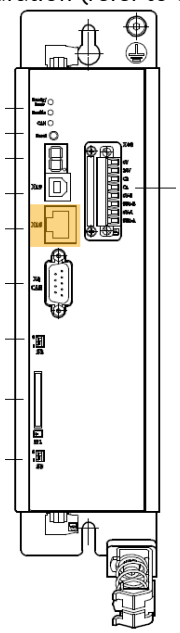
Motors:
EMMS-AS-55-M
EMMS-AS-70-S
EMMS-AS-100-S
EMMS-AS-100-H
EMMS-AS-140-L

Motorcable:
NEBM-T1G8-E-..-Q7N-LE8
NEBM-M23G8-E-..-Q9N-LE8

Encodercable:
NEBM-T1-G8-E-..-S1G15
NEBM-M12W8-E-..-S1G15

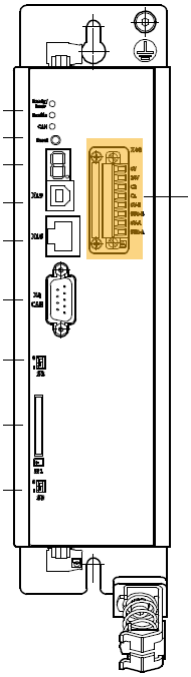
4.2.5 Ethernet interface [X18]

Connect the CMMP via a standard patch cable to your switch.
After downloading the hardware configuration (refer to chapter 6.3), this cable can be unplugged.



4.2.6 Digital IO interface for control of the STO function [X40]

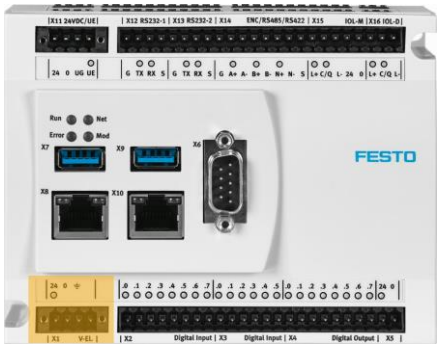
Wire the STO according to your safety level.
If no safety is used, the STO inputs need to be bridged. Otherwise the STO is active and the drive won't move.



[X40]1)	Pin no.	Designation	Value	Specification
	8	0 V	0 V	Reference potential for auxiliary power supply.
	7	24 V	+24 V DC	Output for auxiliary power supply (24 V DC logic supply of the motor controller brought out).
	6	C2	–	Feedback contact for the status "STO" on an external controller.
	5	C1		
	4	0V-B	0V	Reference potential for STO-B.
	3	STO-B	0 V / 24 V	Control port B for the function STO.
	2	0V-A	0 V	Reference potential for STO-A.
	1	STO-A	0V / 24V	Control port A for the function STO.

4.3 Electrical wiring of CECC-X

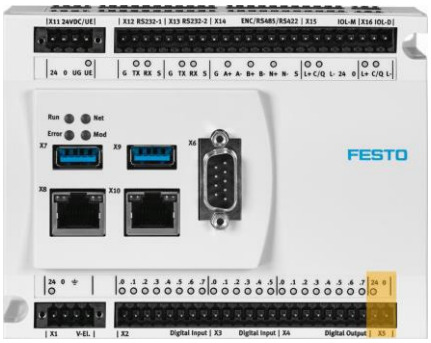
4.3.1 Power supply [X1] for device, digital and analogue inputs
Residual current for all supplied ports: max. 750 mA
of which intrinsic current consumption: max. 200 mA
Please connect it according to the following table.



Terminal	Connection	Usage
X1.1	24	24 V DC
X1.2	0	0 V DC
X1.3	⏚	Functional earth
X1.4	reserved	–

4.3.2 Power supply [X5] for digital outputs
Residual current for all supplied ports: max. 5 A

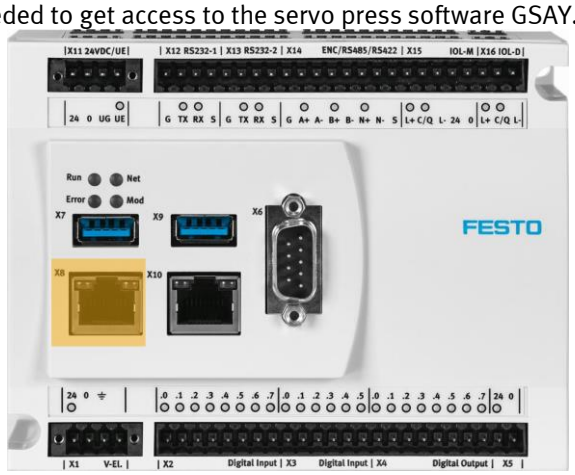
Please connect it according to the following table.



Terminal	Connection	Usage
X5.1	24	24 V DC
X5.2	0	0 V DC

4.3.3 Ethernet interface [X8]

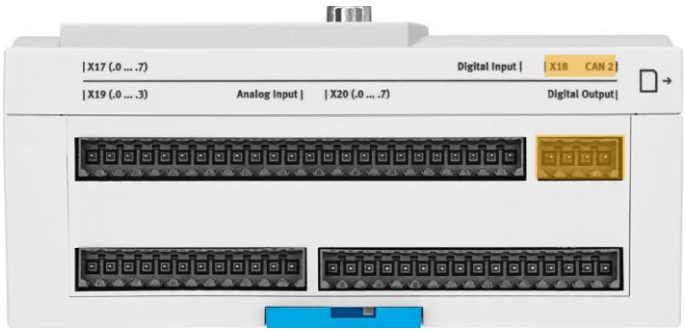
Connect the CECC-X via a standard patch cable to your switch.
This connection is needed to get access to the servo press software GSAY.



Important:
Please use only the ethernet port [X8], [X10] is NOT supported.

4.3.4 CANopen interface [X18]

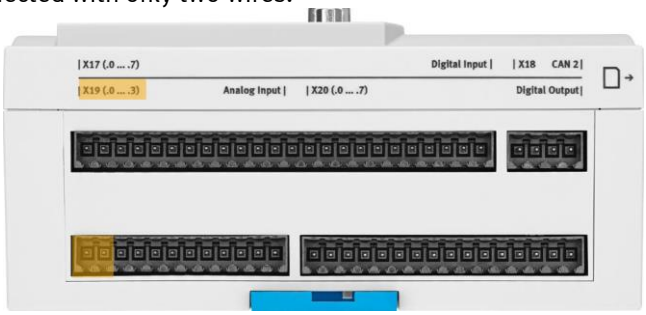
Connect the CECC-X with the CMMP [X4] using the included cable from the scope of delivery NEBC-S1WA9-P-_-BB-L2G4

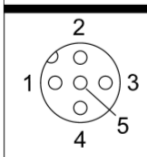


This step is also described in chapter 5.2.3.

4.3.5 Analogue input [X19]

The first analogue input X19.0.x is intended for the force sensor.
This sensor is connected with only two wires.



