Application Note

Commissioning of IoT gateway with CPX

This application nodes describes step by step how you configure the CPX-IoT gateway with a CPX terminal

CPX-IoT (8069773)
CPX (197330)

100270

Title .....Commissioning of CMMO-ST-C5-1-LKP Modbus/TCP with Codesys V3
Version 1.10
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Author .....Festo

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Internet: http://www.festo.com

Table of contents

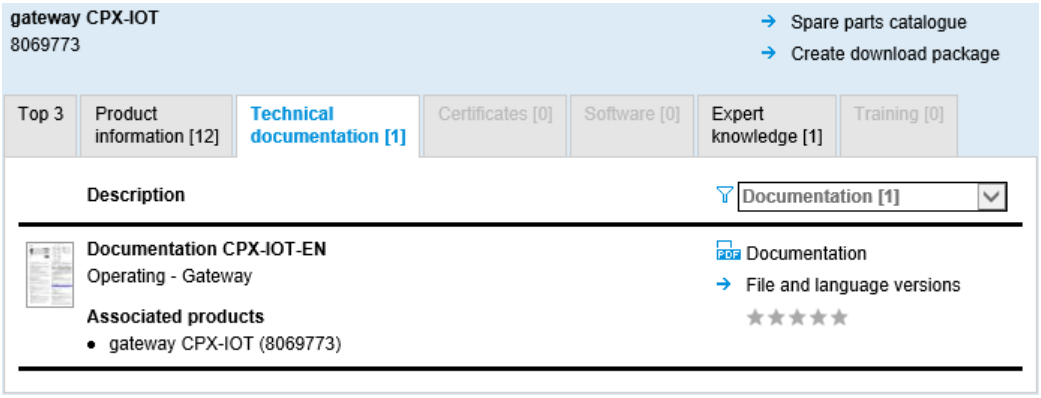
1 Used Components, Software, conditions etc.

Type/Name	Version Software/Firmware	IP address	Subnet mask
CPX-IoT	FW 1.2.30	192.168.0.10	255.255.0.0
CPX-CEC-C1-V3	FW 2.0.12.0.9221	192.168.0.20	255.255.0.0
FFT	V2.9.9.43663	--	--
FMT	4.21.210	--	--

Table 1.1: 1 Components/Software used

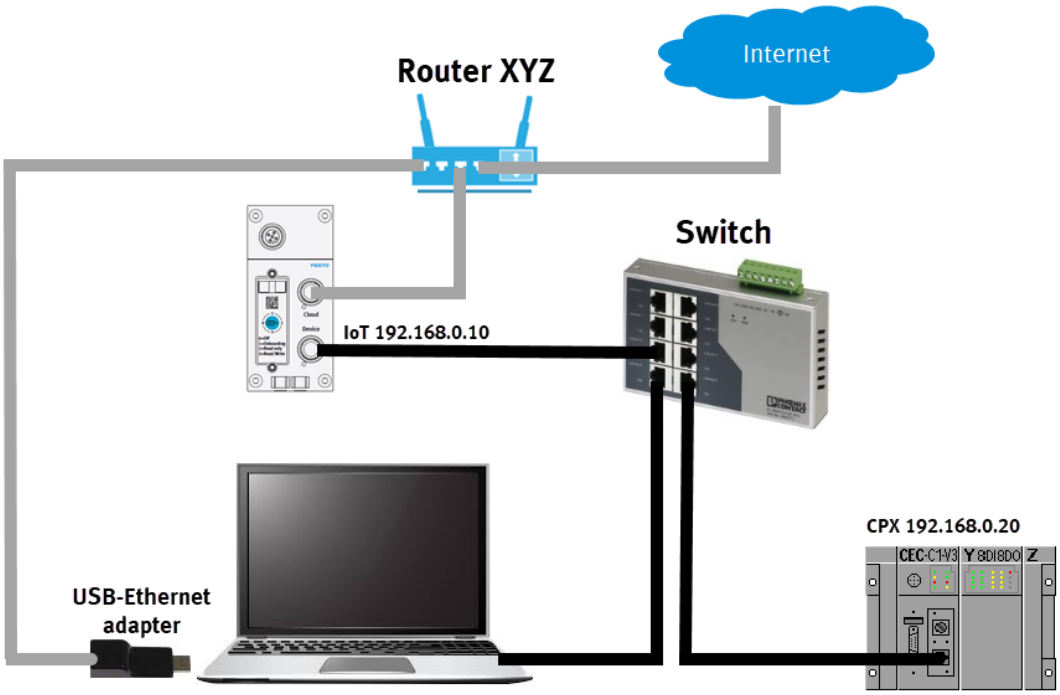
1.1 Recommended manuals / GSDML

A) CPX-IoT-EN



Source:
https://www.festo.com/net/en-gb_gb/SupportPortal/default.aspx?q=CPX-IOT&tab=3&s=t#result

1.2 Network topology



Hint:
Festo offers M12-RJ45, RJ45-RJ45 and M12-M12 connecting cables for the Ethernet communication:

Type code	Part number	Description
NEBC-D12G4-ES-0.5-S-D12G4-ET	8040446	M12-M12 -› 0,5m
NEBC-D12G4-ES-1-S-D12G4-ET	8040447	M12-M12 -› 1m
NEBC-D12G4-ES-3-S-D12G4-ET	8040448	M12-M12 -› 3m
NEBC-D12G4-ES-5-S-D12G4-ET	8040449	M12-M12 -› 5m
NEBC-D12G4-ES-10-S-D12G4-ET	8045450	M12-M12 -› 10m
NEBC-D12G4-ES-1-S-R3G4-ET	8045451	M12-RJ45 -› 1m
NEBC-D12G4-ES-3-S-R3G4-ET	8045452	M12-RJ45 -› 3m
NEBC-D12G4-ES-5-S-R3G4-ET	8045453	M12-RJ45 -› 5m
NEBC-D12G4-ES-10-S-R3G4-ET	8040454	M12-RJ45 -› 10m
NEBC-R3G4-ES-1-S-R3G4-ET	8040455	RJ45-RJ45 -› 1m

More information:
https://www.festo.com/net/en-gb_gb/SupportPortal/default.aspx?q=8040446&tab=3

1.3 Pre-Conditions

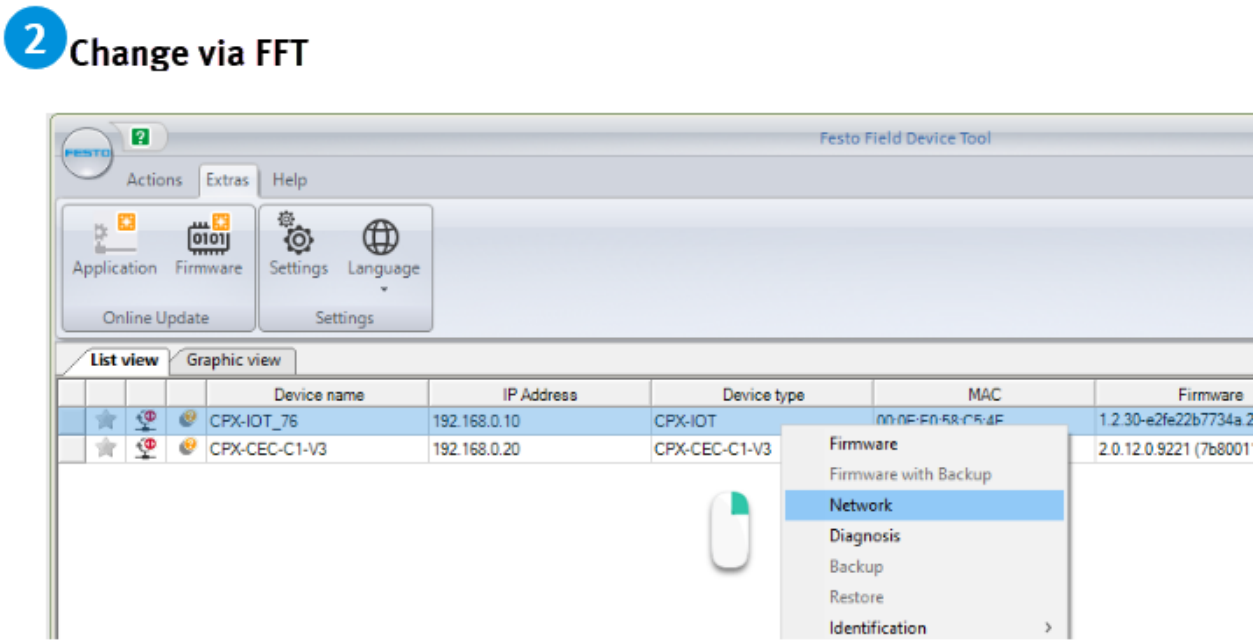
1. The IoT gateway has following IP factory settings
   IP address: 192.168.0.1
   Subnet mask: 255.255.255.0

Note:
Before you connect the IoT gateway please ensure that no other devices existing in your production network with the same IP address.

