fischertechnik

LEARNING FACTORY 4.0 24V

Accompanying booklet

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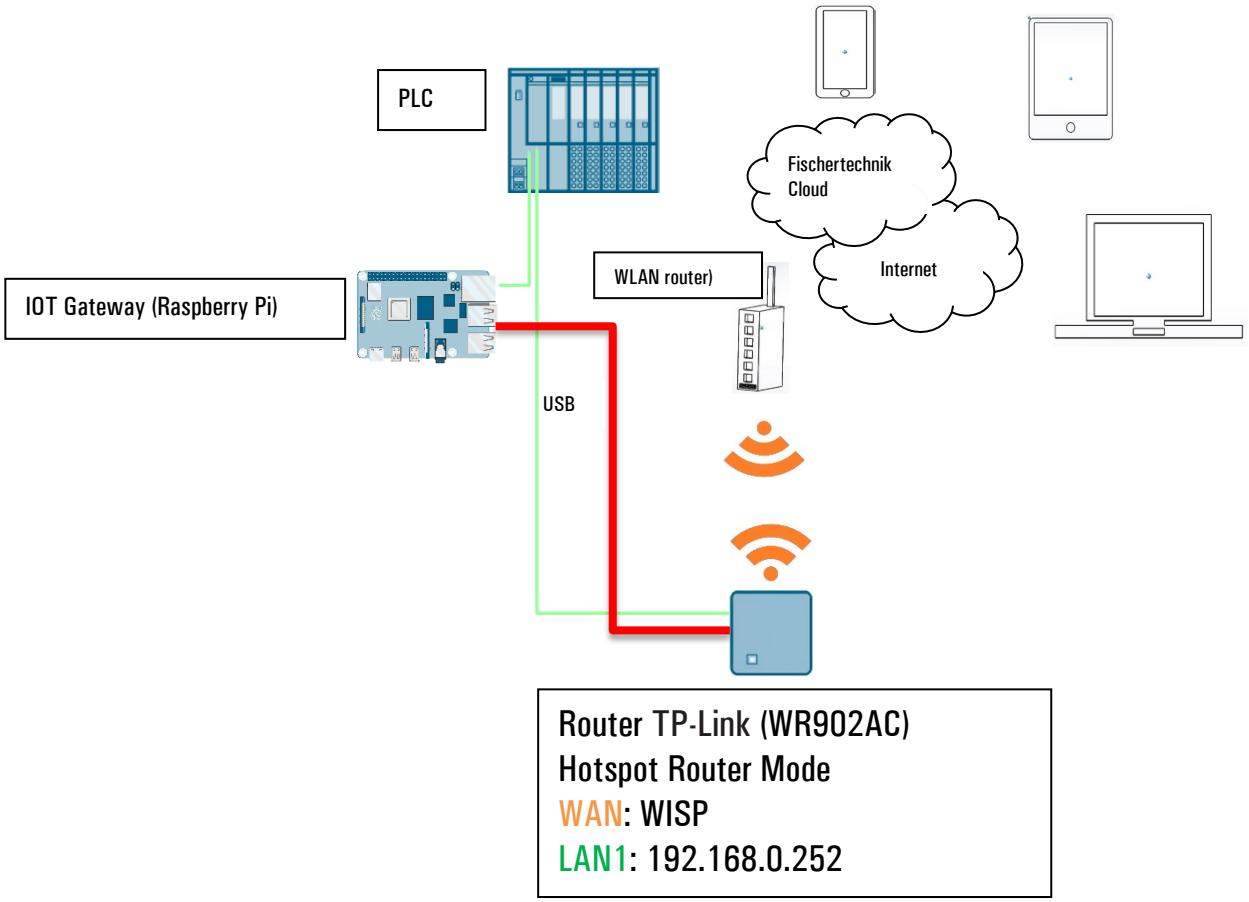
Contents

Connecting the Learning Factory 4.0 with the Internet

To connect the Learning Factory 4.0 to the Internet and thus to the fischertechnik Cloud, the TP-Link router is connected to a wireless WAN in WISP mode.
The fischertechnik Cloud dashboard can then be accessed via mobile devices such as tablets, smartphones, laptops or PCs.

Connection of the TP-Link router (WR902AC) in WISP mode

The TP-Link router is connected to the IOT gateway (Raspberry Pi 4) for power supply via USB. However, it can also be supplied with power via an alternative USB type A socket. The Ethernet cable is connected directly from the TP-Link router to a free socket on the PLC.



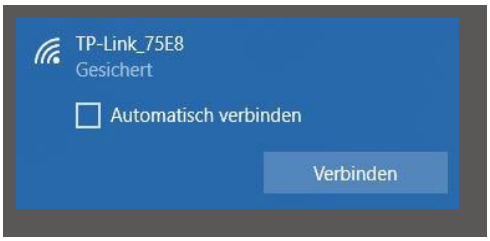
To connect the TP-Link router in WISP mode to a wireless WAN, the TP-Link must be configured.

You can use your PC or tablet for this.

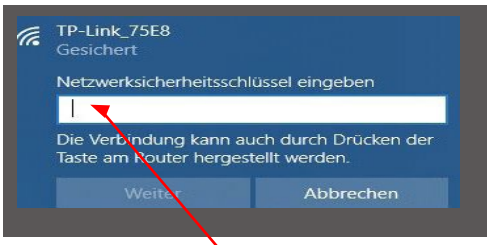
Important: Disconnect an existing Internet connection between your computer (WLAN-capable) and the router. It is best to disconnect the Ethernet LAN cable from the computer and, if necessary, terminate an existing WLAN connection.

The TP-Link router is permanently installed in your system. Before you integrate it into your working environment (configure it), you must first perform a reset. Pull the plug for the power supply on the TP-Link and then plug it back in so that it restarts. The green light on the TP-Link flashes. Press the reset button with a pointed object (small screwdriver) for 5 seconds. The light goes out. The TP-Link restarts. The light flashes again.

Open the context menu for Internet access on your computer by clicking on →  **Internet access.** A screen will appear showing the networks in your area. The TP-Link should appear in the list. If this is not the case, click on → **WLAN** and again on → **WLAN.** The WLAN will be restarted and all WLAN networks will be searched for again.



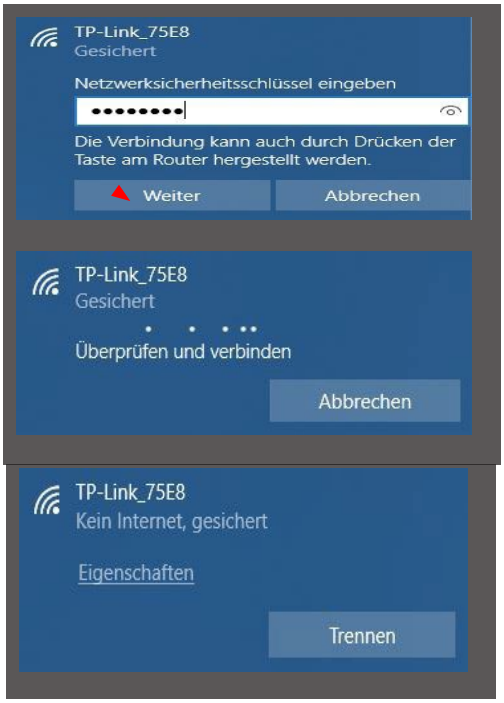
In the next step, activate the TP-Link displayed. Another context menu appears. Select the →Connect button here.



After a short time, a context window will appear asking you to enter the network security key of your TP-Link.

This can be found on the underside of the TP-Link.

After entering the key, confirm with the →Next button.

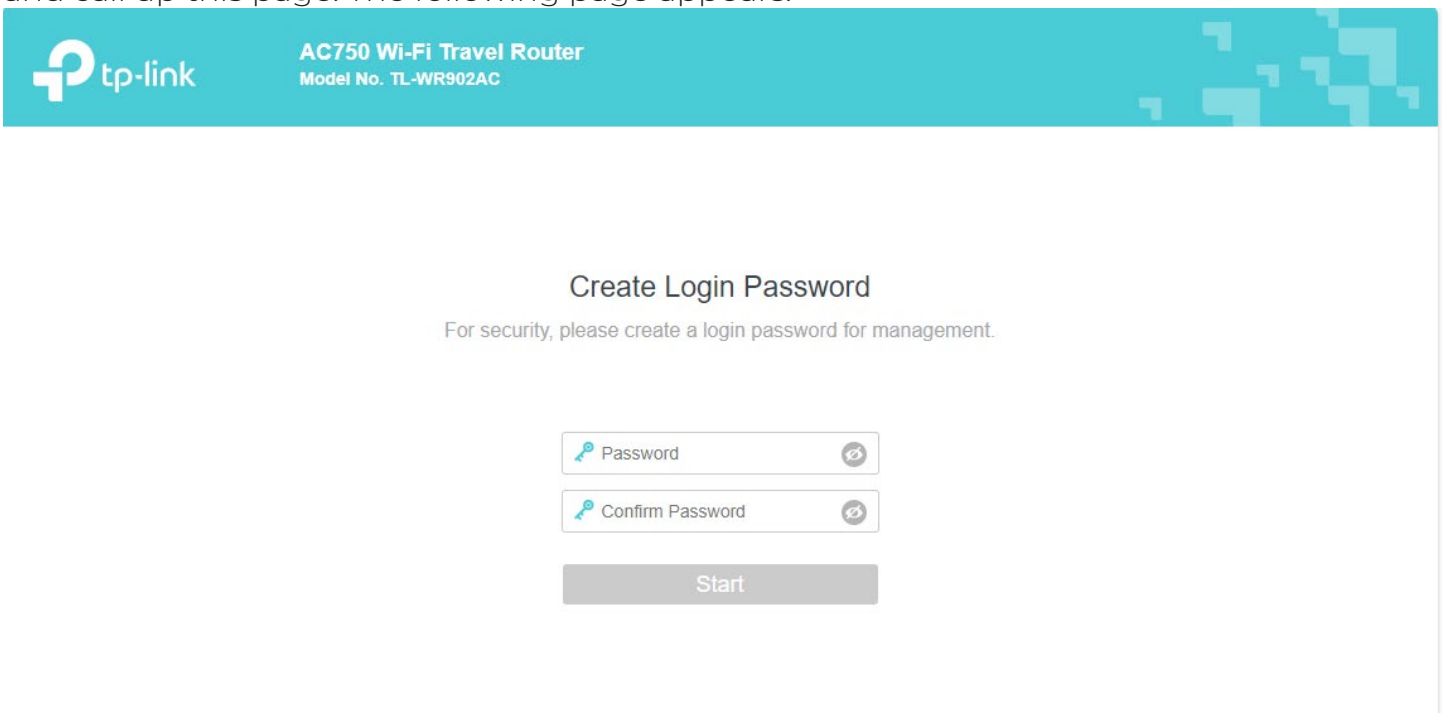


In the next step, the security key is checked and the TP-Link is connected to your computer via WLAN.

The last context window shows you the successful connection.

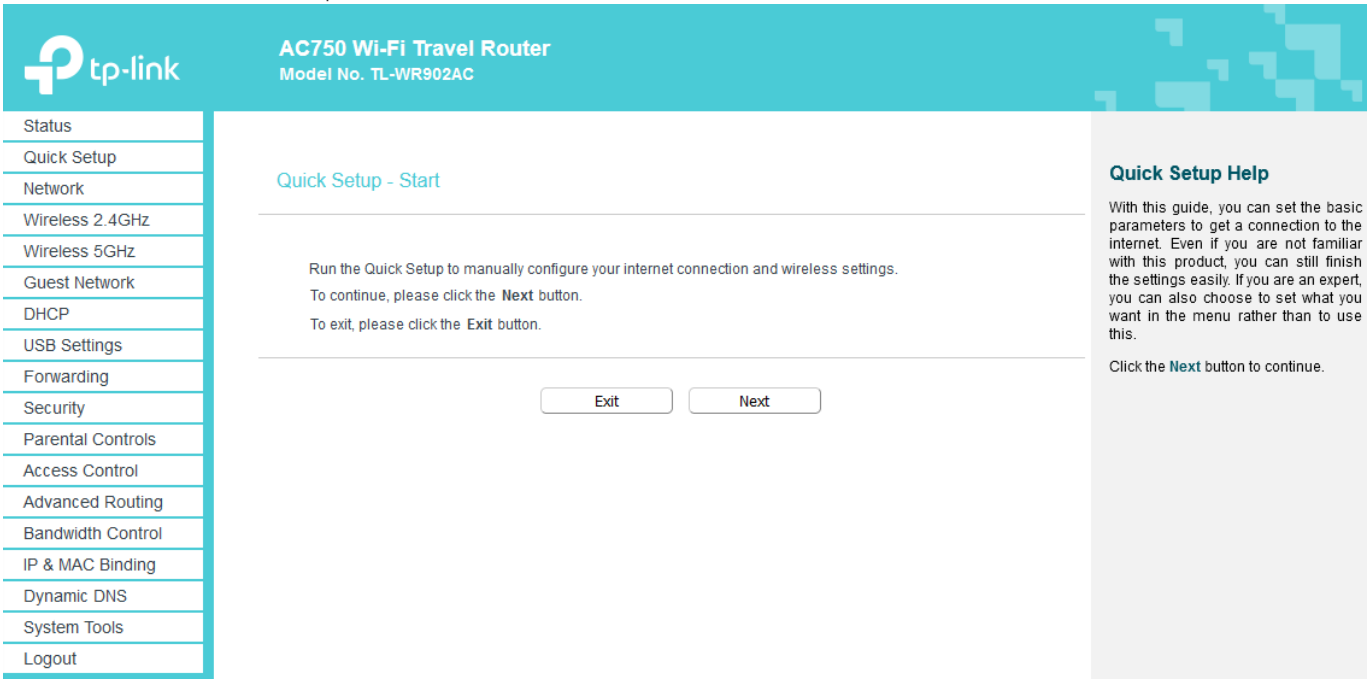
Next, you need to configure the TP-Link for your network. To do this, open a web browser (Firefox or Chrome).

Enter the page http://tplinkwifi.net Important: The address must not be preceded by www. and call up this page. The following page appears:

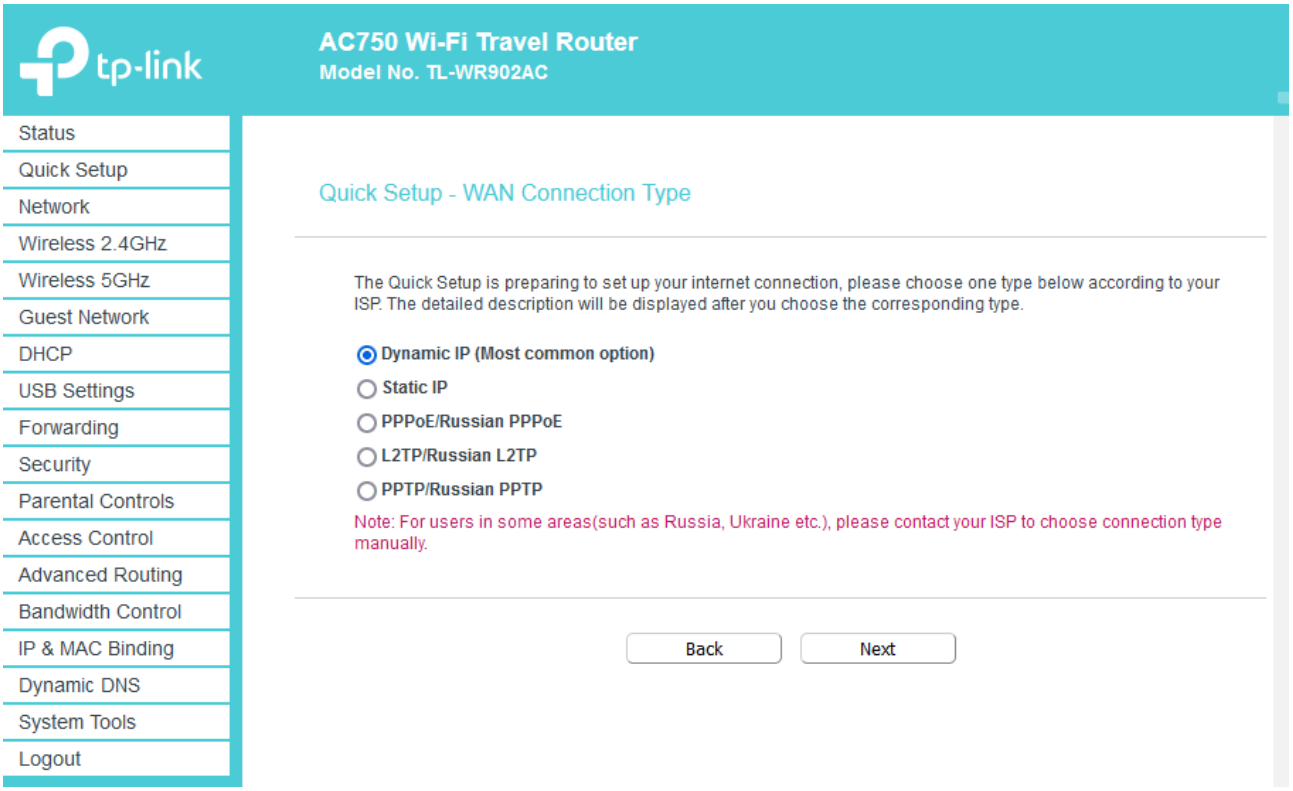


Enter "admin1" as the password and confirm with "Start".