Sensor SKDA				**Controller CECC-X-M1-YS**	
Connection	Pin	Wire colour[1)]	Usage	Pin	Connection [X19]
	1	BN	24 V DC Power supply for sensor	X19.0.1	
	2	–	–		
	3	BU	Input 4 ... 20 mA Evaluation of the sensor signal through servo press software	X19.0.2	
	4	BK	Not used		
	5	–	–		

For more information please refer to the operating instructions for the YJKP on our support portal or local under the following link:
Operating instruction YJKP

4.3.6 Software version depending connections

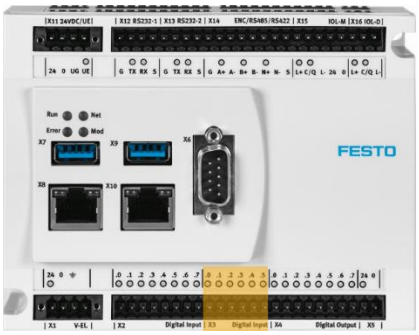
The following inputs are only needed if one of the following conditions is true:

- System should be controlled via digital inputs and outputs
- Software version GSAY is ‹= 1.3.13 and
  - WebVisu should be used during commissioning phase
  - host connectivity is not available yet

With software version GSAY ›= 1.4.1 it is possible to control the system completely only with the Web-Visu. WebVisu control is mainly used during commissioning phase.

4.3.6.1 Digital Inputs [X3]

At least 5 digital inputs on X3 are needed (please check also 5.3.5 Digital Inputs X17).

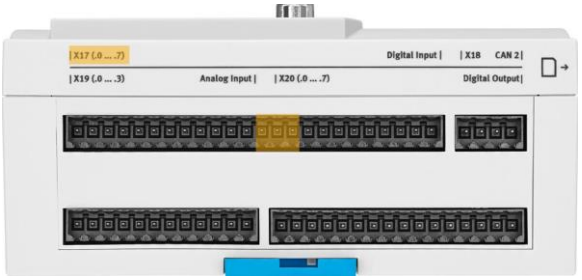


Terminal	Connection	Usage
X3.0	6 digital inputs	Start press process
X3.1		"Manual" operating mode
X3.2		"Automatic" operating mode
X3.3		Start homing
X3.4		Acknowledge error
X3.5		Terminate press process[1)]

Important:
X3.4 is to acknowledge an error. Not mandatory, but useful in case of an error.
X3.5 is **LOW ACTIVE.** This signal needs to be high to do any movement!

4.3.6.2 Digital inputs [X17]

The input X17.4.2 (Servo press activation) enables (rising edge) or disables (falling edge) the CMMP.

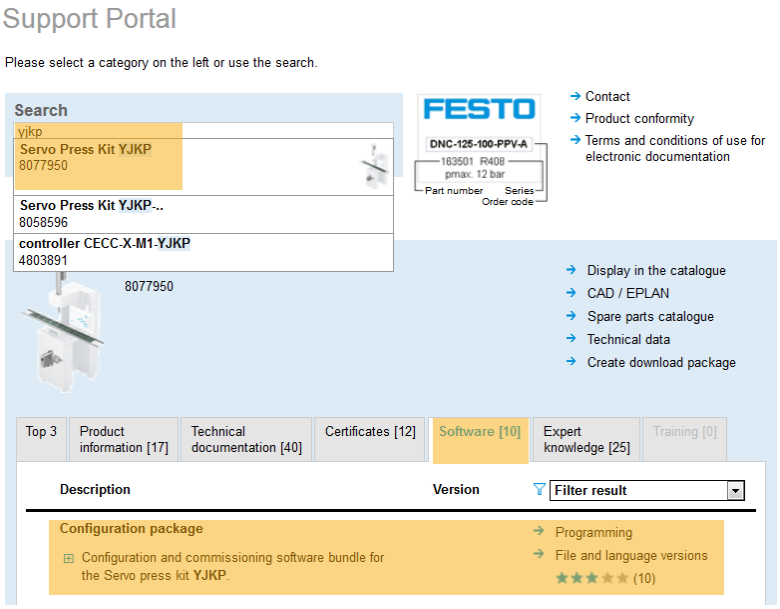


Terminal	Connection	Usage
X17.4.1	24 V DC	Power supply for safety acknowledgement
X17.4.2	Servo press activation	Release of motor controller output stage via CECC-X controller
X17.4.3	GND logic	Power supply for safety acknowledgement

5 Software

5.1 Needed software

You will find all needed software on the support portal in the tab “Software” by searching for “YJKP”.



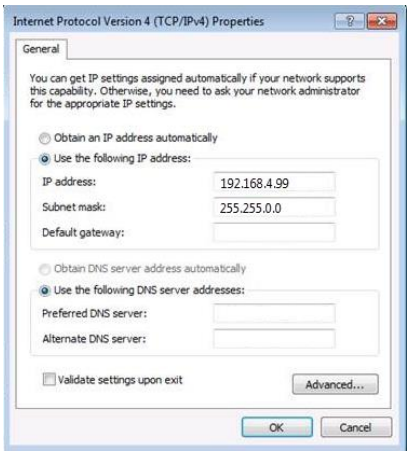
This package includes

- Festo Field Device Tool (FFT)
- Application software GSAY-A4-F0-Z4-... (actual and previous version of YJKP-software)
- Firmware CECC-X-M1-YJKP (needed firmware for the GSAY)
- GSDML for Profinet
- Online help file
- Release notes

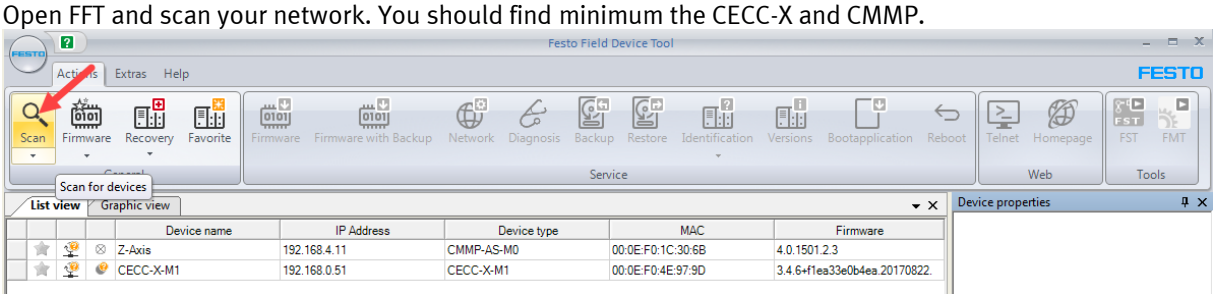
5.2 Configuration IPs of CECC-X and CMMP

All used components (CECC-X, CMMP, PC) need to be in the same IP range. Otherwise it is not possible to do the configuration. Their default IP is different!

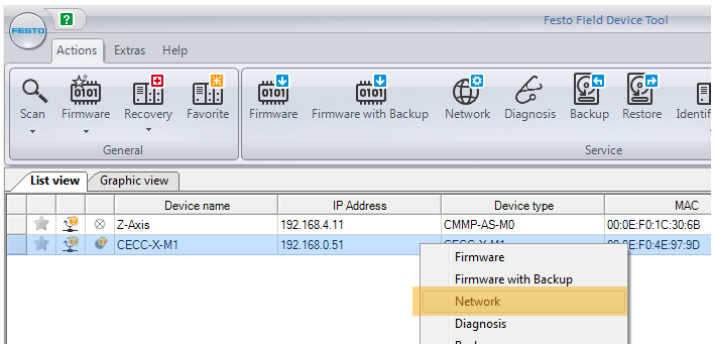
The IP of your PC has to be changed in your system settings.



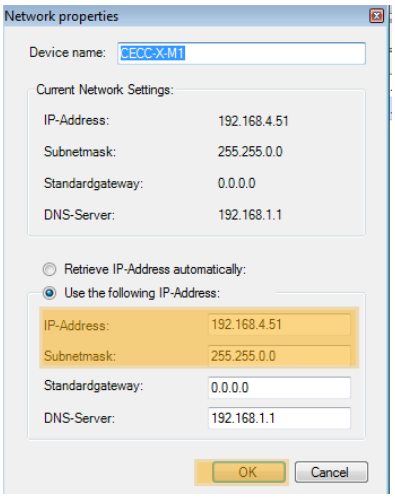
You can set the IPs (CECC-X and CMMP) with the Festo Field Device Tool (FFT).
Open FFT and scan your network. You should find minimum the CECC-X and CMMP.