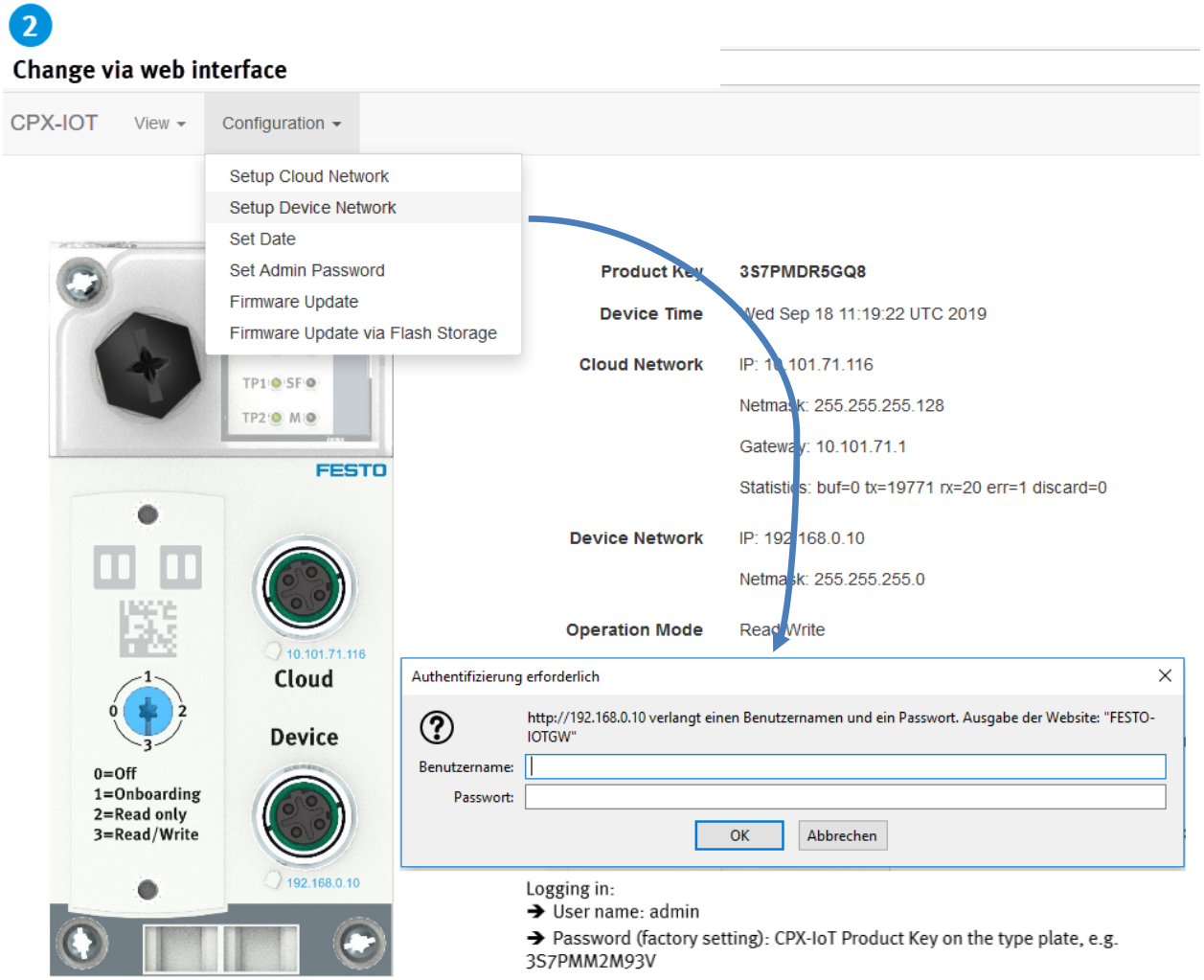
The FFT software or the IoT web server can be used to change the IP address of the IoT gateway. Therefore, please do following:

Connect your laptop which has a fixed IP address (192.168.0.xxx) to the CPX-IoT “Device” port:

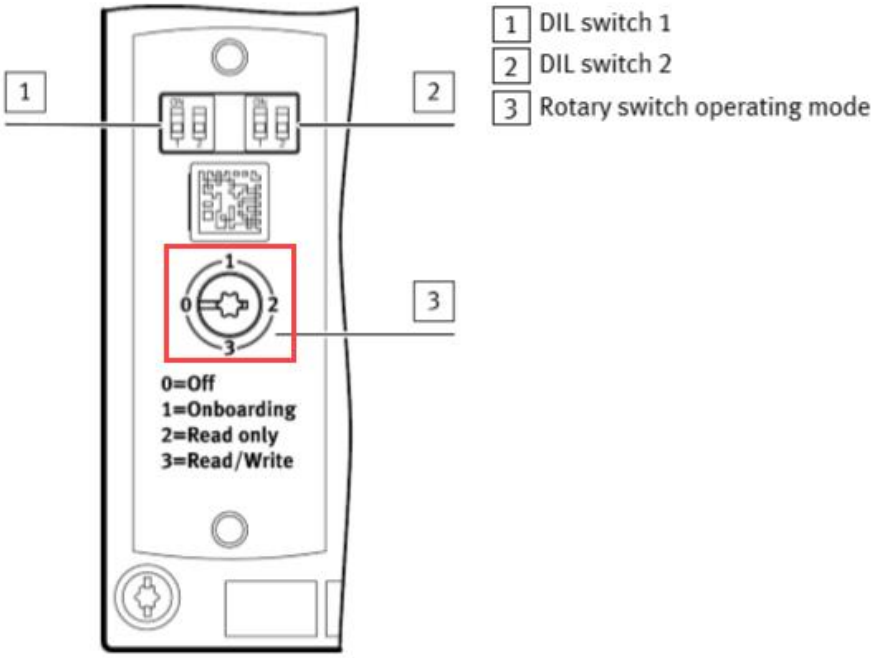
Start the FFT software to change the IP address



Or use the web interface with the IP address and e.g. the Firefox browser



2. For the first commissioning the IoT DIL and rotary switch should have following positions:



DIL switch 1

Switching position		Function
	DIL 1.1: Off (factory setting)	Reserved
	DIL 1.1: On	Reserved

Tab. 10 DIL switch 1.1

Switching position		Function
	DIL 1.2: Off (factory setting)	Reserved
	DIL 1.2: On	Reserved

DIL switch 2

Switching position		Function
	DIL 2.1: Off (factory setting)	Reserved
	DIL 2.1: On	➔ 10 Reset to factory setting ("Factory Reset")

Tab. 12 DIL switch 2.1

Switching position		Function
	DIL 2.2: Off (factory setting)	Reserved
	DIL 2.2: On	➔ 10 Reset to factory setting ("Factory Reset")

Tab. 13 DIL switch 2.2

Rotary switch operating mode

Switching position		Operating mode/function
	0: Off	– Network connection "Cloud" deactivated (switch-off of interface) – No communication with the cloud
	1: Onboarding	– Network connection "Cloud" activated – Gateway for integration into the cloud ("Onboarding") ready
	2: Read only	– Gateway sends process data of the configured field devices to

3. The network connection is established, and the devices are powered on

If the rotary switch is on position 1 and no network problems exist, then the status after power on is:

Cloud Led:

Flashes blue 1x		Creation or new creation of a connection to the cloud

NS Led:

Flashes green		No connection to field devices ("Devices"): The gateway is online and has an IP address, but is not yet connected with field devices.

Both TP Led's:

Flashes green		Data traffic ("Traffic")[1]

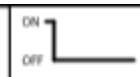
M Led:

Illuminated yellow		The gateway is not yet integrated into the cloud application. The gateway is in the operating mode "Off", "Read only" or "Read/Write" ➔ 6.3 Rotary switch operating mode.

PS Led:

Illuminated green		Normal operating status: Operating voltage applied.

SF Led:

Off		Normal operating status: No error.

A running system with e.g. CPX-CEC-C1-V3 and ready for a Cloud connection is looking like following:

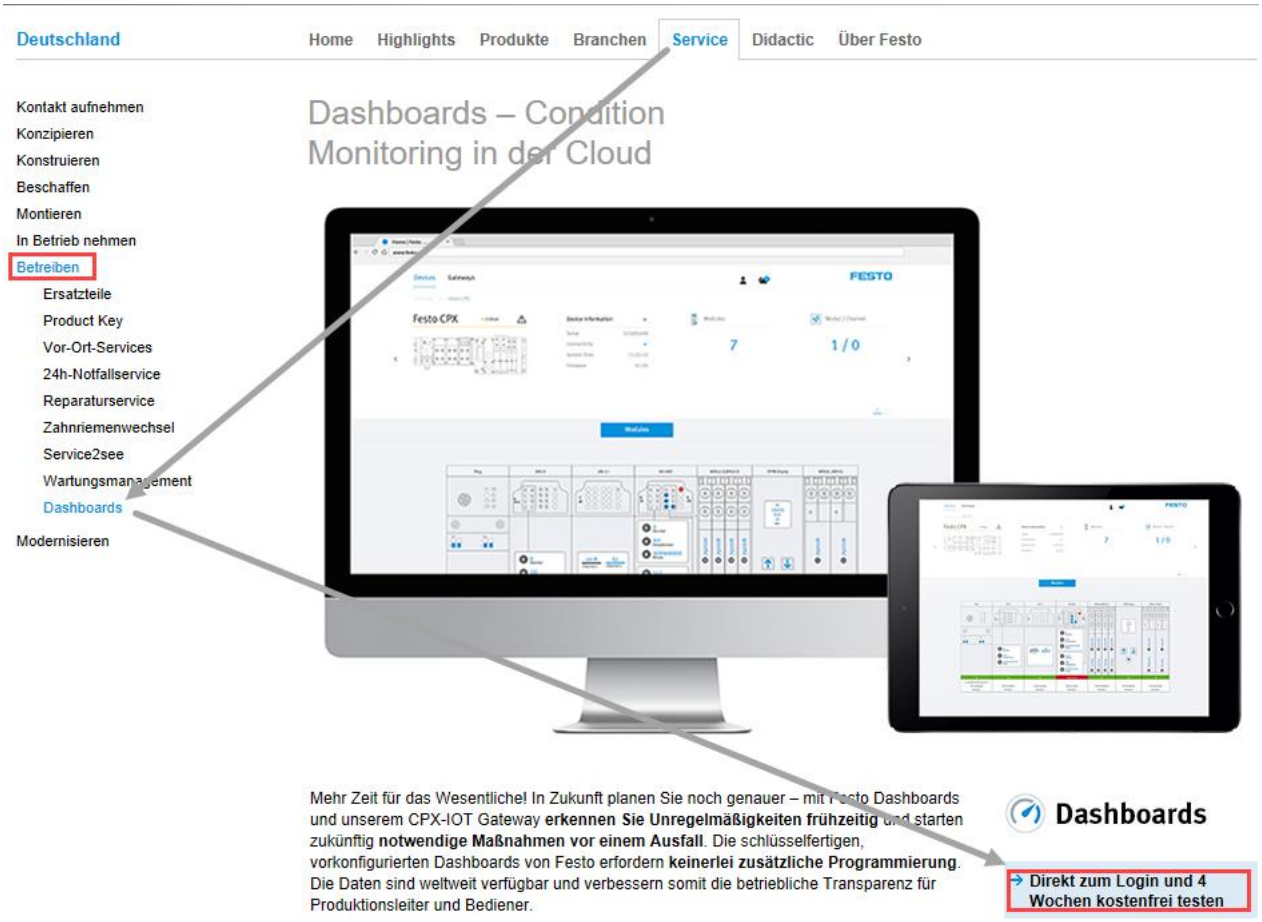
(Example of the LED status)