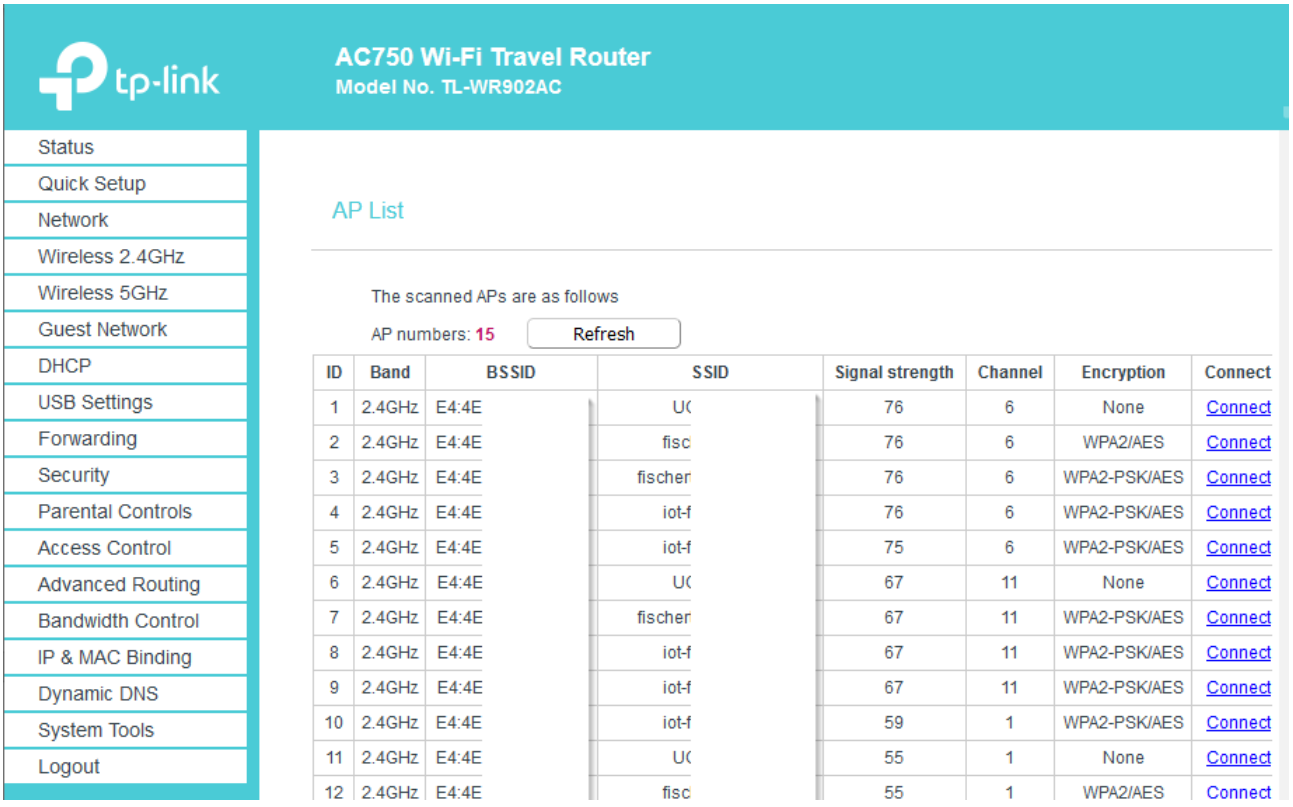
Start the Quick Setup → Next.



Select the WAN connection type **Dynamic IP** and confirm with → **Next**

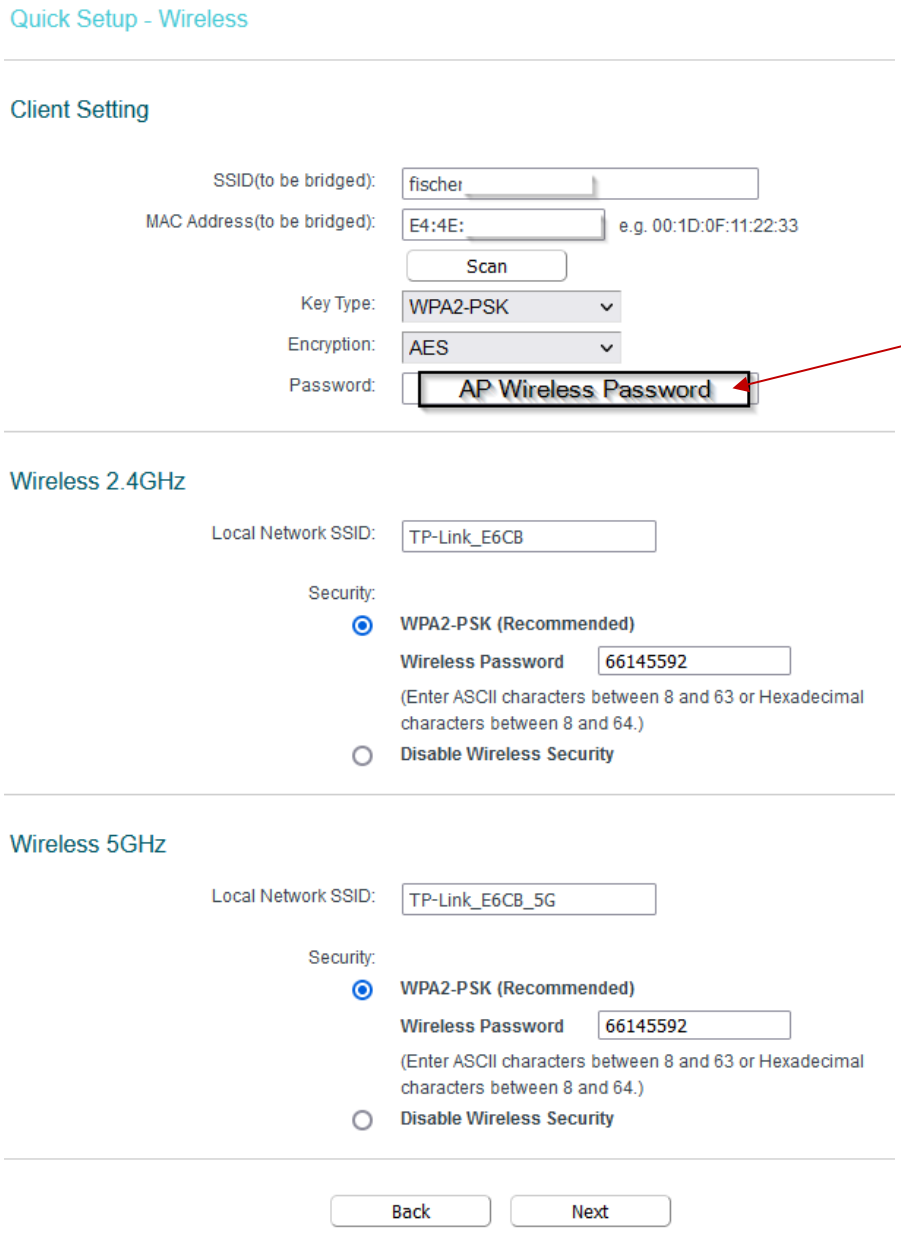


Next, the → **AP list** of WLAN access points (APs) available in the area appears. Select your WLAN access points with → **Connect**



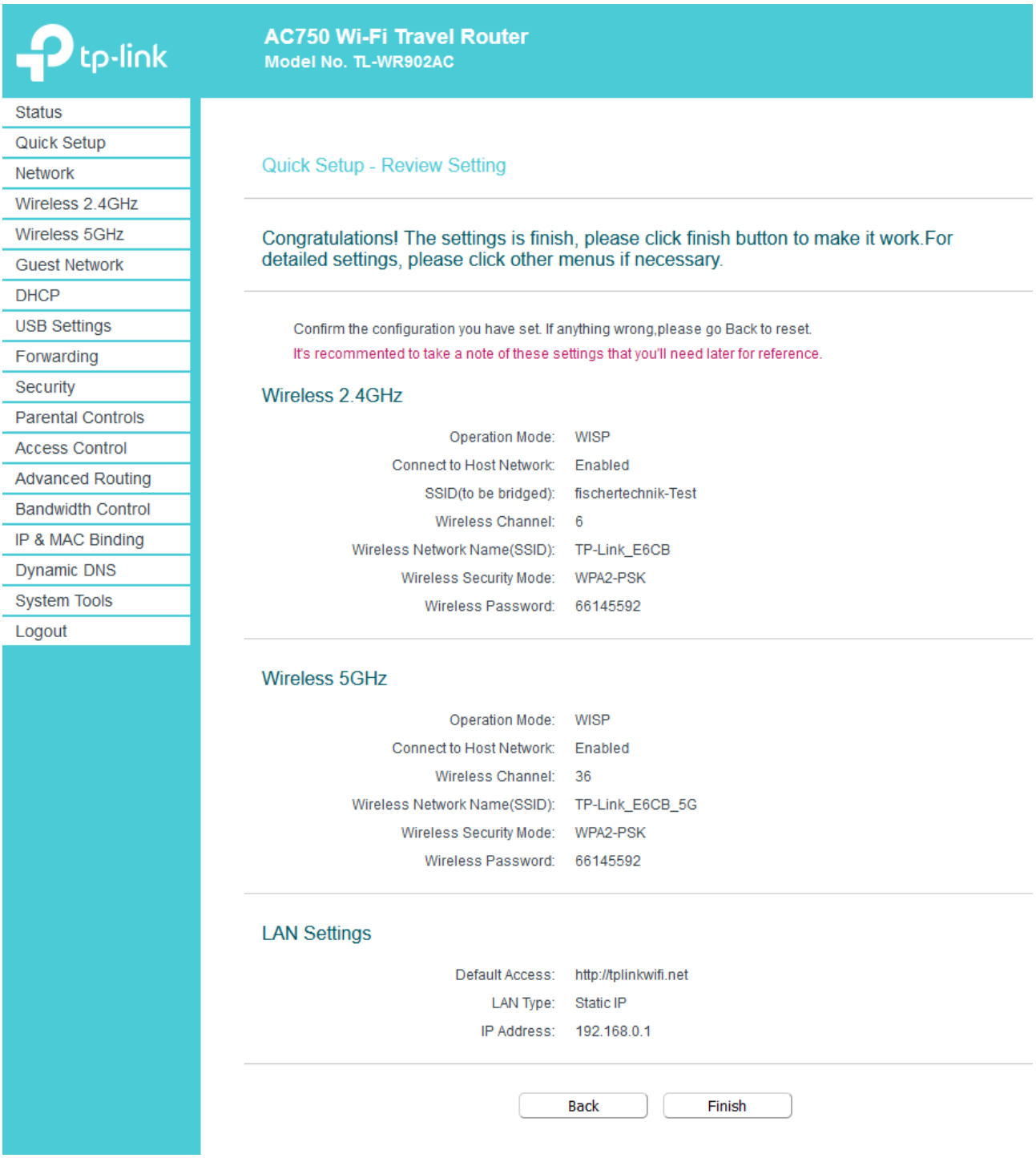
Accept the → **Client Settings** and → **AP Settings** with → **Next.**

Note: The **AP settings** should not be changed, as otherwise the settings of the TXT controller would have to be adjusted. The **client settings** and the **wireless password** can be found on the configuration pages of your WLAN access point or can be obtained from your network administrator.

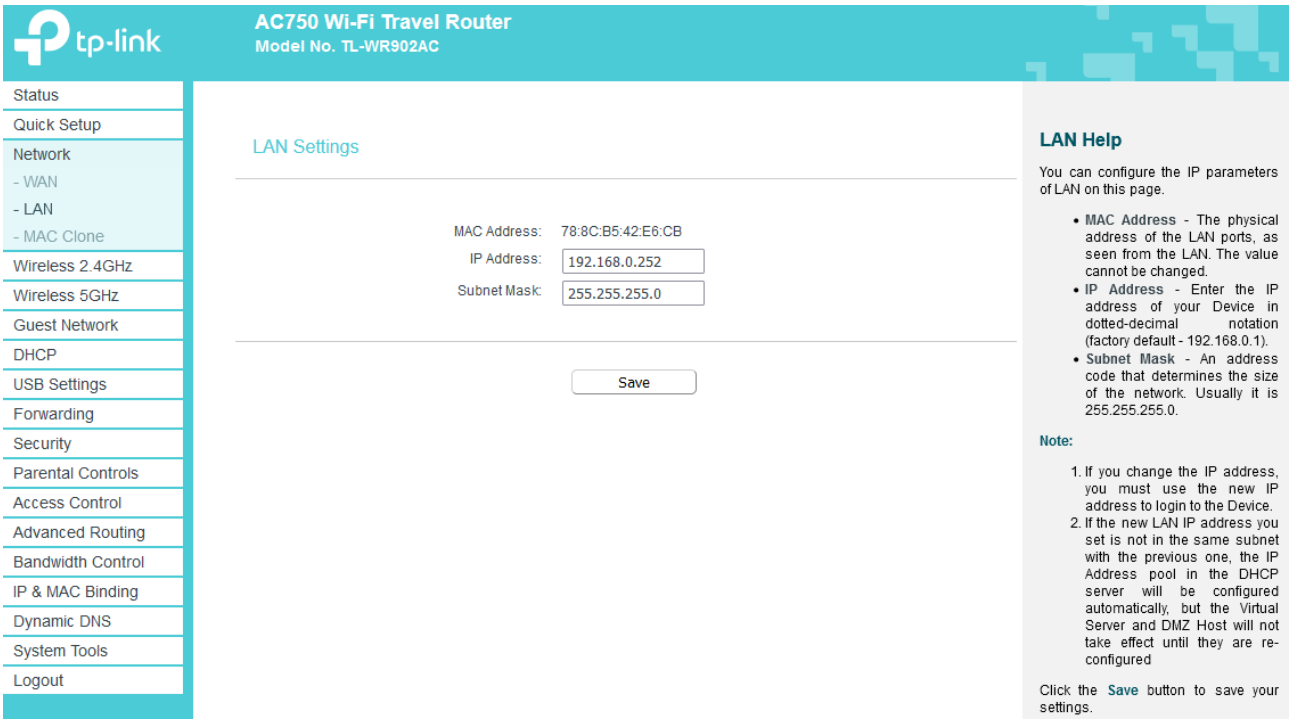


Wireless password of the WLAN access point

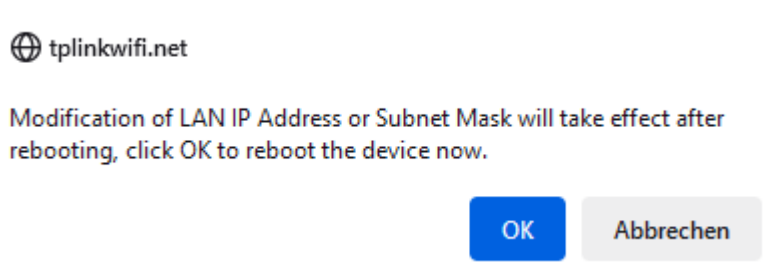
Finally, you will see an overview of the settings. Accept these with →Finish.



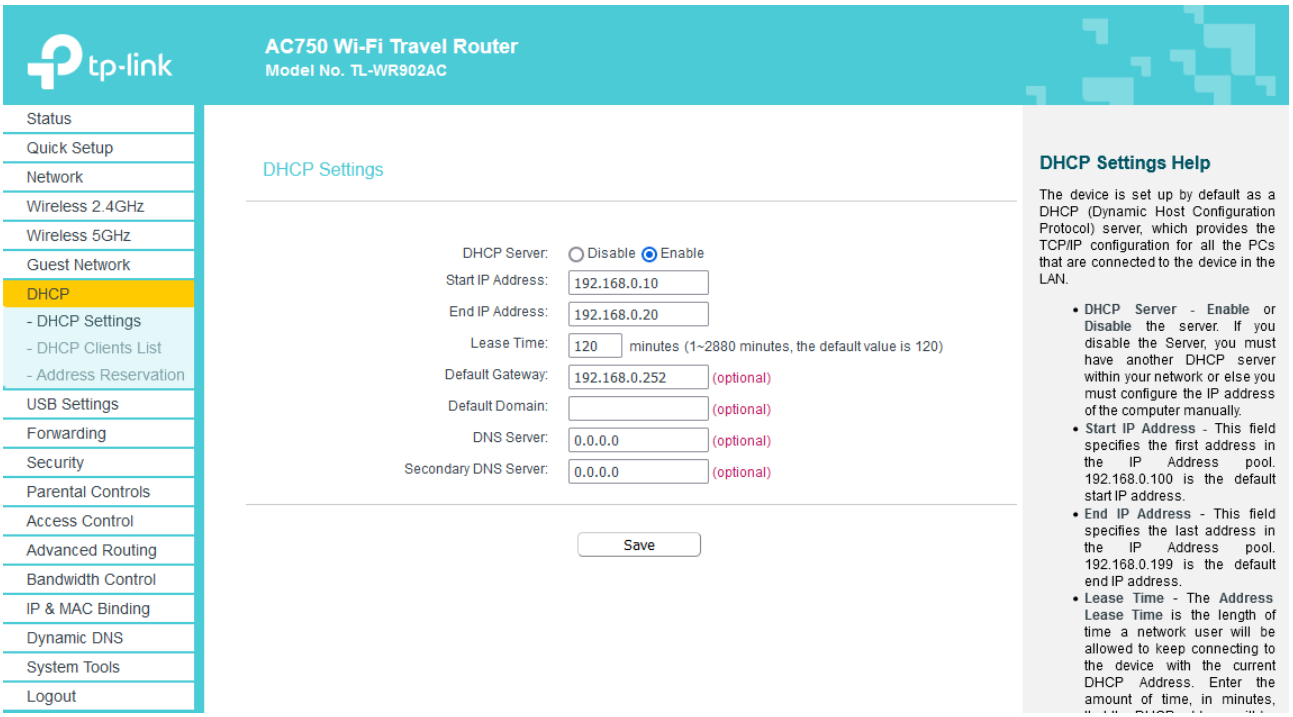
Then make the settings for the IP address of the router on the LAN and for DHCP.
To do this, select → Network and then → LAN from the menu on the left. Assign the → IP address 192.168.0.252 with the → Subnet Mask 255.255.255.0 to the TP-Link.



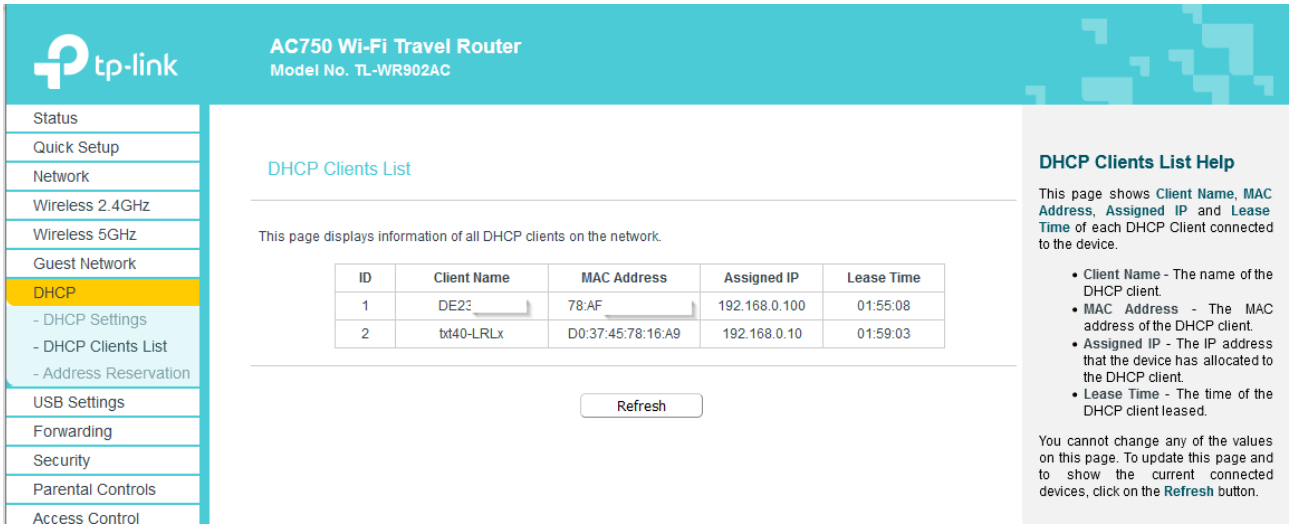
Confirm the reboot with → OK



Then activate → **DHCP by** clicking on → **Enable** and make the settings shown here for the IP addresses. Accept these settings with → **Save.**



If the TXT controller is switched on, it will then be displayed in the → **DHCP Clients List** with its **MAC** and **IP address.** Otherwise, switch on the TXT controller, wait until it has started up and then refresh the view by clicking on → **Refresh.**



The TXT controller should have the fixed IP address **192.168.0.10.**
In the → **Address Reservation** menu, this address can be reassigned under → **Edit** and accepted with → **Save.**

Now the WLAN connection to the to the TP-Link router can be disconnected again.

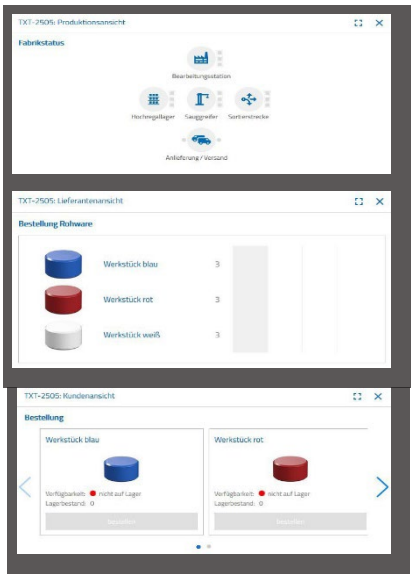
Dashboard of the learning factory in the fischertechnik cloud

The dashboard can be accessed and operated via mobile devices such as tablets and smartphones as well as on laptops and PCs. It enables the factory scenario to be displayed from three different perspectives:

Customer view

Supplier view

Production view

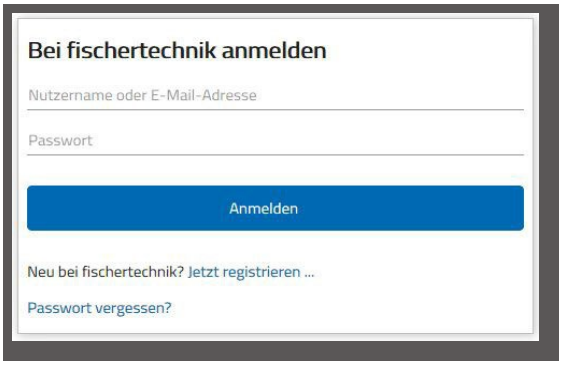


User login

Before you can work with the dashboard, you must log in.
To do this, call up the page

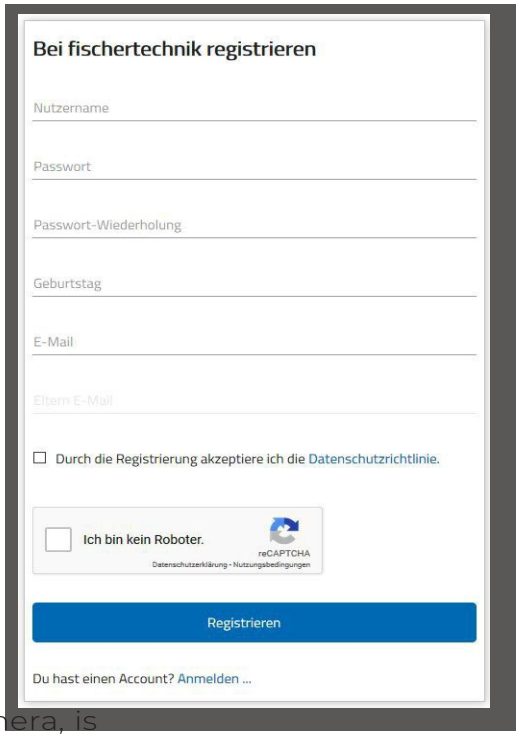
www.fischertechnik-cloud.com

on. It is best to use "Firefox" or "Google Chrome" as your Internet browser. Enter the address. The following screen appears.



Important: If the page does not load, the page must be reloaded with the key combination "STR + F5". This is a general browser problem.

Select "here" to log in for the first time:



New to fischertechnik? Register now ...

Fill in all items, accept the privacy policy. Click on the square **"I am not a robot"** and answer the questions.

Confirm the registration with the button:

After registering, you can log in with your user name and password. Your dashboard will then be started. Once the next content item has been executed, the dashboard is filled with data.

Cloud connection

The TXT 4.0 Controller, which also controls the moving camera, is connected to the cloud from the Learning Factory 4.0. The Wi-Fi connection to the TP-Link router is already preset at the factory.

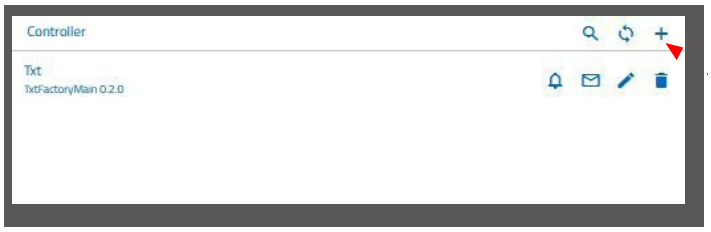
The following settings are required on this TXT 4.0 to connect to the fischertechnik cloud:

Activate **"Settings - Properties"** on the TXT.
- **Cloud Client"**. Then go back to the "Home" screen via the **"Home"** button.

Connect the TXT controller to the fischertechnik Cloud via **"Settings - fischertechnik Cloud".**

If the TXT 4.0 Controller can establish a connection with the cloud, a QR code and a pairing code will appear. You now have 30 minutes to add the TXT Controller to your account in the cloud. After this time has elapsed, you must start the pairing process again.

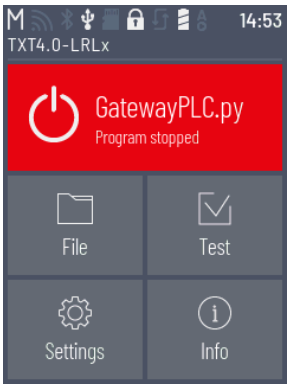
You can scan the QR code, e.g. with the "Quick Scan" app, and you will automatically be directed to the fischertechnik cloud.

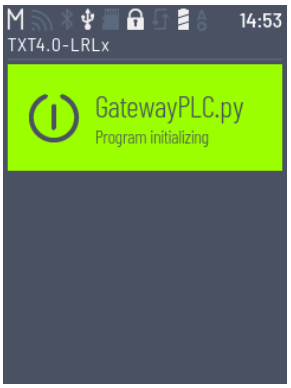


Alternatively, you can go to "Settings - Add controller" on the fischertechnik cloud page and enter the pairing code there manually.

Enter any name for the TXT controller here, e.g. its ID "TXT-7133".

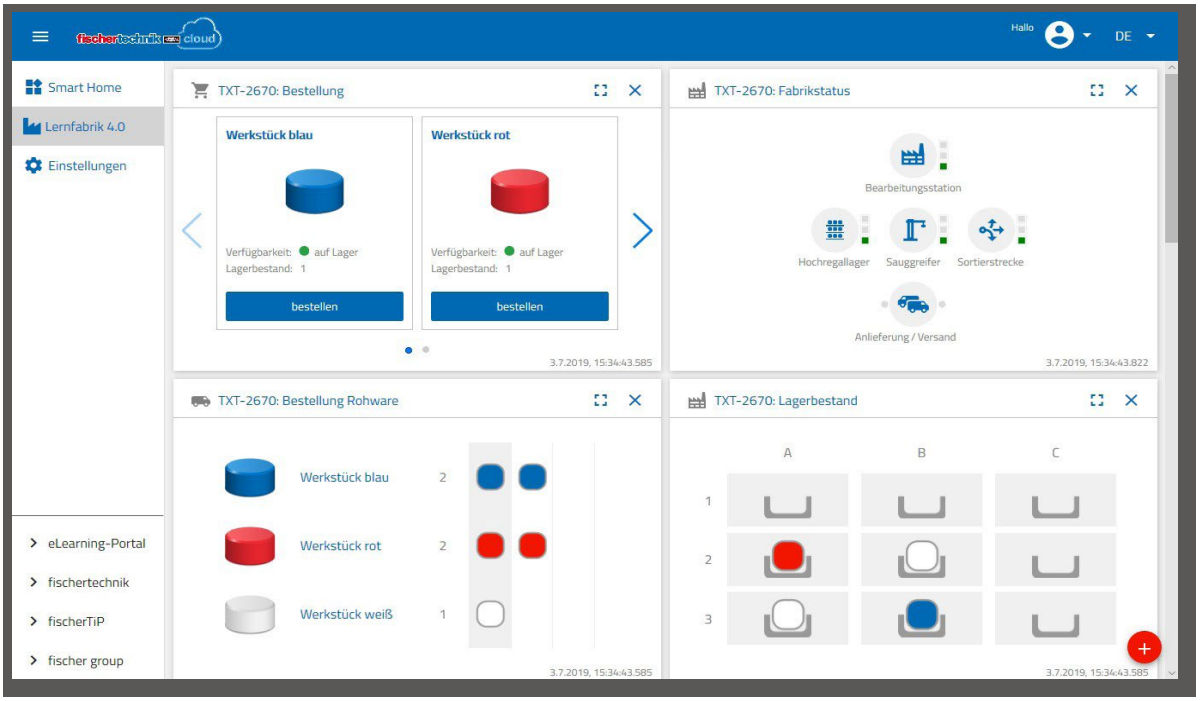
The TXT 4.0 Controller is now connected to the cloud. Load the GatewayPLC.py application on the TT 4.0 Controller under "File - Cloud".





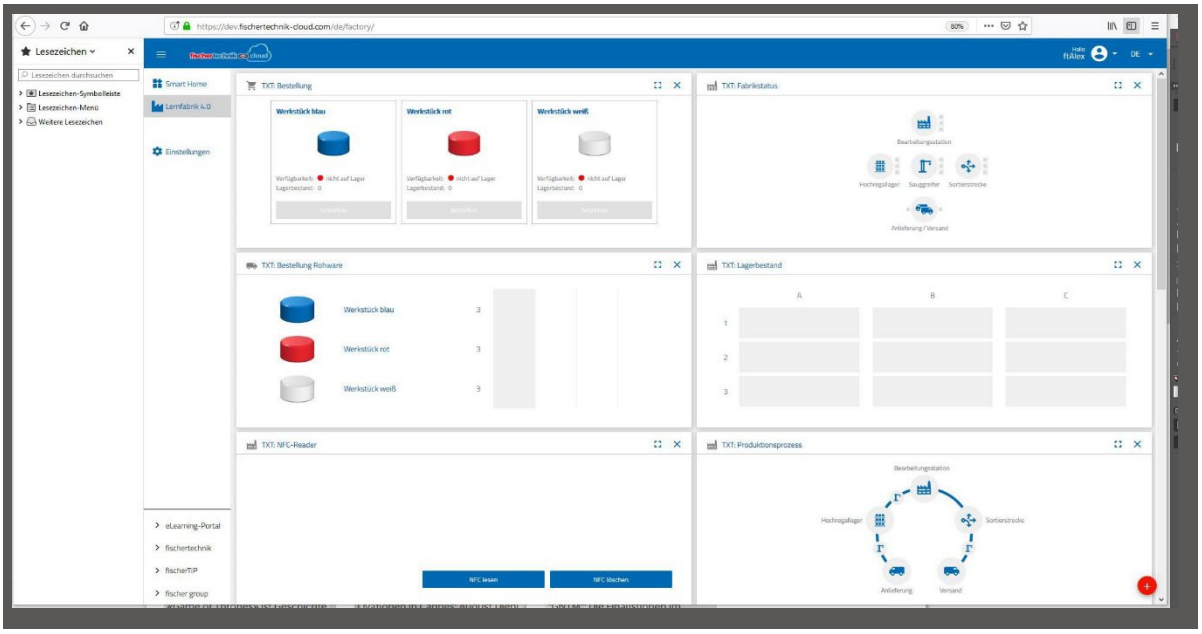
As soon as the connection to the cloud is established, start the applications on the TXT 4.0 Controller.

This appears with the following screen:



You can move the individual screens in sequence and adapt them to your needs.

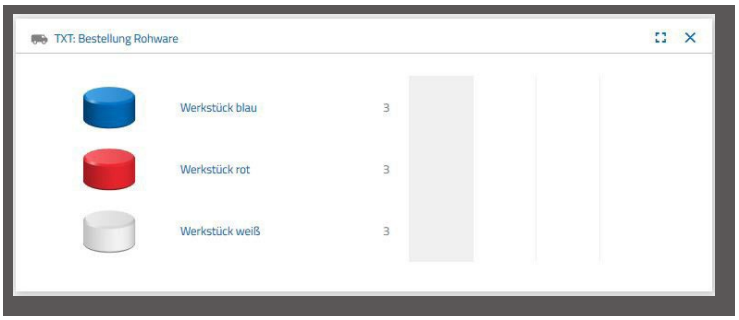
This button can be used to expand and collapse the main menu of the cloud.



An overview of the individual windows and their functions:

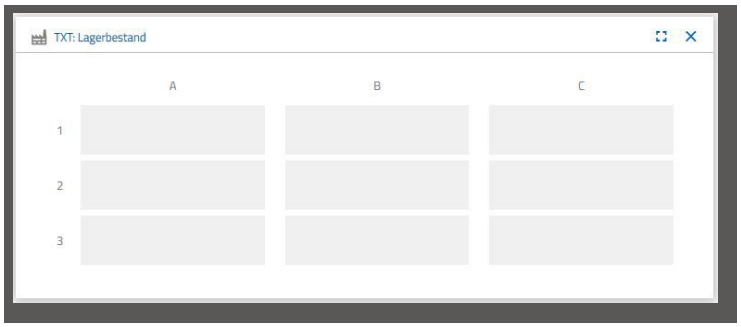
Order raw material

The "Order raw materials" view: This shows which raw materials are missing and need to be reordered.



Stock

In the "Stock" window, you can see how much raw material has been stored in the high rack. If goods are removed, the stock level is changed according to the number and color.



order

This window shows how many raw materials (blue, red, white) are available in the warehouse. If, for example, a red workpiece is placed on the shelf, the color display and the stock value change.

Factory status

The current work status of the entire factory is displayed in the **"Factory status"** window. If, for example, the vacuum suction pad is currently being worked on, the "Icon is highlighted in blue" is displayed.

Production status

In this window, you can see the production process highlighted in blue if you have just ordered a workpiece. This allows you to track where the workpiece is currently located in the factory.

NFC reader

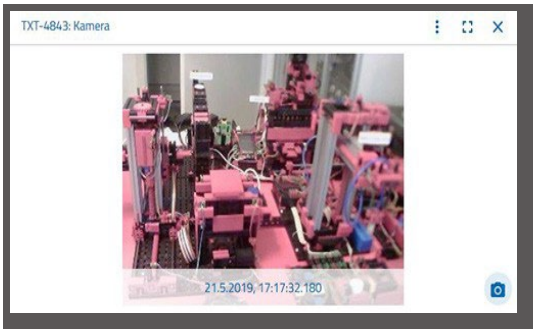
The current status of the NFC reader is always displayed in this window.

However, you can also place a workpiece on it and read the data from the NFC tag.

The content of the NFC tag can be **deleted** via **"Delete"**.

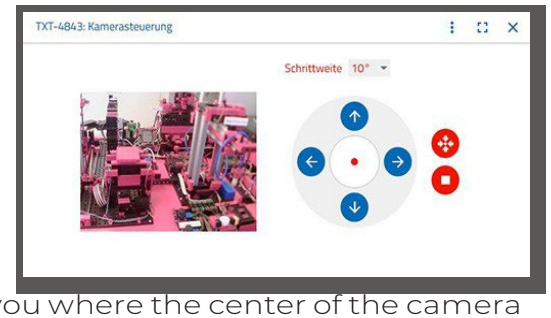
Camera

The "Camera" screen displays the camera section of your factory installation.



This corresponds to a live recording of the factory.

Camera control



This screen allows you to control your camera live. This gives you an overview of the entire factory.

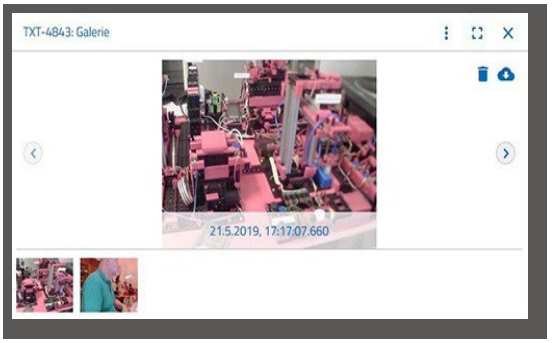
Control with the virtual joystick

the camera. The red dot shows you where the center of the camera is located. Use the "Increment" button to specify how many degrees the camera should rotate when you click the arrow. The two red buttons can be used to center or stop the camera.

