Application Note

FESTO

YJKP - Quick Start Guide EVO4.1

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
Servo press kit YJKP	EVO 4.1 and above
Application software YJKP (GSAY-A4-F0-Z4-2.1.5)	V2.1.3 and above
Firmware controller (CECC-X)	V3.8.14
Firmware motor controller (CMMT-AS)	V32.0.9.9 and above
Festo Automation Suite (FAS) CMMT-AS plug-in	V2.6.0.481 and above V2.6.1.6 and above

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 CMMT-AS-..-MP and servo motor EMMT-AS.
This example is based on controlling YJKP through WebVisu. Using any different settings, please refer to the manual and further application notes.
All documents for the parts of the scope of delivery can be found in the support portal under the heading of "YJKP".
Support portal: YJKP | Festo

2 Scope of delivery

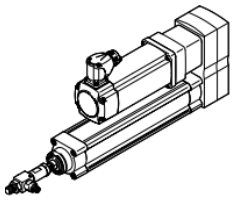
2.1 What is included?

Inside the servo press kit, following parts are included:

- Electric cylinder ESBF
- Motor EMMT-AS (single-/multi-turn)
- Axial/parallel mounting EAMM
- Servo Motor controller CMMT-AS-..-MP
- Motor and Encoder Cable NEBM
- Servo press controller CECC-X
- Force sensor SKDA
- SKDA connecting cable NEBS
- Ethernet cable to connect the CECC-X and CMMT-AS-..-MP
- MicroSD-card

Included in the scope of delivery of the servo press kit

Electric cylinder

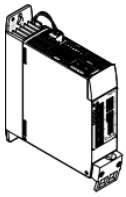


- With force sensor
- Connecting cable to controller

Optionally with:

- Motors with absolute displacement encoder:
  - Single-turn
  - Multi-turn
- Motors with/without holding brake
- Axial or parallel motor attachment (pre-assembled if required)

Motor controller



- For servo motor

Control system

- With special software
- With connecting cable to the motor controller

Motor cable

- Pre-assembled cable

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?

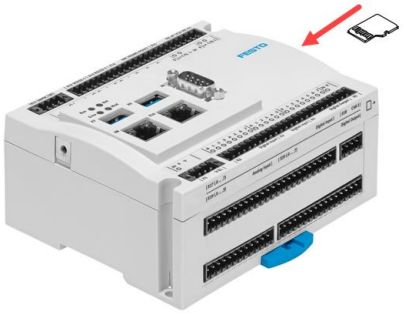
Beside the included parts, you will need some additional ones, which partially are only necessary for the commissioning.

- Switch
- PC
- Standard Ethernet Cat5e cables (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 EMMT 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).

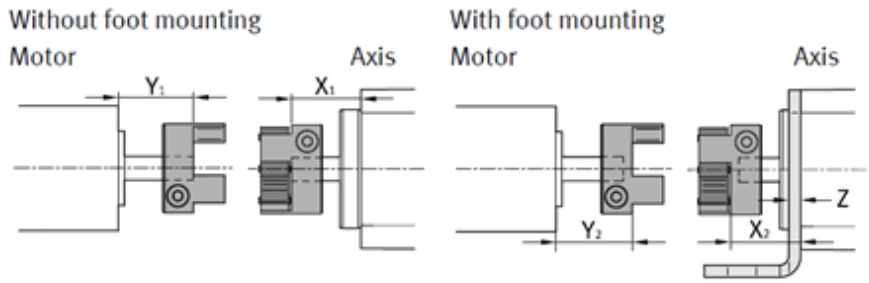
Important:
Tension and/or compression force is introduced via two axial threads. The supplied lock nuts must not come into contact with the deformation body.

Connect the cable NEBU to the sensor.

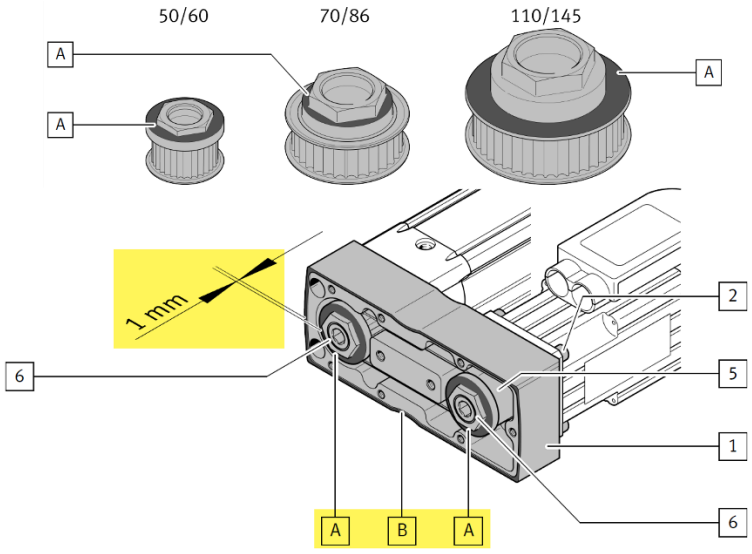
3.2.2 Electric cylinder ESBF to motor EMMT

The ESBF can be mounted to the EMMT 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:
EAMM-A | Festo
Please have a closer look especially on the alignment of the coupling hubs and their distances under chapter 5.1.3.



Parallel kit:
EAMM-U | Festo
Please have a closer look especially on the position of the toothed belt pulleys to the lower body part under chapter 5.1.2 point 6.