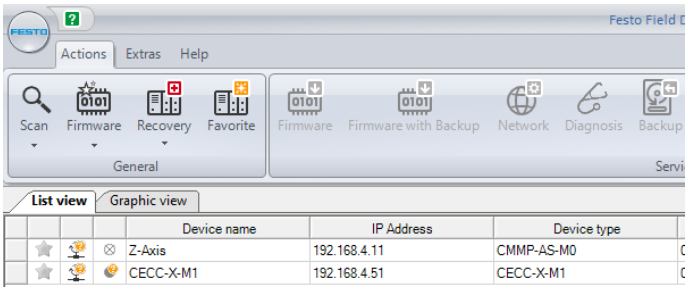
In this case the IPs are not in the same range, so they have to be changed.
Right click on one of the components and select “Network”.



Change the IP and confirm it. The device will reboot automatically.



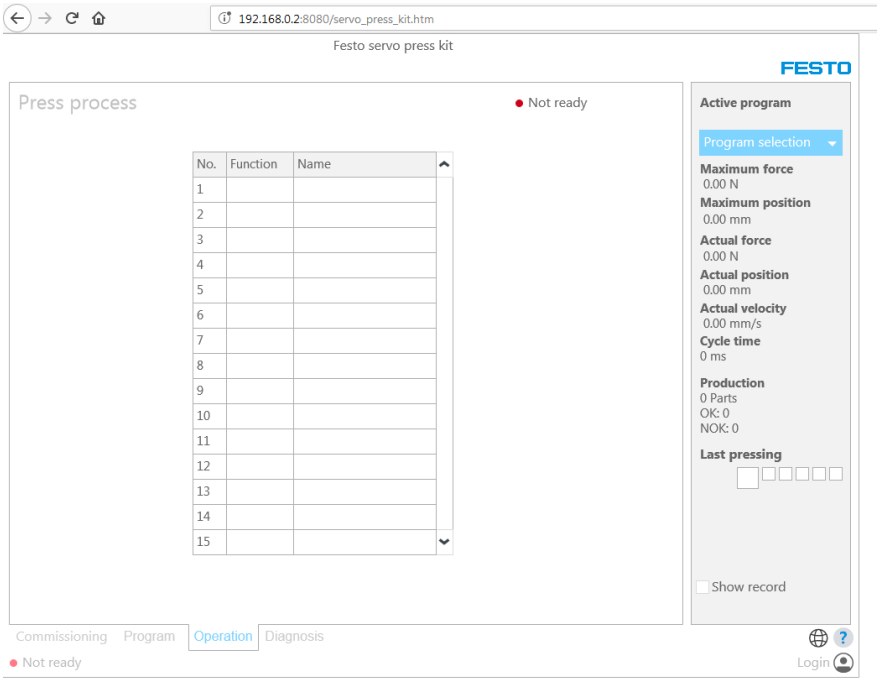
Now all devices have the same IP range.



5.3 Configuration of the system via YJKP software

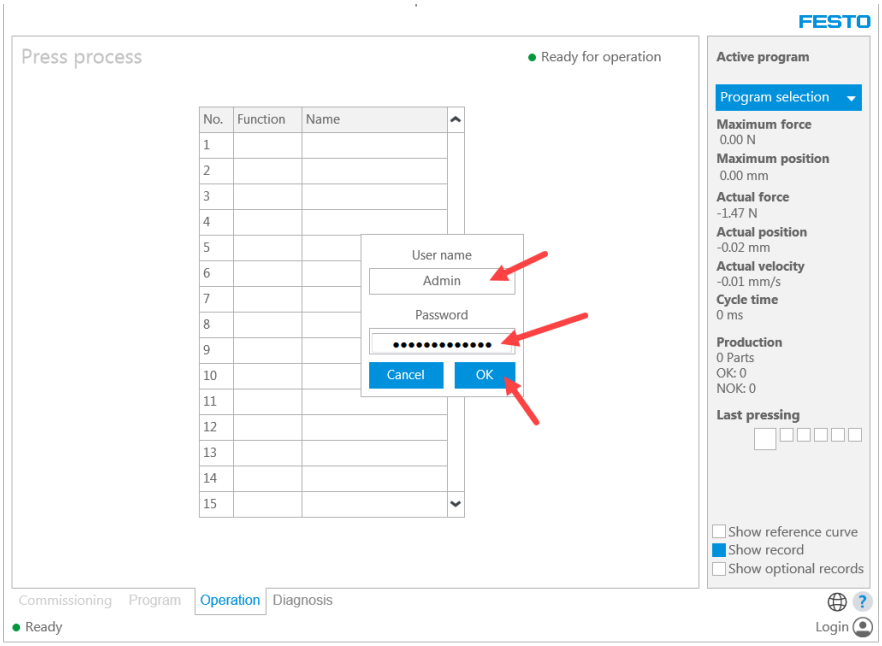
Open a browser and start the WebVisu of the YJKP.

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

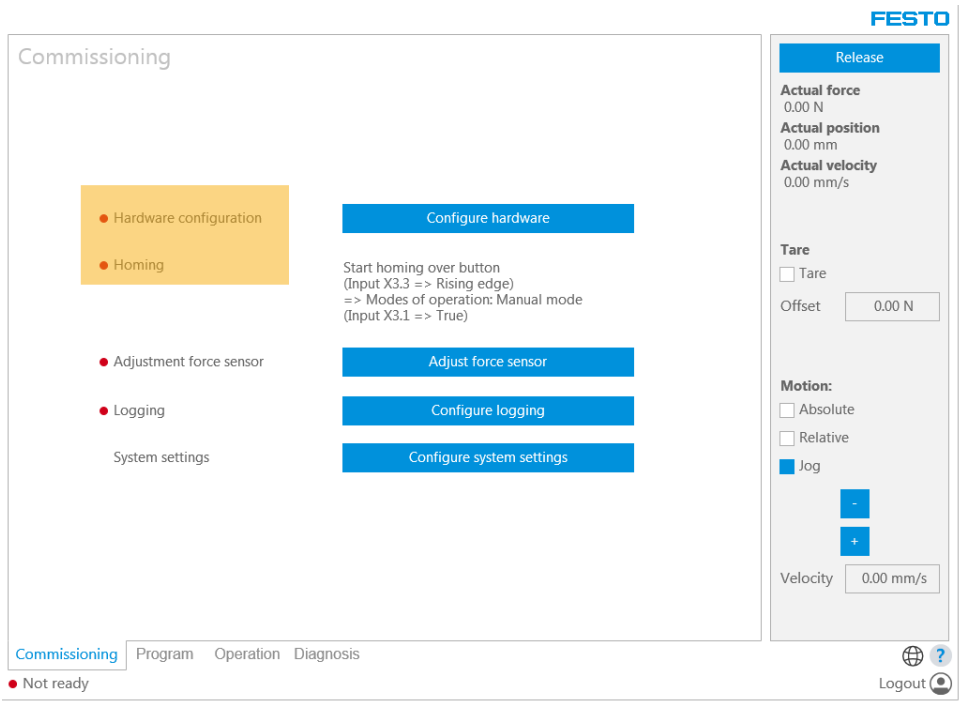


Click on the Login-button and a new window will open.
User name: Admin
Password: ServoPressKit

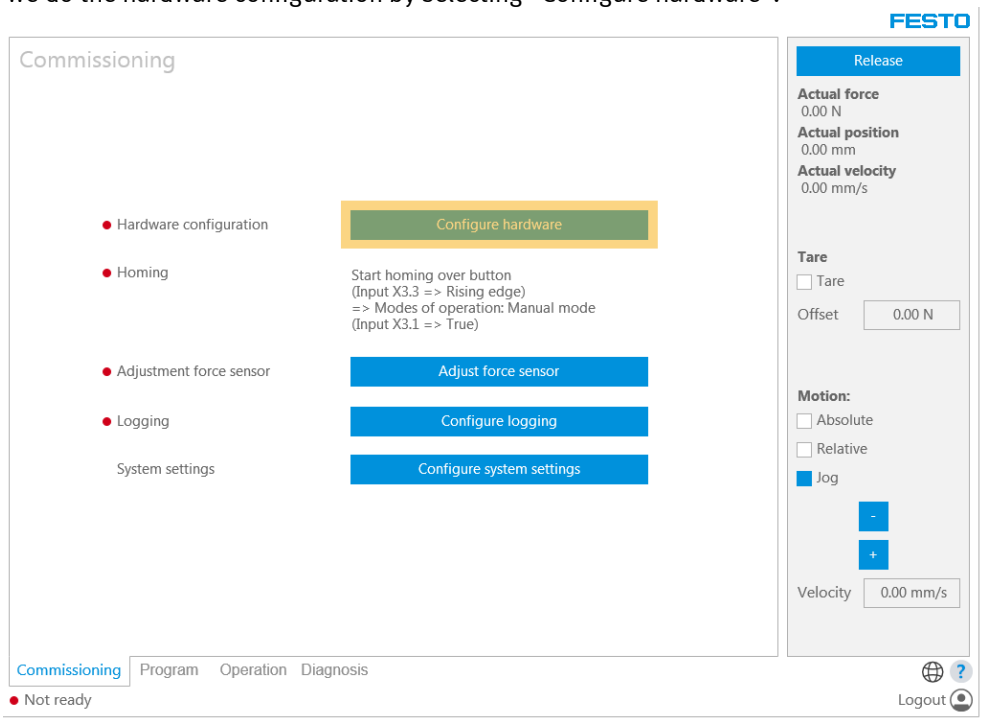
Confirm it with OK.



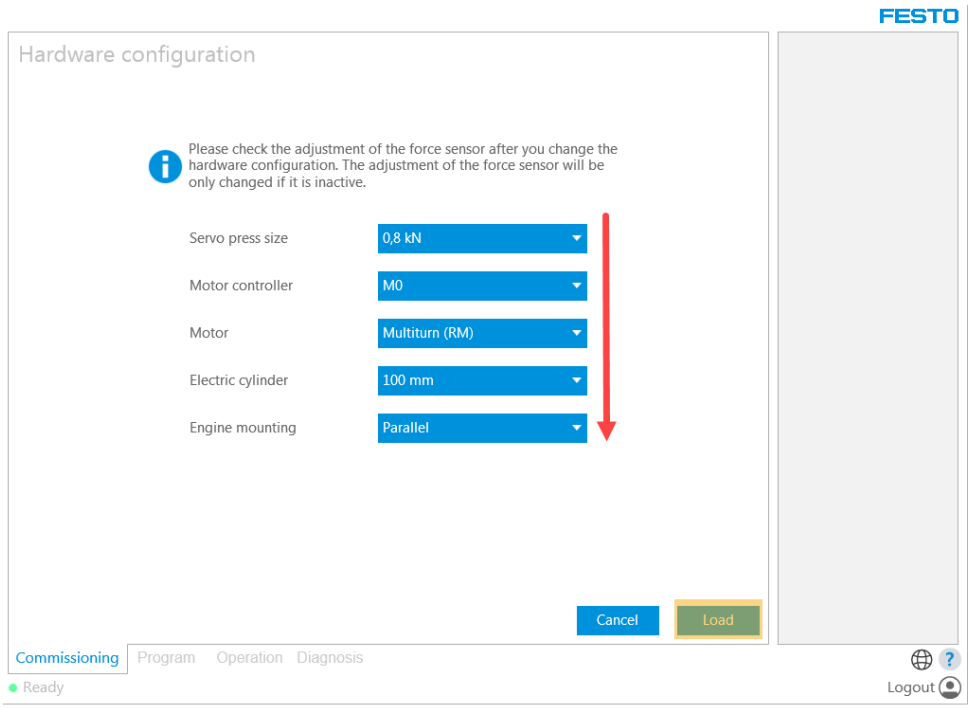
Switch to the Commissioning tab.
You can see the hardware configuration is invalid (=red) as well as the homing.



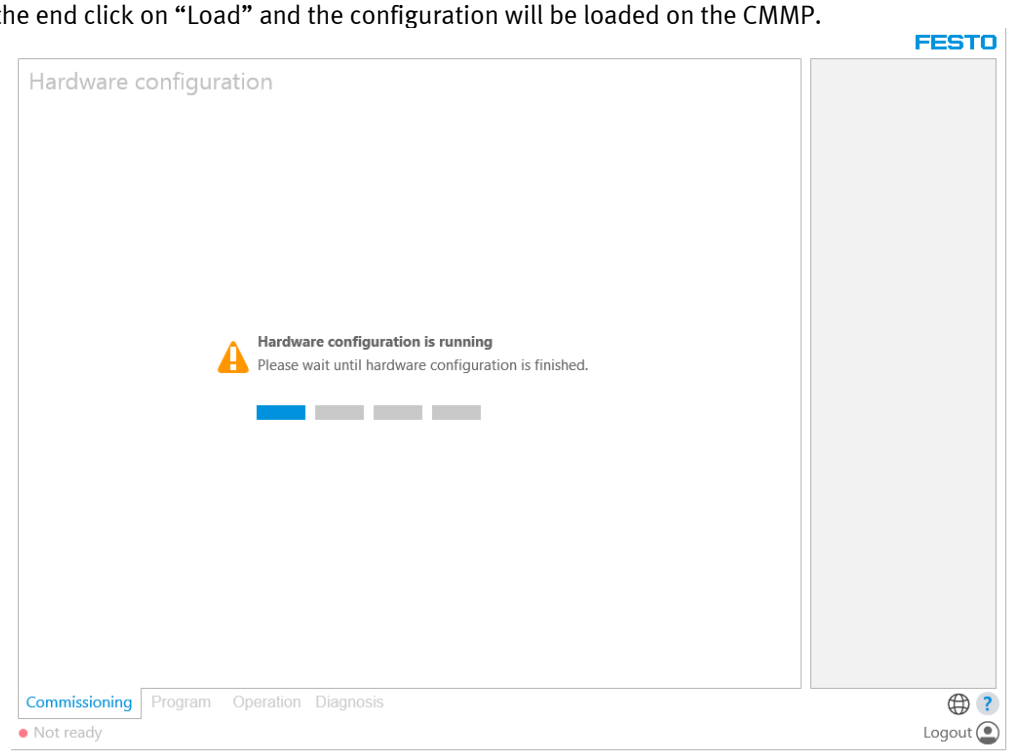
First, we do the hardware configuration by selecting “Configure hardware”.



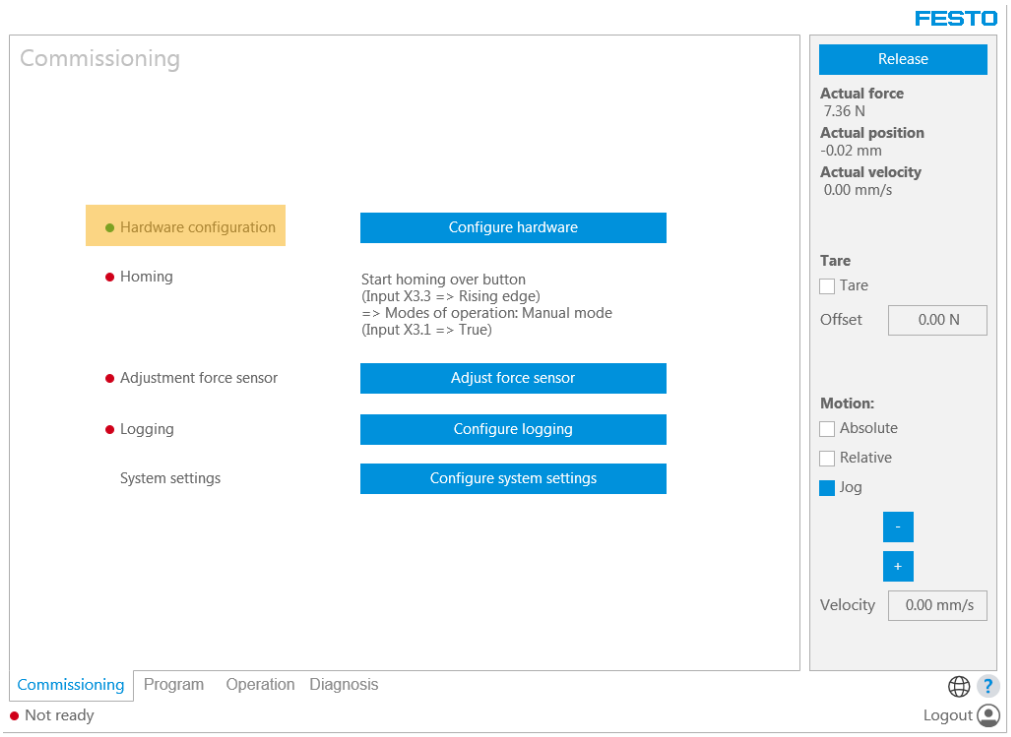
You have to configure your system. Select the parts beginning from the top.



At the end click on “Load” and the configuration will be loaded on the CMMP.

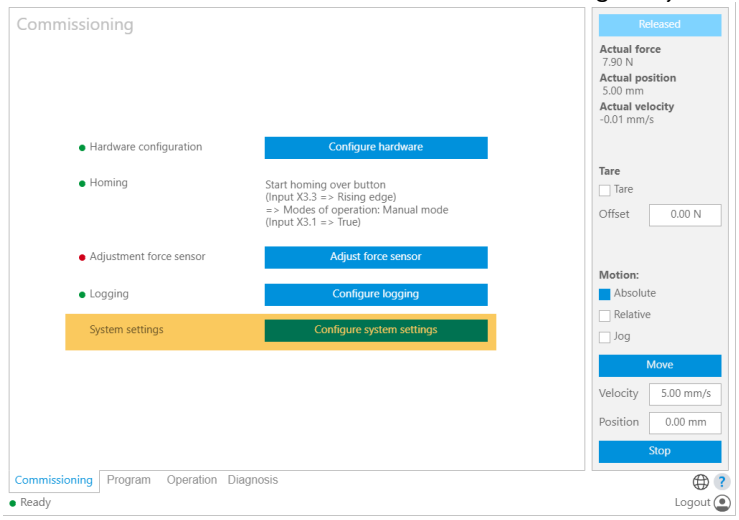


If everything is okay, the hardware configuration will be valid (=green). Otherwise please check the device diagnosis for any errors.

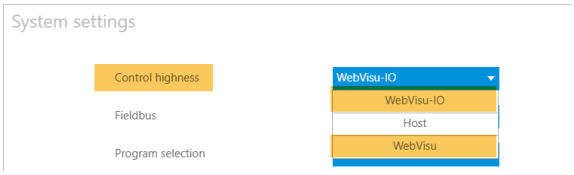

FESTO
Commissioning
Release
Actual force
7.36 N
Actual position
-0.02 mm
Actual velocity
0.00 mm/s
Hardware configuration
Configure hardware
Homing
Start homing over button
(Input X3.3 => Rising edge)
=> Modes of operation: Manual mode
(Input X3.1 => True)
Tare
Tare
Offset
0.00 N
Adjustment force sensor
Adjust force sensor
Logging
Configure logging
System settings
Configure system settings
Motion:
Absolute
Relative
Jog
-
+
Velocity
0.00 mm/s
Commissioning
Program
Operation
Diagnosis
Not ready
Logout

5.4 Homing

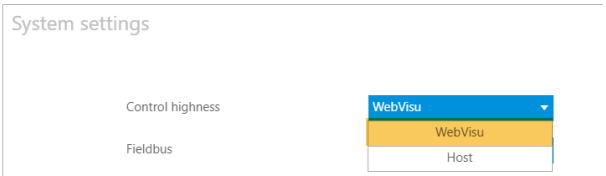
If you have a complete new system, you have to do a homing independent of a single- or multi-turn encoder.
Without a working host connection homing can be done in two ways:
Using digital inputs together with the WebVisu or only WebVisu.
The selection between both modes is done via “Configure system settings”:



The possibility to control only with the WebVisu is available with a software version ›=1.4.1 (EVO3+). This mode is called “WebVisu”. If you like to use IOs, please select “WebVisu-IO”.

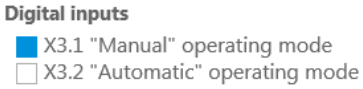


For all other software version 1.3.x (EVO3) you will need the digital inputs on X3 and X17 (please check chapter 4.3.6).
Although you need digital IOs, the mode is called “WebVisu” in versions 1.3.x.