Create snapshot

You can use the "Create snapshot for current image" button to save the current image to the "Gallery" screen.

Gallery



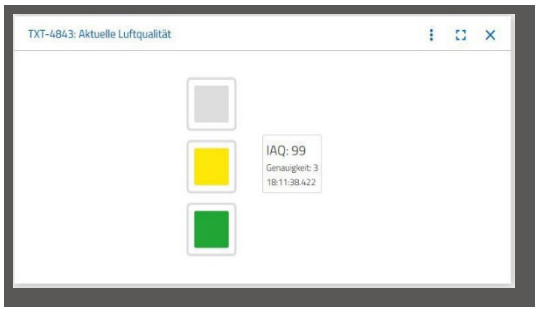
All the images you have created are stored in the "Gallery" window. You can scroll through the gallery using the arrow buttons. The current picture is displayed zoomed in. You can remove this image from the gallery using the "Delete" command.

If you would like to save the image for further use, use the "Download" command. Enter a storage location in the context menu that opens.

Environmental station dashboard

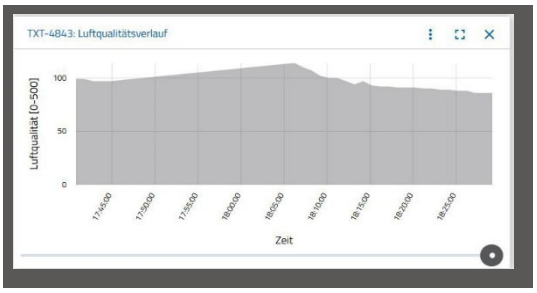
In addition to the camera function, you can view and process the information from the environmental sensor.

Current air quality

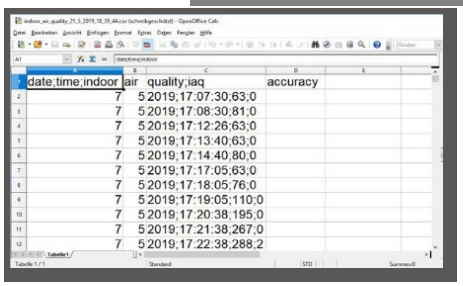


The "Current air quality" window displays the air quality value visually using three rectangles. The displays are switched on depending on the quality of the air measured. Green stands for very good, green and yellow for good, yellow for satisfactory, yellow and red for sufficient and red for poor.

With the **"More"** button (this applies to all windows of the environmental sensor), you can choose between the **"Graph", "Single value"** and **"Download"** view.



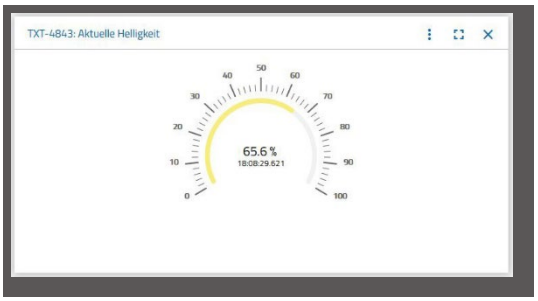
If you select **"Graph"**, you will see a graphical representation of the measured values. You can use the scroll bar to scroll through all the recorded data.



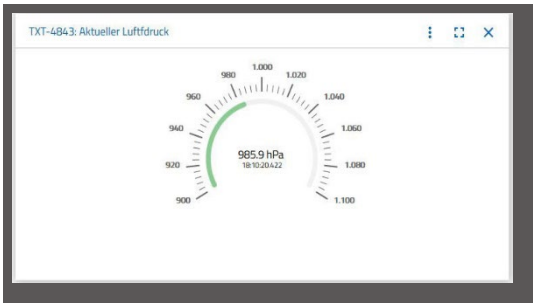
If you select **"Download"**, the data is downloaded as a .csv file and can be displayed with OpenOffice Calc or Excel, for example. You can then process the data further.

Current brightness

The "Current brightness" window displays a brightness value in %, as well as the time at which the measured value was taken. The brightness fluctuations are also visible.



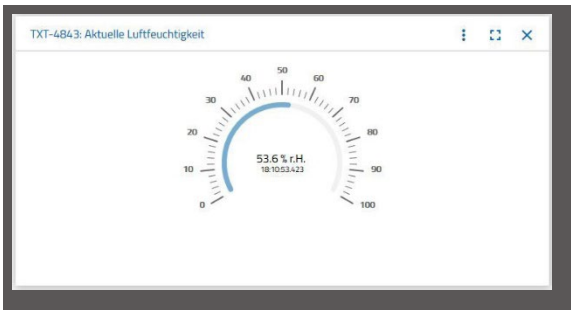
Current air pressure



The "Current air pressure" window displays the air pressure in hPa (Hecto-Pascal) and the time at which the measured value was taken.

Current humidity

The "Current humidity" window displays a value for the relative humidity in %.

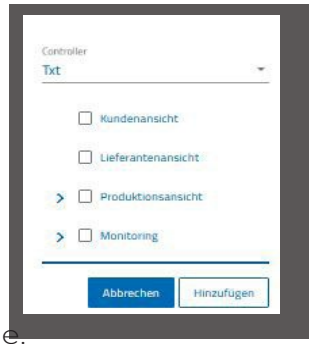


Current temperature

The "Current temperature" window displays the current temperature (ambient temperature) of the measuring sensor in °C.

Further buttons

With the **"Add window"** button, you can add a window that is currently not visible. If you activate the button, a context menu appears from which you can display a dashboard window.



Use this button to close the current window.

Use this button to zoom the current window to full screen mode.

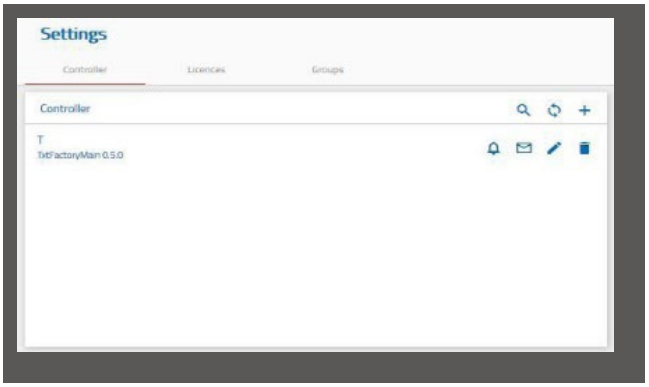
Use this button to show and hide the left-hand status bar.

The button shows which profile you have logged in under. Click on the arrow to open a context menu. Here you can select "Profiles" or "Log out". If you select "Profiles", another context menu appears in which you can make settings for your profile. Click "Log out" to log out of the fischertechnik cloud.

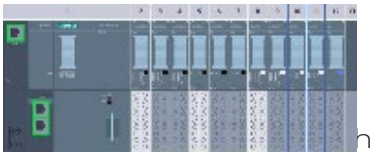
If you activate the arrow behind "DE", a context menu for selecting the language appears.

In the status bar, you have three selection points that you can activate with a mouse click. Use the first two buttons to select whether you want to work with the dashboard of the factory simulation or only with the dashboard of the environmental station.

If you activate the "Settings" button, a context menu appears in which you can view and change various parameters relating to your TXT 4.0 controller.



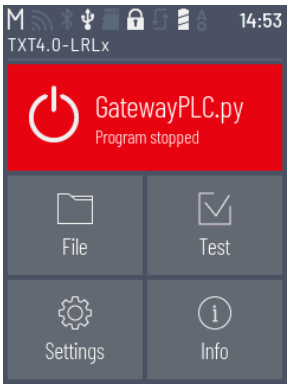
Factory operation with the fischertechnik Cloud



To start factory operation, first load the PLC program and then set the CPU1512SP to RUN.

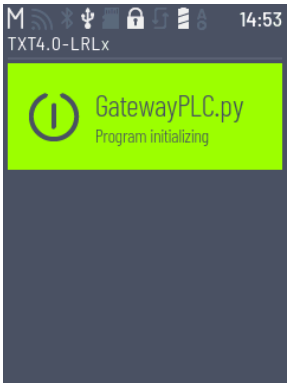
The chapter **Commissioning and adapting the SIMATIC CPU 1512SP controller.**

The application is then started on the TXT 4.0 controller as described here:

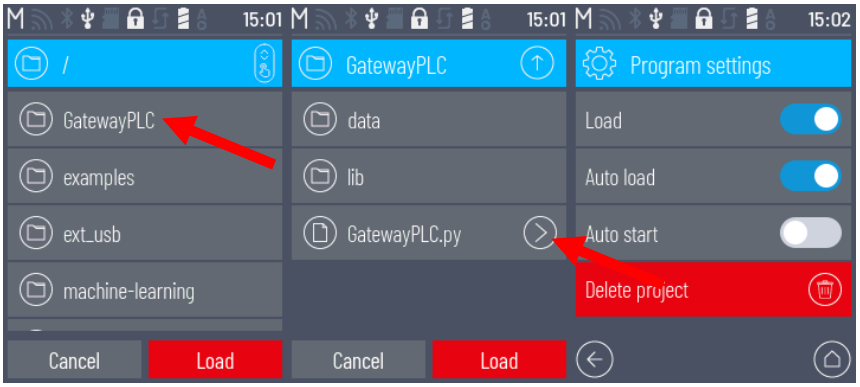


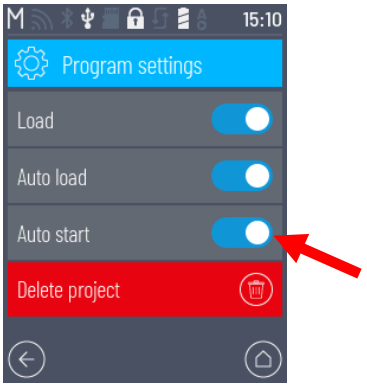
When the TXT 4.0 controller is switched on, the program is automatically loaded by the "Auto Load" and only needs to be started by pressing "Start program" on the touch display.

The following application is running on the TXT 4.0 controller: **"GatewayPLC"**



The GatewayPLC program can also be started automatically by activating the **"Auto start"** function in the file structure.





Once the programs have been started on the PLC, the IOT gateway and the TXT 4.0 controller, the Learning Factory 4.0 is ready for use.

fischertechnik Node-RED Dashboard of the learning factory

The fischertechnik Node-RED Dashboard is intended as a local user interface HMI (Human Machine Interface) in the local network (LAN). It can simply be started in a web browser (recommended: Firefox or Chrome) by entering:

192.168.0.5:1880/ui

(IP address of the IoT gateway: Port 1880 / ui as the name of the application)

The following views are offered here:

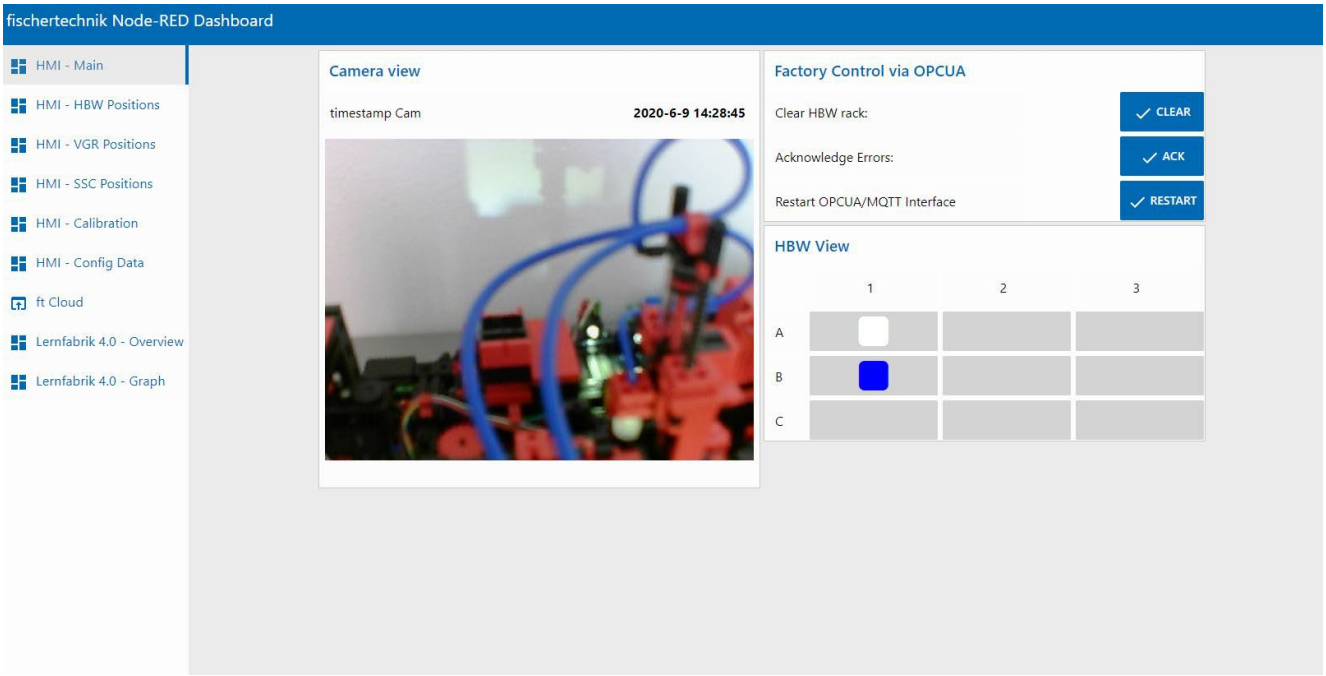
HMI - Main

The camera image and the stored workpieces in the high-bay warehouse are displayed in this menu.

In the "Factory Control via OPCUA" window, the assignment of the high-bay warehouse can be reset by clicking on . CLEAR

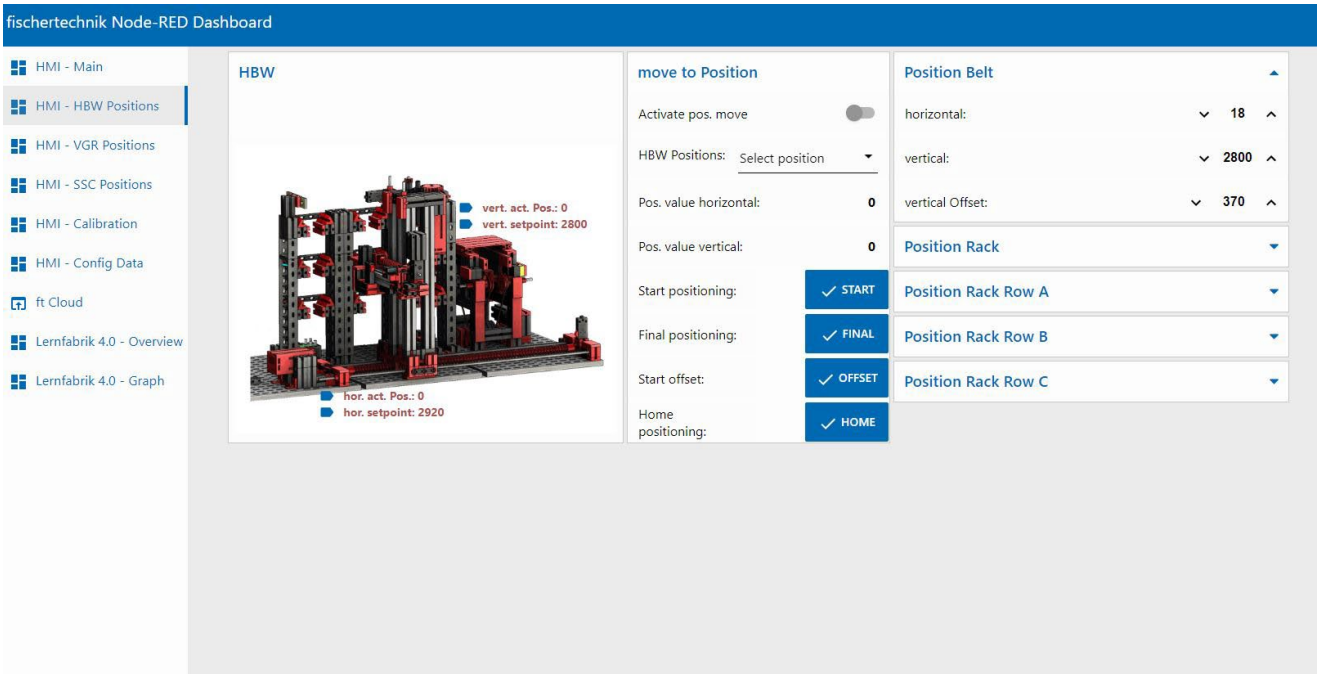
Errors in the Learning Factory 4.0 can be acknowledged by clicking on . ACK

The IOT gateway can be restarted by clicking on RESTART . This is necessary if the PLC program has been reloaded.