4 Electrical commissioning

4.1 Interconnection overview

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

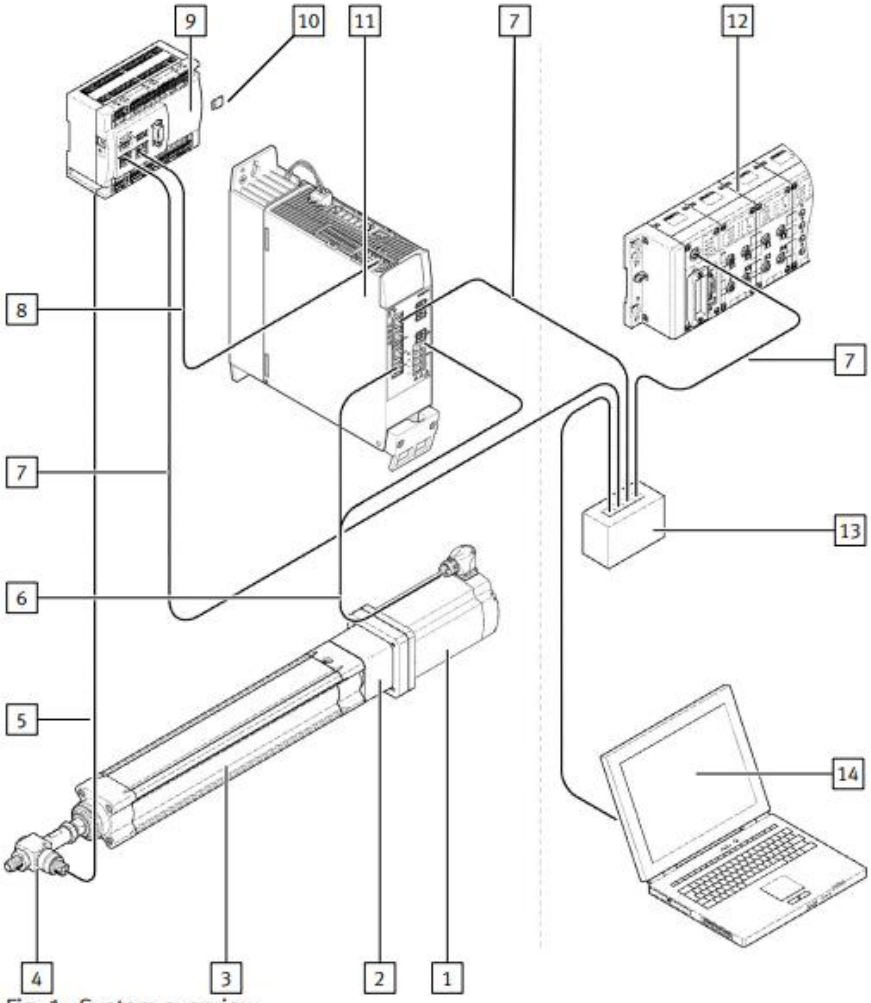


Fig. 1: System overview

1	Servo motor EMMT-AS	8	LAN cable
2	Axial kit EAMM-A/parallel kit EAMM-U	9	Controller CECC-X-M1-YS
3	Electric cylinder ESBF-BS	10	Memory card
4	Sensor SKDA-...-AB	11	Motor controller CMMT-AS
5	Connecting cable NEBS-M12G5-ES-...-LE5	12	Higher-order controller (not in scope of delivery)
6	Motor cable NEBM-M...-EH-...-R3LEG14	13	Switch (not in scope of delivery)
7	LAN cable (not in scope of delivery)	14	Laptop (not in scope of delivery)

Note:

- Festo Automation Suite (FAS) is not necessary for the commissioning of the YJKP. However, it is recommended to install it for firmware update and system diagnostic.

4.2 Electrical wiring of CMMT

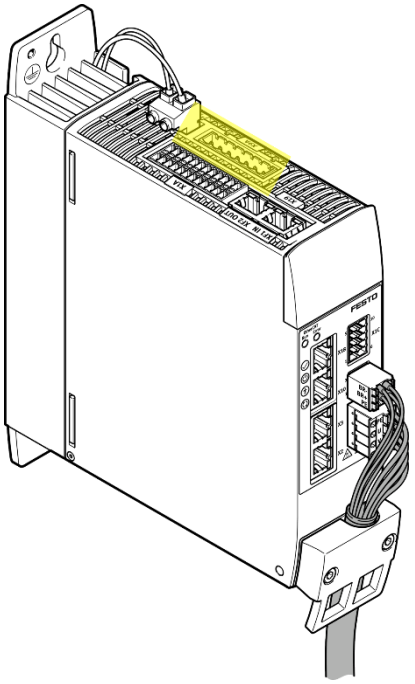
A complete mounting and installation description can be found in the support portal (search for the part number using the following link: Support portal).

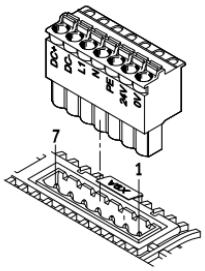
Force range	Power supply
Up to 4 kN	230 V AC
7 kN and more	3 x 230 V AC

4.2.1 Power supply [X9A]

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

1-phase controller





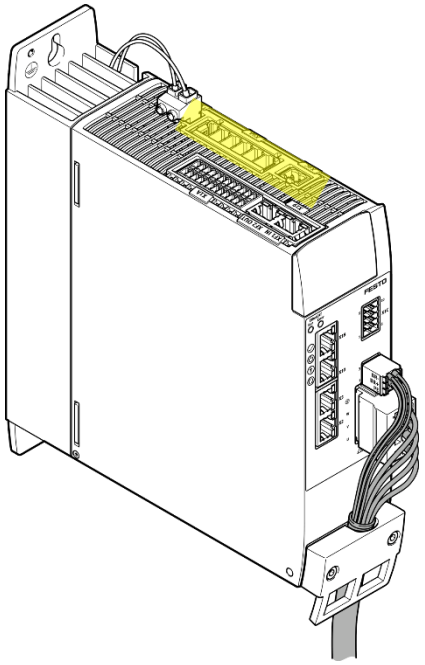
[X9A]	Pin	Function	Description
	7	DC+	DC link circuit positive potential
	6	DC-	DC link circuit negative potential
	5	L1	Mains supply phase L1
	4	N	for 1-phase mains connection: mains supply neutral conductor for 2-phase mains connection: mains supply phase L2
	3	PE	Protective earthing
	2	24 V	positive potential of the 24 V logic voltage
	1	0 V	Reference potential of the 24 V logic voltage

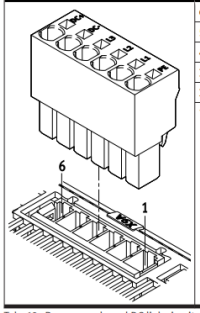
Tab. 63: Power supply and DC link circuit connection

Note:

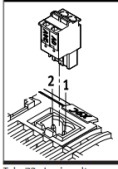
- YJKP of size 0.8kN and 1.5kN uses single-phase controllers.

3-phase controller



[X9A]	Pin	Function	Description
	6	DC+	DC link circuit positive potential
	5	DC-	DC link circuit negative potential
	4	L3	Mains supply phase L3
	3	L2	Mains supply phase L2
	2	L1	Mains supply phase L1
	1	PE	Protective earthing

Tab. 69: Power supply and DC link circuit

[X9C]	Pin	Function	Description
	2	24 V DC	positive potential of logic voltage supply
	1	0 V	Reference potential for logic voltage supply

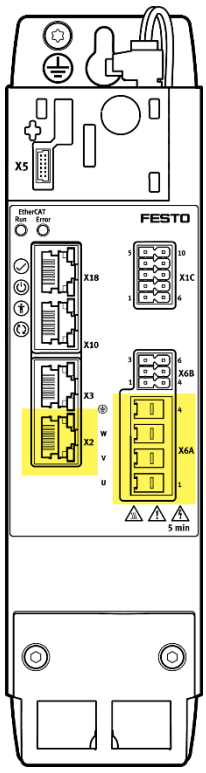
Tab. 72: Logic voltage supply

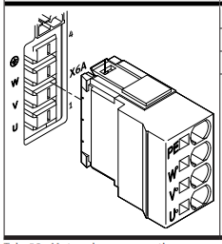
Note:

- YJKP of size 4kN - 17kN uses three-phase controllers.

4.2.2 Motor cable [X6A] and Encoder cable [X2]

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

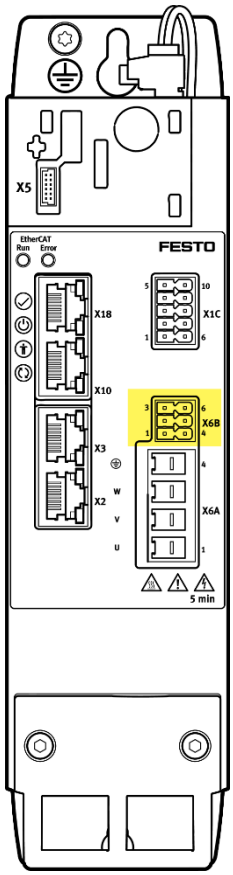


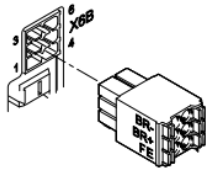
[X6A]	Pin	Function	Description
	4	PE	Protective earthing, motor
	3	W	third motor phase
	2	V	second motor phase
	1	U	first motor phase

Tab. 59: Motor phase connection

4.2.3 Motor auxiliary connection [X6B]

Connect the holding brake of the motor and the motor temperature sensor.