2 Boarding process

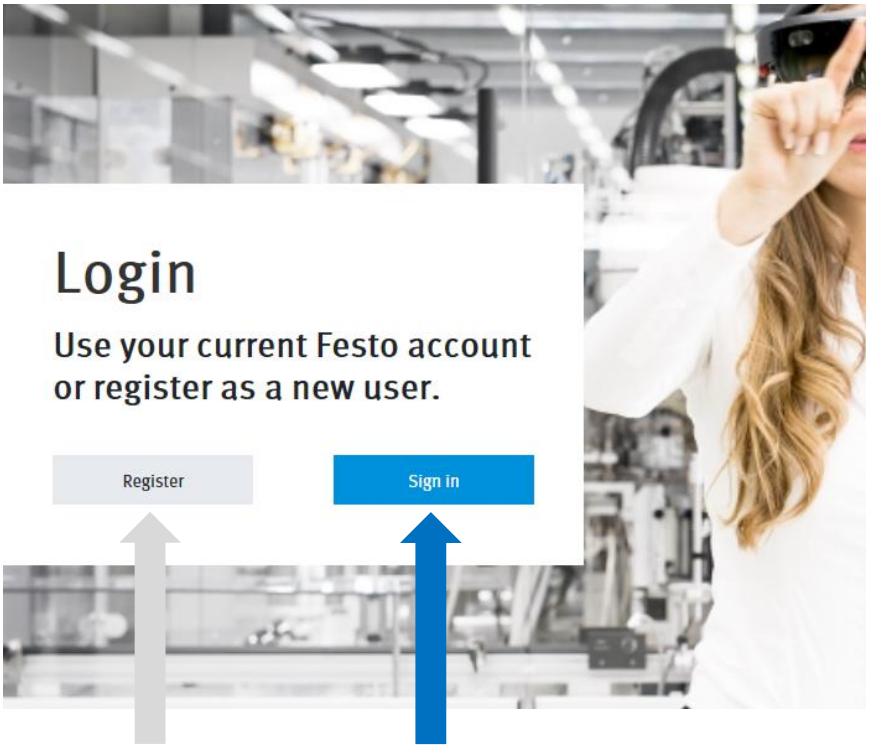
2.1 Login

The Login is available on the German Festo homepage (Service -› Betreiben -› Dashboards -› Login)

➔ https://dashboards.festo.com



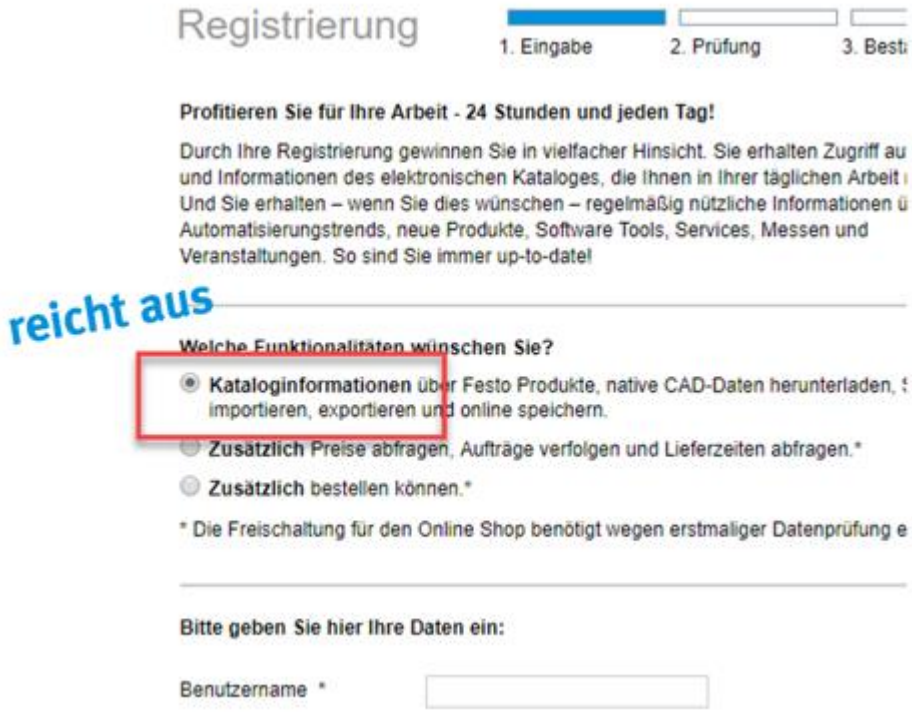
To Login you need a Festo account



No Festo shop user yet Existing Festo shop user

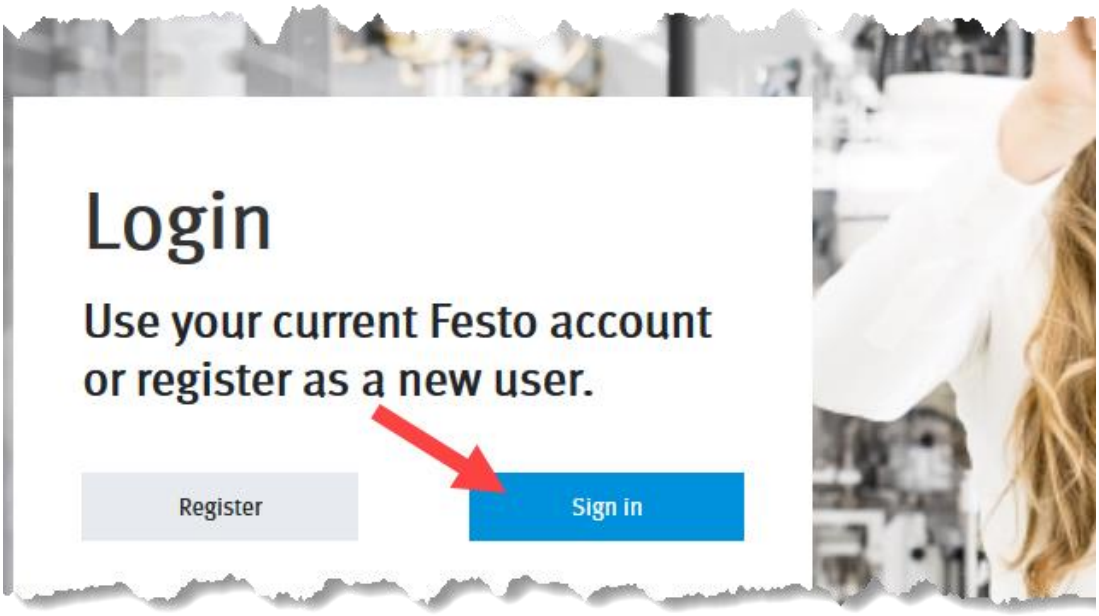
To create an account just press the register button:

Note:
To use the Festo dashboards the level “catalogue information” is enough:



As soon as you have the Login data two steps are left

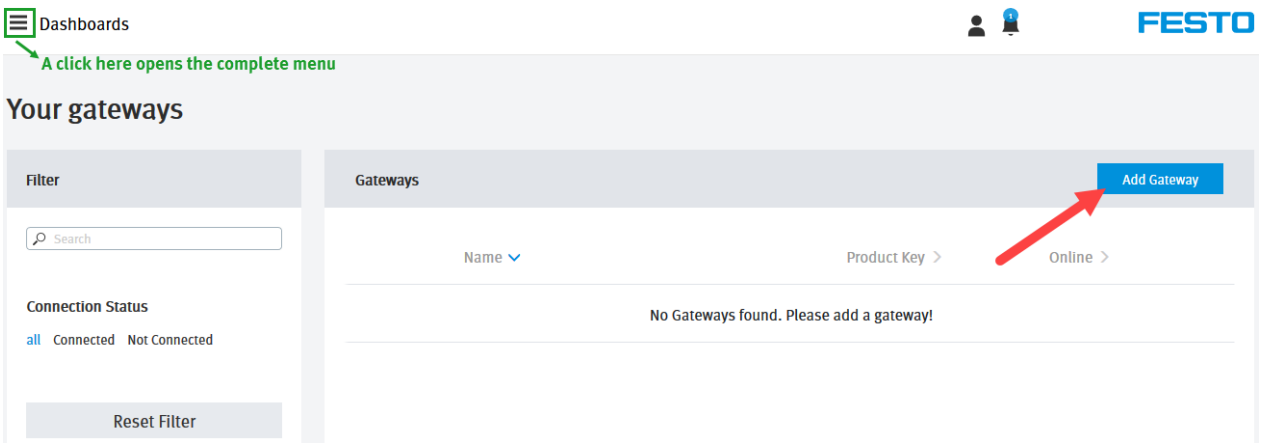
1. Login



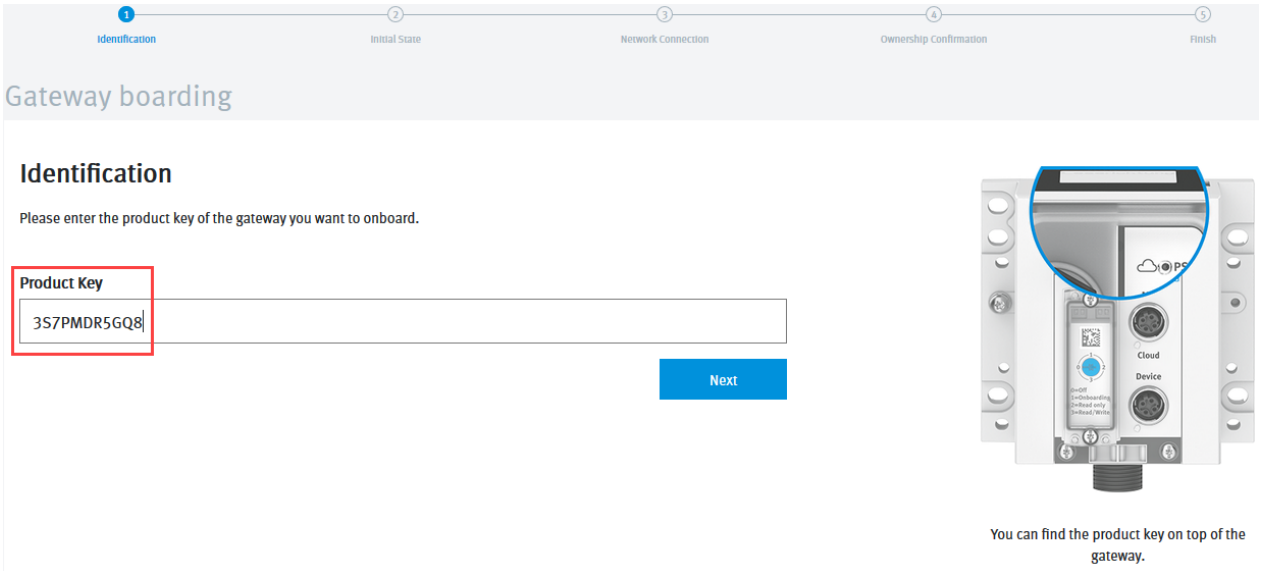
2. Enter user name

2.2 Add the IoT Gateway

Step 1:

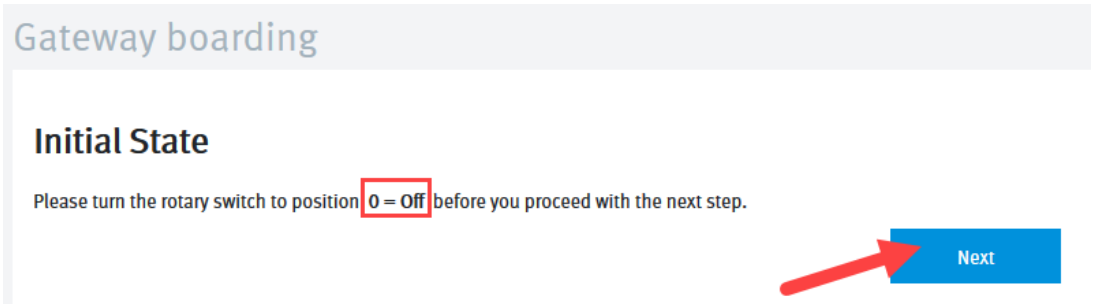


Step 2: Type in your product key



Note:
You find the product key on the CPX-IoT label:

2.3 Initialization

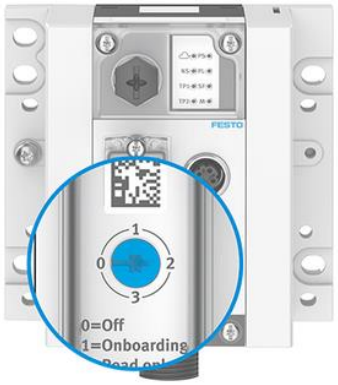


Note:

With the rotary switch you define the IoT operation mode

The meaning is following:

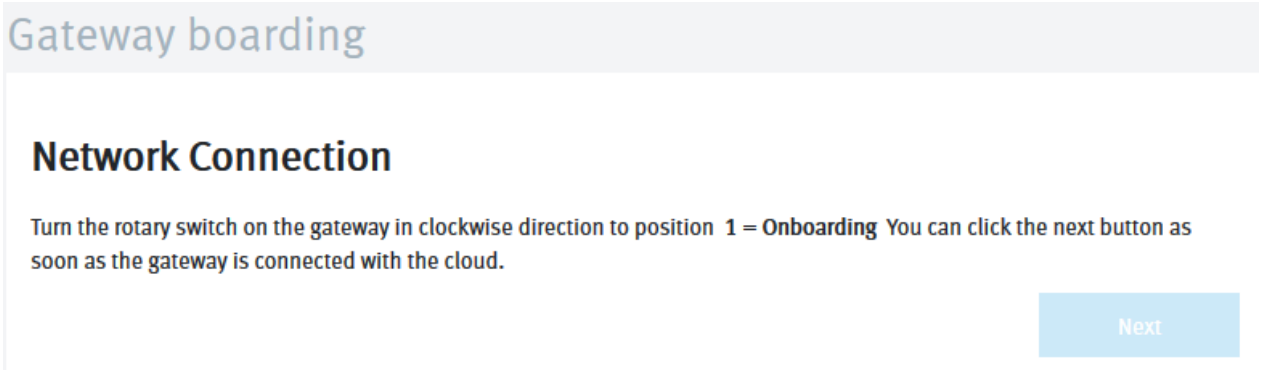
0 = OFF
1 = Onboarding
2 = Read only
3 = Read/ Write



Switching position		Operating mode/function
	0: Off	– Network connection "Cloud" deactivated (switch-off of interface) – No communication with the cloud
	1: Onboarding	– Network connection "Cloud" activated – Gateway for integration into the cloud ("Onboarding") ready
	2: Read only	– Gateway sends process data of the configured field devices to the cloud – Manual adding of field devices enabled – Automatic adding of field devices via the Auto-Scan function blocked – Removal of field devices and removal of the gateway from the cloud ("Offboarding") blocked – Receipt of data, e. g. parameters, from the cloud disabled – Parameters of connected devices cannot be changed
	3: Read/Write	– Gateway sends process data of the configured field devices to the cloud – Manual adding of field devices enabled – Automatic adding of field devices via the Auto-Scan function enabled – Removal of field devices and removal of the gateway from the cloud ("Offboarding") enabled – Receipt of data, e. g. parameters, from the cloud enabled – Parameters of connected devices can be changed

2.4 Gateway Boarding

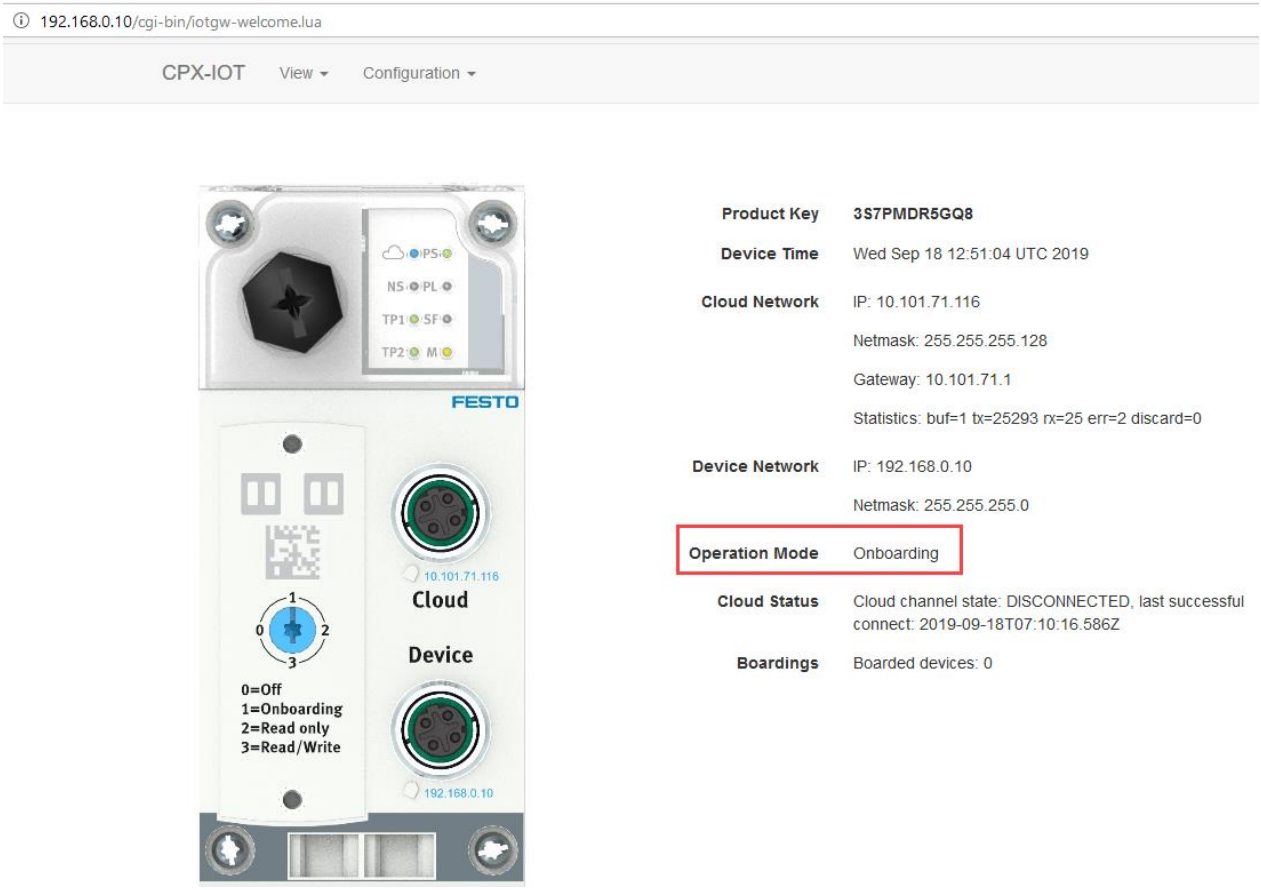
In the next step we switch the rotary switch to position 1