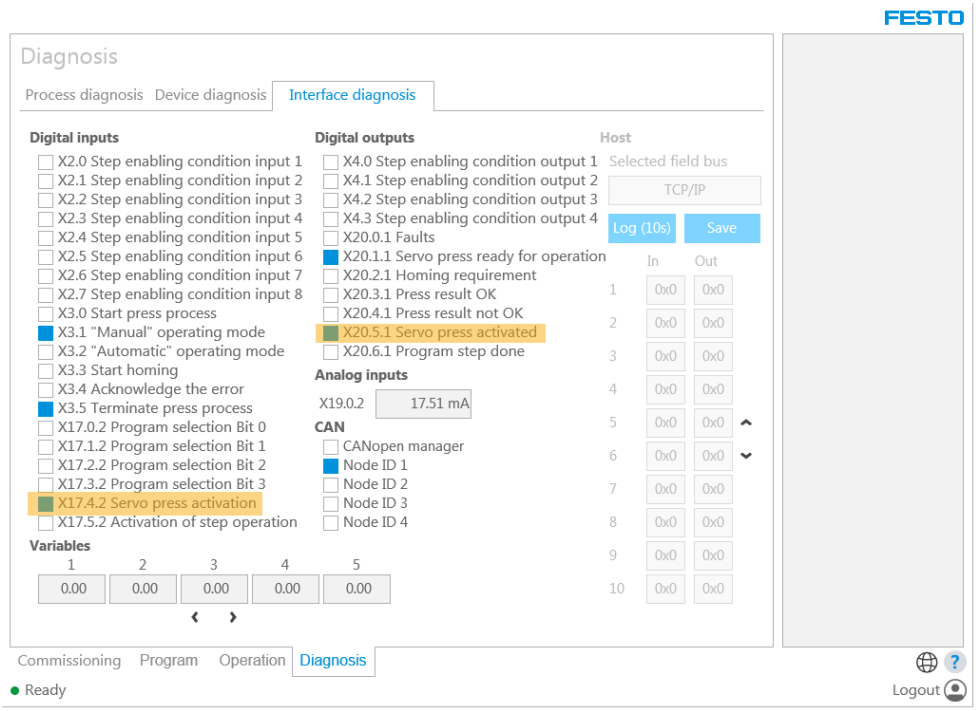


5.4.1 Homing with digital inputs

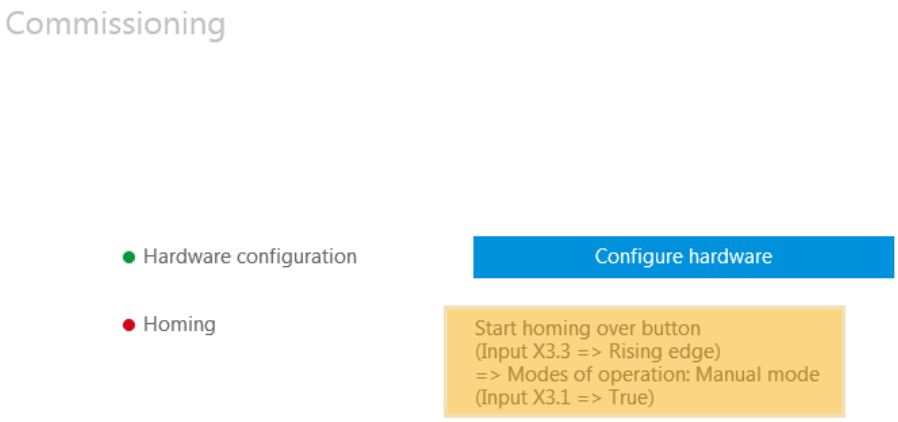
Homing requires to be in manual mode.
Input X3.1 high (manual mode), input X3.2 low (automatic mode).



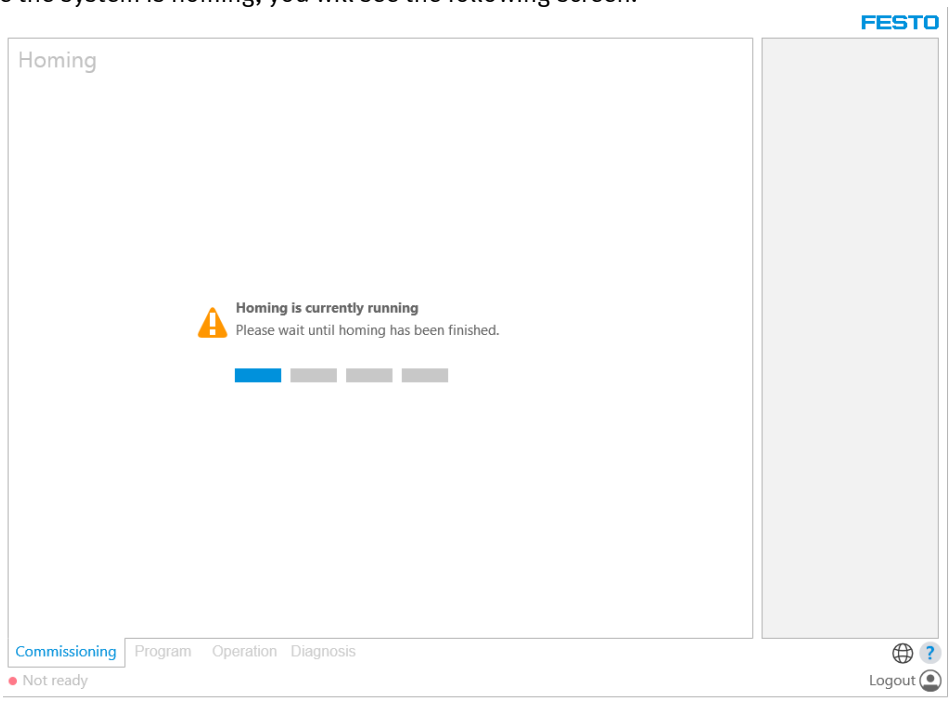
The press must be activated with the input X17.4.2. When output X20.5.1 is true, the system is enabled.



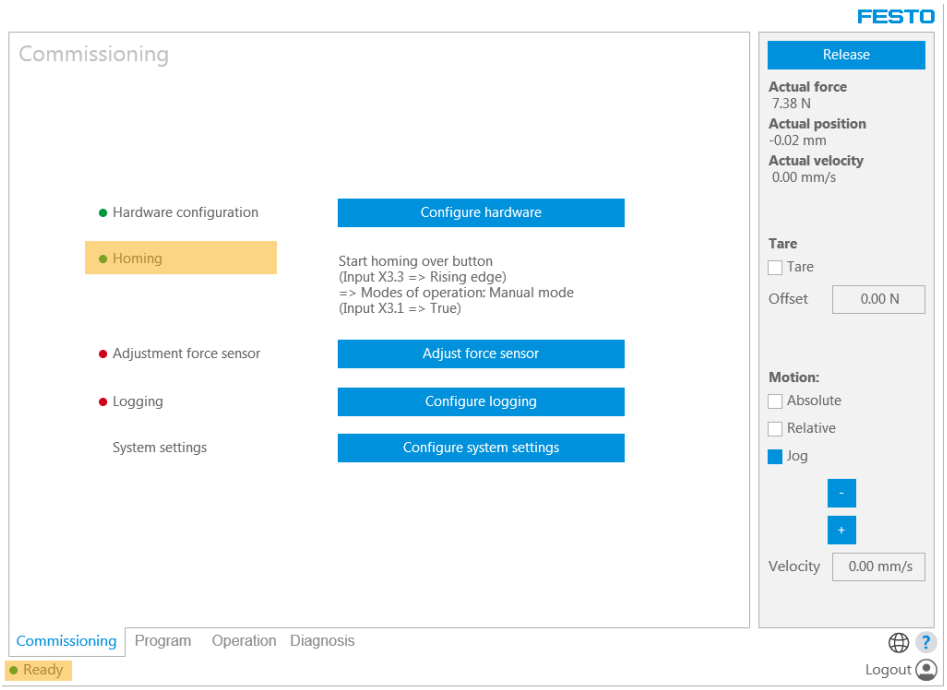
To start the homing the servo press needs a rising edge on the input X3.3.



While the system is homing, you will see the following screen.



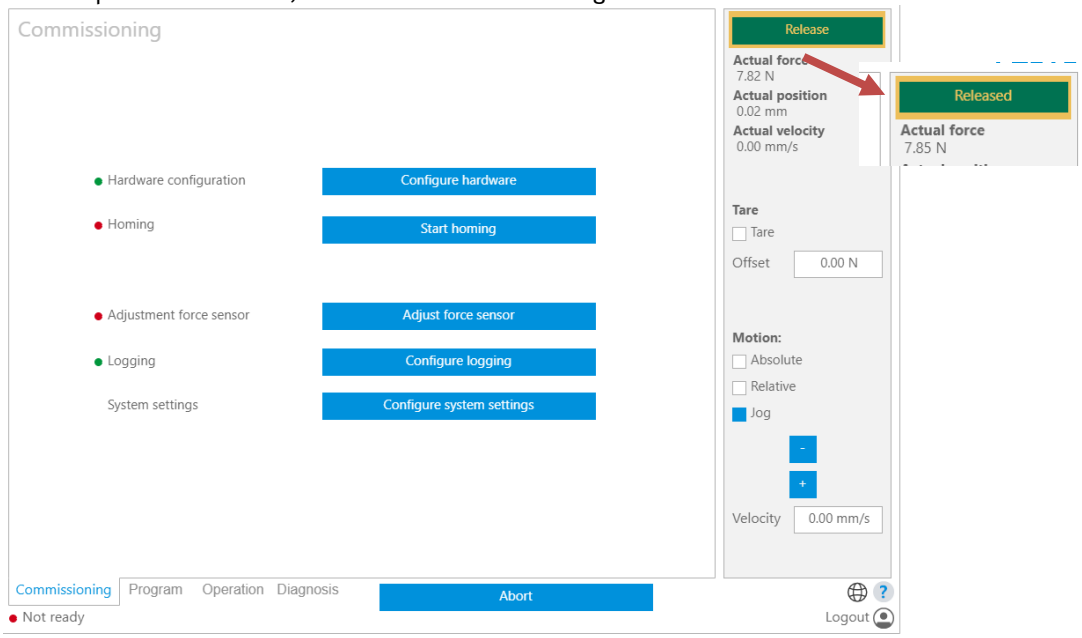
After a successful homing, homing will indicate a valid (=green) status.



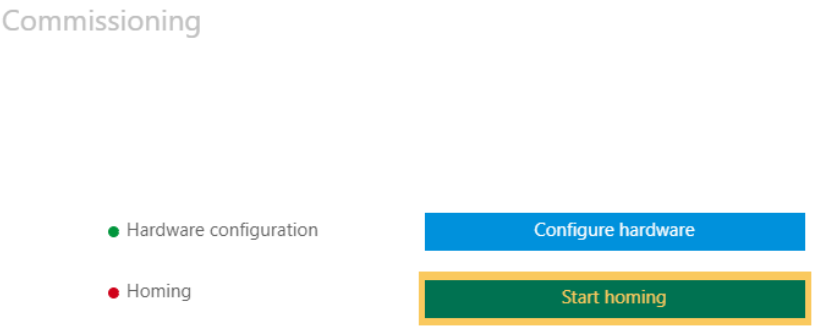
In the bottom left corner the status of the servo press turns to “Ready”.
The servo press is now ready for operation.

5.4.2 Homing only with WebVisu (EVO3+)

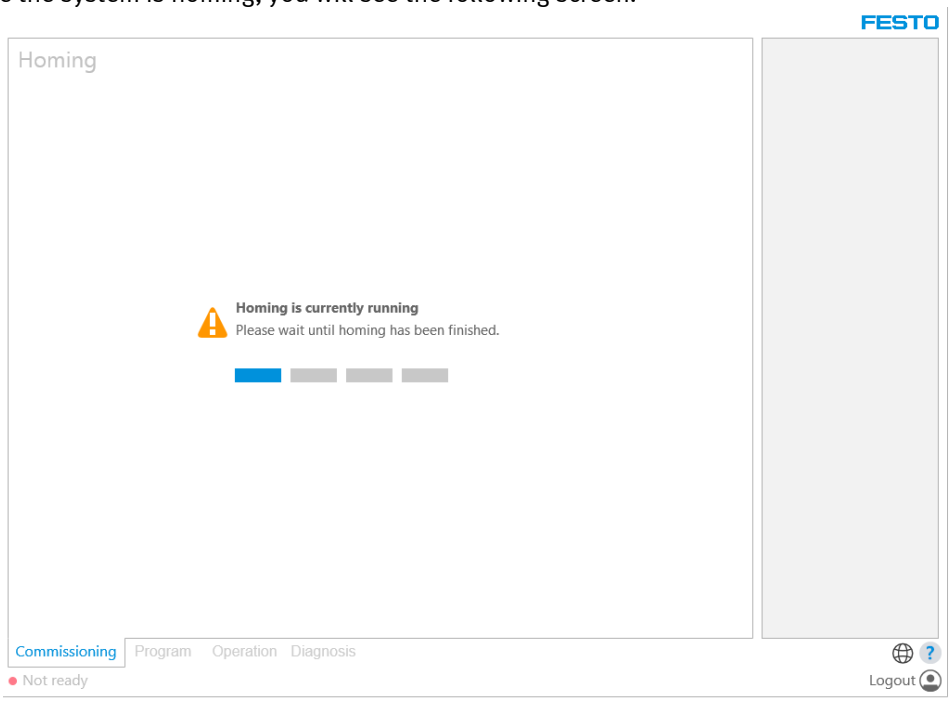
The press must be activated. Click on the button “release” in the commissioning tab.
As soon as the press is activated, the button name will change to “released”.



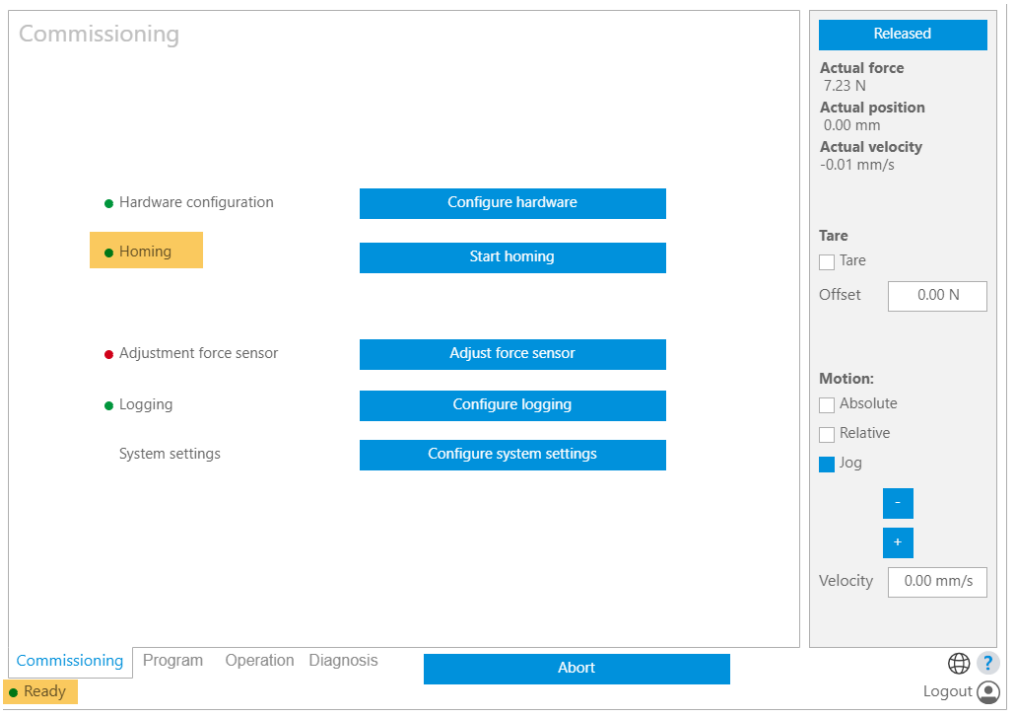
To start the homing please click on the button “Start homing.



While the system is homing, you will see the following screen.



After a successful homing, homing will indicate a valid (=green) status.

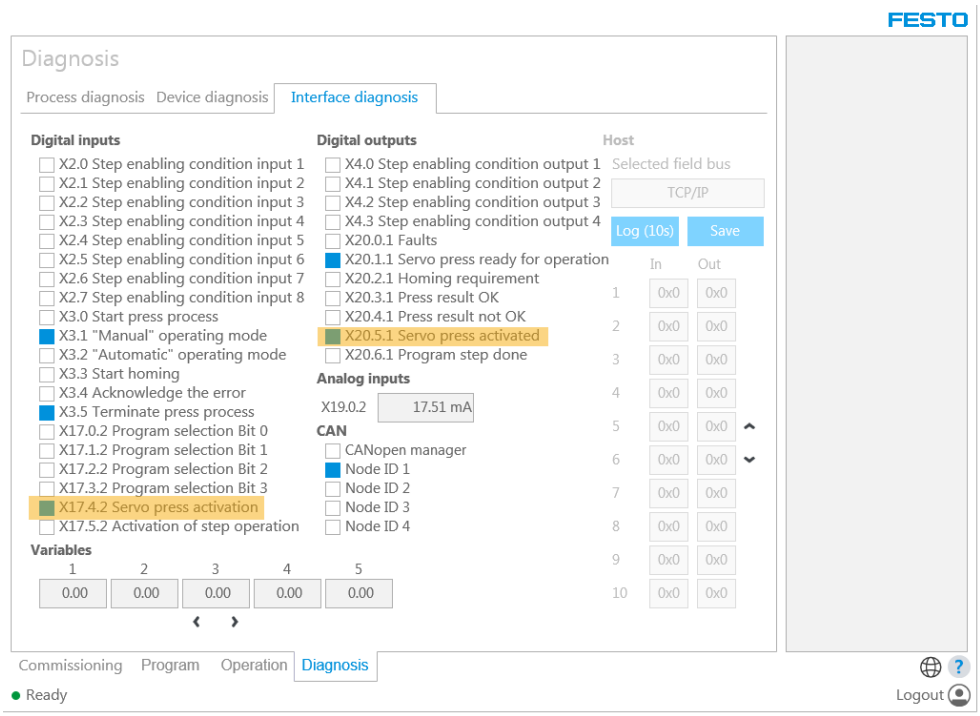


In the bottom left corner the status of the servo press turns to “Ready”.

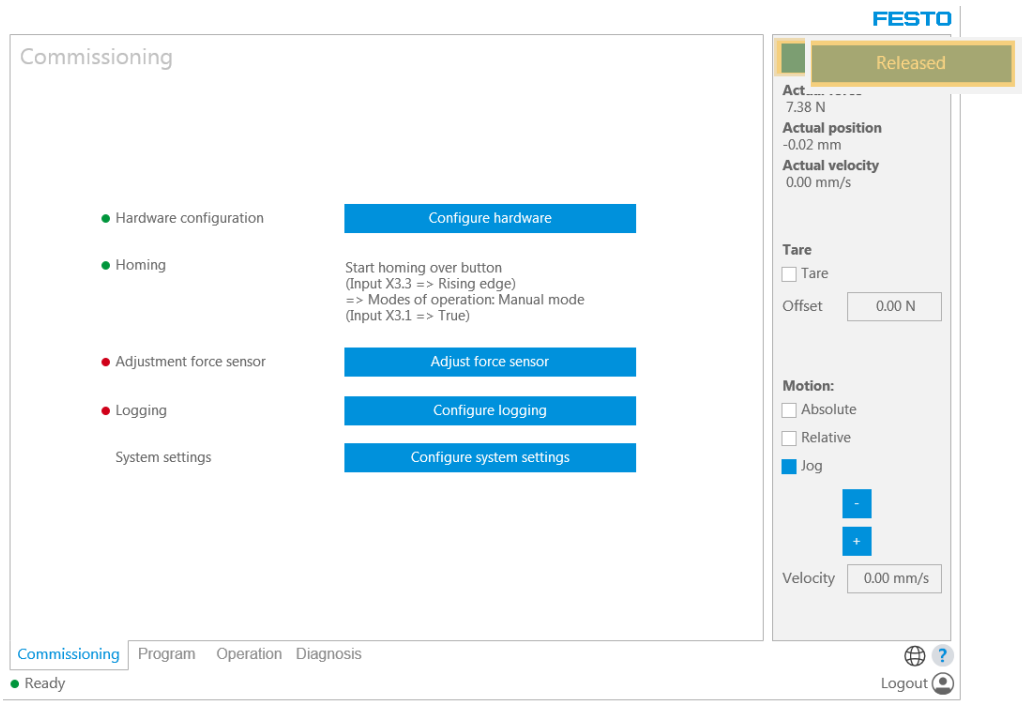
The servo press is now ready for operation.

5.5 Jogging

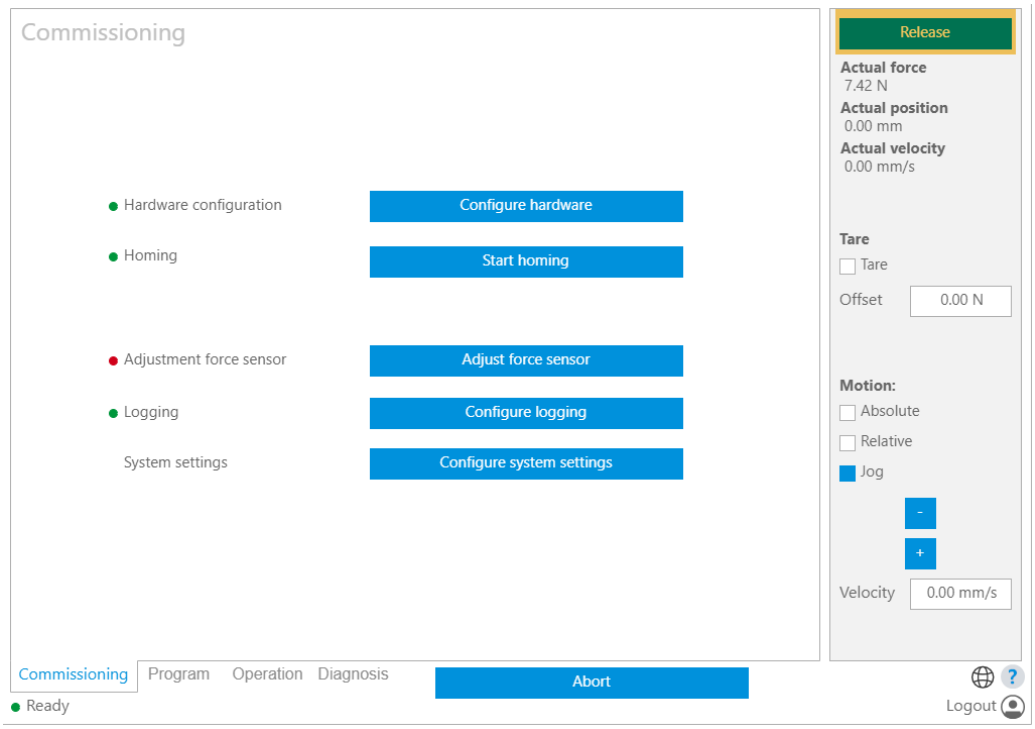
If you are using digital IOs to control the system, activate the system with X17.4.2, if not already done.



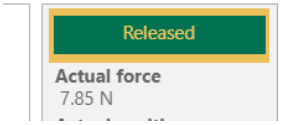
The active status should be also visible on the commissioning tab with “Released”.



If you are able to control the system only with WebVisu, activate the system by clicking on the “release”-button.



The active status should be also visible on the commissioning tab with “Released”.



You can test now some movements with the servo press by using the WebVisu.
Enter a velocity, for instance 10.00mm/s.

With the buttons “+/-“ you can now move the cylinder in positive and negative direction.
At the top you can see the actual values for force, position and velocity.

Please refer also to the other application notes, which you can find in the support portal under the tab “expert knowledge.