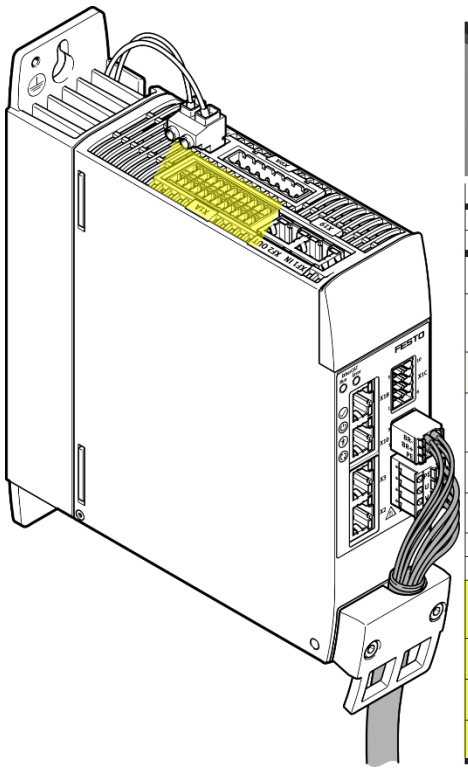


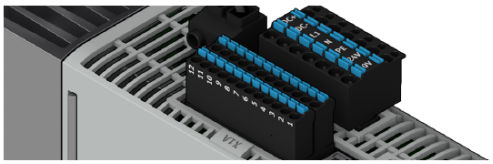
[X6B]	Pin	Function	Description
	6	MT–	Motor temperature (negative potential)
	5	MT+	Motor temperature (positive potential)
	4	FE	Functional earth connected to protective earth
	3	BR–	Holding brake (negative potential)
	2	BR+	Holding brake (positive potential)
	1	FE	Functional earth connected to protective earth

Tab. 62: Motor auxiliary connection

4.2.4 Safety function [X1A]

STO and SBC must be connected to X1A port. For more information, please refer to the documentation [CMMT-AS-_-S1-EN]





X1A – inputs and outputs for the higher-order PLC and to the safety relay unit					
Min. cable cross section			[mm²]	0.25	
Max. conductor cross section			[mm²]	0.75	
Pin 1	#AIN0	Differential analogue input +/-10 V control voltage	Pin 13	CAP1	Like CAP0, but channel 1 +24 V
Pin 2	AIN0		Pin 14	CAP0	Fast input for position detection, channel 0 +24 V
Pin 3	CTRL-EN	Output stage enable (can be parameterised) +24 V	Pin 15	TRG1	Like TRG0, but channel 1+24 V
Pin 4	ERR-RST	Error acknowledgement (rising edge) +24 V	Pin 16	TRG0	Fast output for triggering external components, channel 0+24 V
Pin 5	–	Reserved, do not connect	Pin 17	GND	Reference potential (ground)
Pin 6	–		Pin 18	SIN4	Release brake request +24 V
Pin 7	–		Pin 19	–	Reserved, do not connect
Pin 8	–		Pin 20	–	
Pin 9	#SBC-B	Control input Safe Brake Control, channel B	Pin 21	SBA	Diagnostic output Safe Brake Control acknowledge
Pin 10	#SBC-A	Control input Safe Brake Control, channel A	Pin 22	STA	Diagnostic output Safe Torque Off acknowledge
Pin 11	#STO-B	Control input Safe Torque Off, channel B	Pin 23	RDY-C2	Normally open contact: ready for operation message (Ready)
Pin 12	#STO-A	Control input Safe Torque Off, channel A	Pin 24	RDY-C1	

4.2.5 Minimum Connection Requirement:

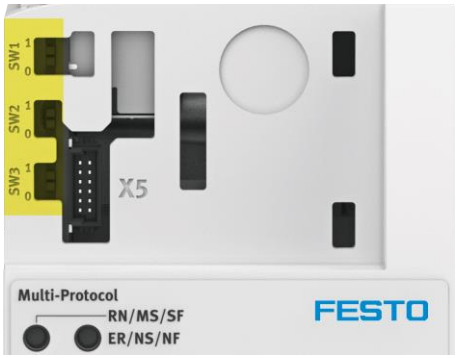
To Enable the motor controller, below connections are mandatory:

- CTRL-EN (Pin 3 of X1A connector) must be supplied with 24V.
- STO-A, STO-B and SBC-A, SBC-B must be connected.

Connection	Pin	Type	Identifier	Function
[X1A]	X1A.9	DIN	#SBC-B	Supplies each one with 24 V
	X1A.10		#SBC-A	
	X1A.11		#STO-B	
	X1A.12		#STO-A	
	X1A.21	DOUT	SBA	Do not connect
	X1A.22		STA	

4.2.6 EtherCAT DIL switch setting

The DIL Switch must be set to EtherCAT setting as shown below:
SW1: 0
SW2: 1
SW3: 0



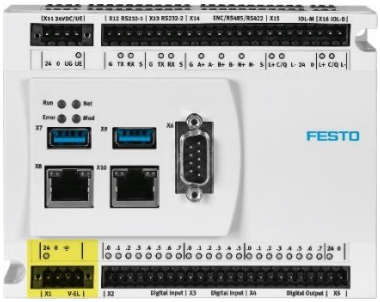
Note:

- CMMT must be rebooted to update changes in DIL switch.
- If the DIL Switch settings are not correct, then there will be an EtherCAT communication error.

4.3 Electrical wiring of CECC-X

4.3.1 Power supply [X1] for device, digital and analogue inputs

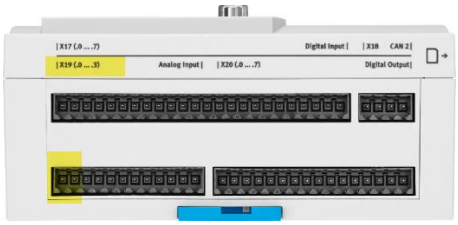
Residual current for all supplied ports: max. 750 mA of which intrinsic current consumption: max. 200 mA.
Please connect it according to the following table.

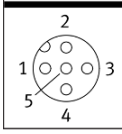


Terminal	Connection	Usage
X1.1	24	24 V DC
X1.2	0	0 V DC
X1.3	⏚	Functional earth
X1.4	reserved	–

4.3.2 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		Connecting cable NEBS-M12G5-ES-...-LE5		Controller CECC-X-M1-YS
Pin		Wire colour[1)]	Signal	Connection [X19]
	1	BN	24 V DC Power supply for sensor	X19.0.1
	2	WH	not used	
	3	BU	Input 4 ... 20 mA Evaluation of the sensor signal by servo press software	X19.0.2
	4	BK	not used	
	5	GY	not used	
		Shielding braid	Apply shielding braid in the direct vicinity of the controller and sensor with a large surface area	