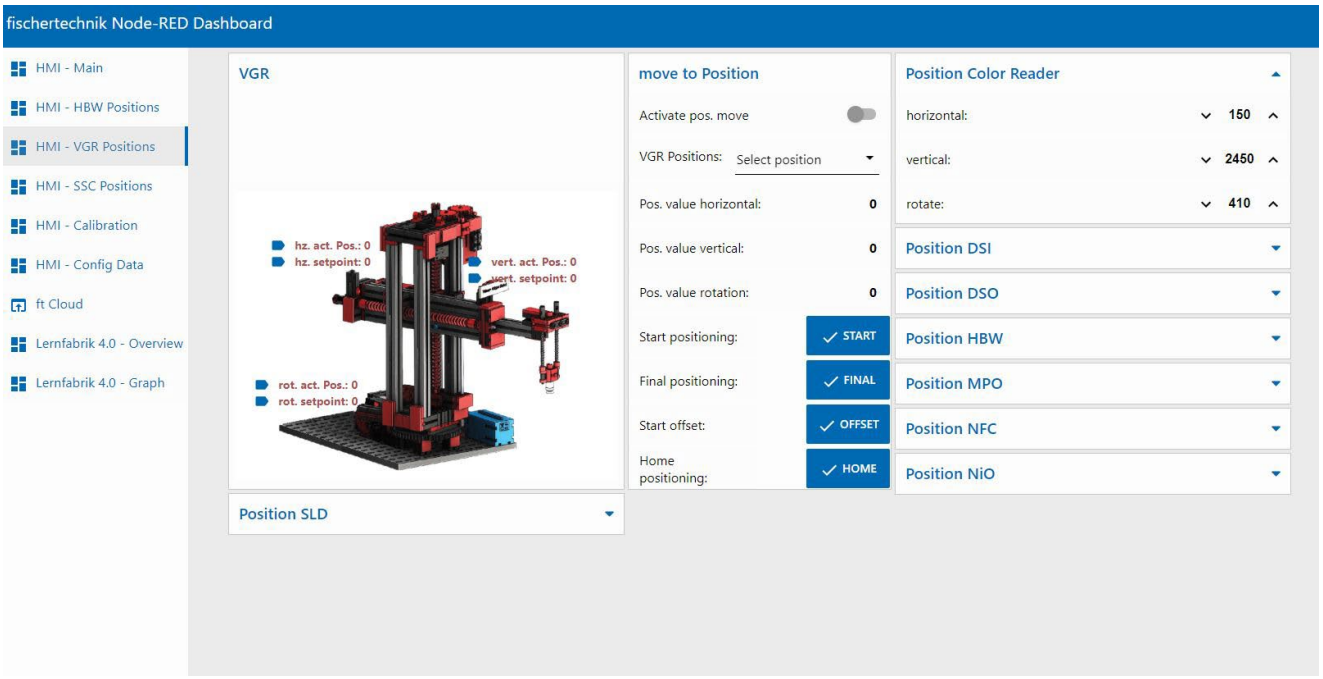
HMI - HBW Positions

In this menu, the positions of the storage and retrieval machine in the automated high-bay warehouse (HBW) station can be calibrated and monitored.



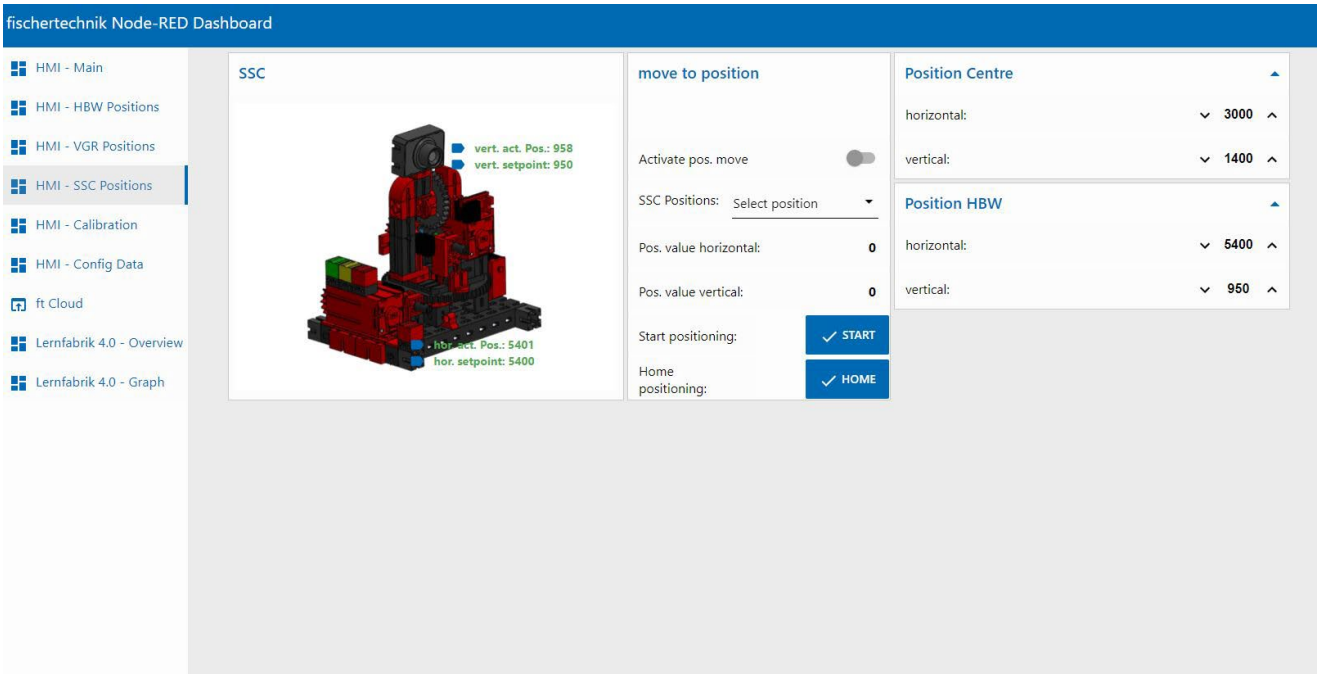
HMI - VGR Positions

In this menu, the positions of the 3-axis robot in the vacuum gripper station (VGR) can be calibrated and monitored.



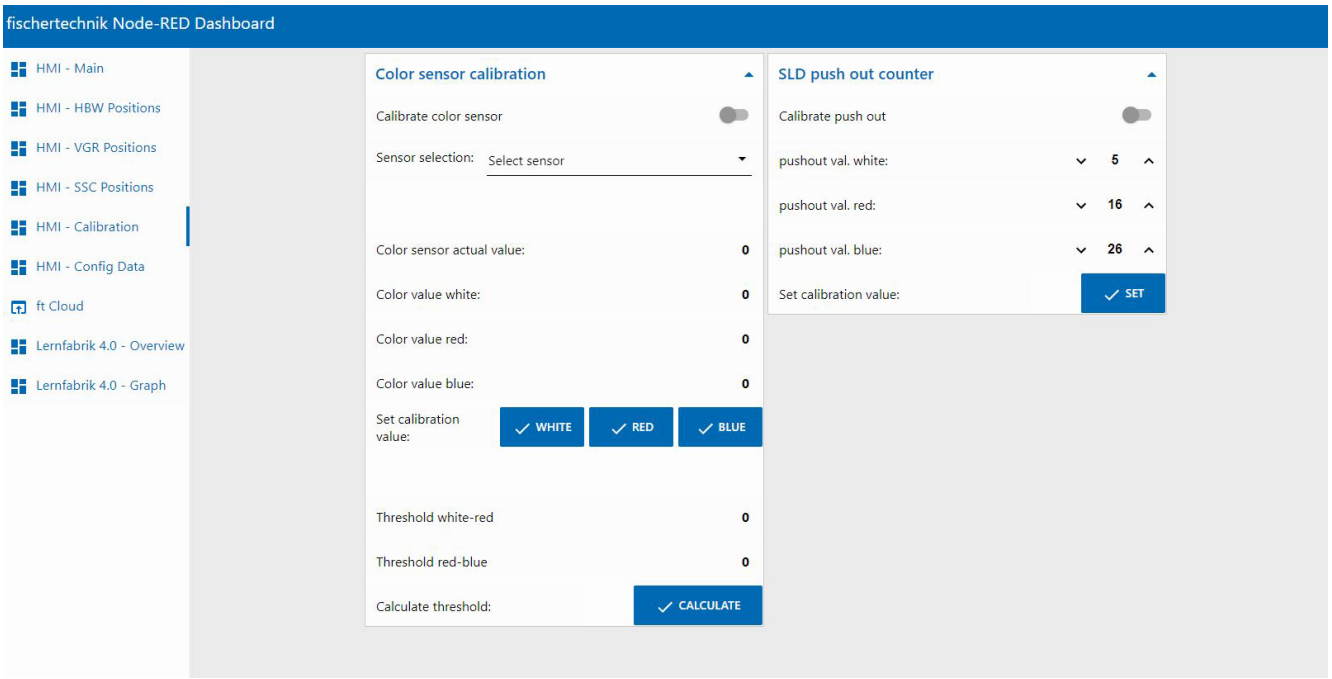
HMI - SSC Positions

In this menu, the positions of the camera in the sensor station with camera (SSC) can be calibrated and observed.



HMI - Calibration

In this menu, the color sensor in the sensor station with camera (SSC) and the color sensor as well as the positions in the sorting line with color detection (SLD) can be calibrated.

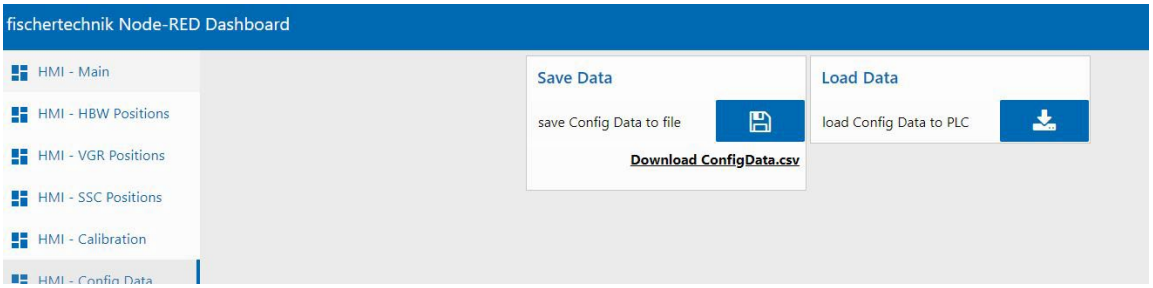


HMI - Config Data

In this menu, after calibrating the color sensors and the positions, the data in the **"Save Data"** window can be saved from the PLC to a file on the Raspberry Pi 4  . This file is stored on the Raspberry Pi 4 in the path **/home/pi/.node-red/pub/CSV/ConfigData.csv on the Raspberry Pi 4**.

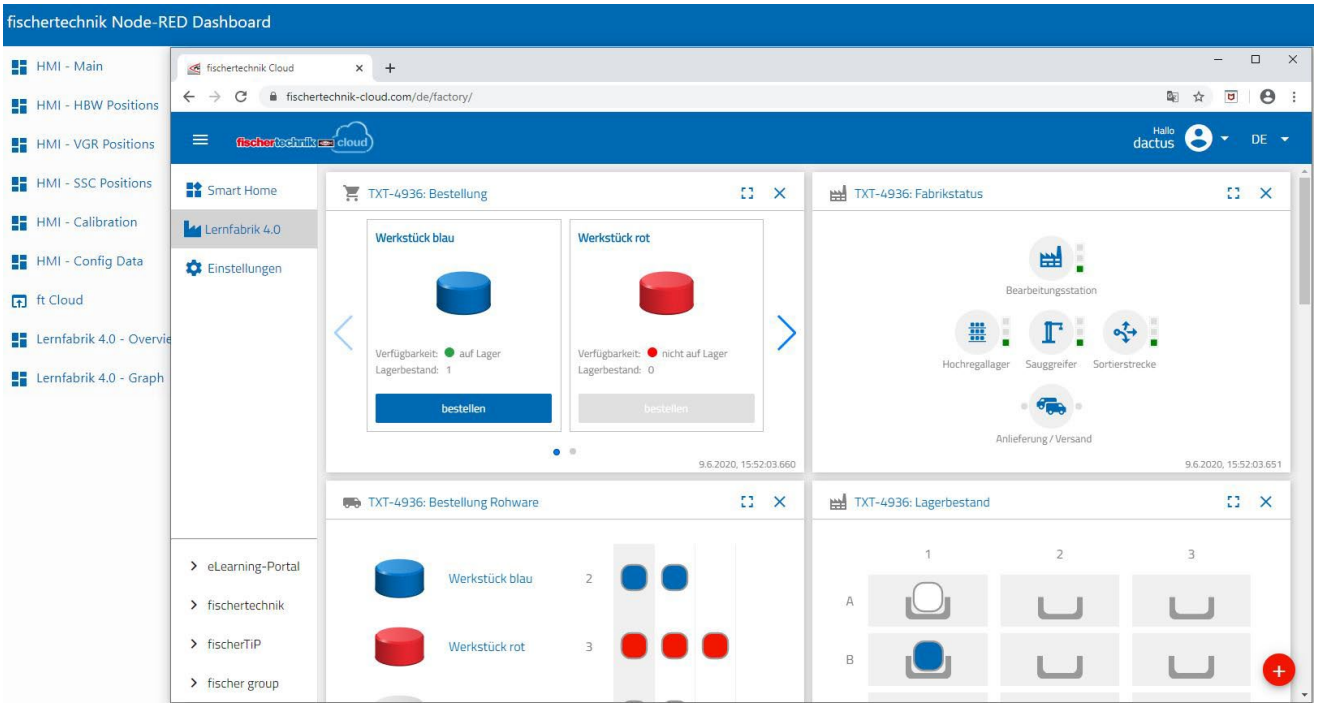
The calibration data can be loaded into the PLC in the **"Load Data"** window  . This is necessary, for example, if the PLC switch on the S7-1500 PLC is pressed for several seconds from the **"STOP"** position in the "**MRES**" direction instead of the **"RUN" direction**, all current values in the PLC are reset to default values. The values from the Raspberry Pi 4 can be reloaded into the PLC with **"Load Data"**.

Download ConfigData.csv can be used to temporarily save the file in a *.csv file on the computer. As the Learning Factory 4.0 24V is supplied fully calibrated with PLC S7-1500 (560840) on delivery, this function can be used to create a backup of the calibration data.



ft Cloud

The fischertechnik Cloud can be accessed in this menu. An Internet connection is required.



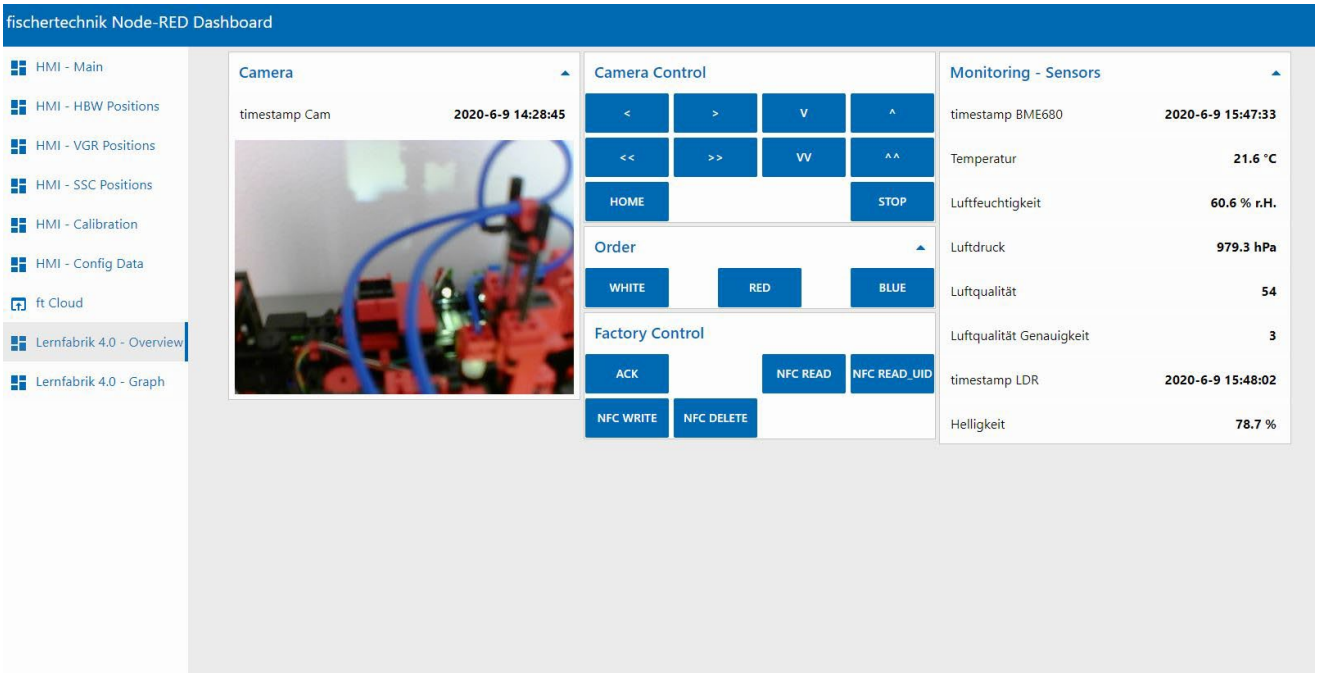
Learning Factory 4.0 - Overview

The camera image and sensor data are displayed in this menu.

Camera control is also available in the "**Camera Control**" window.

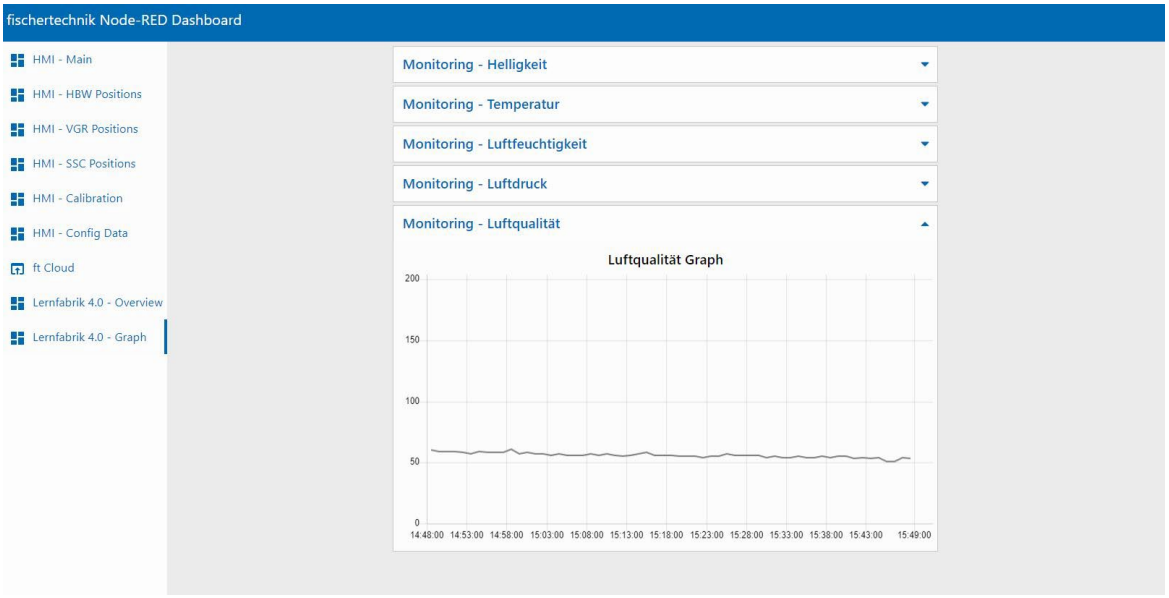
An order for a white, red or blue workpiece can be placed in the "**Order**" window.

In the "**Factory Control**" window, errors can be acknowledged and commands for deleting, reading and writing the NFC tags can be executed.



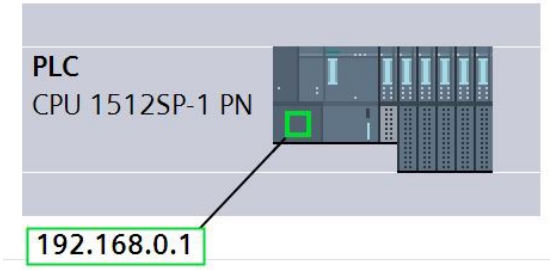
Learning factory 4.0 - Graph

In this menu, the graphs for the environmental data can each be called up in a window.



Commissioning and customization of the SIMATIC CPU1512SP controller

The following pages show you how to establish a connection to the SIMATIC S7-1500 programmable logic controller (PLC) with CPU1512SPF-1 PN and how to load the program solution for complete factory operation.
This program solution is available as the LearningFactory_4_0_24V_V14_TP_V18.zip archive for the TIA Portal V18 and represents the standard solution for the Learning Factory 4.0.



The modules used in the standard configuration are shown here:

Modul	Steckplatz	E-Adresse	A-Adresse	Typ	Artikel-Nr.
PLC	1			CPU 1512SP-1 PN	6ES7 512-1DK01-0AB0
DO1+2	2		1...2	DQ 16x24VDC/0.5A ST	6ES7 132-6BH01-0BA0
DO3+4	3		3...4	DQ 16x24VDC/0.5A ST	6ES7 132-6BH01-0BA0
DO5+6	4		5...6	DQ 16x24VDC/0.5A ST	6ES7 132-6BH01-0BA0
DO7-14	5		7...14	DQ 4x24VDC/2A HS	6ES7 132-6BD20-0DA0
DO15-22	6		15...22	DQ 4x24VDC/2A HS	6ES7 132-6BD20-0DA0
DO23-30	7		23...30	DQ 4x24VDC/2A HS	6ES7 132-6BD20-0DA0
DI1+2	8	1...2		DI 16x24VDC ST	6ES7 131-6BH01-0BA0
DI3+4	9	3...4		DI 16x24VDC ST	6ES7 131-6BH01-0BA0
DI5	10	5		DI 8x24VDC HS	6ES7 131-6BF00-0DA0
DI6	11	6		DI 8x24VDC HS	6ES7 131-6BF00-0DA0
AI7-10	12	7...10		AI 2xU ST	6ES7 134-6FB00-0BA1
End	13			Servermodul	6ES7 193-6PA00-0AA0

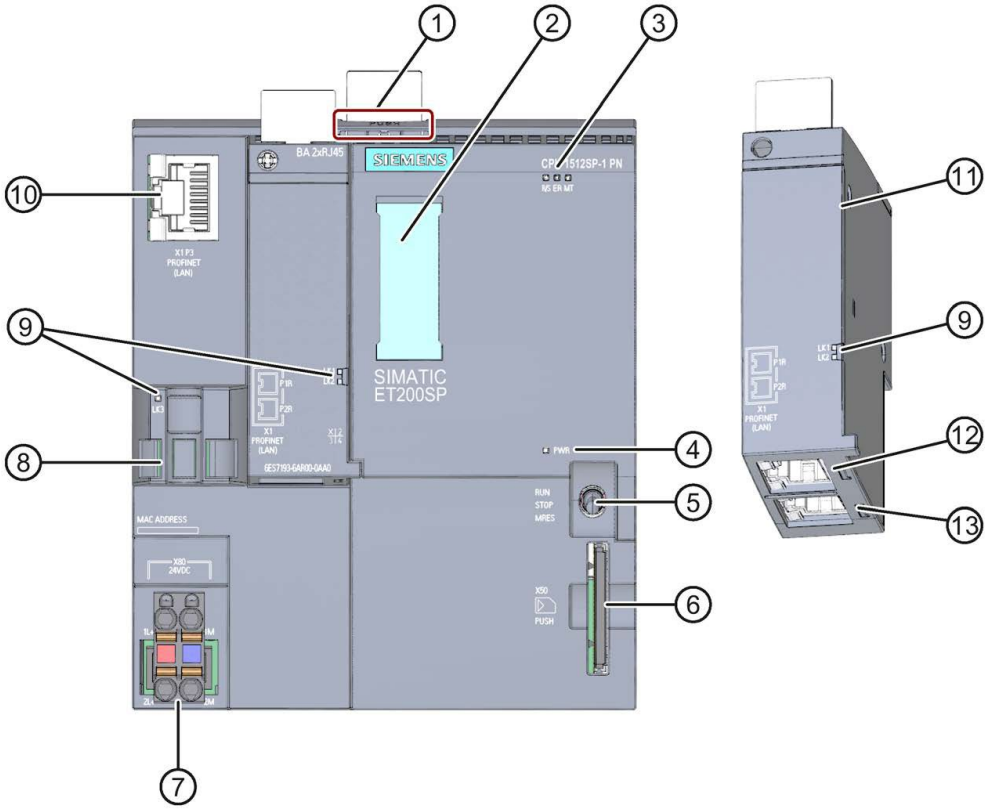
You can find the program solutions under:
https://github.com/fischertechnik/plc_training_factory_24v/tree/master/PLC_SCL_sources

Note:

This chapter describes the commissioning for a SIEMENS SIMATIC S7-1500 controller with CPU1512SP as an example. If a different controller is used, other software tools must be used accordingly to create and load the programs and commission the Learning Factory 4.0.
Depending on the control system, the source codes can be imported to create the programs, which can be found under:
https://github.com/fischertechnik/plc_training_factory_24v/tree/master/PLC_SCL_sources
are available.

Design and operation of the CPU 1512SP-1F 1PN

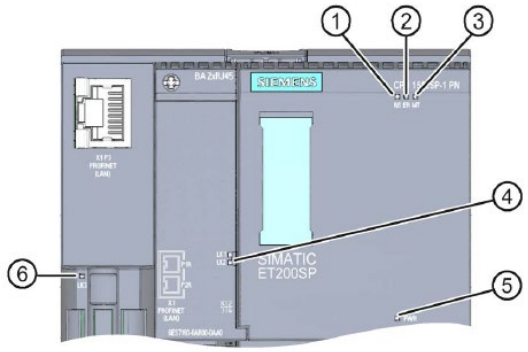
Here is an overview of the elements of the CPU 1512SP-1 F 1 PN with bus adapter used



① Profile rail release
② Labeling strips
③ LEDs for status and error displays
④ LED for displaying the supply voltage
⑤ Operating mode switch
⑥ Slot for the SIMATIC memory card
⑦ Connection for supply voltage (included in the scope of delivery)
⑧ Cable support and fastening for port P3 of the PROFINET interface
⑨ LEDs for status displays of the PROFINET interface to ports P1, P2 and P3
⑩ Port P3 of the PROFINET interface: RJ45 socket on the CPU
⑪ Single view of the bus adapter
⑫ Port P1 R of the PROFINET interface: RJ45 socket on bus adapter BA 2×RJ45
⑬ Port P2 R of the PROFINET interface: RJ45 socket on bus adapter BA 2×RJ45

Status and error displays

The CPU 1512SP-1 F 1 PN and the bus adapter BA 2xRJ45 are equipped with the following diagnostic LEDs:



① RUN/STOP LED (yellow/green LED)
② ERROR LED (red LED)
③ MAINT LED (yellow LED)
④ LINK RX/TX LED for ports X1 P1 and X1 P2 (green LEDs on bus adapter)
⑤ POWER LED (green LED)
⑥ LINK RX/TX LED for port X1 P3 (green LED on CPU)

SIMATIC Memory Card

A SIMATIC Micro Memory Card is used as the memory module for the CPUs. This is a specially pre-formatted memory card compatible with the Windows file system.
The MMC must be plugged in to operate the CPU, as the CPUs do not have an integrated load memory for the programs. A commercially available SD card reader is required to read/write the SIMATIC Memory Card with the laptop/PC. This can be used, for example, to copy files directly to the SIMATIC Memory Card using Windows Explorer or to delete the program data completely.

Note: It is recommended that the SIMATIC Memory Card is only removed or inserted when the CPU is de-energized.

Operating mode switch

You can use the operating mode switch to set the current operating mode of the CPU. The operating mode switch is designed as a toggle switch with 3 switching positions:

Position	Meaning	Explanation
RUN	Operating	The CPU processes the user program
STOP	STOP	The CPU processes the user program
MRES	Memory reset	Position for resetting the CPU

STEP 7 Professional programming software in the TIA Portal

The STEP 7 Professional programming tool is required for programming and loading the SIMATIC S7-1500 PLCs.
The program solutions for the Learning Factory 4.0 have been created with STEP 7 Professional in the TIA Portal in version V16.

Further details can be found in the SIEMENS manuals under:
http://support.automation.siemens.com.

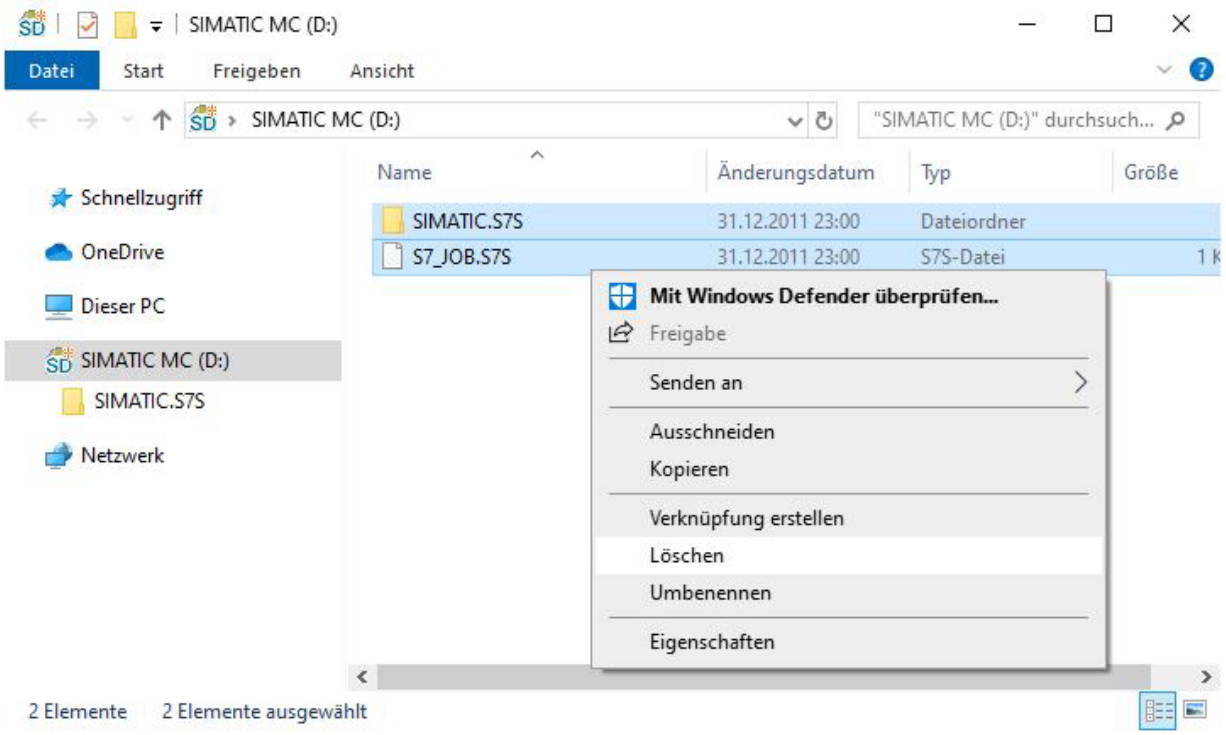
Resetting the control unit and setting the IP address

Before you can load the program solutions into the SIMATIC S7-1500, you should reset it to the factory settings and set the IP address of the CPU 1512SP 1 F 1 PN.

The CPU can be reset to factory settings in the following steps.

→ First switch off the power supply to the control unit and then remove the SIMATIC Micro Memory Card inserted in the CPU.

→ To completely delete all program data from the SIMATIC Micro Memory Card in the CPU, you can simply insert the SIMATIC Memory Card into a standard SD card reader and delete the data on the card using Windows Explorer.



→ Then plug the SIMATIC Memory Card back into the CPU and switch on the power supply to the controller.

Note: It is recommended that the SIMATIC memory card is only removed or inserted when the CPU is de-energized, otherwise it could be damaged.

Note: You should not format the SIMATIC Memory Card, only delete the data.

A TCP/IP connection is required to program the CPU of a SIMATIC S7-1500 controller from a laptop/PC.

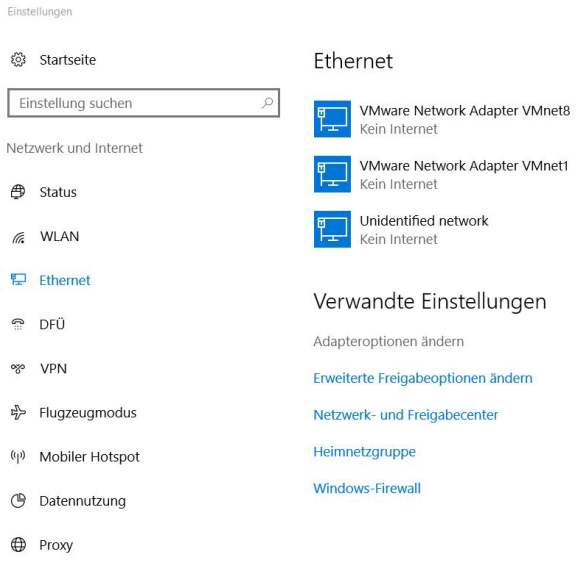
Note: In order to carry out these first steps of the PLC configuration, you must remove one of the Ethernet connections of the PLC in order to connect your computer directly to the controller.

Alternatively, you can continue with the router configuration (p.67) and then with the PLC configuration via WLAN without having to connect an Ethernet cable directly to the CPU switch. In this case, you would have to carry out the configurations from page 29 with the TIA V18 configuration. It would not be necessary to change the IP settings of the computer.

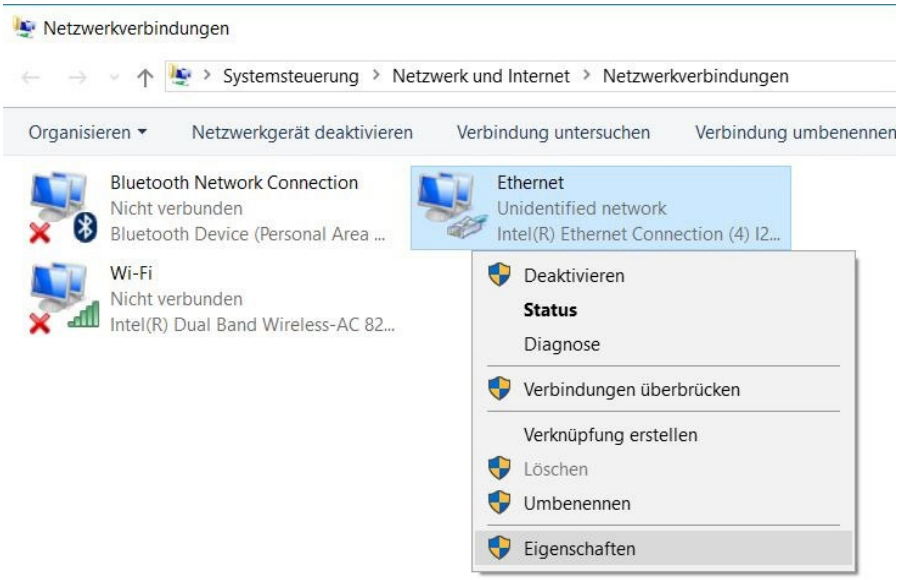
To ensure that the computer and SIMATIC S7-1500 can communicate with each other via TCP/IP, it is important that the IP addresses of both devices match.
First, we will show you how to set the IP address of a computer with the Windows 10 operating system.

→ Select the network icon at the bottom of the taskbar and then click on → **Network settings.**

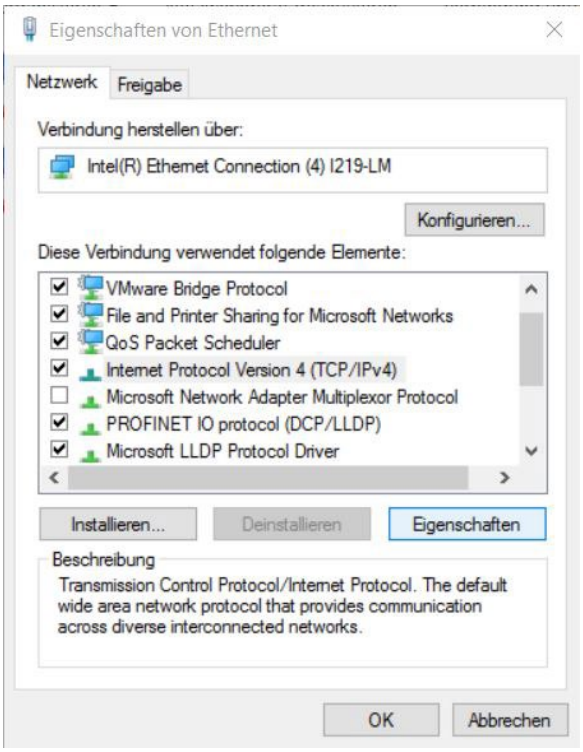
→ In the network settings window that opens, click on → **Ethernet** and then on → **Change adapter options.**



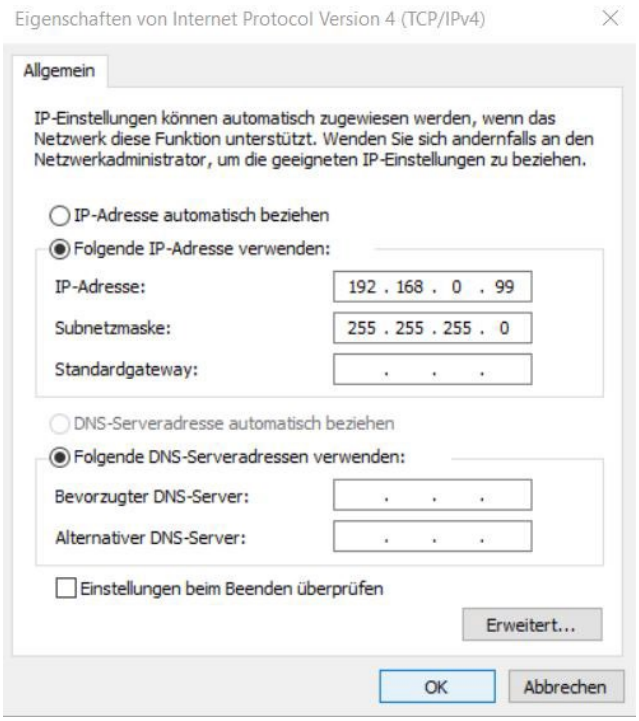
→ Select the desired → **LAN connection** with which you want to connect to the control unit and then click on → **Properties**.



→ Now select → **Properties** for → **Internet Protocol Version 4 (TCP/IPv4)**.



→ For example, you can now use the following IP address →**IP address: 192.168.0.99** and enter the following →**Subnet mask 255.255.255.0.** Then confirm the settings with →**OK.**

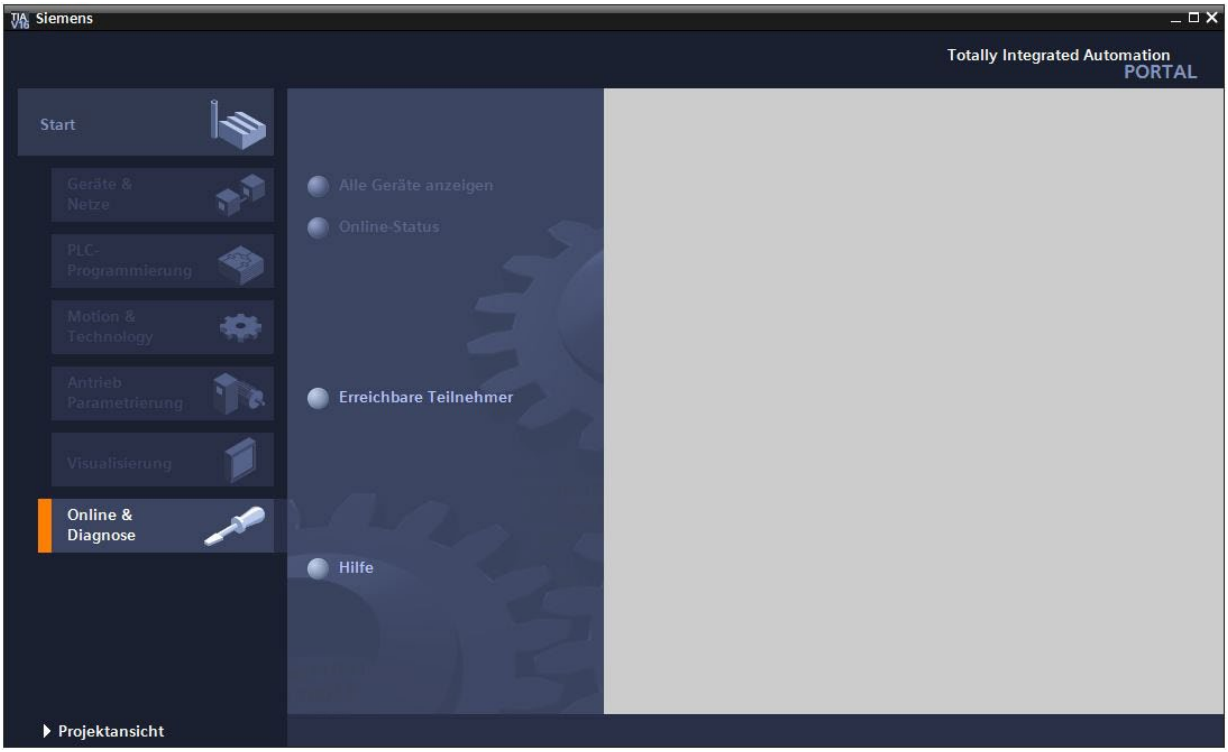


The IP address of the CPU can now be assigned as shown in the following steps.

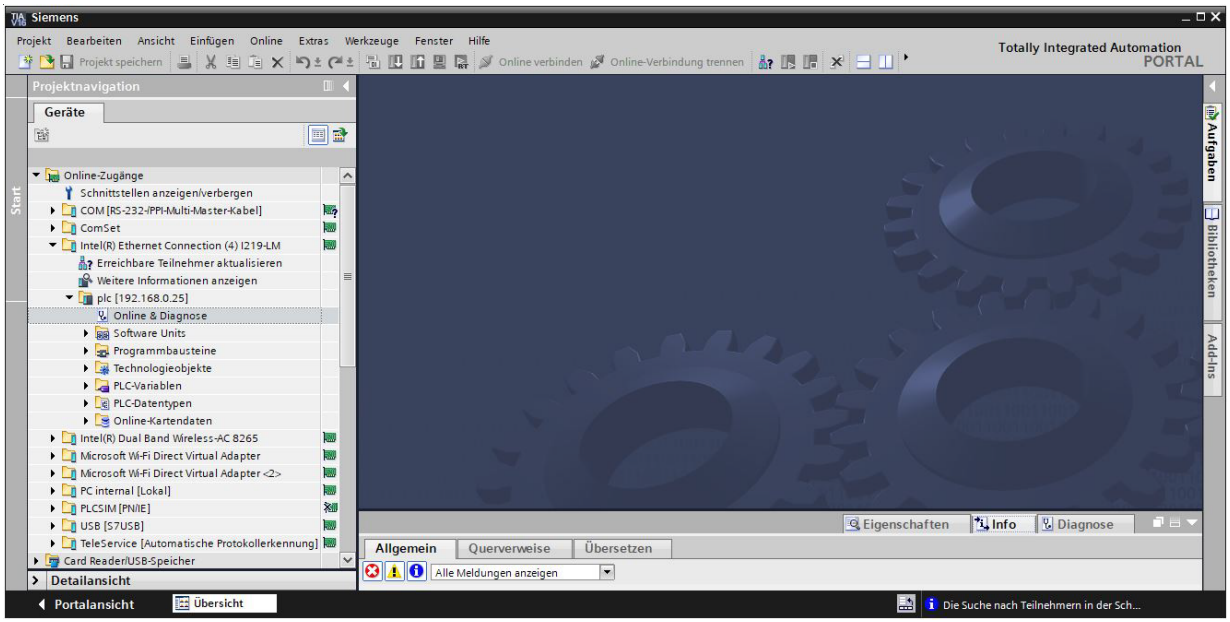
→ Connect your laptop/PC directly to one of the three Ethernet interfaces of the CPU and switch on the power supply to the control unit.

→ Now start the Totally Integrated Automation Portal, which is opened here with a double-click. (→**TIA Portal V18**)

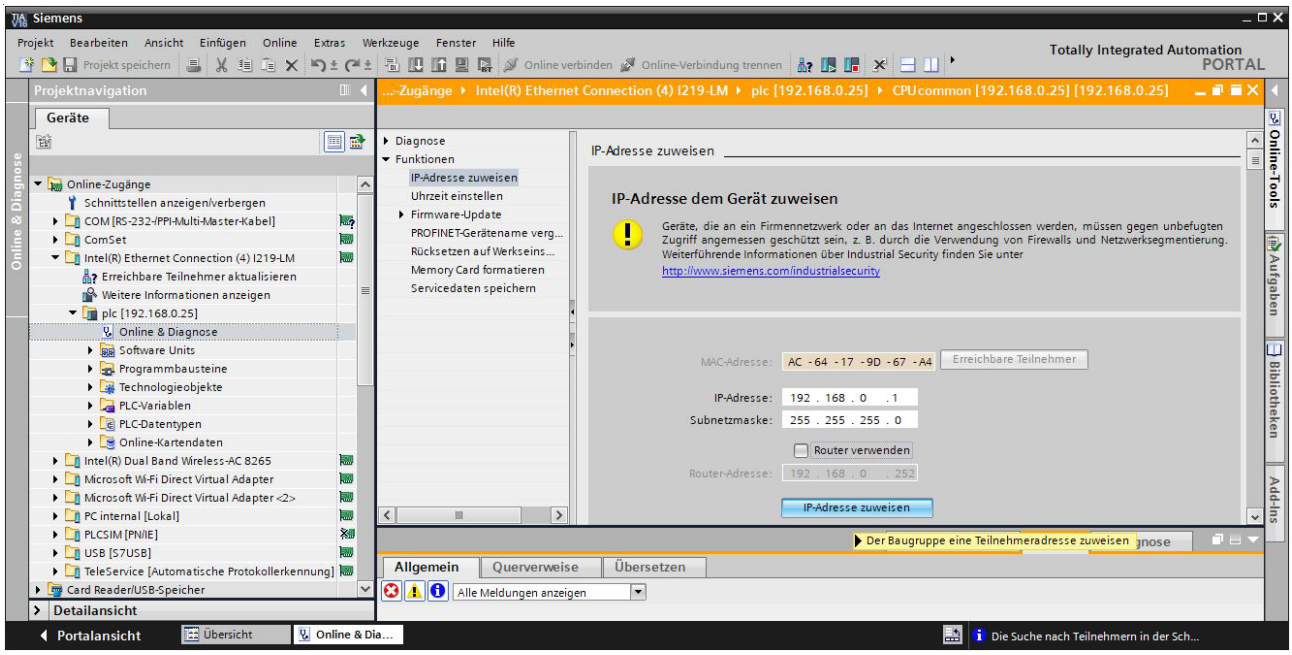
→ Select the →Online&Diagnosis item and then open the →Project view.



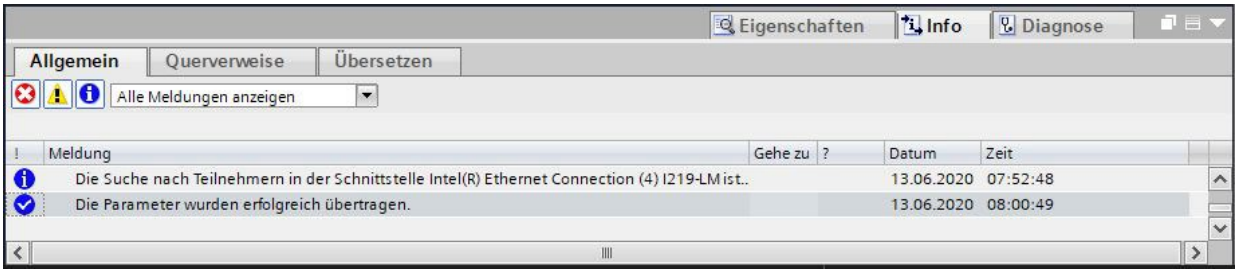
→ Under →Online accesses in the project navigation, select the network card that has already been set. If you click on →Update accessible participants, you will see the IP address (if already set) or the MAC address (if IP address not yet assigned) of the connected SIMATIC S7-1500. Select →Online&Diagnosis.



→ Under → **Functions you will** now find the item → Assign **IP address.** Enter the following IP address here, for example: → **IP address: 192.168.0.1** → **Subnet mask 255.255.255.0.** Now click on → **Assign IP address** and your SIMATIC S7-1500 will be assigned this new address.



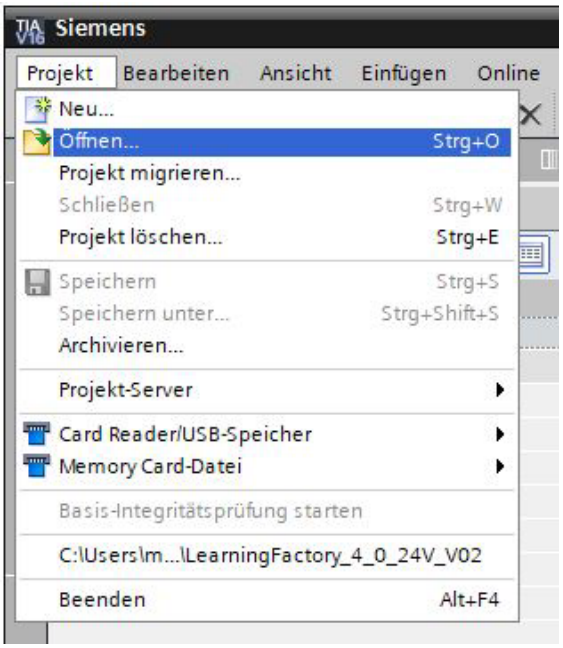
→ **Τηε** → **Info** → **General** window displays messages on the status of address assignment.

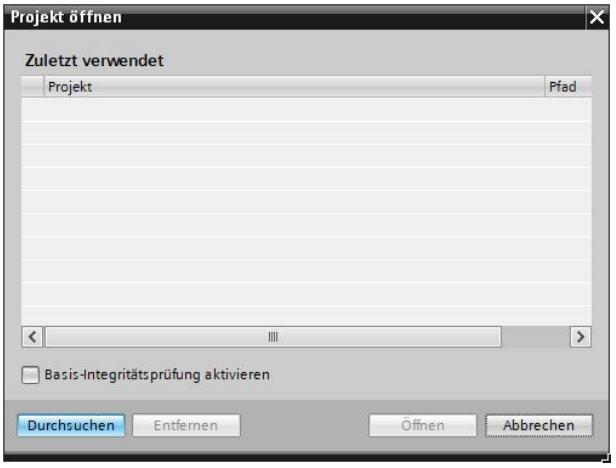


Opening the program solutions for the Learning Factory 4.0

The program solutions for the Learning Factory 4.0 can be opened in the following steps.

→ In the TIA Portal menu, select → **Project** → **Open** and then → **Browse.**





→ Then click on the compressed V18 project → **LearningFactory_4_0_24V** and select a target path on your computer to unzip the project there.

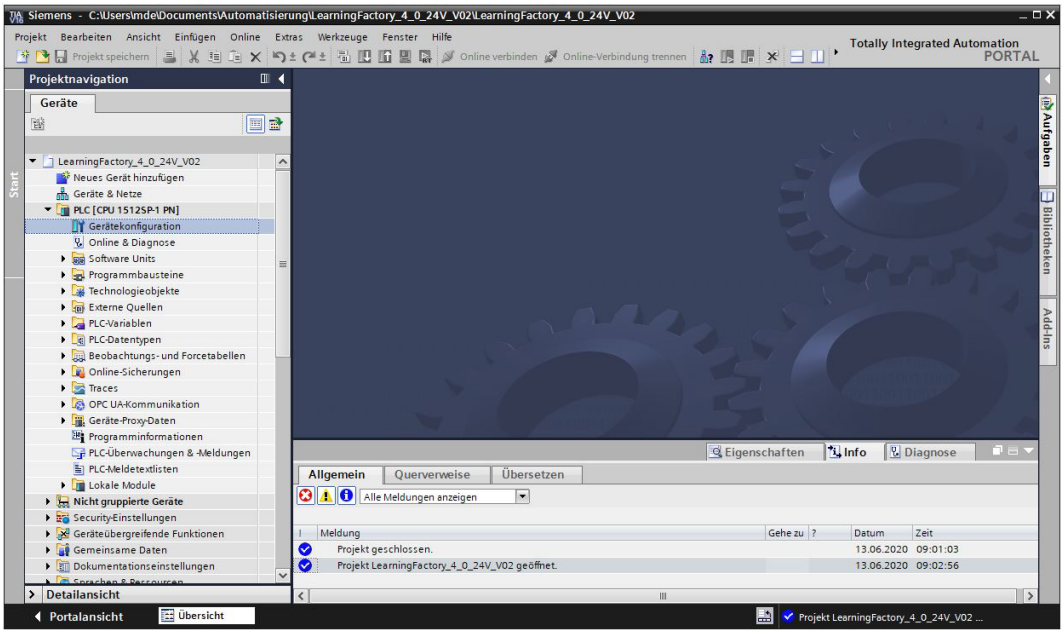
LearningFactory_4_0_24V_V15_TP_V18.zap18

Note: You can find the program solutions under:
https://github.com/fischertechnik/plc_training_factory_24v/tree/master

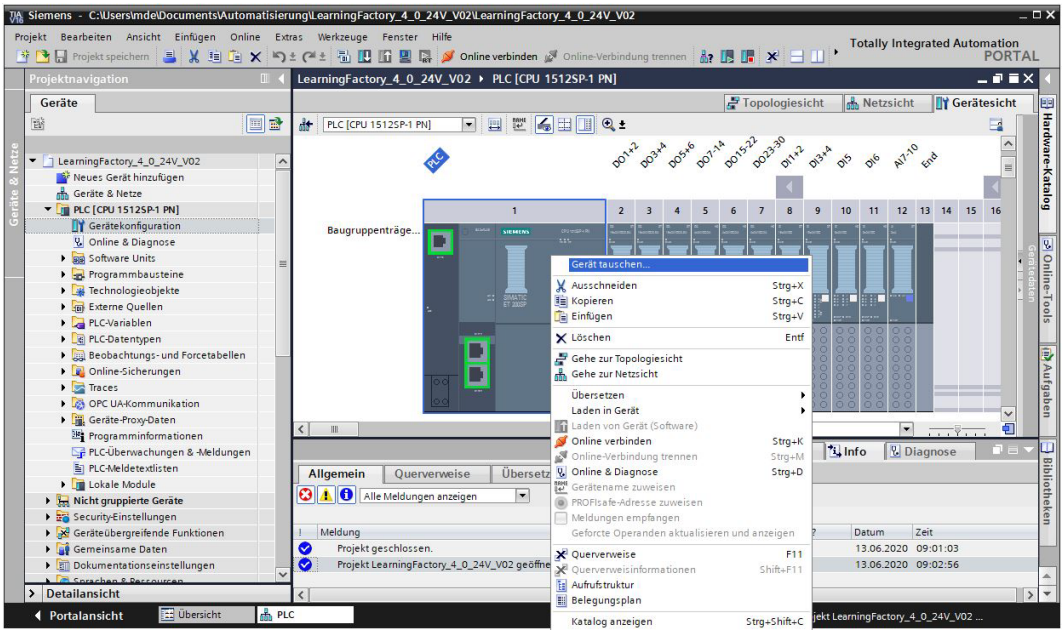
Adaptation of the hardware configuration

The project is now open and is displayed on the left in the project navigation.
If your hardware components differ from those in the program solutions, these components must be adapted in the TIA Portal.

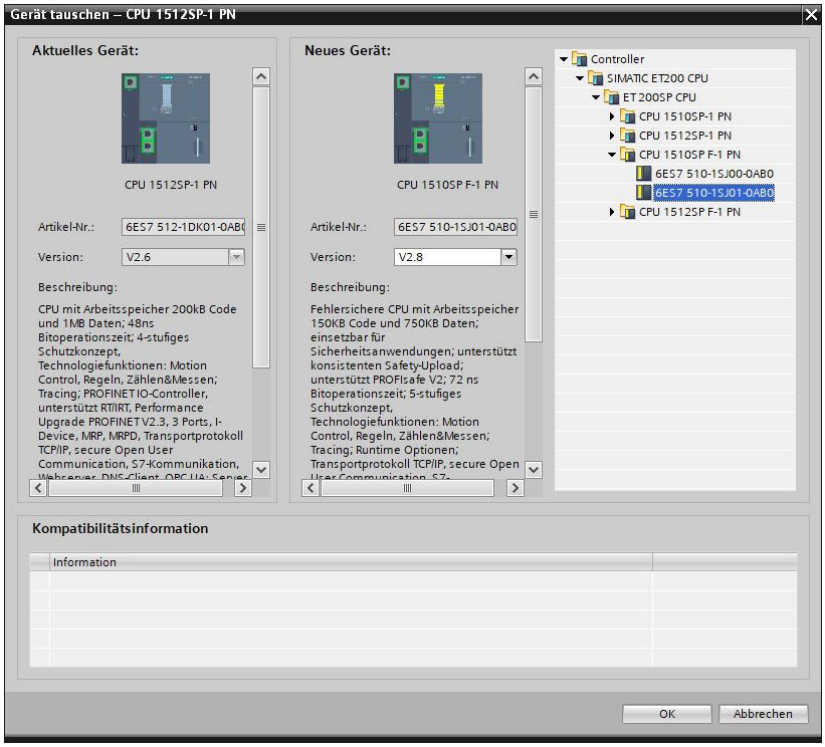
→ To do this, first open the → Device configuration.



→ Select one of the different components and then click on → Replace device.



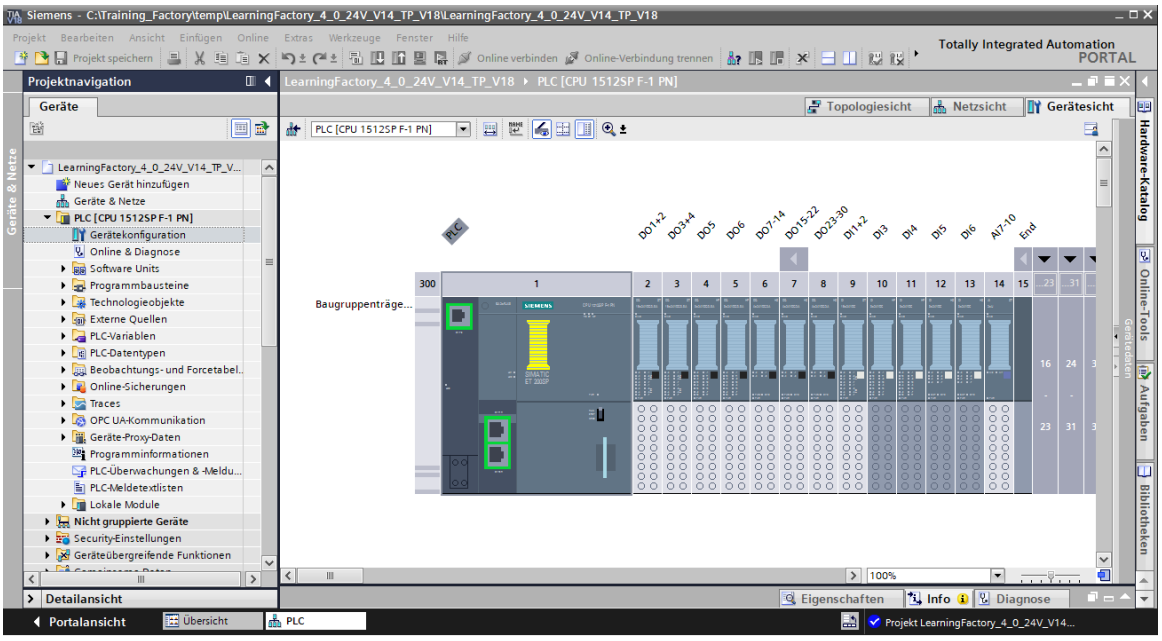
→ You will then see a dialog in which you can select from compatible devices.



The correct BaseUnit must be selected for each signal module:

- Use potential group of the left module (dark BaseUnit)
- Enable new potential group (light-colored BaseUnit)

→ You can change this setting **under** → Properties → General → **Potential** group change.

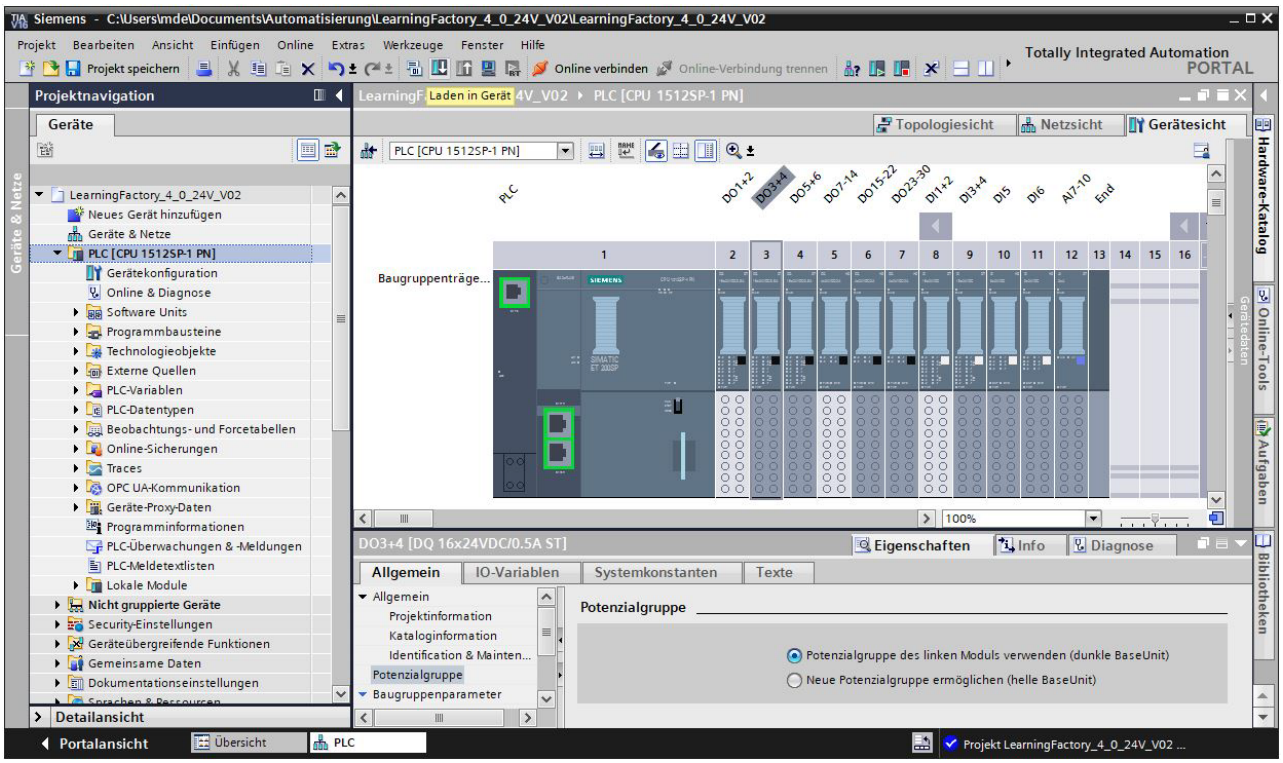


Loading the control program into the CPU1512SP

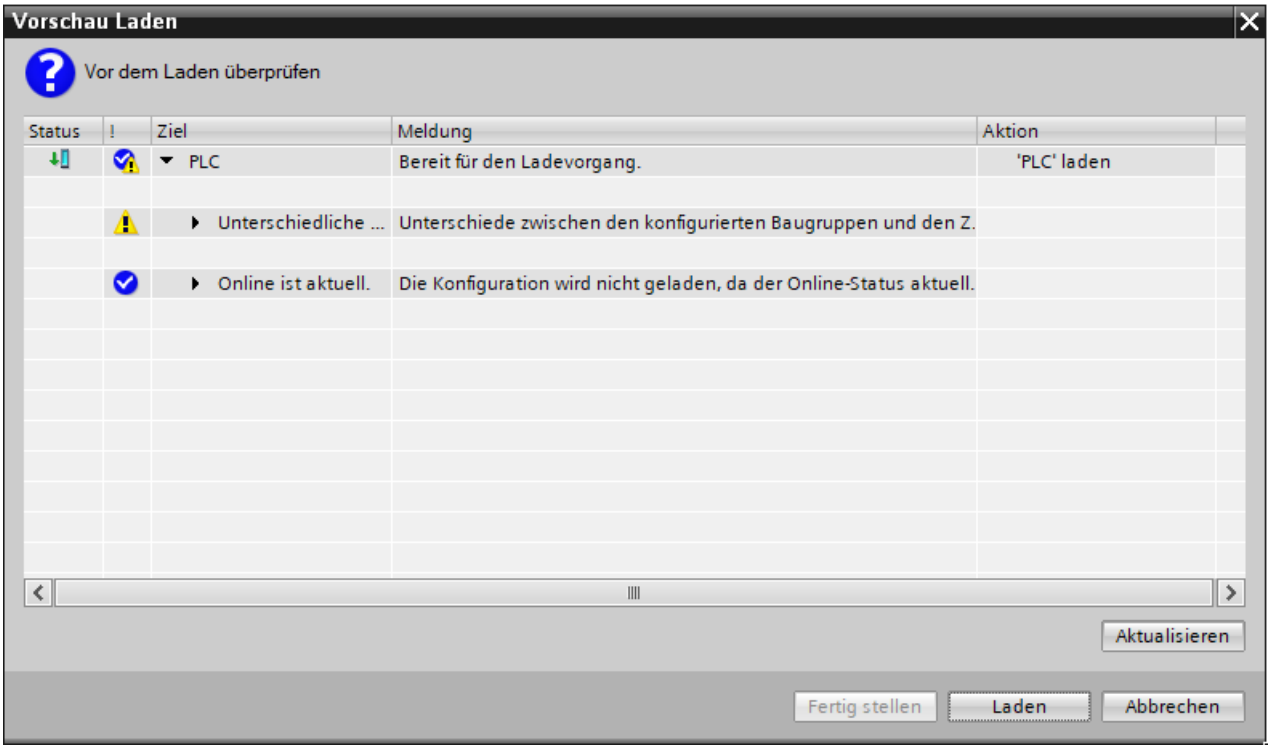
The CPU1512SP can be loaded in the following steps.

→ Before you continue, your project should be saved by clicking on the →  **Save project button**.

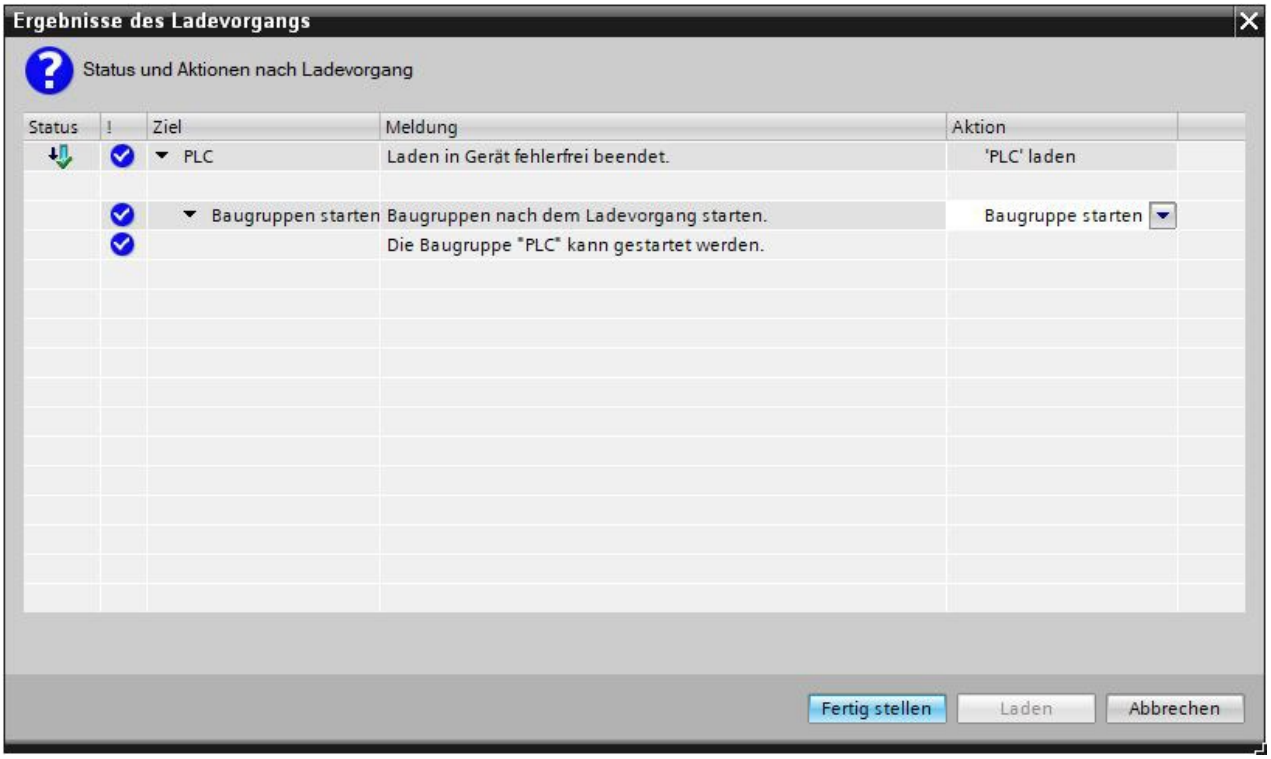
→ To load your entire CPU including hardware configuration and program solutions into the device, select the → PLC [CPU1512SP-1 F 1 PN] folder and click on the →  **Load into device** symbol.



→ You will first receive a preview with information on the loading process, data security, etc... Continue with → **Loading.**

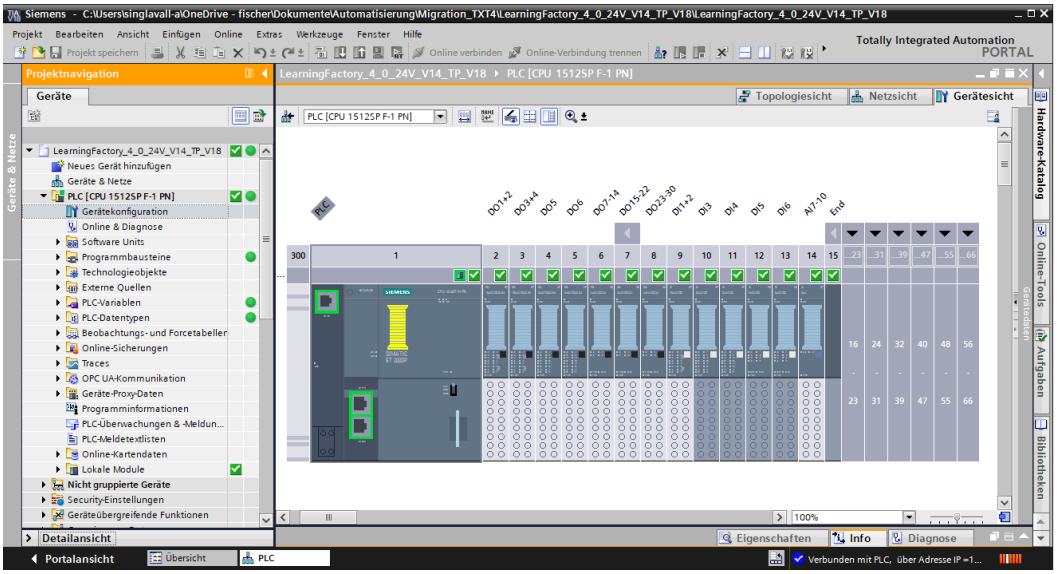


→ The → **Start module** option is now selected before the loading process can be **completed** with → **Finish.**



Finally, you can check online whether the configuration has been loaded without errors. The time should then be set in the CPU in case the set NTP server for automatic time synchronization is not available.

→ Select the CPU → **PLC [CPU 1512SP 1F 1PN]** and select → **Connect online.**



Note: All symbols should be green here if there are no errors.

→ To set the time, open → **Online & Diagnostics** and then select → **Functions** → **Set time** and then → **Transfer to** transfer the time from the laptop/PC.