

Drive Operations through File Access over EtherCAT (FoE)

for SOMANET Integro and ACTILINK-S Integro

1. Notices

The information contained in this document is subject to change without notice. Synapticon GmbH provides this material "as is" and makes no warranty of any kind, expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Synapticon GmbH shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material, whether based on warranty, contract, or other legal theory.

1.1. Copyrights and Trademarks

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Synapticon GmbH.

SYNAPTICON, SOMANET, OBLAC, ACTILINK, as well as the Synapticon logos, are registered trademarks ® of Synapticon GmbH.

EtherCAT® and TwinCAT® are registered trademarks of, and licensed by, Beckhoff Automation GmbH, Germany. All other product names are the property of their respective trademark or service mark holders and are hereby acknowledged.

Synapticon GmbH
Steinbeisstr. 1
71101 Schönaich
Germany, Europe
www.synapticon.com

Copyright © Synapticon GmbH 2025. All rights reserved.

2. Table of Contents

1. Notices	2
1.1. Copyrights and Trademarks	2
2. Table of Contents	3
3. Overview	4
3.1. Updating the Firmware	4
3.1.1. Setup Information	5
3.1.2. Preparation	5
3.1.3. Operational Steps	7
3.2. Uploading a Drive Configuration	10
3.2.1. Setup Information	10
3.2.2. Operational Steps	10

3. Overview

Synapticon SOMANET servo drives support *File Access over EtherCAT (FoE)* operations, which allows a number of operations for accessing files in the drive memory including:

- Updating the firmware
- Uploading a drive configuration

Additionally, files can be stored on the drive's file system using FoE; however, do not store files that exceed 400 KBs (in total). Although the total available memory is larger, the 400 KB limit must be adhered to so that the drive is compatible with future firmware versions.

Note:

The operation instructions provided here are based on a TwinCAT 3 environment. The steps are similar in other master applications.

3.1. Updating the Firmware

Attention:

Installing firmware to a drive is a critical operation. Using a third-party tool, e.g., a Master, cannot provide protection mechanisms, such as version or hardware validation.

- Always use OBLAC Drives for drive configurations unless it is unavoidable to use a third-party tool.
- Some critical items - such as version compatibility - must be thoroughly checked to avoid unexpected results such as drive failure.

3.1.1. Setup Information

- The master environment used for the example is TwinCAT v3.1.4024.4
- The firmware used for the example is version 5.4.2.

NOTE

The servo drive in the example had firmware installed; however, the procedure is the same if the firmware were not installed.

3.1.2. Preparation

The appropriate firmware package can be downloaded as displayed in the images that follow.

1. Check the Identifier of your drive in the OBLAC Drives - Configuration tab of the device for which the firmware is to be downloaded.

Details	
Assigned Name	SN00-0000000 (302)
Product Name	SOMANET Circulo 9 Safe Motion (CR9-48-60-ECDLSM)
Device Serial Number	8603-02-0000109-2528
Identifier	8613-02-2332
Position	1
Supported Drive Modes	PP PV TQ HM CSP CSV CST CTR COD

For SOMANET Integro, go to

<https://bundles.synapticon.com/latest/latest/packages?name=SOMANET+Integro>

For ACTILINK-S Integro, go to

<https://bundles.synapticon.com/latest/latest/packages?name=ACTILINK>.

Click on **Browse SOMANET Firmwares**.

2. Select the firmware version to be downloaded, enter the Identifier of your device in the search bar, and download the package.

To download the firmware package, click the **Download (.zip)** button in the *Actions* column.

SOMANET Firmwares (65) Compatible with OBLAC Drives v25.1.1

v5.6.2

Packages (148)

Changelog

Device Descriptions

8613-02-2332

Name	Firmware ID	Rev.	Enc. Key	Protocol	Actions
All	All			All	
SOMANET Circulo 9 Circulo 9 Safe Motion - 1800, Magnetic Rings (pos.1&2), no...	8613	2	2332	EtherCAT	Download (.zip)

Download Firmware Bundle (.odbx)

For any questions on which version to use, contact [support](#).

NOTE

The tool/master to be used should support File Access over EtherCAT (FoE) access and, if necessary, SII/EEPROM access.

3.1.3. Operational Steps

Attention:

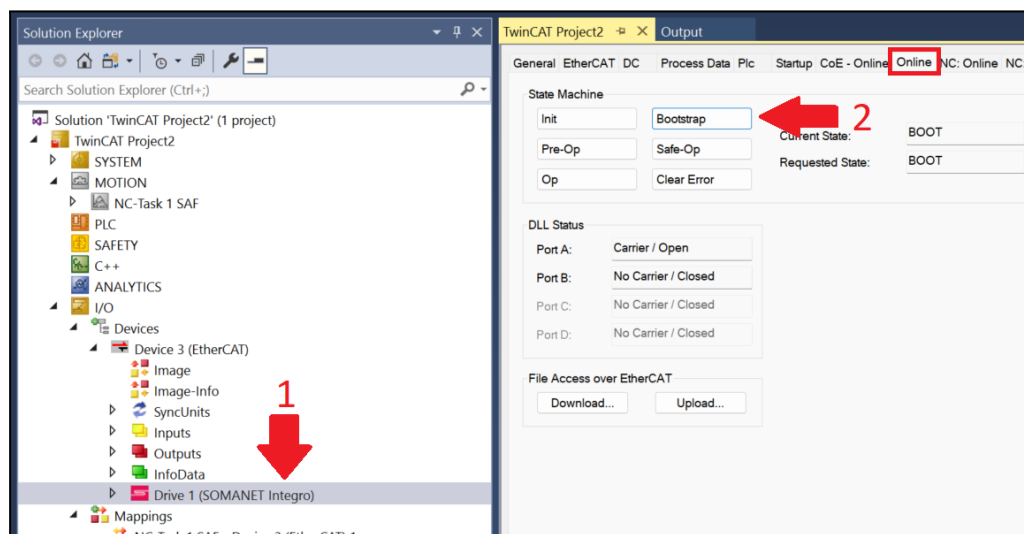
The following steps assume that the firmware has been checked for compatibility. In this example, the drive has firmware installed and it is being updated. The procedure is the same as when a device without firmware installed, i.e., never used or factory reset. The only difference is that the icon and the name of the drive in TwinCAT will be displayed differently.

To proceed:

1. Unzip the firmware package to the expected location. After the operation, it should appear as displayed below.

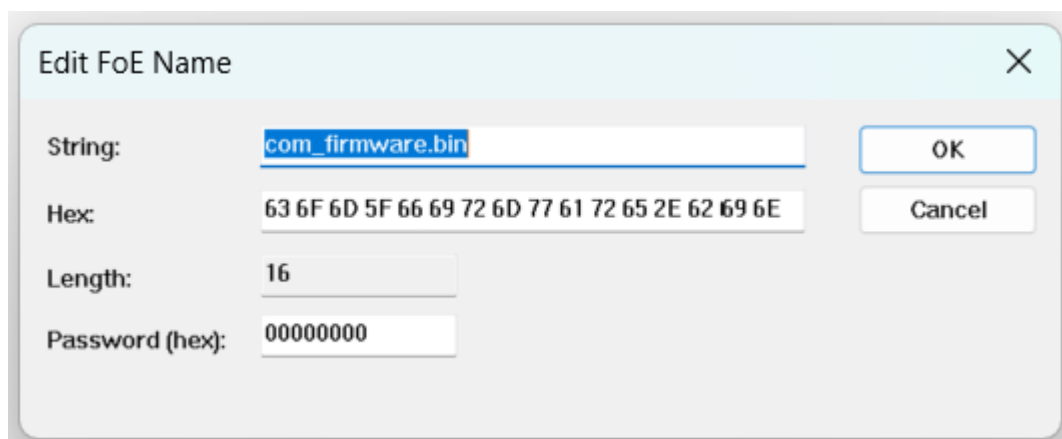
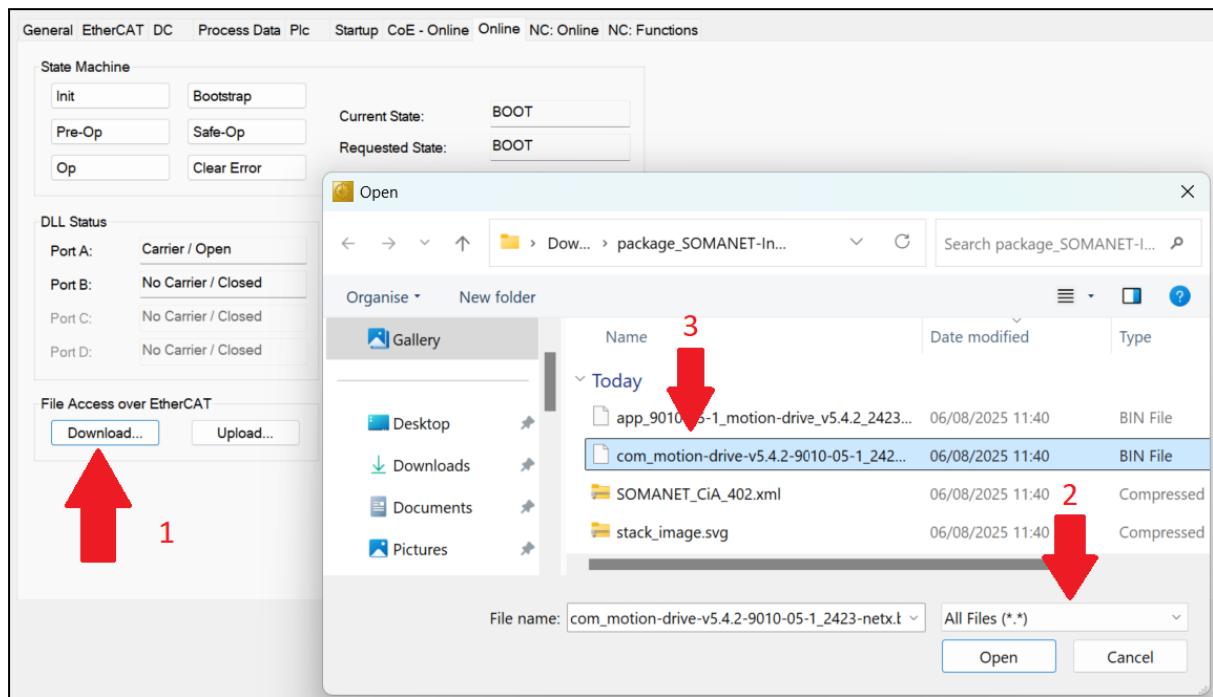
 app_9010-05-1_motion-drive_v5.4.2_2423.bin	Firmware Binary
 com_motion-drive-v5.4.2-9010-05-1_2423-netx.bin	Communication Binary
 SOMANET_CiA_402.xml	EtherCAT Slave Information (ESI) File
 stack_image.svg	Stack Image File

2. Switch the drive EtherCAT state to BOOT. In TwinCAT 3, the access (clicking **Bootstrap**) can be found - as displayed below - together with the FOE access.

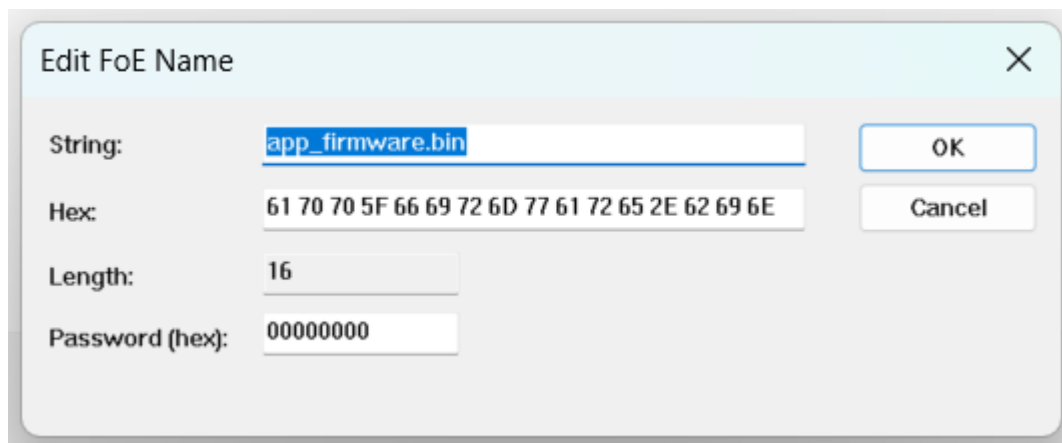
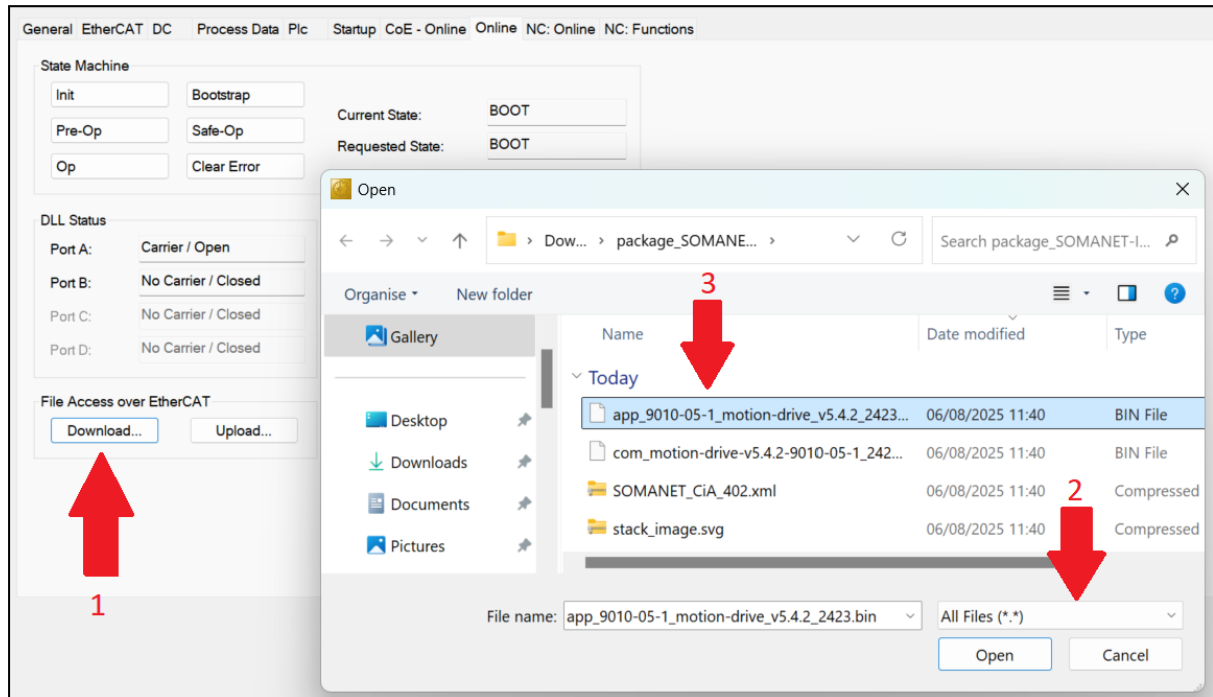


