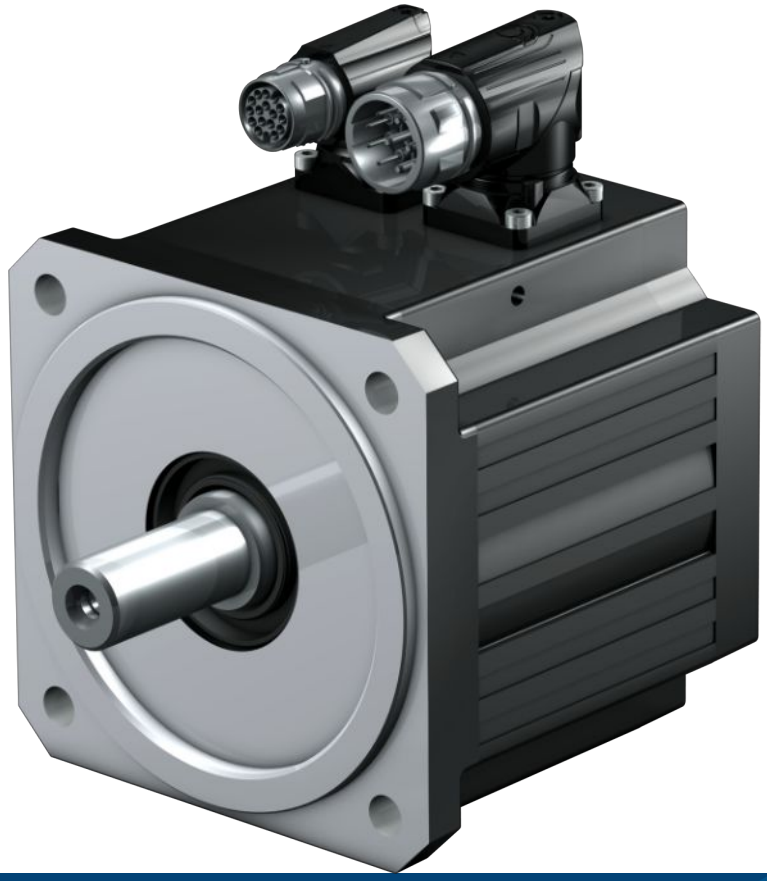


# Commissioning of EZ motors on Beckhoff AX5000

## Information

en-US
04/2023
ID 443185_en.04

STÖBER

# 1 Overview

This document contains information about the **Beckhoff AX5000** feature that is offered in the SAP configuration of STOBER motors when selecting the drive controller type. This feature affects the connection and parameterization of STOBER synchronous servo motors to drive controllers of the Beckhoff AX5000 series.

A STOBER motor version is available and can be delivered with the Beckhoff AX5000 feature.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to AX5000 drive controllers and avoiding errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- Parameter files for all supported motor versions are provided.

### Brand names

| | |
|---|---|
| TwinCAT® | TwinCAT® is a registered trademark of Beckhoff Automation GmbH, Verl, Germany. |

04/2023 | ID 443185_en.04

# 2 Beckhoff drive controllers

### Supported series

This document refers to Beckhoff drive controllers of the AX5000 series.

### Parameter files

STOBER provides motor parameters in files in order to connect a STOBER motor to an AX5000 drive controller. For drive controllers up to firmware version 2.06, XML files are available for all supported motor types in the download area of the STOBER website. For drive controllers in firmware version 2.10 or later, parameter files are provided in XEDS format on request. Detailed information on the parameter files can be found in the chapter Parameterizing the motor [▶ 7].

### Automatic parameterization

Automatic parameterization of a STOBER motor is only supported up to firmware version 2.06. The process is as follows: The Beckhoff TwinCAT software reads the motor designation from the motor's electronic nameplate and compares it to the designations in the parameter file. If the designations match, the motor has been detected and all necessary motor parameters are taken over from the parameter file. The motor can then be commissioned like an original Beckhoff motor.

### Connection cables

The plug connectors and terminal assignment of STOBER motors are designed so that the customer can obtain and connect the corresponding original cables from Beckhoff. STOBER does not offer any connection cables for Beckhoff drive controllers.

04/2023 | ID 443185_en.04

# 3 STOBER motors

### Supported motor series

The STOBER EZ motor series can be parameterized to AX5000 drive controllers. This excludes other STOBER motor series.

### Electronic nameplate

The electronic nameplate is stored in the encoder memory of STOBER motors. For drive controllers up to firmware version 2.06, the electronic nameplate allows the Beckhoff TwinCAT software to detect the motor automatically and load all necessary motor parameters from the corresponding parameter file.

### Temperature sensor

As standard, PTC or PT1000 temperature sensors are installed in Beckhoff motors depending on the series. STOBER offers the same temperature sensors. The temperature sensor connections are routed via the power plug connector. The terminal assignment is the same as with motors from Beckhoff.