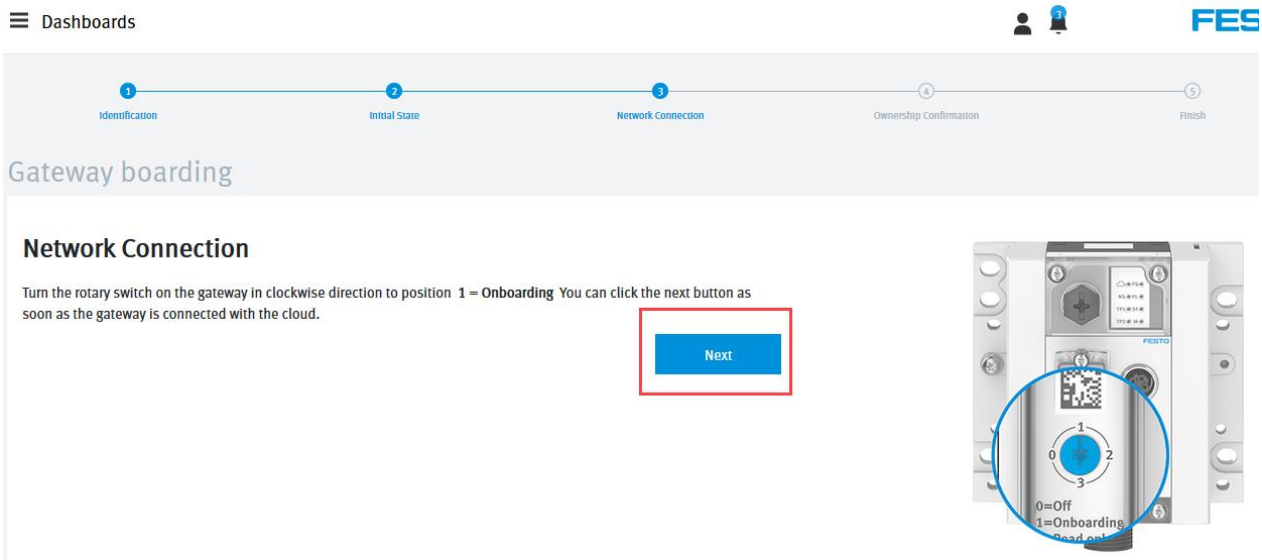
As soon as the IoT gateway has a connection to the Cloud the “Next” button will be active. This procedure can take some **minutes:**

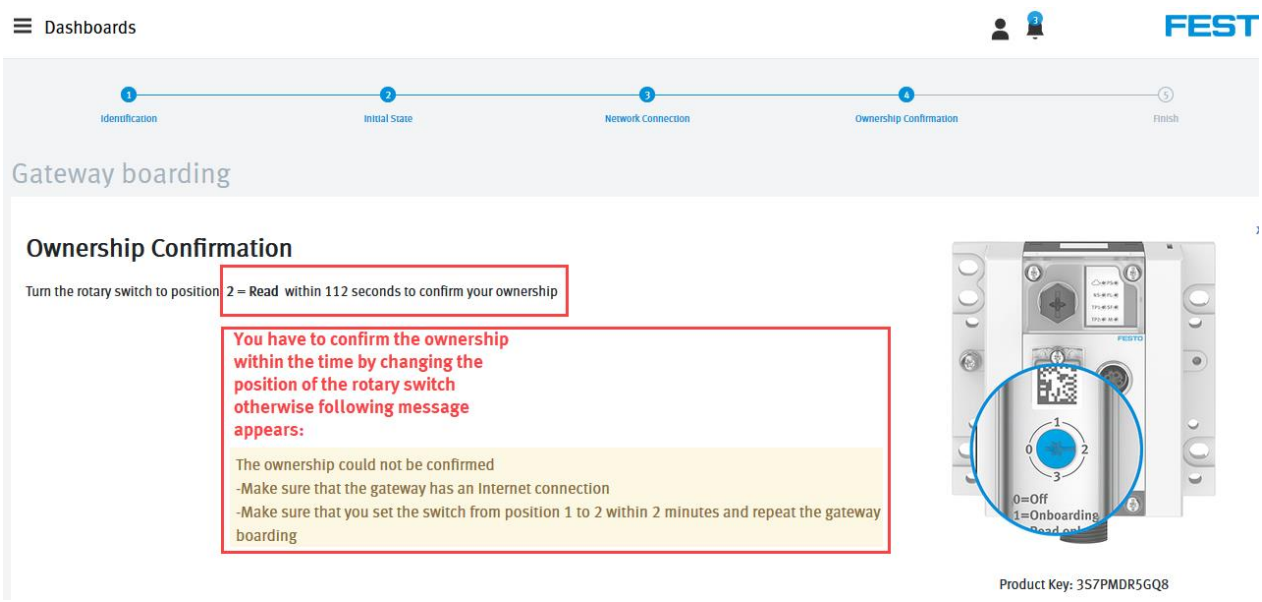
Note:
The TP1 connection is only active if the rotary switch is actuated from 0 to 1.
The flashing behavior of the Cloud LED shows that a connection procedure has started:

The integrated web server can be used in the local network to check the status.
Therefore, you must type in the IP address of the IOT gateway (default 192.168.0.1) in e.g. your Firefox browser.
A connection to the cloud only exists if the following is visible in the web server:

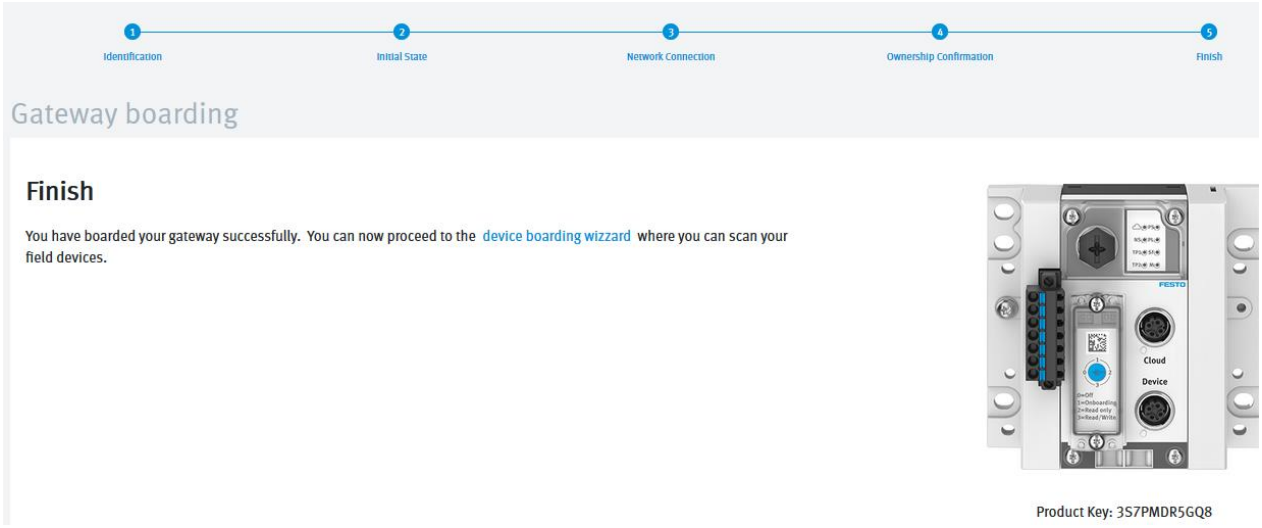


As soon as the boarding was successfully the next Button is active:

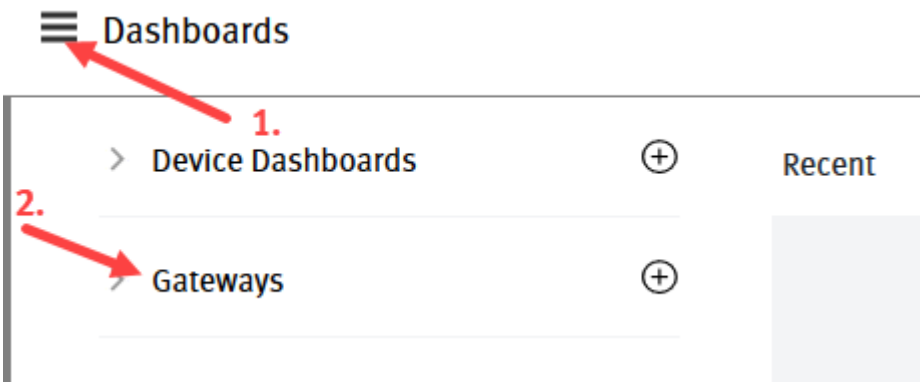


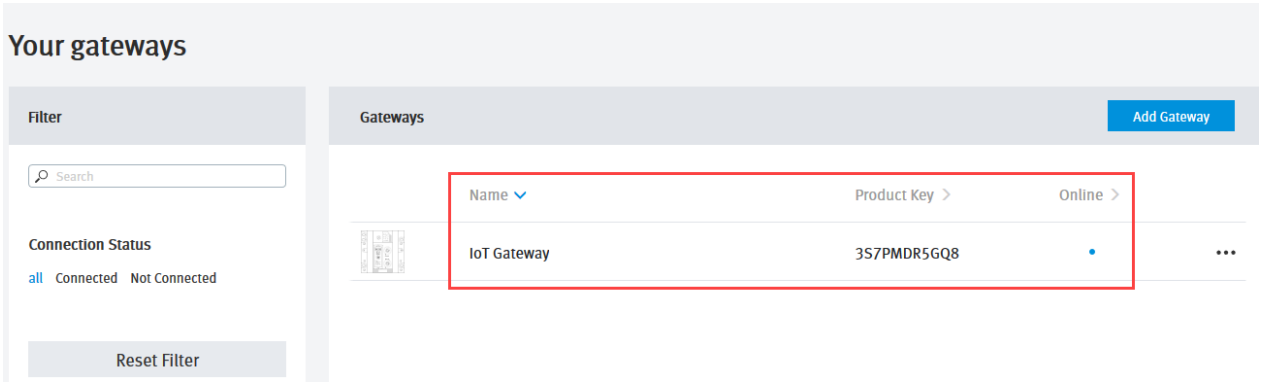


If you switch the rotary switch, then you get following screen:



The IoT gateway is available now and has a connection to the cloud



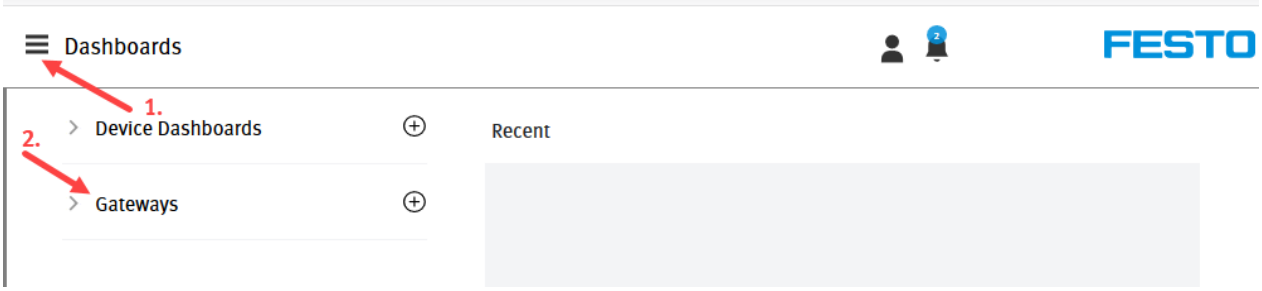


2.5 Device boarding

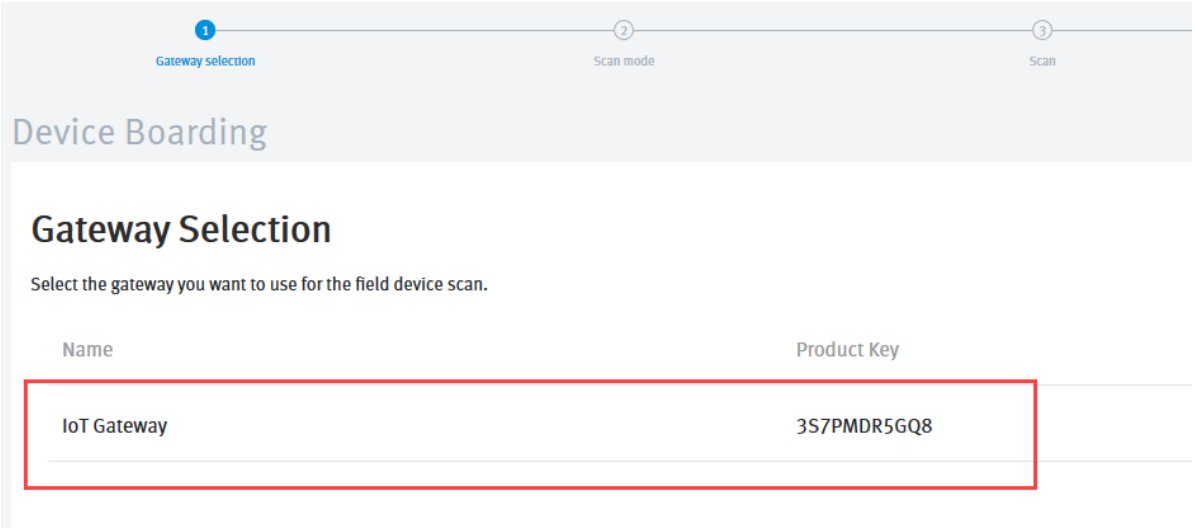
After you have boarded the gateway successfully you can add your device dashboards

Note:
You can have maximum 15 device dashboard which are connected to one IoT gateway

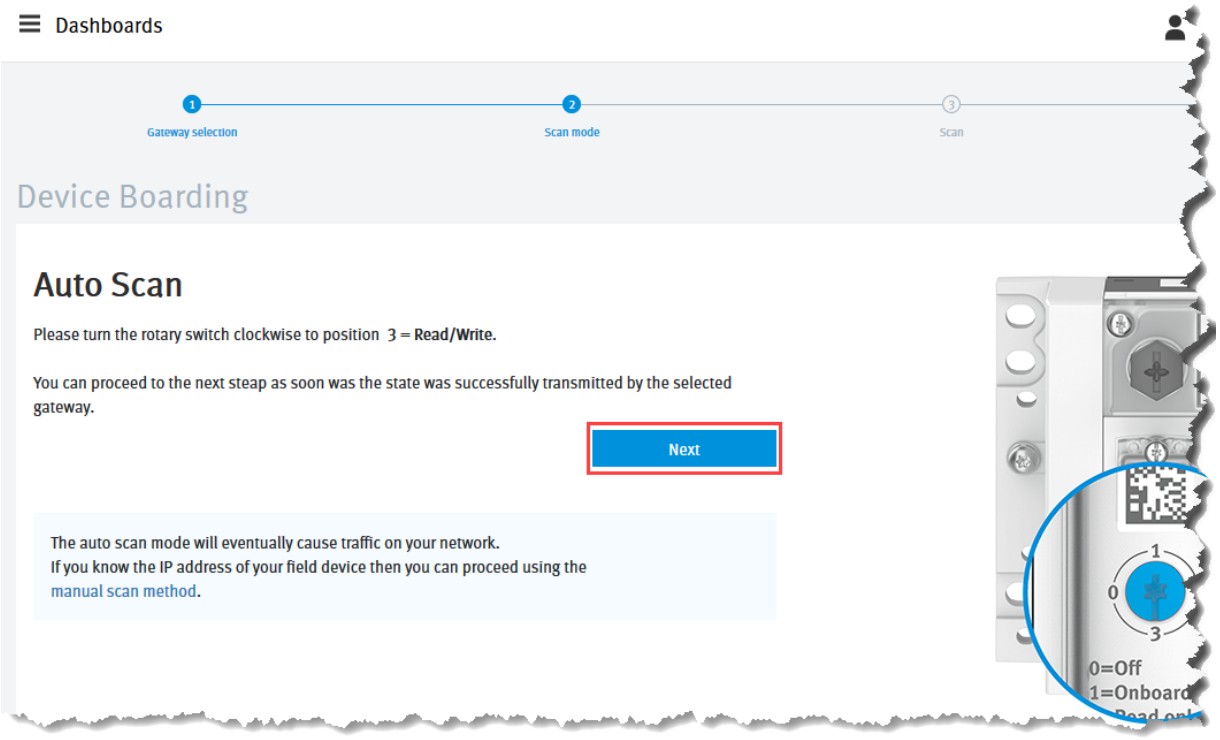
Step1: Open the tab device dashboards



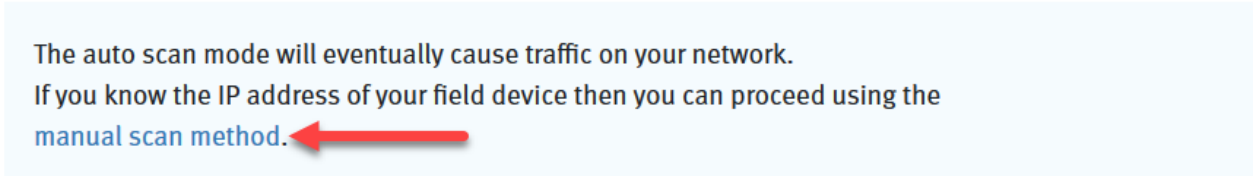
Step2: Choose the corresponding gateway:

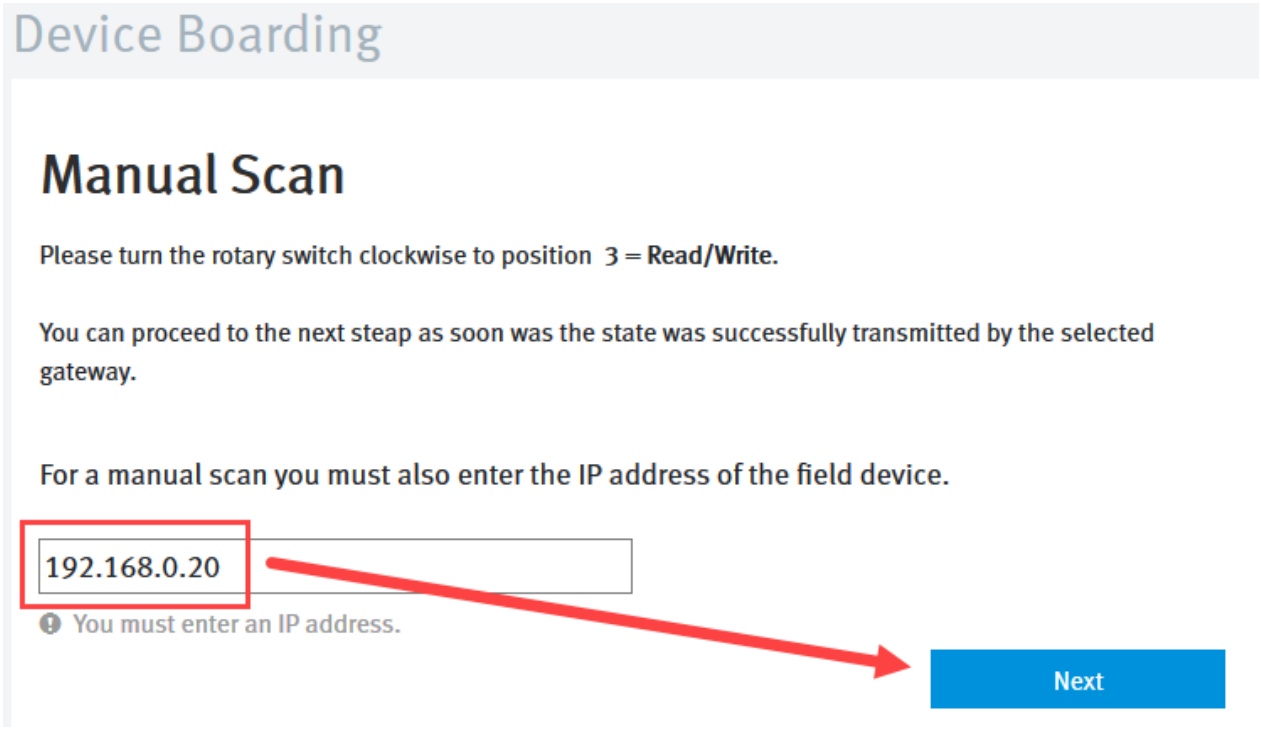


Step3: Activate the network scan function on TP2 via rotary switch position 3

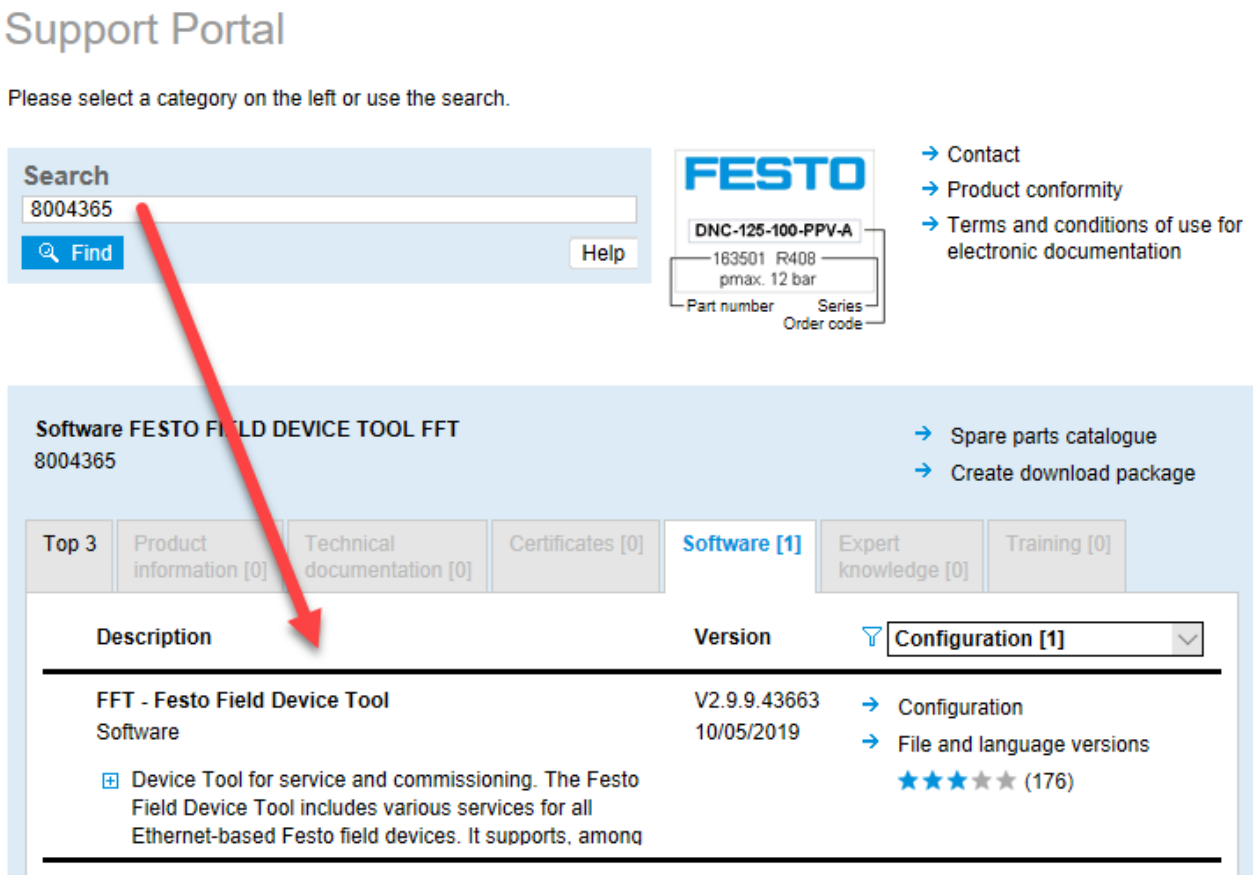


Note:
If you have problems with the Auto Scan function due e.g. high network load you can type in the IP address manually too:

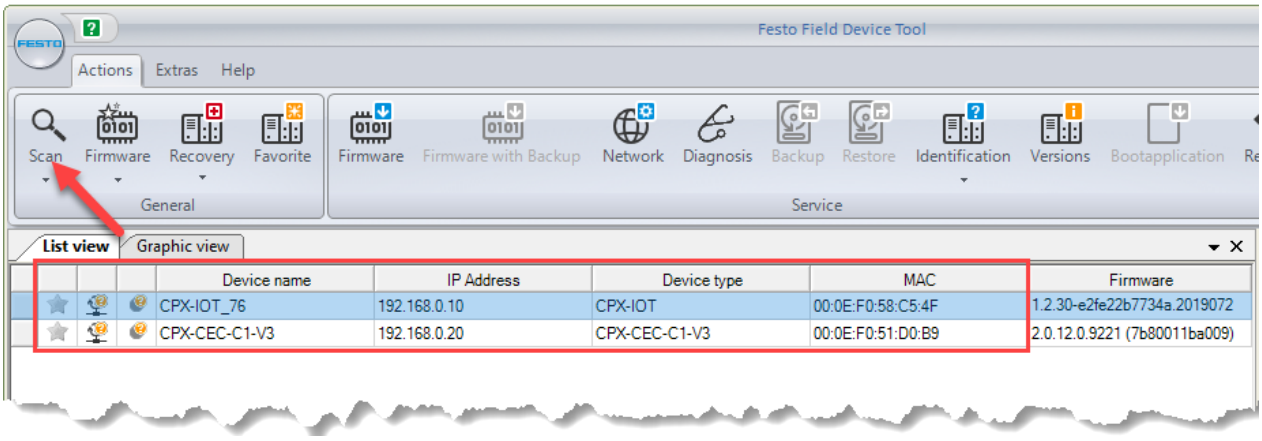




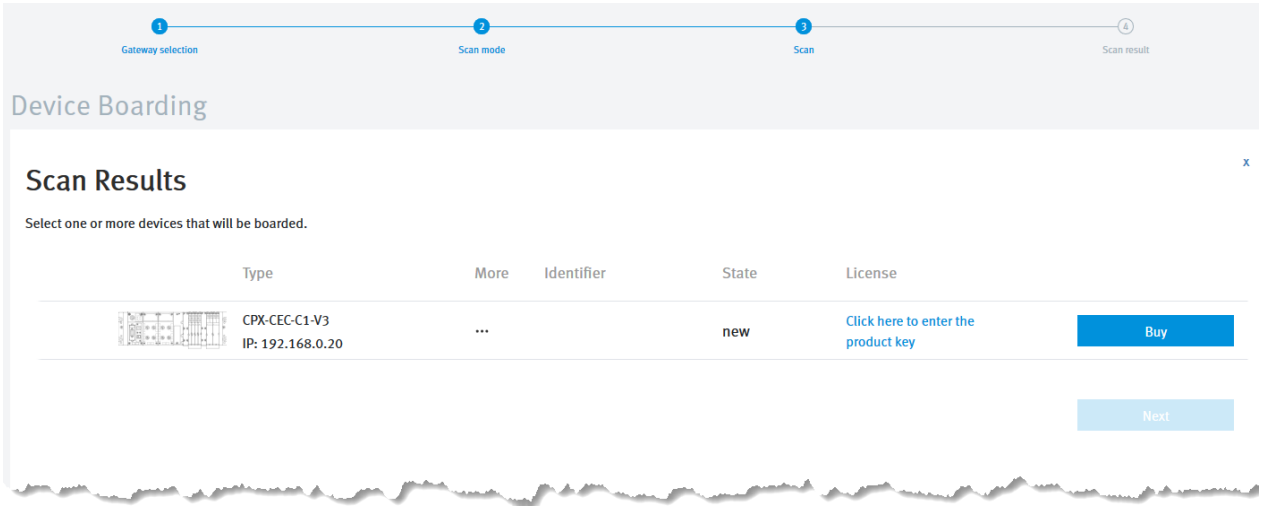
To check which Festo device are in the network available you can use the FFT software. The software you find in the Festo support Portal as free download:



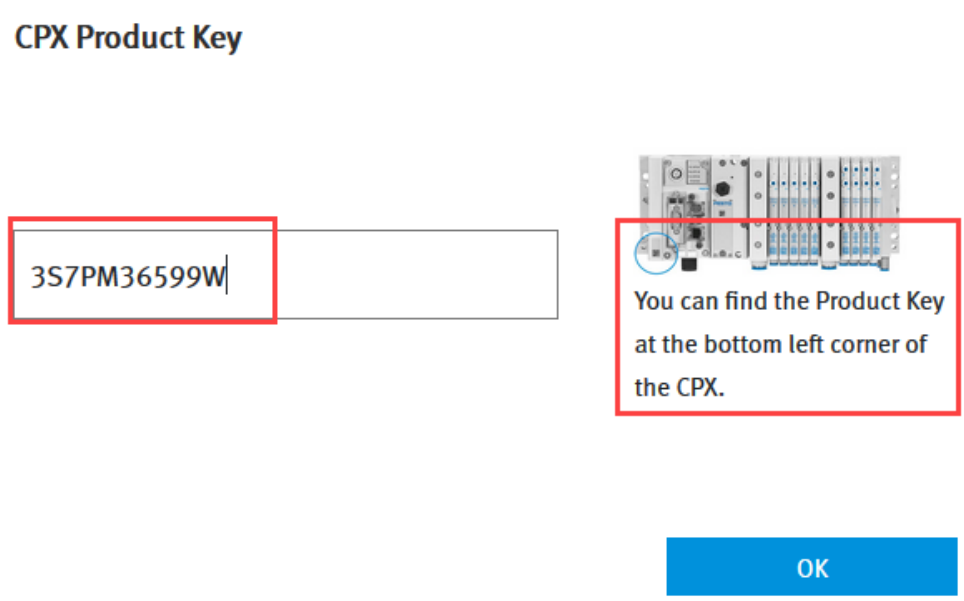
Via the FFT Search mechanism you find all Festo devices very easily:



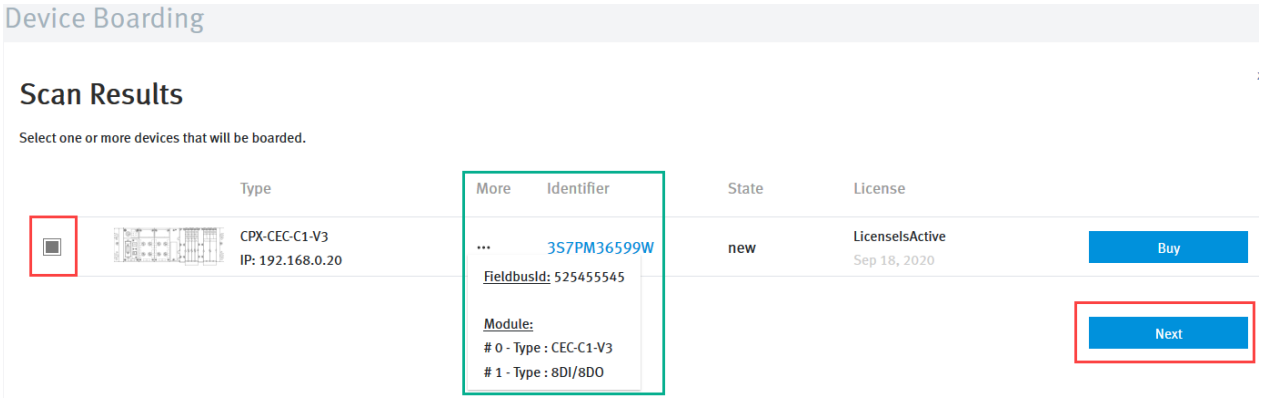
Step 4:
After a succesful Auto Scan you will see all available Festo devices:



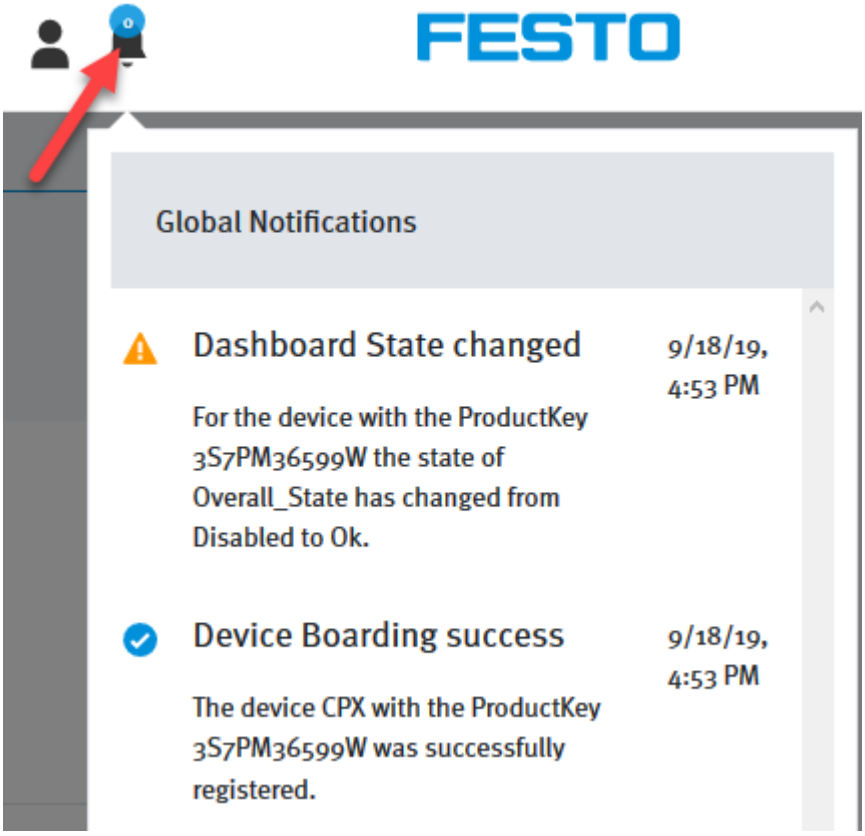
As soon as you enter the product key of the connected device a “Cloud-Device” relation is created:



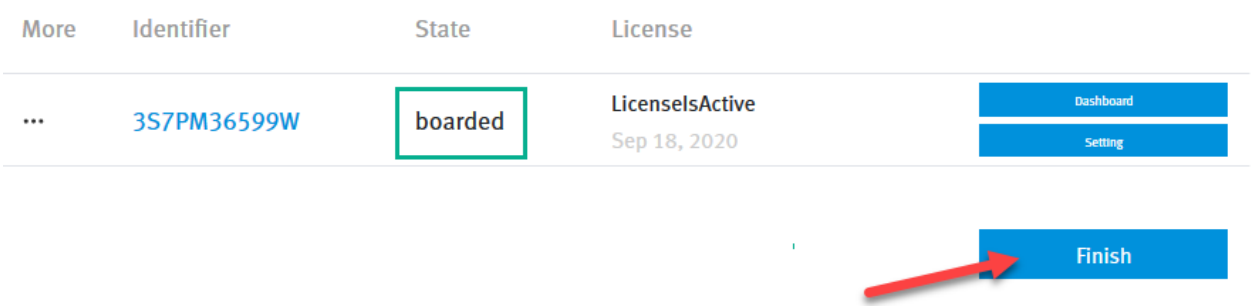
If you have bought a dashboard license for your product key already then, the “Next” button is active as soon as you have marked your Terminal

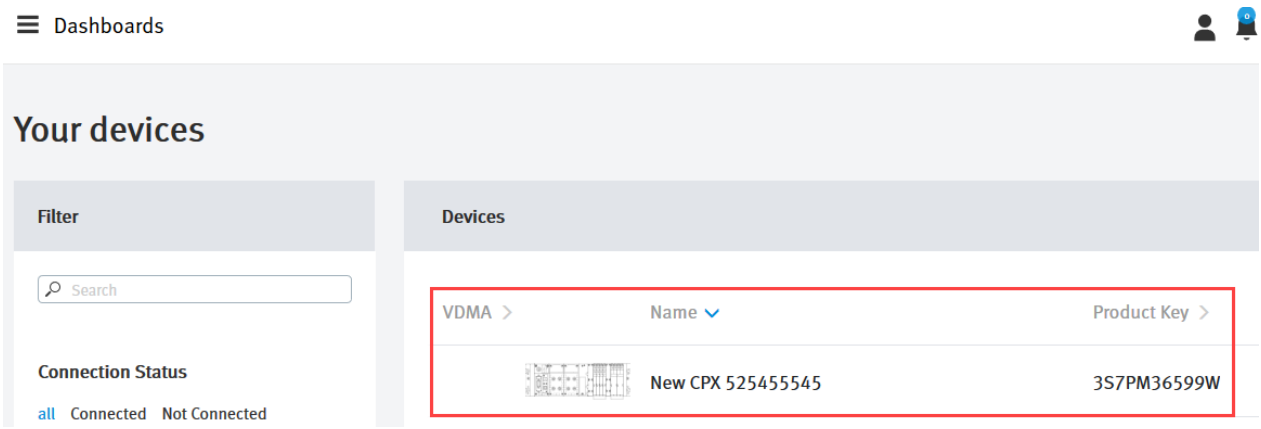


The notification tells you the result:



And via the “Finish” button you are going to the device view:





Via mouse click you get access to the data of the boarded device which are in the Cloud available now: