Getting started with the EK9160

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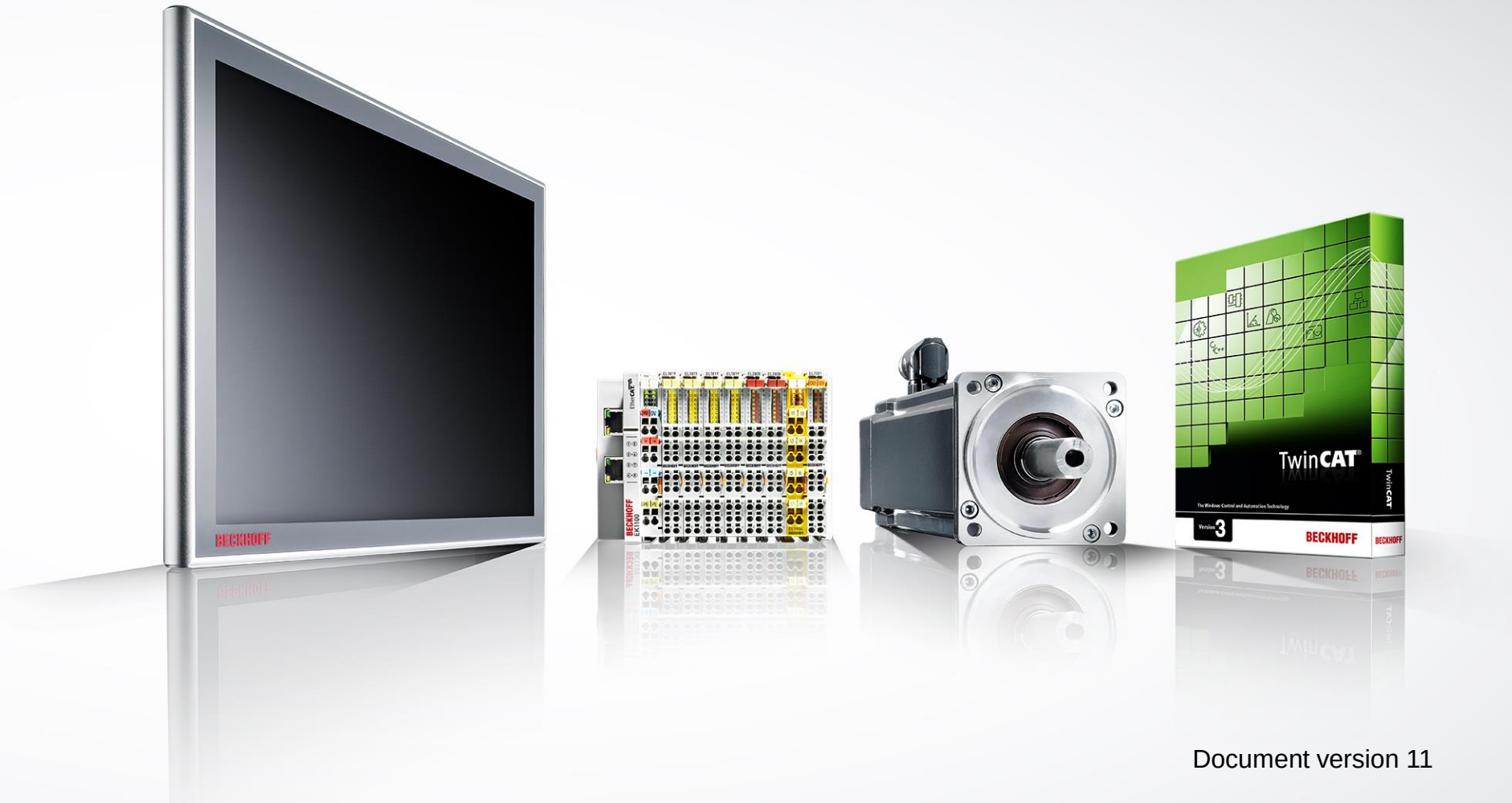

Document version 11

Documentation is in progress

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This presentation shows the first steps for commissioning the EK9160.

The EK9160 documentation is in progress. These information do not claim to be complete.

The design, connection and dimensions of the EK9160 are very similar to those of the CX8190, so please refer to the following chapters of the CX8190 documentation

- **For your safety** https://infosys.beckhoff.com/content/1033/cx8190_hw/4932192395.html?id=7669938318419844580
- **Transport and storage** https://infosys.beckhoff.com/content/1033/cx8190_hw/4932877963.html?id=4245029026716479713
- **Product overview** https://infosys.beckhoff.com/content/1033/cx8190_hw/9007204186831755.html?id=6828851530034229880
- **Commissioning** https://infosys.beckhoff.com/content/1033/cx8190_hw/45036001264257419.html?id=8564970738140030495
- **Care and maintenance** https://infosys.beckhoff.com/content/1033/cx8190_hw/9007204343970699.html?id=7648363428189374769

Descriptions of the protocols can be found in the documentation of the software TF6701 TC3 Communication (MQTT) and TF6100 TC3 OPC-UA:

TF6701 TC3 Communication (MQTT)
https://download.beckhoff.com/download/document/automation/twincat3/TF6701_TC3_IoT_Communication_MQTT_EN.pdf

TF6100 TC3 OPC-UA
https://download.beckhoff.com/download/document/automation/twincat3/TF6100_TC3_OPC-UA_EN.pdf

EK9160 | Informationen

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Protokolle:

- MQTT (data format: binary und JSON)
- OPC-UA

Supported digital / analog EL terminals:

- “simple” digital and analog EL terminals are supported
- no EL terminals with activated DC
- the new generation of power measurement terminals EL3423, EL3443, EL3453 and EL3483

The EK9160 coupler connects the EtherCAT I/Os directly to the Internet of Things (IoT) without a control program. It converts the E-bus signal representation to various IoT communication protocols. Neither a controler or programming is necessary. The I/O data are parameterised in a simple configuration dialog of the integrated web server via any browser (recommended: Mozilla Firefox or Google Chrome).

The respective cloud services and security functions (authentication, encryption, etc.) can also be conveniently configured via browser. After the parameters have been set, the coupler independently sends the digital or analog I/O values to the cloud service, including the time stamp.

Power supply EK9160

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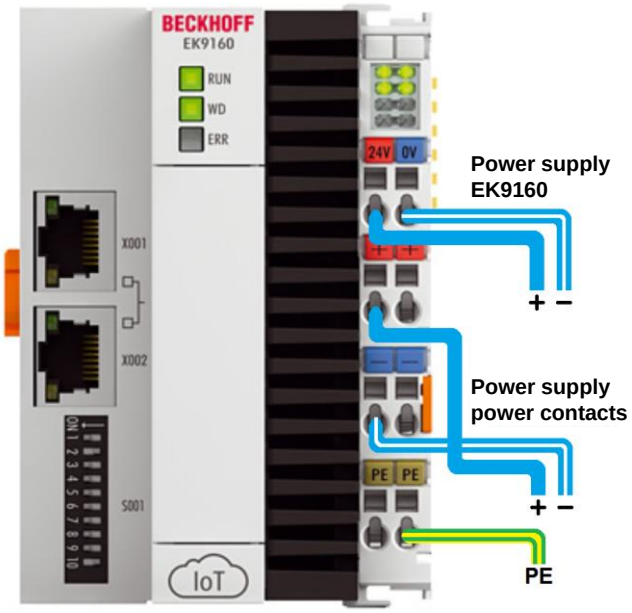
- The EK9160 is supplied with voltage via the two connections "24V" and "0V" (U_S).

  The input current is approx. 150 mA. In addition, the entire E-bus current / 4 is required to supply the EtherCAT Terminals.

- The connections "+" and "-" serve to supply the power contacts (U_P).



Host name, MAC address and IP address

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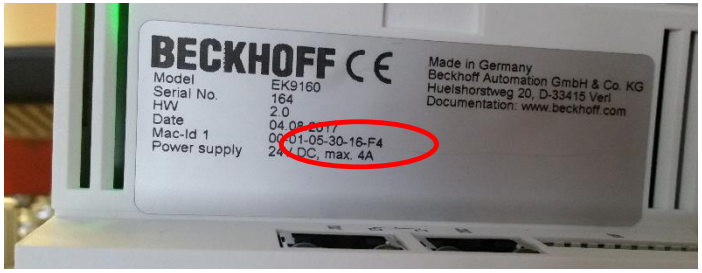
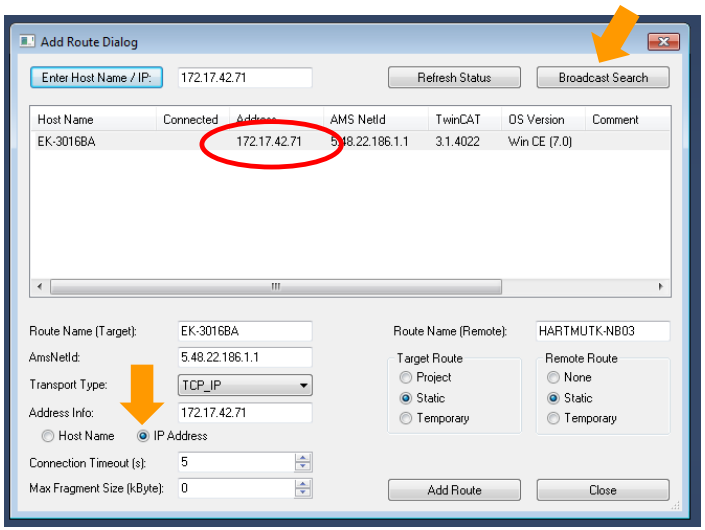
To configure the EK9160, the IP address or the host name for networks with DHCP server is required.

- The MAC address is printed on the side of the EK9160 nameplate.
- The hostname is formed from "EK-" and the last 3 bytes of the MAC address:
  E.g. MAC address 00-01-05-30-16-F4 => Hostname "EK-3016F4“
- The IP address can be found as follows:
  - Ping command e.g. "ping EK-3016F4", if a DHCP server is in the network
  - With TwinCAT 3 "Add Route Dialogue
  - Dip switches (page 9), if no DHCP is in the network





Device Manager

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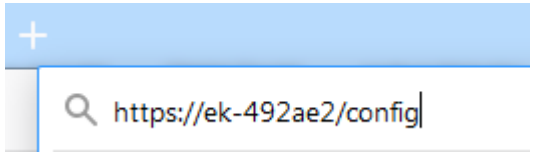
It is recommended to open the web configuration page "Device Manager" of the EK9160 with the current versions of the web browsers Mozilla Firefox or Google Chrome.

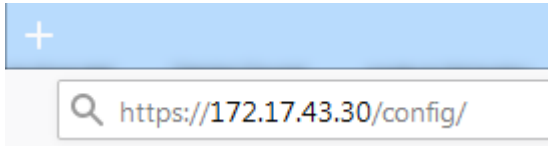
- https:// “host name or IP address” followed by “/config” in the URL line of the web browser.

  Hostname e.g.: ek-492ae2 or e.g.: 172.17.43.30

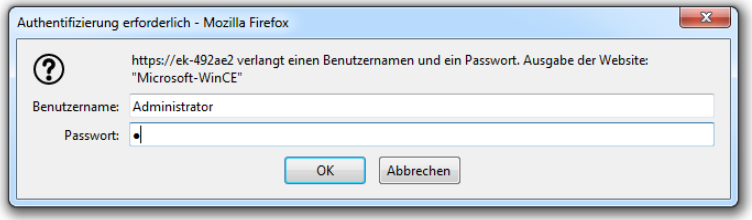
  https://ek-492ae2/config

  https://172.17.43.30/config





  - Username: Administrator
  - Passwort: 1



Warning about possible safety risk

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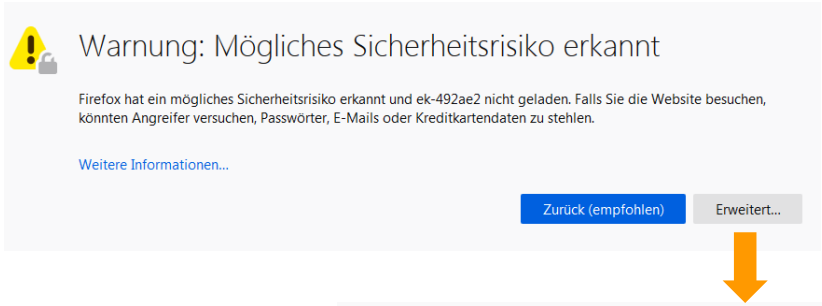
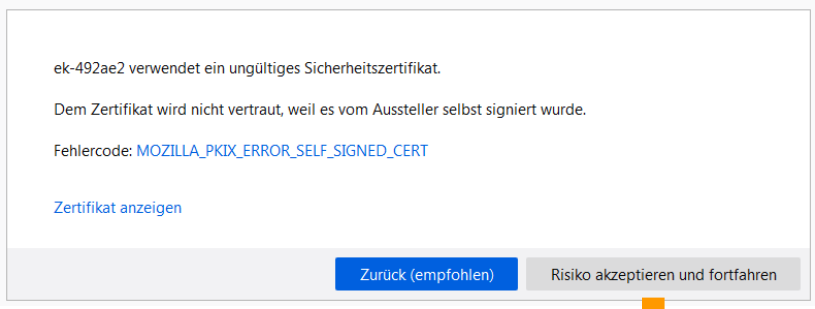
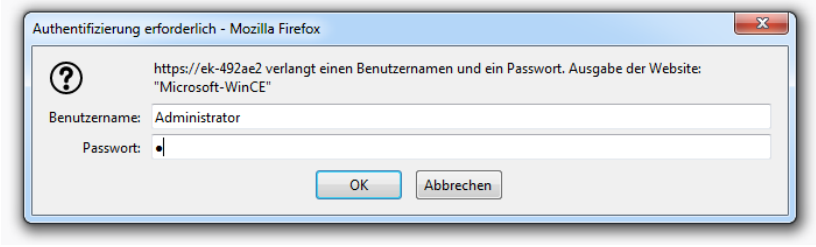
The first time you open the Device Manager of the EK9160 from your browser, a security warning will probably appear.



The EK9160 uses a self-signed certificate.

Since the browser does not know this certificate, you are requested to trust this certificate and continue.





Change IP address of the EK9160

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Delivery status:

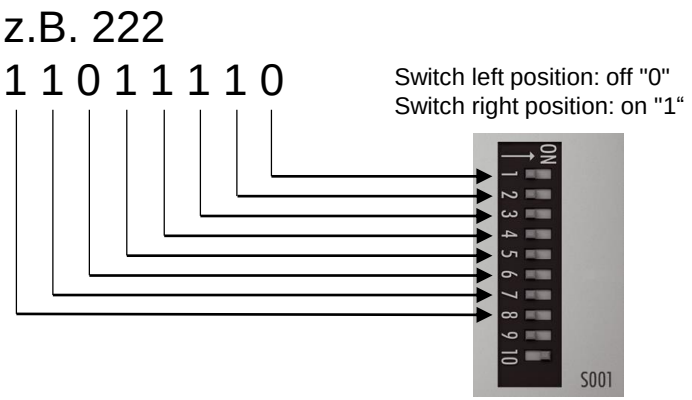
By default the EK9160 is set to DHCP (DIP switch 9 to "off" and 10 to "on"). If the EK9160 is connected to an Ethernet network, it expects to be assigned an IP address.
If no DHCP server is available, a random IP address is selected 192.168.1.xxx.

Set IP address with DIP switches

With the DIP switches S001 you can set the IP address for the switched Ethernet interfaces X001/X002.

The DIP switches have priority over the Device Manager settings. After a change, a reboot must be performed (Open Device Manager => Device => Boot => Reboot).

DIP switch S001	Meaning
DIP 1 to 8 all **on** 9 **off** and 10 **off**	The complete IP address is taken from the configuration (Beckhoff Device Manager)
9 **off** and 10 **off**	DHCP inactive. The fixed IP address 192.168.1.xxx and subnet mask 255.255.255.0 are used as standard. The last byte of the IP address 192.168.1.xxx is edited with DIP switches 1 to 8. You can change the first three bytes of the IP address in the operating system or via the web interface (Beckhoff Device Manager).
9 **off** and 10 **on**	DHCP active. Standard setting ex factory. The DIP switches 1 to 8 then have no meaning.



Change IP address of the EK9160

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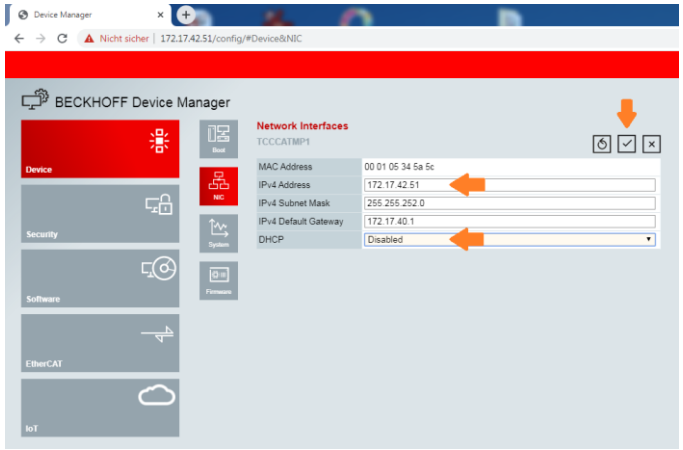
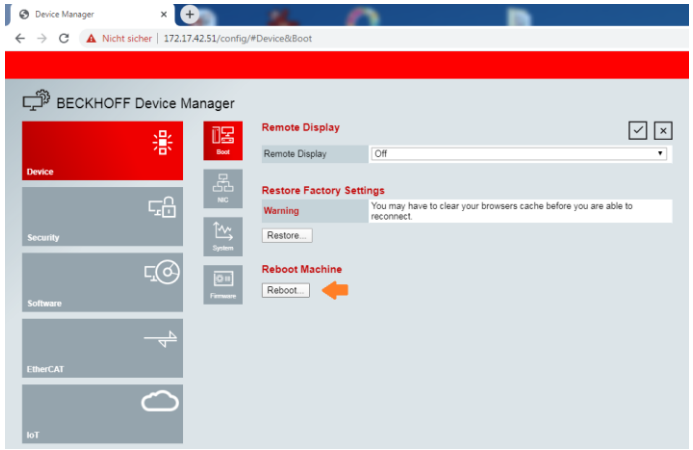
The complete IP address can also be set via the Beckhoff Device Manager:

- Open the device manager of the EK9160. Use either the assigned DHCP address or the basic IP address listed in the table (line 2).

- Deactivate DHCP and enter the desired IP address. Accept the configuration. Set DIP switches 9 and 10 to "off" and 1-8 to "on" and reboot the EK9160.





- After the reboot you can call the device manager of the EK9160 again under the new IP address.

Configurate EK9160

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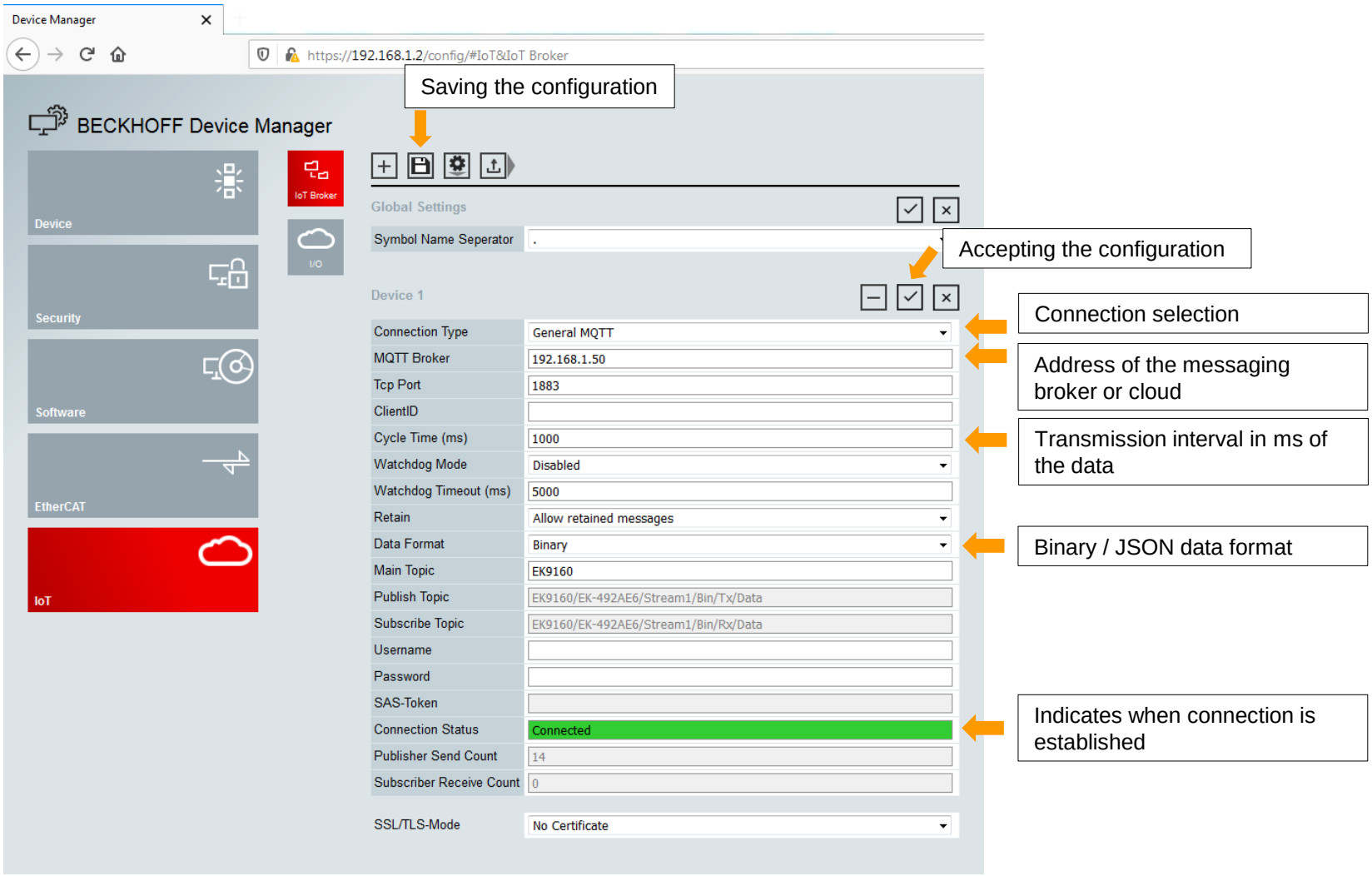
- Configurate EK9160 – Device Manager – IoT Broker:



Selection of data channels

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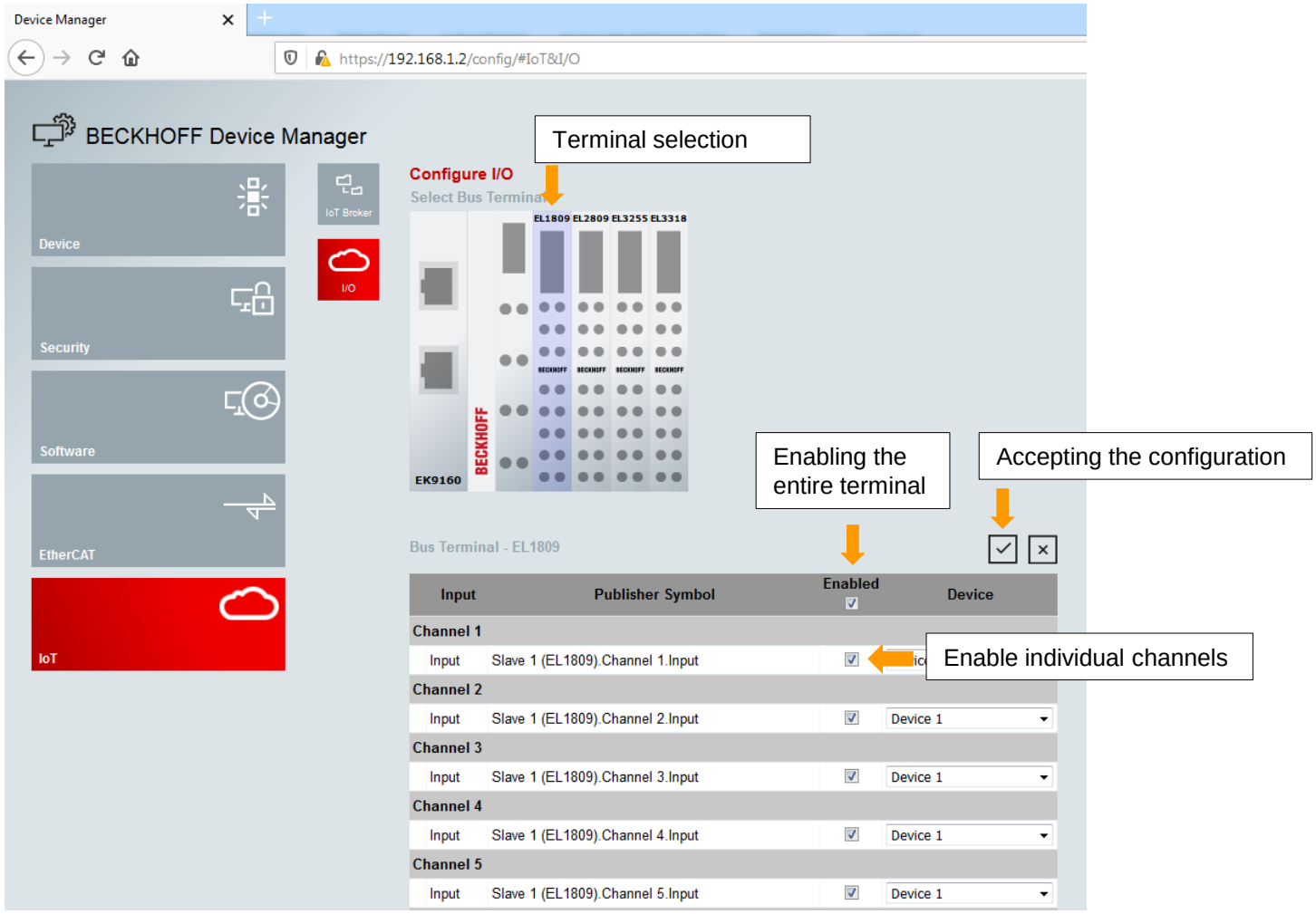
- Each channel or measured value to be transmitted must be enabled:



Terminal parameter settings

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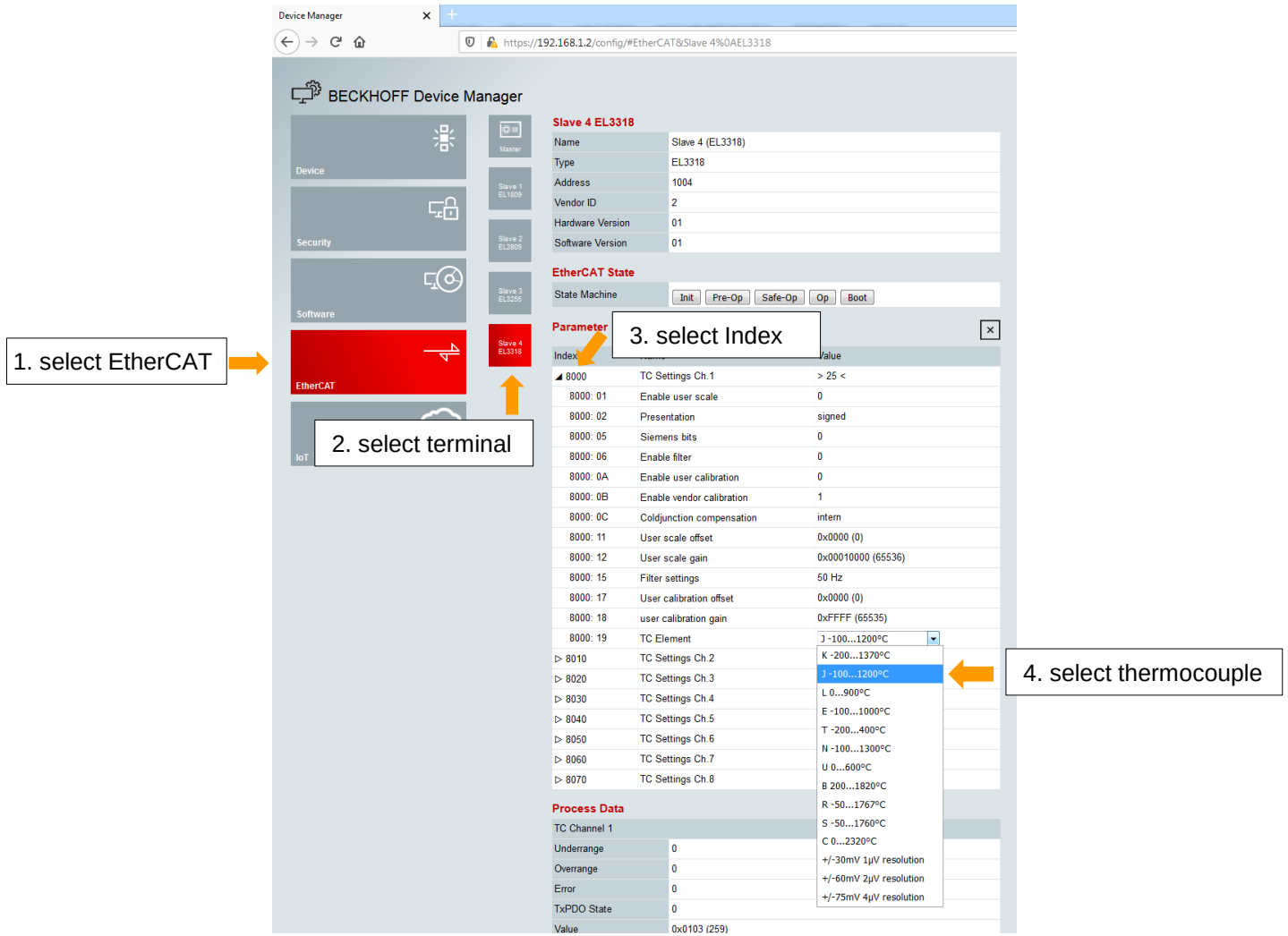
- E.g. Configurate TC Element Type J



Change User and Password:

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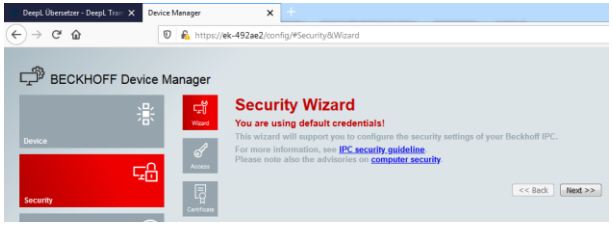
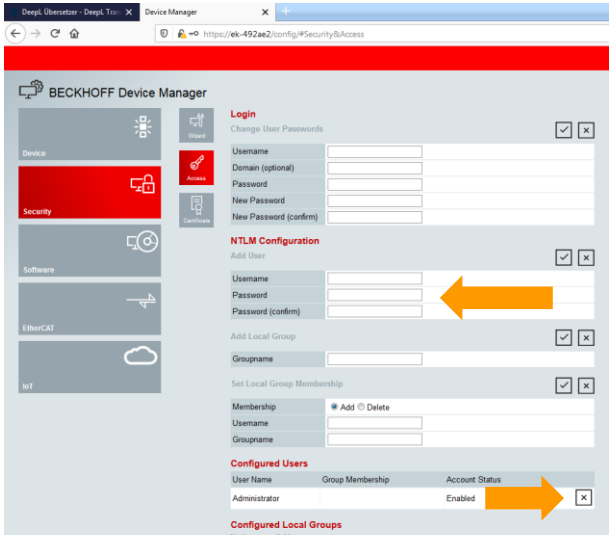
To increase security for access to the Device Manager, change the username and password:

1. **Open the Security Wizard**

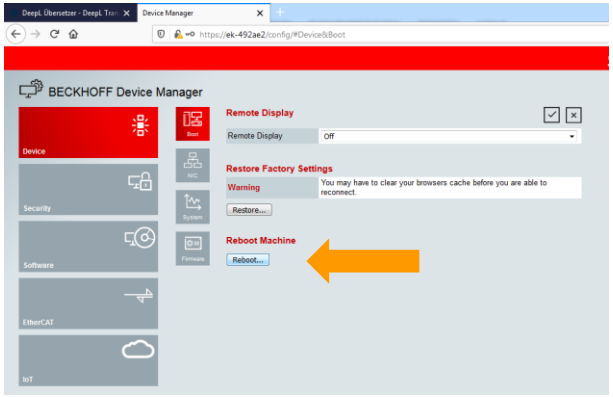


2. **Create new User and set a new password**



3. **Delete the default User Administrator**

4. **Reboot the EK9160**



Check the current firmware and update:

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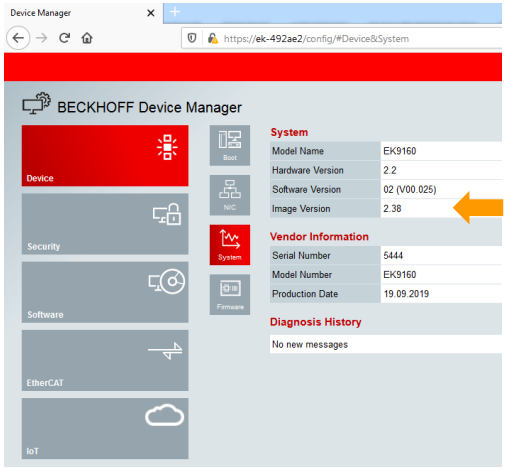
Via the Device Manager you can check the current firmware version:

- Device Manager => Device => System
- The firmware version can be found under Image Version

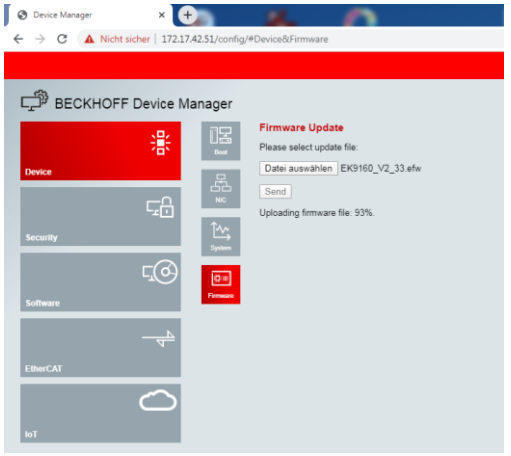


Firmware update with a NK.bin file (for firmware less than 2.33):

- Remove the MicroSD card
- Insert the MicroSD card into a USB reader and format the MicroSD card
- Copy the new firmware (NK.bin) to the memory card
- Insert the memory card back into the EK9160
- The first startup will take a little longer

Firmware update with an EK9160_Vx_xx.efw file (firmware 2.33 or higher):

- Open the device manager of the EK9160 (slide 6)
- Select Device => Firmware
- Use "Select file" to search for the firmware file with the extension .efw
- Send the firmware to the EK9160
- You will then be prompted to perform a reboot



Firmware versions and bootloader are available under the following link :

https://download.beckhoff.com/download/software/ethercat/ekxxxx/ek9160

Bootloader update for hardware version 2.0

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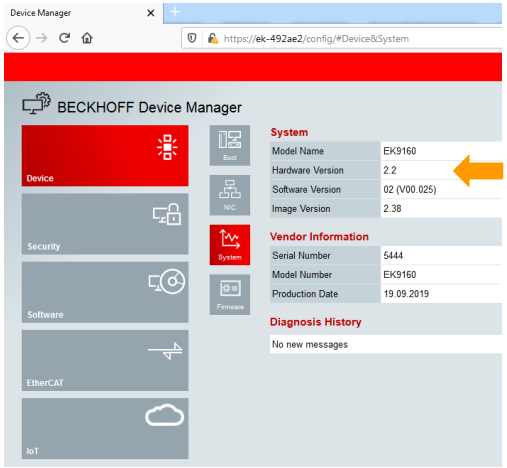
Via the Device Manager you can check the current hardware version:

- Device Manager => Device => System => Hardware Version



If you have an EK9160 with hardware version 2.0, the bootloader must be upgraded before a firmware update. If the new firmware starts, the bootloader is already up-to-date.

Bootloader update for EK9160 hardware version 2.0:

- If the EK9160 does not start with the new firmware, you have to update the bootloader
- Copy the three files from "Bootloader_v1_15" into the root directory of your µSD card.
- Switch on the EK9160 - the EK9160 updates the bootloader and restarts (wait at least 15 seconds)
- After a successful bootloader update, the file "eboot_mpl.bin" has been renamed to "_boot_mpl.bin
- Now you can delete "_boot_mpl.bin" and the two *.rbf files from the root directory of your µSD card
- Firmware versions and bootloaders are available under the following link :

  https://download.beckhoff.com/download/software/ethercat/ekxxxx/ek9160

- Update the firmware with an NK.bin file. See previous page.

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