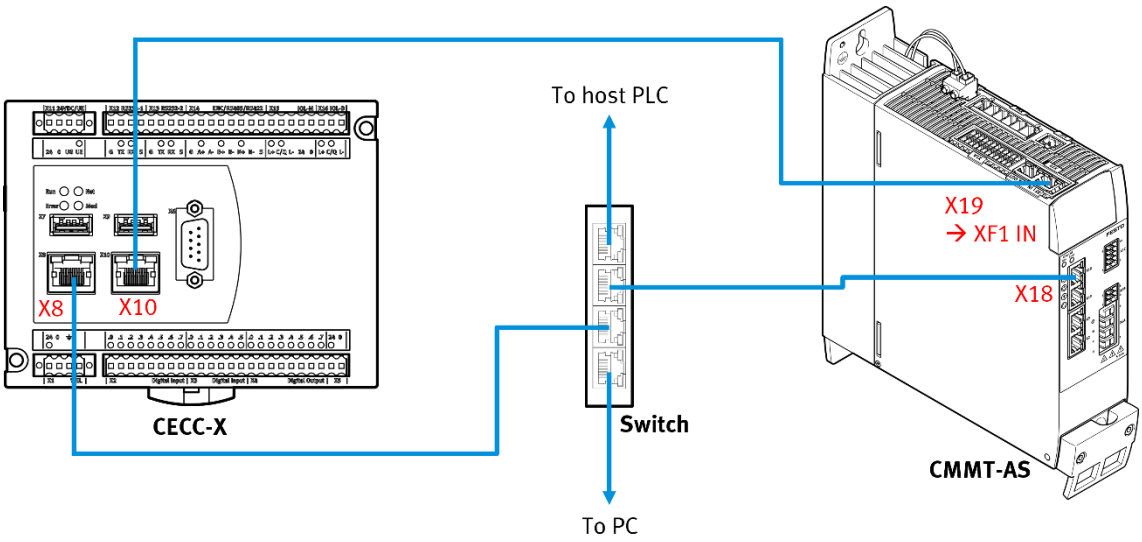
For more information please refer to the sensor's operating instructions for the YJKP on our support portal.
[Operating instruction SKDA for YJKP]

4.4 Network connection

Network connection is shown as diagram below.
Connect following ports with standard patch cables to allow direct access to the components from PC.

- CECC-X [X8]
- CMMT-AS [X18]

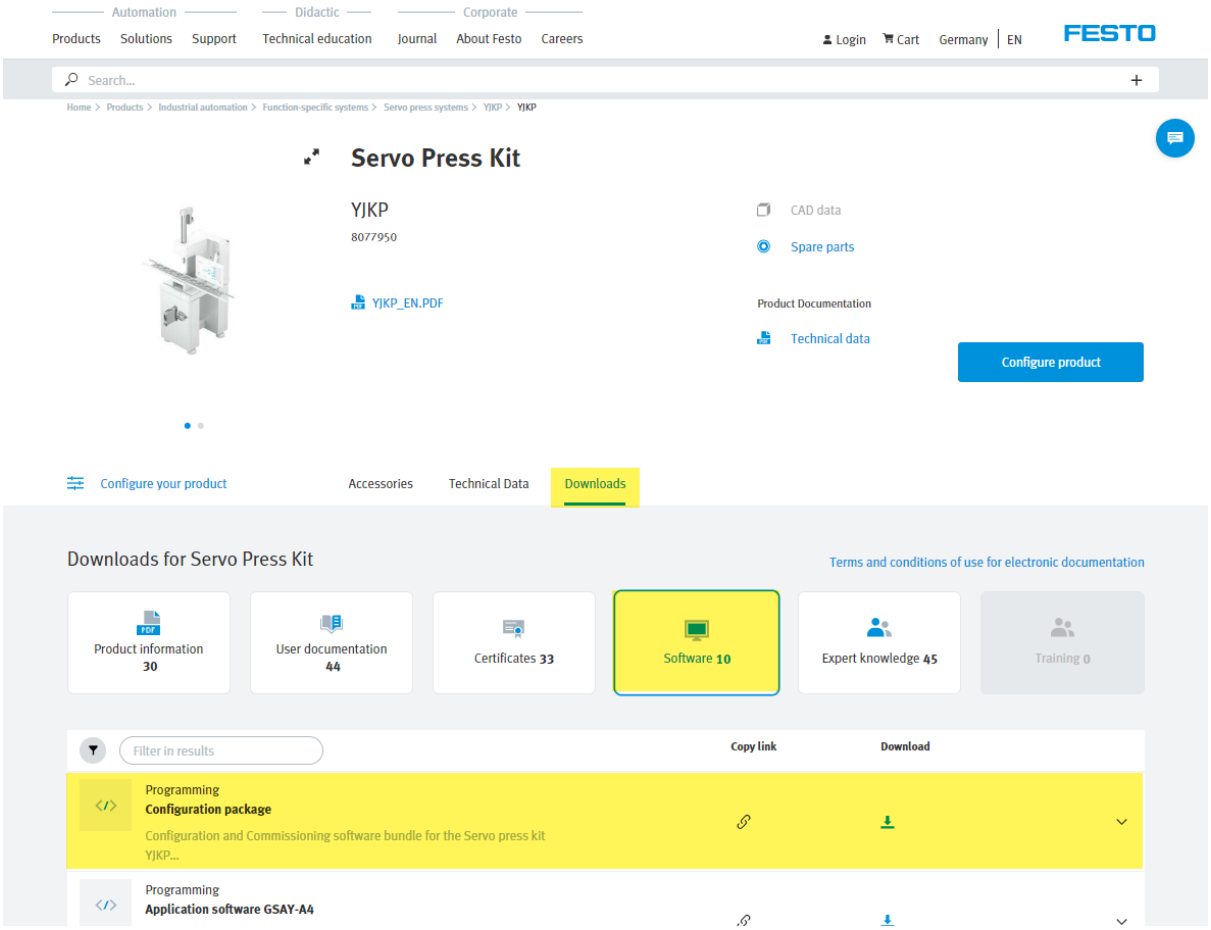
Connect the CECC-X [X10] with the CMMT [X19] using the standard Ethernet Cat5e cable for EtherCAT.



5 Software

5.1 Needed software

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

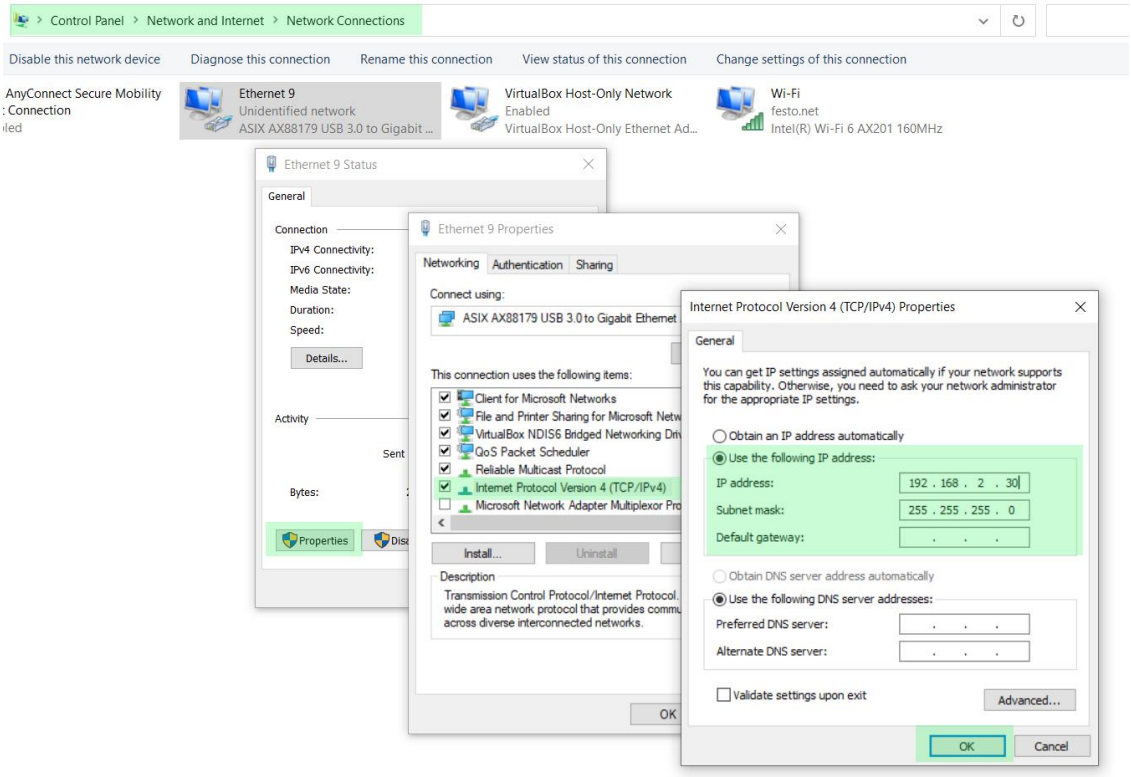


The configuration package includes:

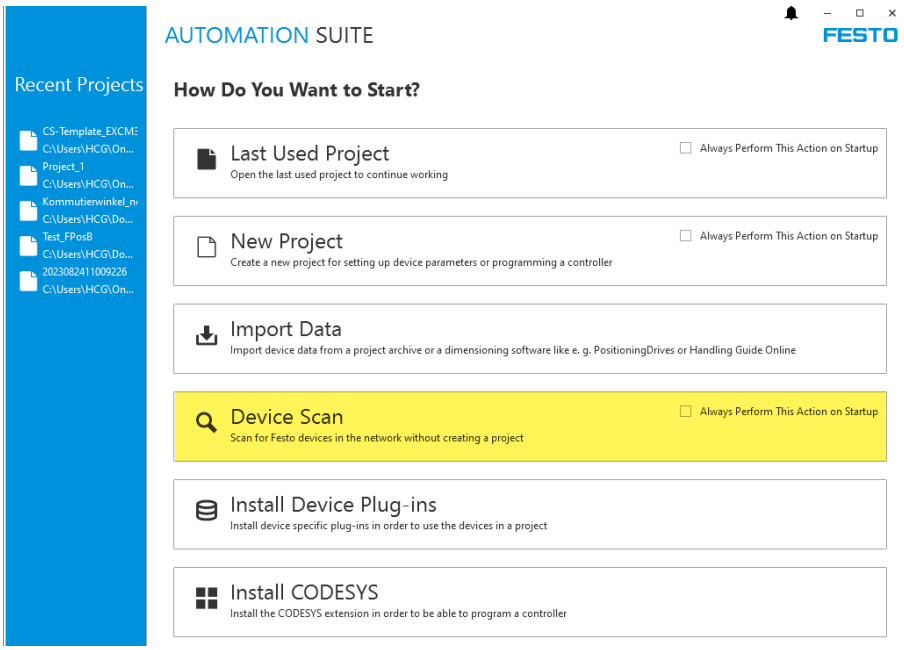
- Festo Field Device Tool
- Application software GSAY-A4-F0-Z4-... (actual and the previous versions)
- Firmware files for CECC-X-M1
- GSDML file for Profinet IO interface
- Online help file
- Release notes

5.2 IP address Configuration of CECC-X and CMMT

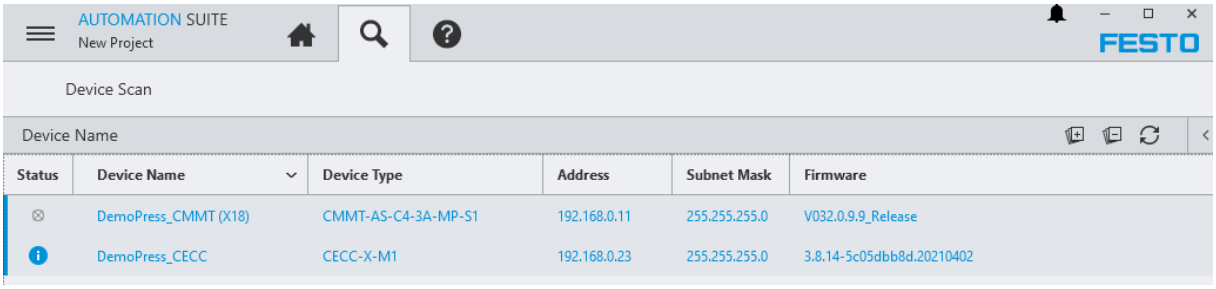
All the used components (CECC-X, CMMT-AS, PC) need to be in the same IP range. Otherwise, it is not possible to do the configuration. Their default IP address is different!
The IP of your PC needs to be changed in your system's network settings.



The IP address of the CECC-X and the CMMT-AS can be set via the Festo Automation Suite (FAS). Open FAS and go to Device Scan.

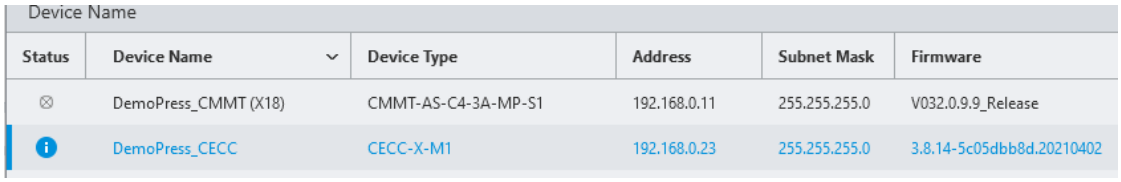


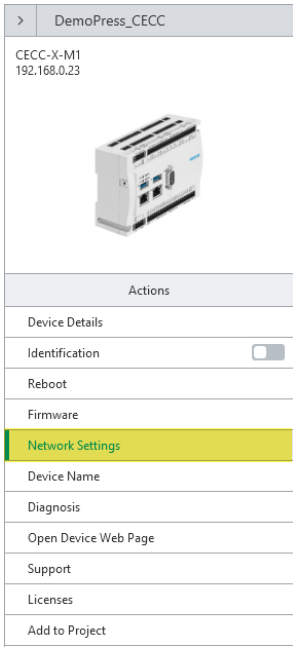
You can see the connected Festo devices.



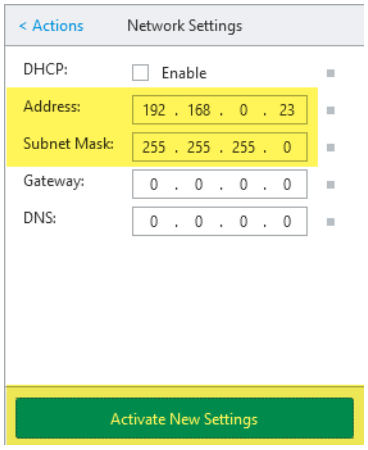
In this case, the IP address of the components are in different range so change them to same network range.

1. Select the component and “Network Settings”.





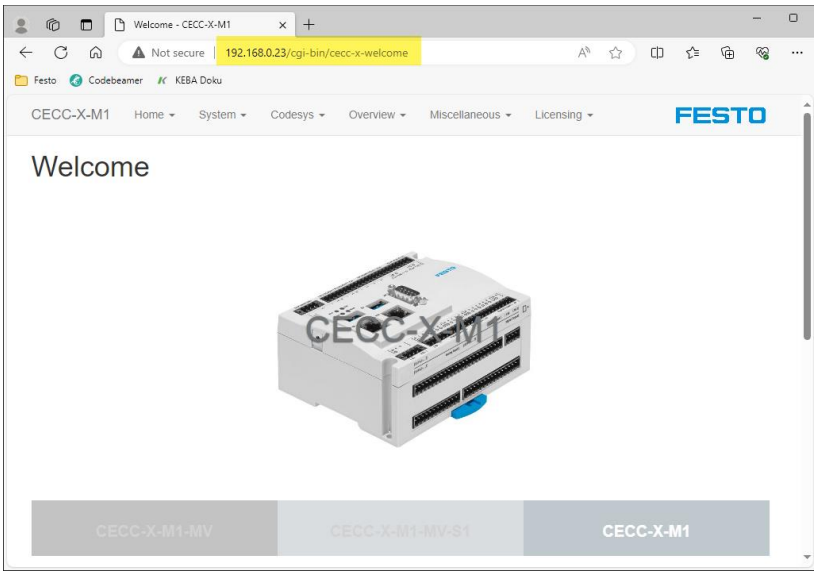
2. Change the IP address of the device to the required network range. Activate new settings.



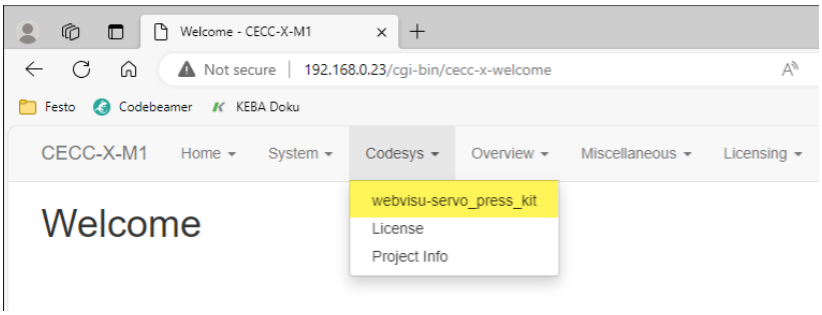
3. Do the same settings for the other device and check the IP address of all the components.

5.3 Configuration of the system via YJKP WebVisu

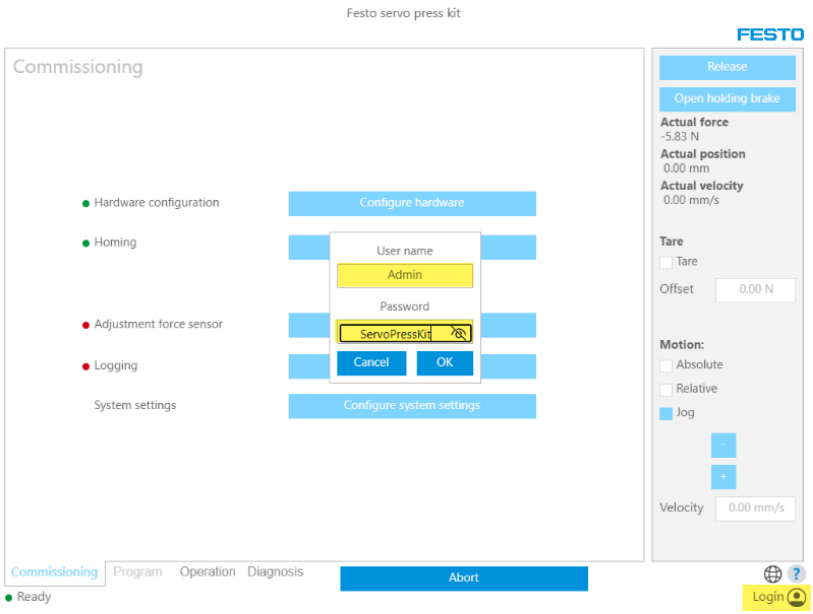
1. Open the browser in your PC and enter the below address or IP address of the CECC-X.
   http:// ‹ IP address of CECC-X › /cgi-bin/cecc-x-welcome



2. Click on the Codesys and go to “Webvisu-servo_press_kit”.

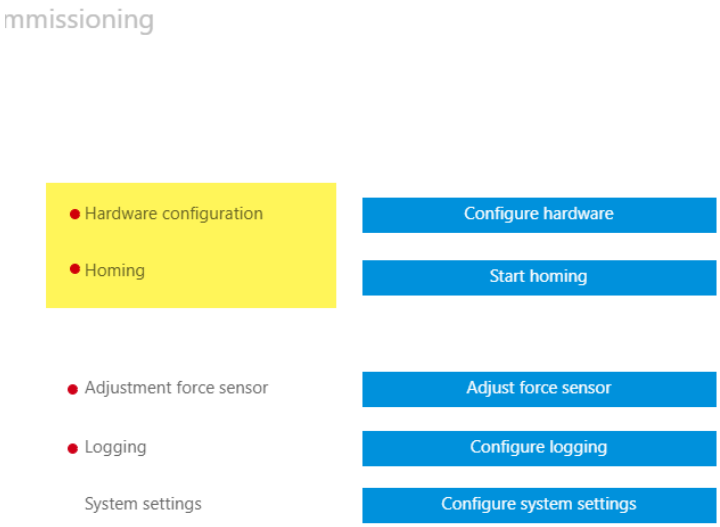


3. Log in with the user ID and password. By default
   - Username: **Admin**
   - Password: **ServoPressKit**



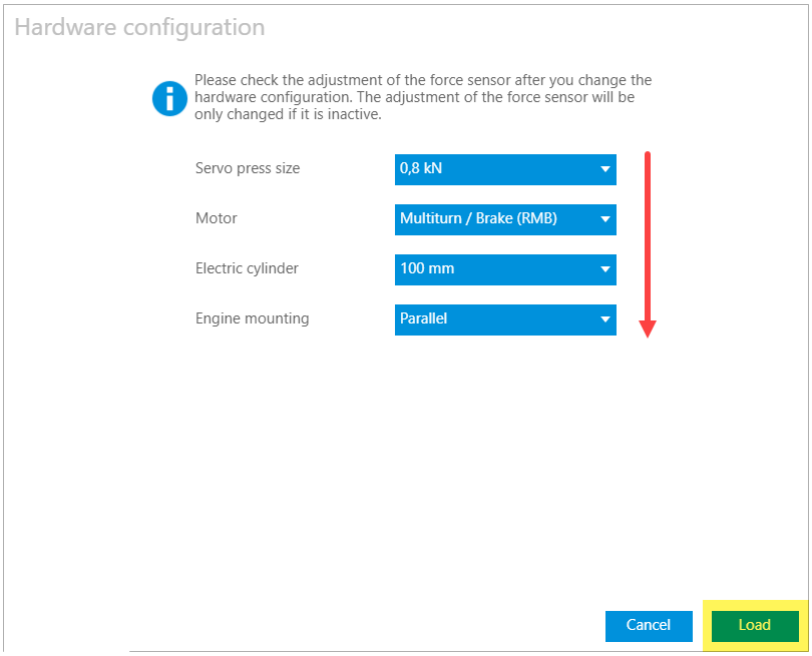
5.3.1 Hardware Configuration

1. Click on the Commissioning tab, you can see the Hardware configuration and Homing will be in red color. This indicates that the configuration and the homing was not done or invalid.

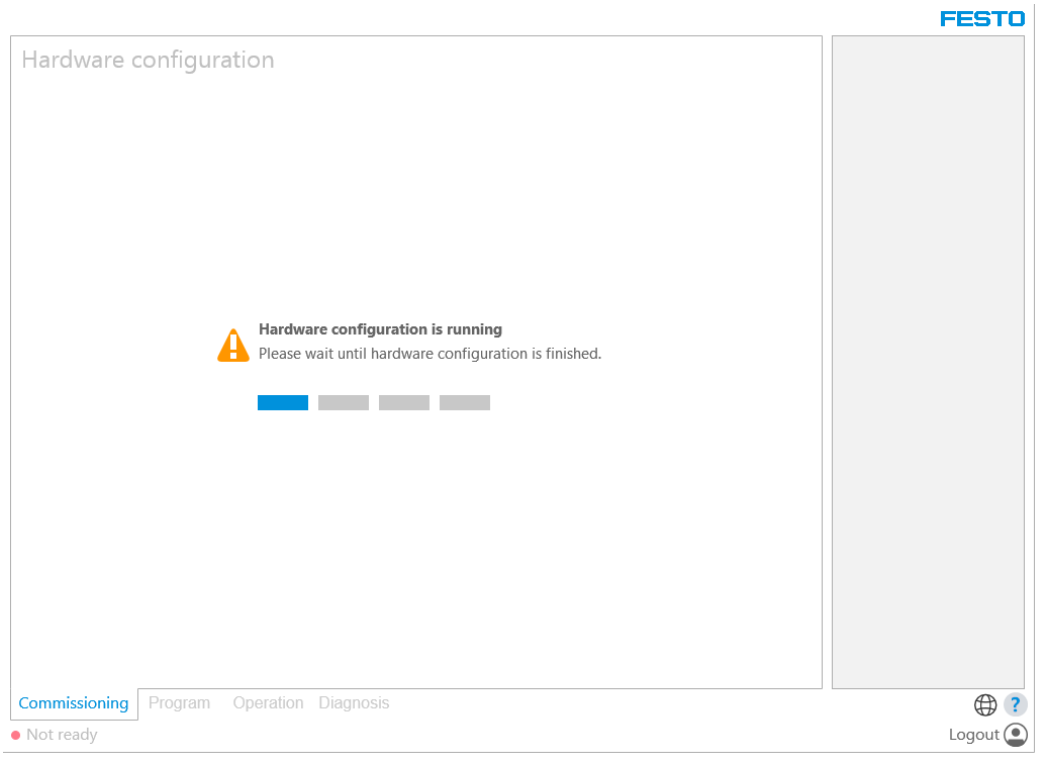


2. Do the hardware configuration by clicking the Configure Hardware tab.

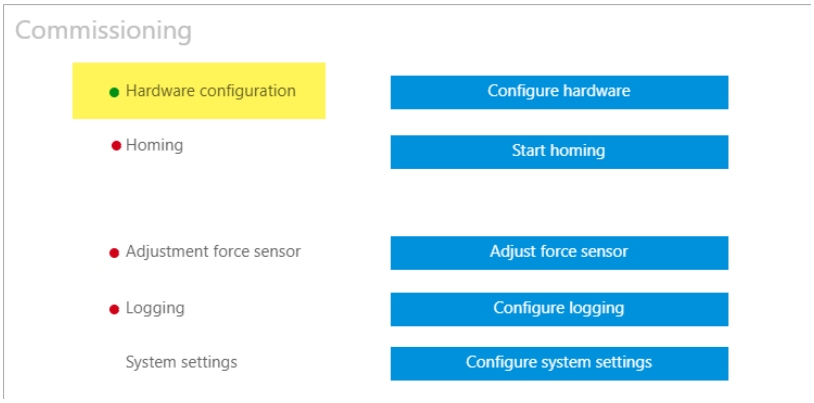
3. Configure the system based on your product selection and load the configuration.



4. All the hardware configurations will be loaded to the CMMT-AS directly from the WebVisu.



If everything is fine the hardware configuration will become green as shown below:



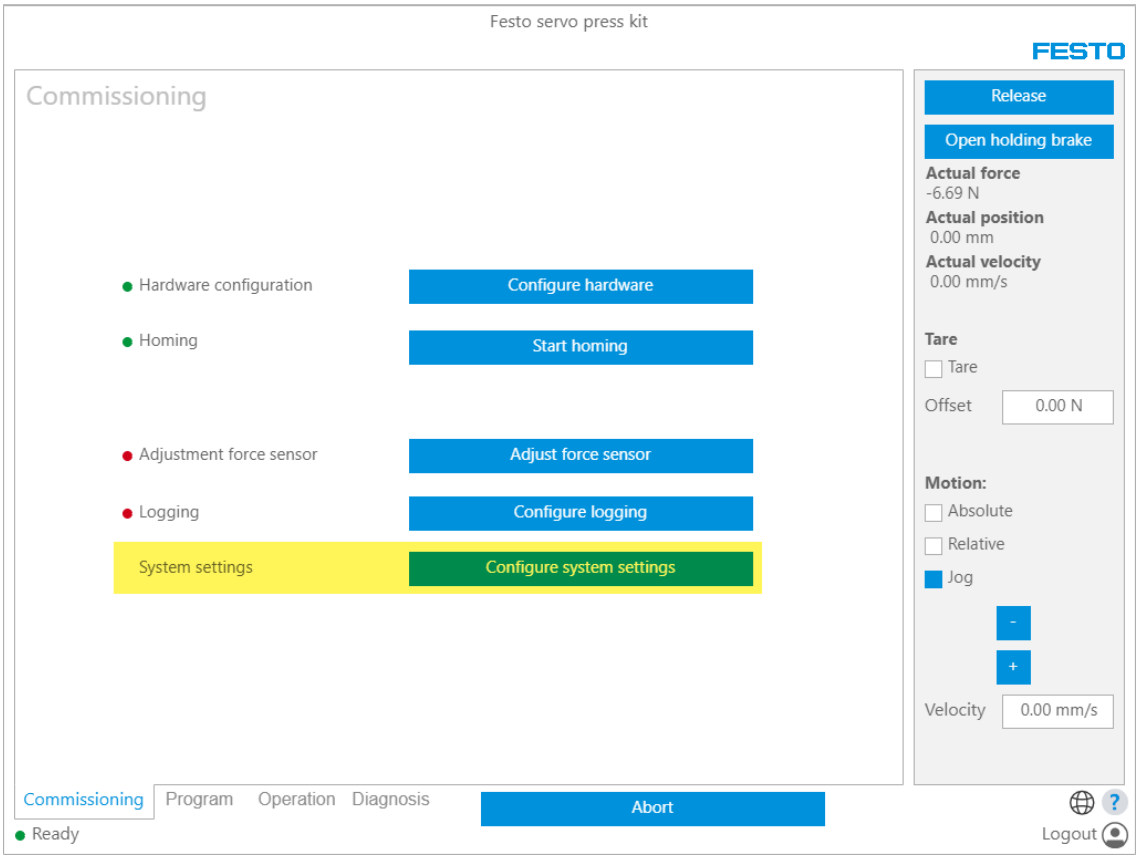
Important:
If there was an error downloading hardware configuration or the downloaded configuration did not work, do following in FAS:

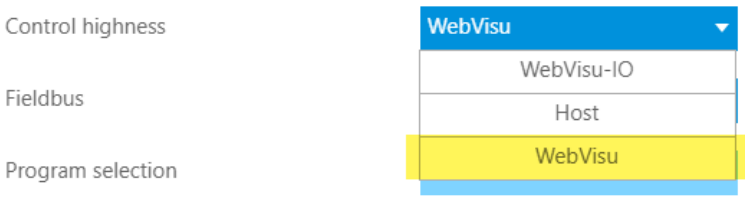
1. Factory reset on CMMT-AS.
2. Complete first commissioning of CMMT-AS with motor and ESBF.

Reason for the error might be CMMT-AS firmware version incompatibility with GSAY.

5.3.2 Homing

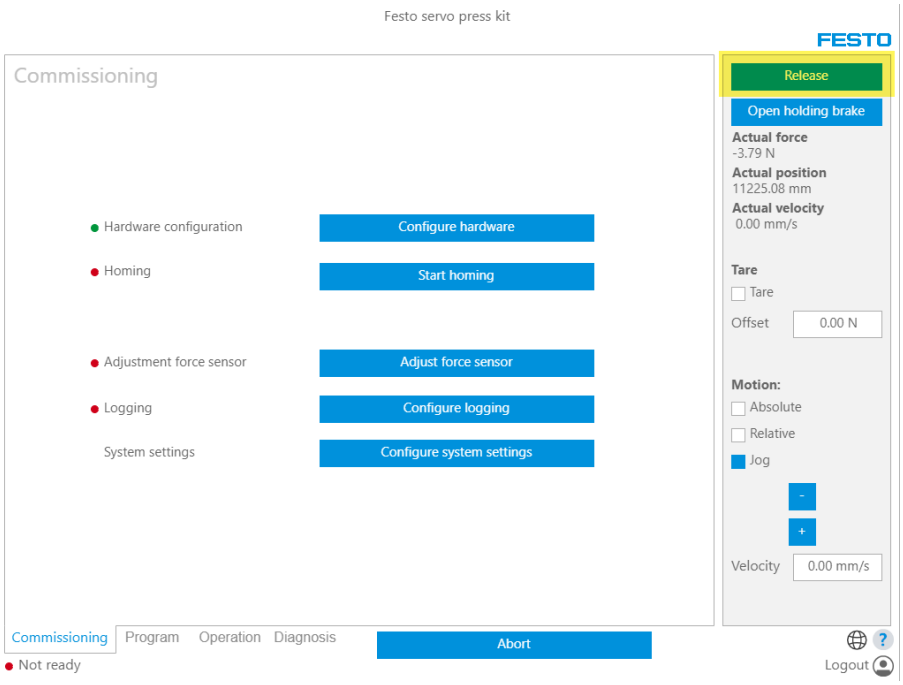
If you have a new system, you need to do homing independent of a single or multi-turn encoder. Without a working host connection homing can be done with WebVisu control.
WebVisu control can be activated in “Configure system settings”.





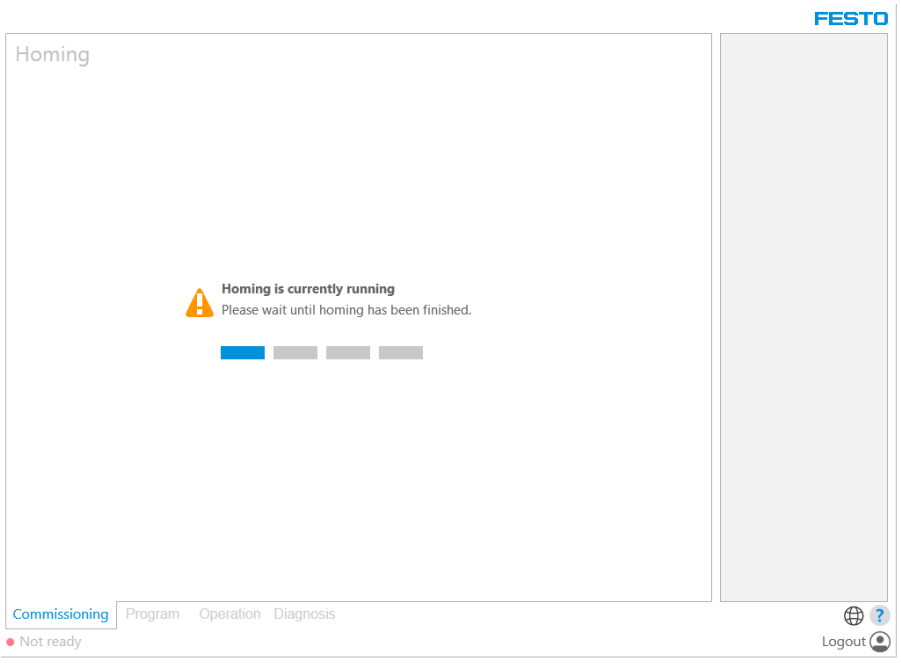
5.3.2.1 Homing with WebVisu

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”.

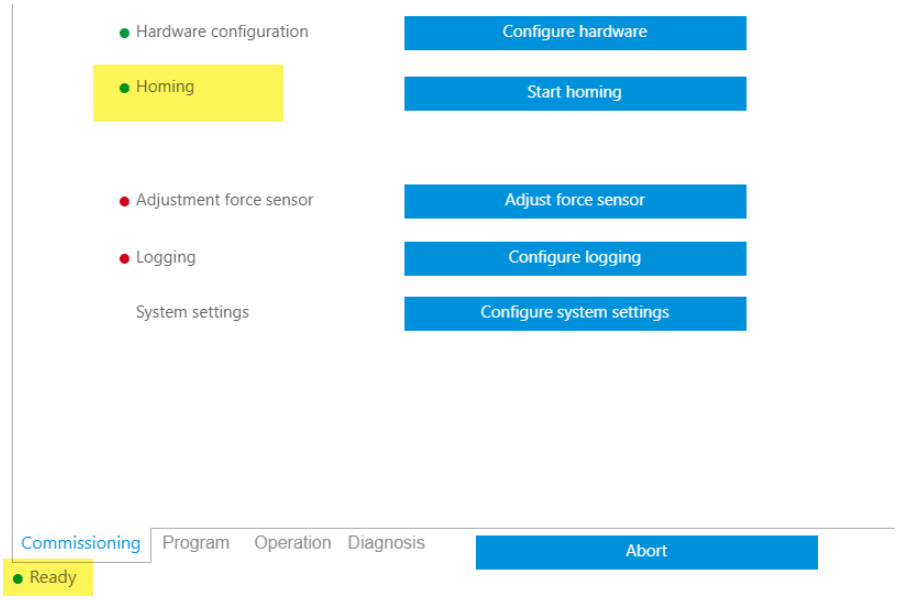


To start the homing please click on the button “Start homing.

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



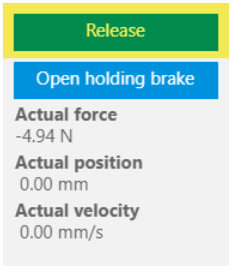
After a successful homing, homing will indicate a valid (=green) status.



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

5.3.3 Jogging

You can manually jog the system using WebVisu. To control the system with WebVisu, you need to activate the system by clicking on the “Release” button as shown.



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

2. Now you can test 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".