## 3.1 Encoders

### Encoders with EnDat 2.1 interface

| Encoder model | Code | Measuring method | Recordable revolutions | Resolution | Position values per revolution | Periods per revolution | MTTF [years] | PHF [h] |
|---|---|---|---|---|---|---|---|---|
| EnDat 2.1 EQN 1125 FMA | M2 | Optical | 4096 | 13 bit | 8192 | Sin/cos 512 | > 57 | $\leq 2 \times 10^{-6}$ |
| EnDat 2.1 EQN 1125 | Q4 | Optical | 4096 | 13 bit | 8192 | Sin/cos 512 | > 57 | $\leq 2 \times 10^{-6}$ |
| EnDat 2.1 ECN 1113 FMA | M0 | Optical | – | 13 bit | 8192 | Sin/cos 512 | > 57 | $\leq 2 \times 10^{-6}$ |
| EnDat 2.1 ECN 1113 | C6 | Optical | – | 13 bit | 8192 | Sin/cos 512 | > 57 | $\leq 2 \times 10^{-6}$ |
| EnDat 2.1 EQI 1130 | Q2 | Inductive | 4096 | 12 bit | 262144 | Sin/cos 16 | > 100 | $\leq 6 \times 10^{-7}$ |

### Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

04/2023 | ID 443185_en.04

## 3.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from Beckhoff depending on the encoder model.

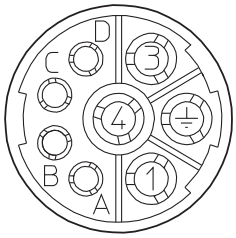
| **Drive controller** | | **AX5000** |
|---|---|---|
| **Drive controller code** | | FM |
| **Connection plan ID** | | 442318 |
| **Encoder** | **Encoder code** | |
| EnDat 2.1 EQN 1125 FMA | M2 | EZ |
| EnDat 2.1 EQN 1125 | Q4 | EZ |
| EnDat 2.1 ECN 1113 FMA | M0 | EZ |
| EnDat 2.1 ECN 1113 | C6 | EZ |

The encoder and drive controller codes are a part of the type designation of the motor.

## 3.3 Connection assignment of the power plug connector

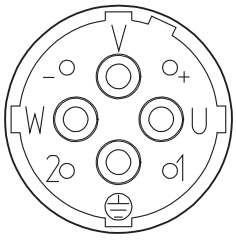
The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

**Plug connector size con.23**

| Connection diagram | Pin | Connection | Color |
|---|---|---|---|
|  | 1 | U phase | BK |
| | 3 | W phase | RD |
| | 4 | V phase | BU |
| | A | Brake + | RD |
| | B | Brake – | BK |
| | C | Temperature sensor + | |
| | D | Temperature sensor – | |
| | ⏚ | Grounding conductor | GNYE |



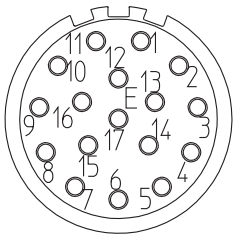
**Plug connector size con.40 (1.5)**

| Connection diagram | Pin | Connection | Color |
|---|---|---|---|
|  | U | U phase | BK |
| | V | V phase | BU |
| | W | W phase | RD |
| | + | Brake + | RD |
| | – | Brake – | BK |
| | 1 | Temperature sensor + | |
| | 2 | Temperature sensor – | |
| | ⏚ | Grounding conductor | GNYE |

## 3.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor.

**EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23**

| Connection diagram | Pin | Connection | Color |
|---|---|---|---|
|  | 1 | B – (Sin –) | RDBK |
| | 2 | 0 V GND | WHGN |
| | 3 | A – (Cos –) | YEBK |
| | 4 | Up + | BNGN |
| | 5 | Data + | GY |
| | 6 | | |
| | 7 | | |
| | 8 | Clock + | VT |
| | 9 | B + (Sin +) | BUBK |
| | 10 | 0 V sense | WH |
| | 11 | A + (Cos +) | GNBK |
| | 12 | Up sense | BN |
| | 13 | Data – | PK |
| | 14 | | |
| | 15 | Clock – | YE |
| | 16 | | |
| | 17 | | |

04/2023 | ID 443185_en.04

# 4 Parameterizing the motor

**Prerequisites**

Before parameterizing the motor, make sure that the following prerequisites are present or have been met:

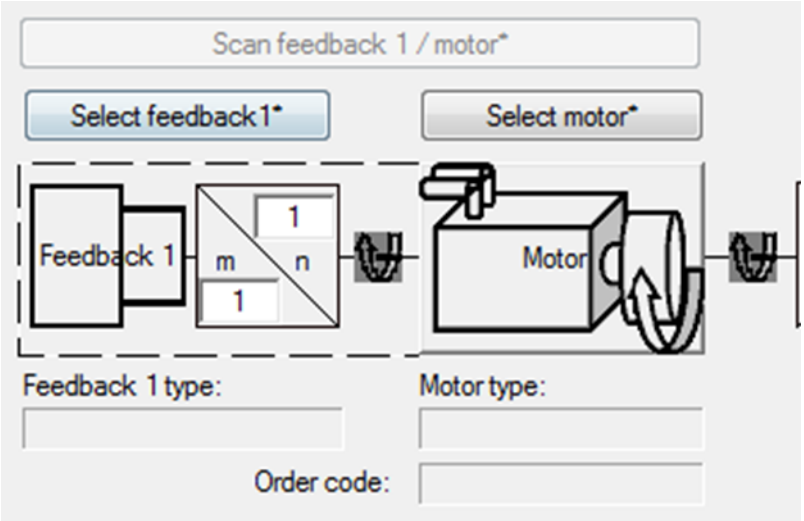
- Computer with Internet access
- TwinCAT software from Beckhoff
- Mechanical installation of the EZ motor in the machine is completed
- Electrical connection of the EZ motor to the AX5000 drive controller is complete.

The technical documentation of a STOBER motor can be found by entering the motor's serial number under https://id.stober.com or scanning the QR code on the motor's nameplate.

### Commissioning on AX5000 drive controllers in firmware version 2.10 or later

To parameterize the motor, read the corresponding parameter file into TwinCAT as follows:

1. Request a parameter file in XEDS format from STOBER SystemSupport that corresponds to the type of your drive.
2. Copy the XEDS parameter file to the MotorPool folder of your TwinCAT installation. For example, if TwinCAT 3.1 is installed on C:\, the path to the MotorPool folder is as follows: **C:\TwinCAT\3.1\Components\Base\AddIns\TcDriveManager\MotorPool**.
3. Click the Select motor button in TwinCAT and select the corresponding XEDS parameter file from the MotorPool folder.




After TwinCAT has read in the parameter file, all motor parameters are set so that you can commission the STOBER motor like a motor from Beckhoff. Further information on commissioning can be found in the technical documentation of TwinCAT, the drive controller and motor.

### Commissioning on AX5000 drive controllers up to firmware version 2.06

To parameterize the motor, read the corresponding parameter file into TwinCAT as follows:

1. Go to the STOBER download page: http://www.stoeber.de/en/downloads/.
2. Enter **Beckhoff** into the search field.
3. From the search results, select and download the file entitled **Parameters for motors EZ on Beckhoff AX5000**.

4. Unpack the downloaded compressed file. (This compressed file contains parameter files for all supported motor types from STOBER.)
5. Select the parameter file whose name matches the type and nominal speed of your motor. These specifications can be found on the nameplate of the motor. For example, for motor type EZ401U with the nominal speed 6000 rpm, select the file EZ401U-6000.xml.
6. Copy the selected parameter file to the MotorPool folder of your TwinCAT installation. For example, if TwinCAT 3.1 is installed on C:\, the path to the MotorPool folder is as follows: **C:\TwinCAT\3.1\Components\Base\AddIns\TcDriveManager\MotorPool**.
7. Perform a scan in the TwinCAT Solution Explorer so that TwinCAT detects the motor and loads the parameters from the parameter file:

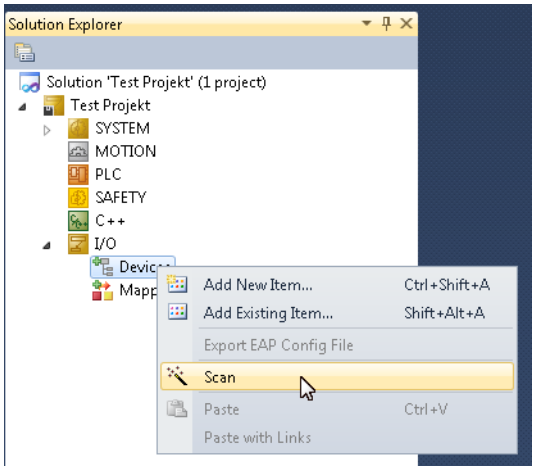



Fig. 1: Performing a scan in TwinCAT

After TwinCAT has detected the motor, all motor parameters are set so that you can commission the STOBER motor like a motor from Beckhoff. Further information on commissioning can be found in the technical documentation of TwinCAT, the drive controller and motor.

04/2023 | ID 443185_en.04

443185_en.04

04/2023

STÖBER Antriebstechnik GmbH + Co. KG
Kieselbronner Str. 12
75177 Pforzheim
Germany
Tel. +49 7231 582-0
mail@stoeber.de
www.stober.com

24 h Service Hotline
+49 7231 582-3000