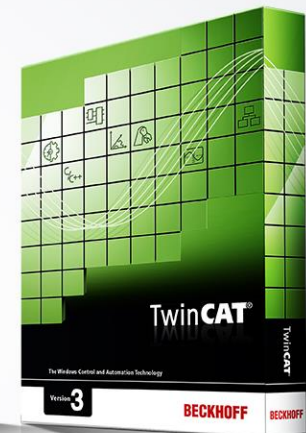
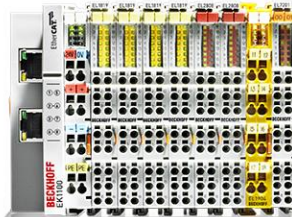


EK9160: OPC-UA with UaExpert

BECKHOFF



This guide shows the steps to establish an OPC-UA connection with the UaExpert software and obtain signal values from 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

Protocols:

- 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 controller 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.



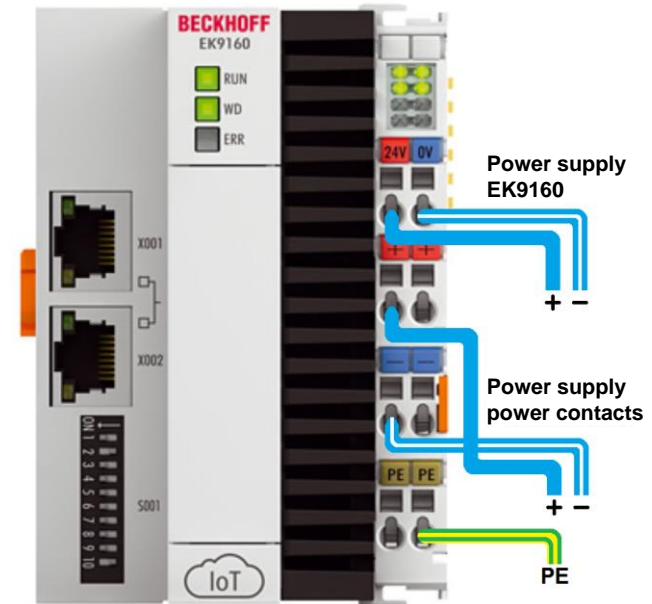
Power supply EK9160

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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).

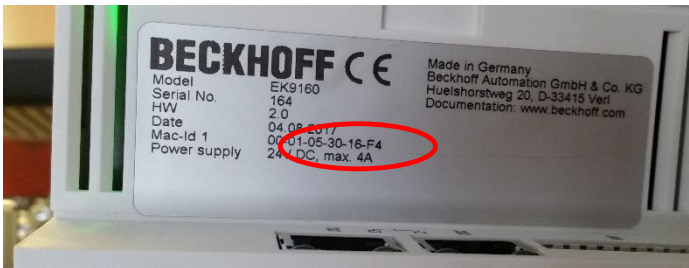


Host name, MAC address and IP address

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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



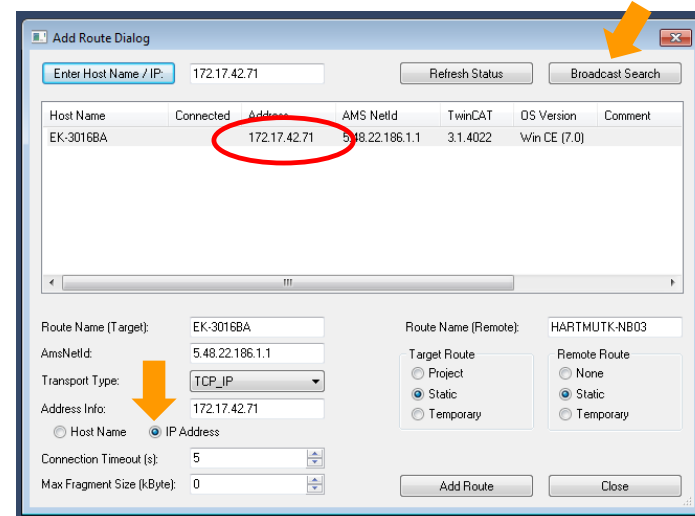
```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\Hartmutk>ping EK-3016BA

Ping wird ausgeführt für EK-3016BA [172.17.42.71] mit 32 Bytes Daten:
Antwort von 172.17.42.71: Bytes=32 Zeit=1ms TTL=128
Antwort von 172.17.42.71: Bytes=32 Zeit<1ms TTL=128
Antwort von 172.17.42.71: Bytes=32 Zeit=1ms TTL=128
Antwort von 172.17.42.71: Bytes=32 Zeit=1ms TTL=128

Ping-Statistik für 172.17.42.71:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0
    (0% Verlust)
    Ca. Zeitangaben in Millisek.:
    Minimum = 0ms, Maximum = 1ms, Mittelwert = 0ms

C:\>
```



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

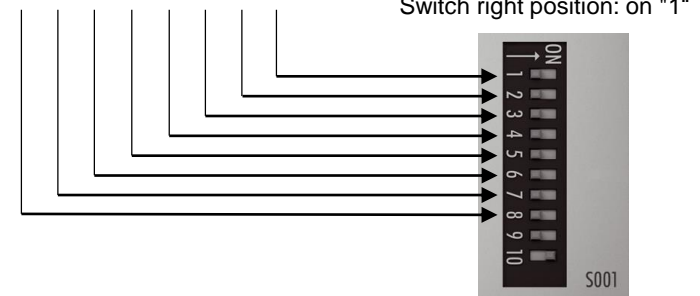
With the DIP switches S001 you can set the IP address for the switched Ethernet interfaces X001/X002.

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.

z.B. 222

1 1 0 1 1 1 1 0

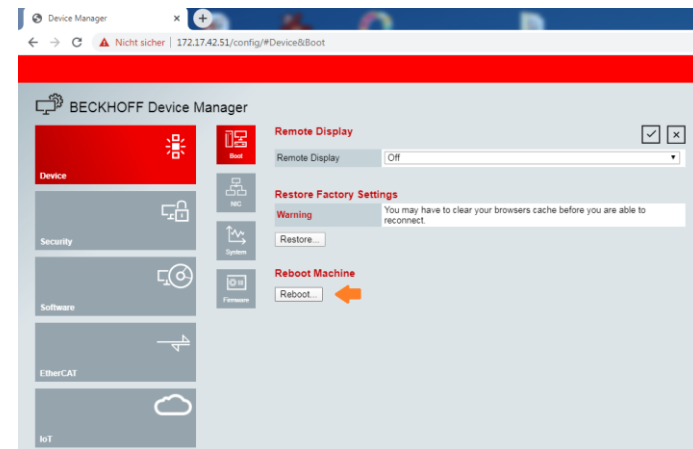
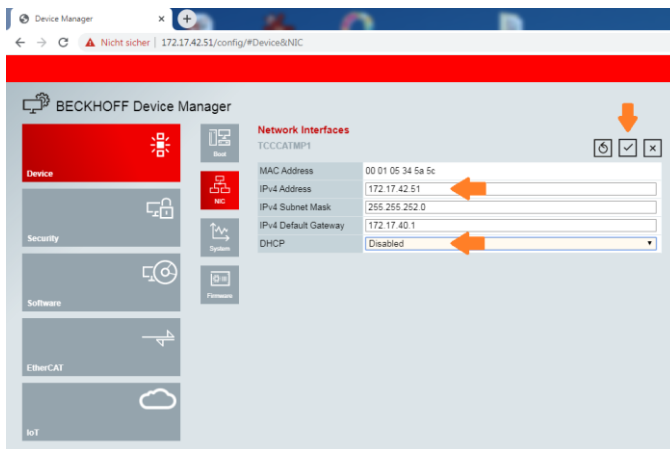


Change IP address of the EK9160

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

- Open the device manager of the EK9160 (Written on the slides further back). Use either the assigned DHCP address or the basic IP address 192.168.1.xxx.
- 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.



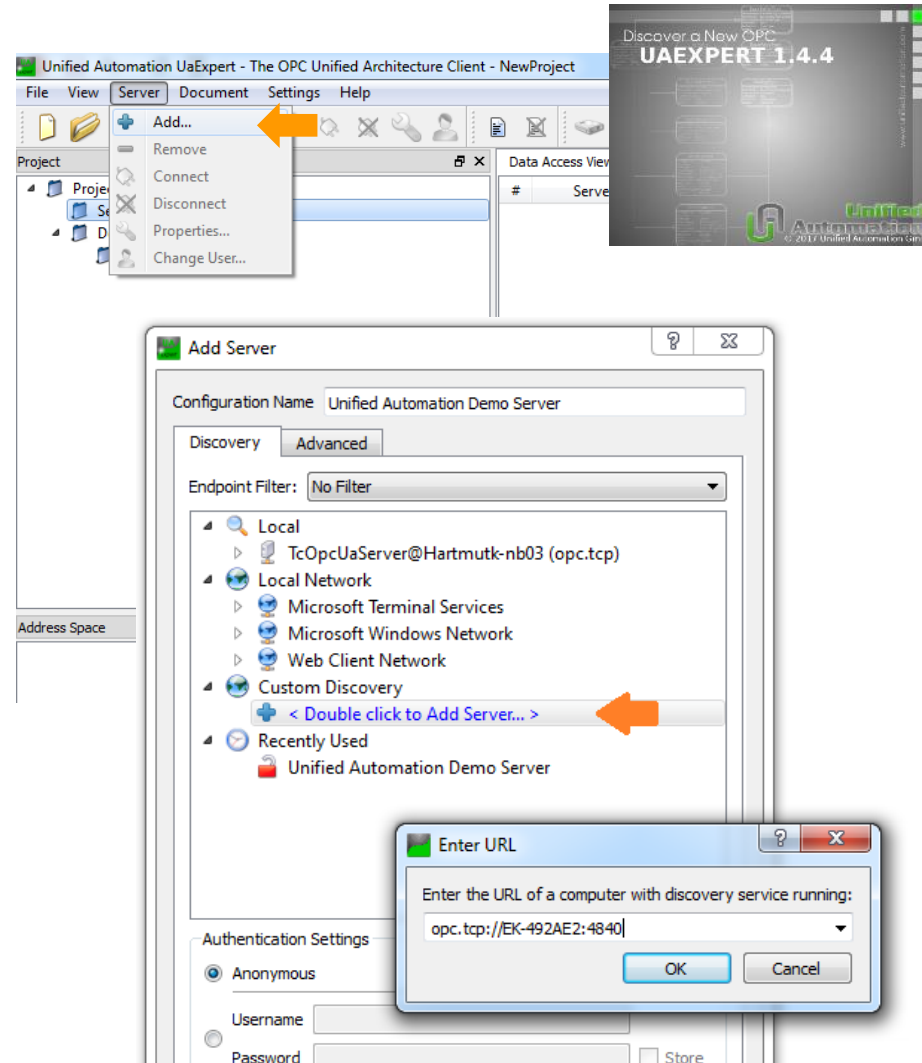
- After the reboot you can call the device manager of the EK9160 again under the new IP address.

Connection to UaExpert

By connecting to an OPC-UA Client you have full access to the data of the EtherCAT terminals

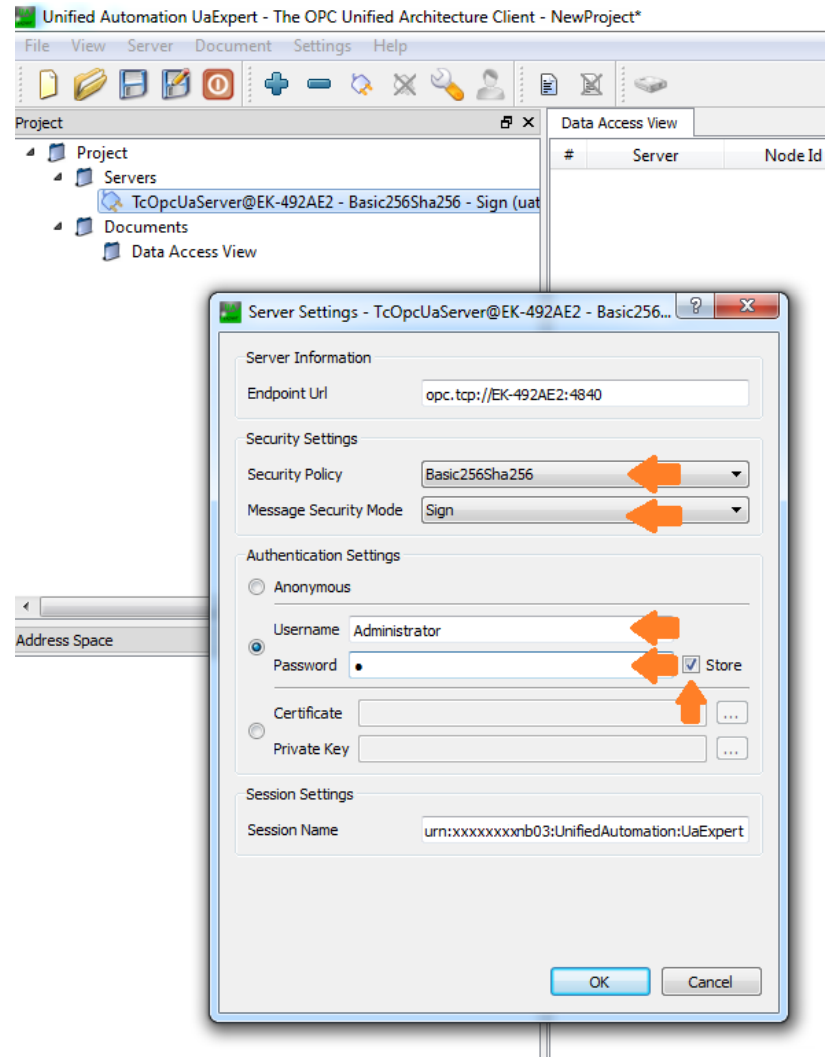
- Start UaExpert and Add Server
- Endpoint URL for e.g. hostname EK-492AE2:

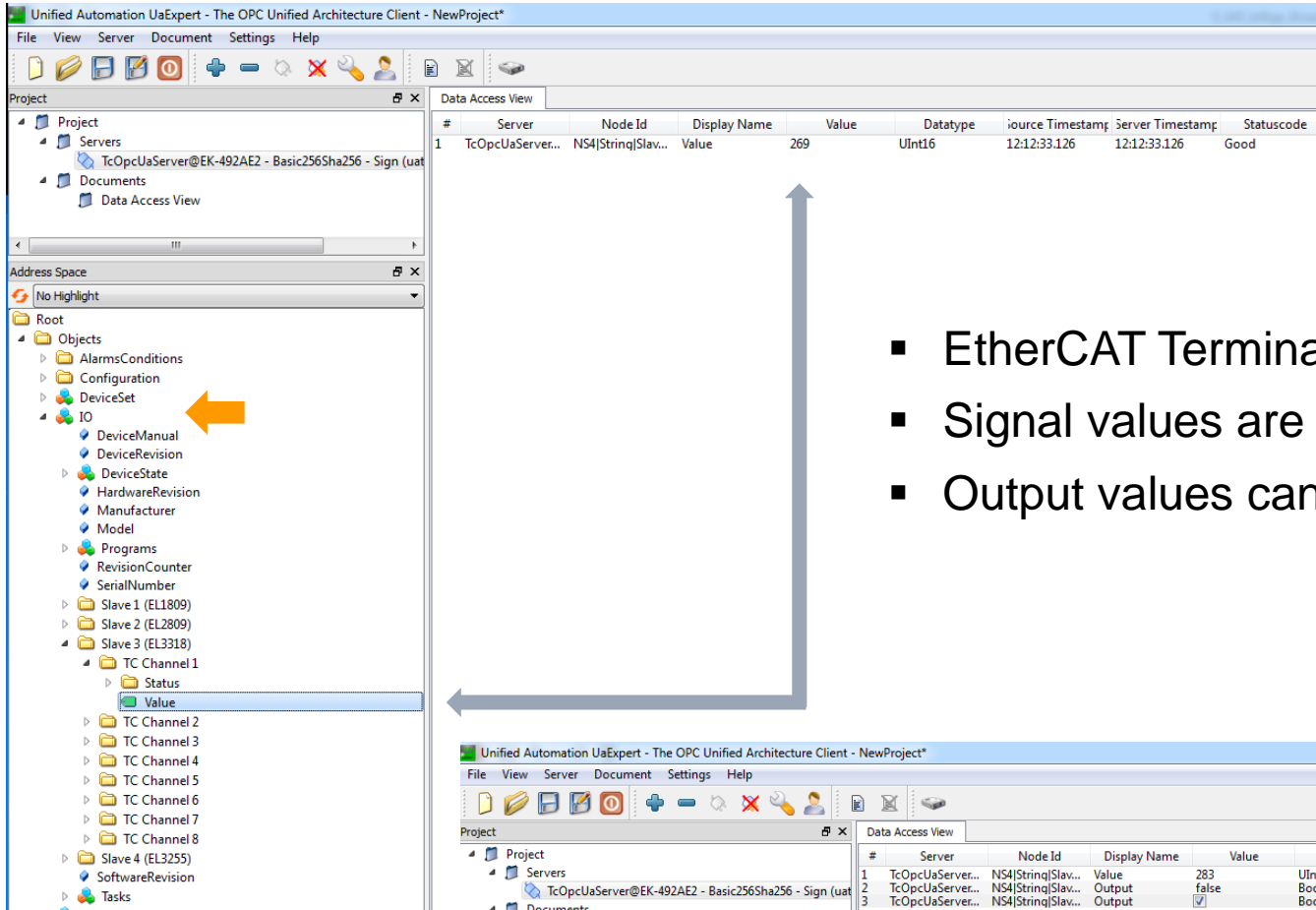
opc.tcp://EK-492AE2:4840



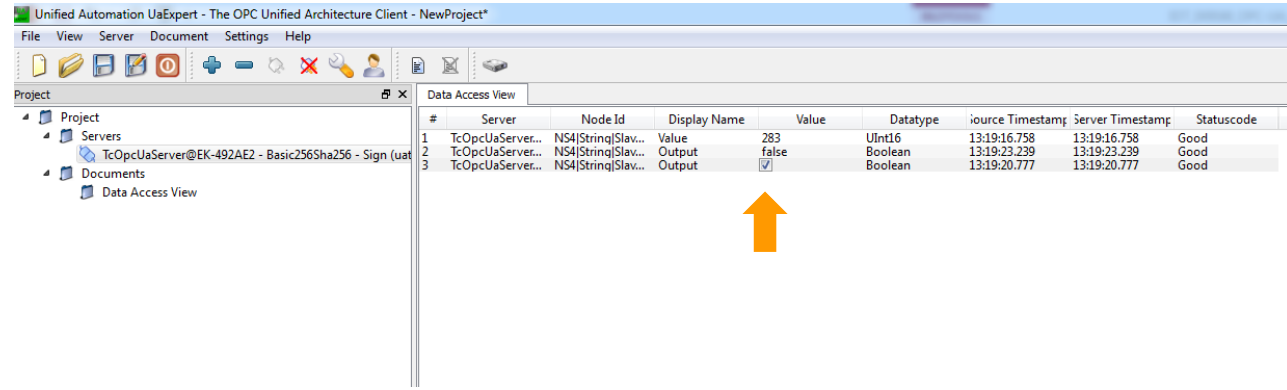
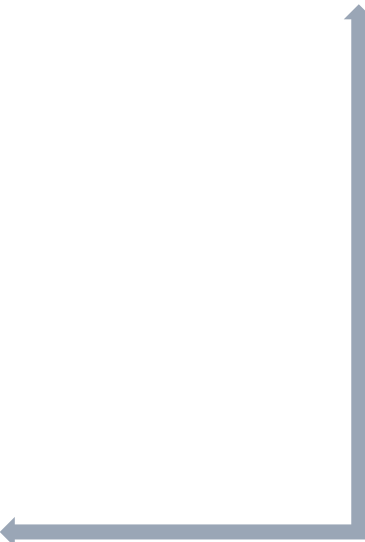
Check the Server Settings

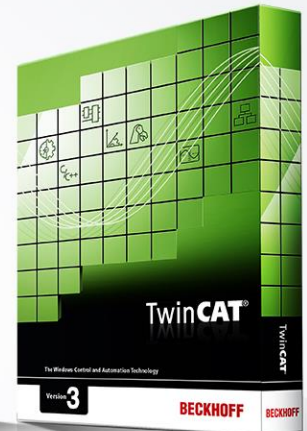
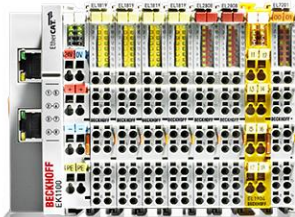
- Security Policy:
Basic256Sha256
- Message Security Mode:
Sign
- Authentication Settings:
Username: Administrator
Password: 1





- EtherCAT Terminals appear under IO
- Signal values are displayed
- Output values can be controlled





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