3. In BOOT state, upload the communication binary file to the drive memory through FOE, with the FOE name edited as *com_firmware.bin*. In TwinCAT 3, the operations are displayed in the images below.

This prompts the bootloader to flash the communication firmware.



4. The firmware binary is flashed similarly. Note that the drive must remain in the boot state and upload the communication binary file to the drive memory through FOE, with the FOE name edited as *app_firmware.bin*. In TwinCAT 3, the operations are displayed in the images that follow.



3.2. Uploading a Drive Configuration

3.2.1. Setup Information

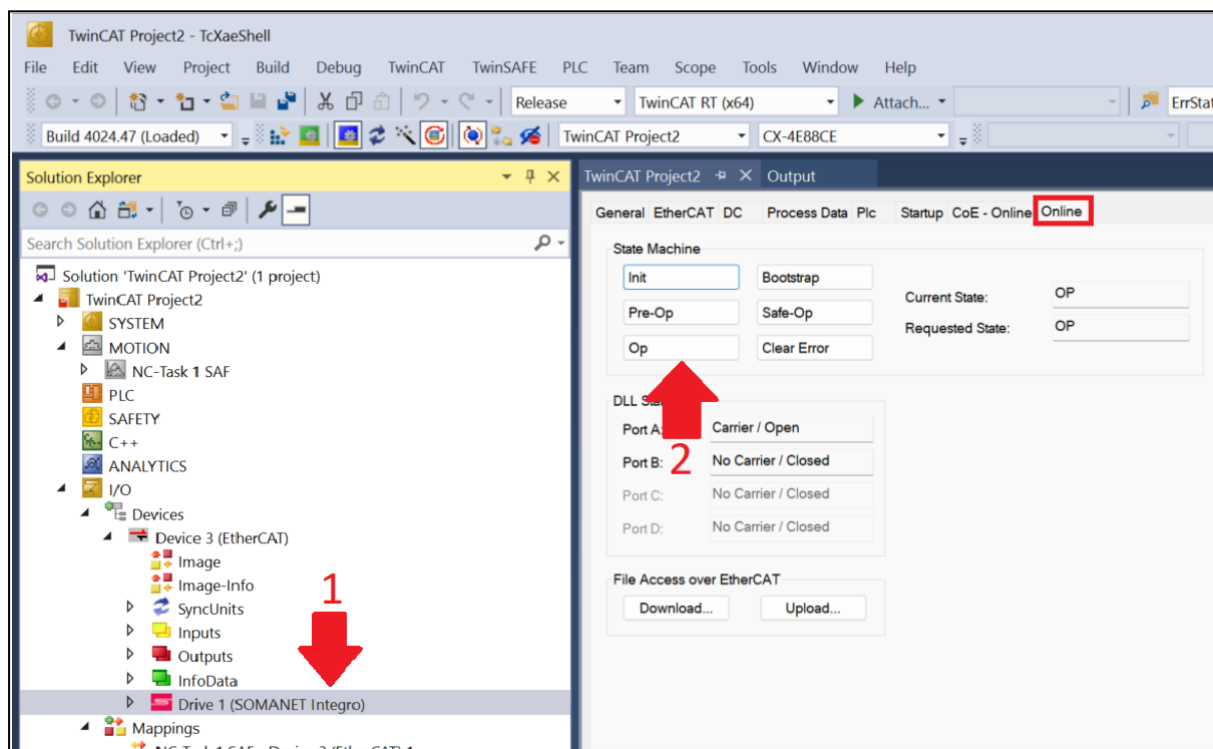
- The master environment used for the example is TwinCAT v3.1.4024.4
- The firmware used for the example is version 5.4.2

Note:

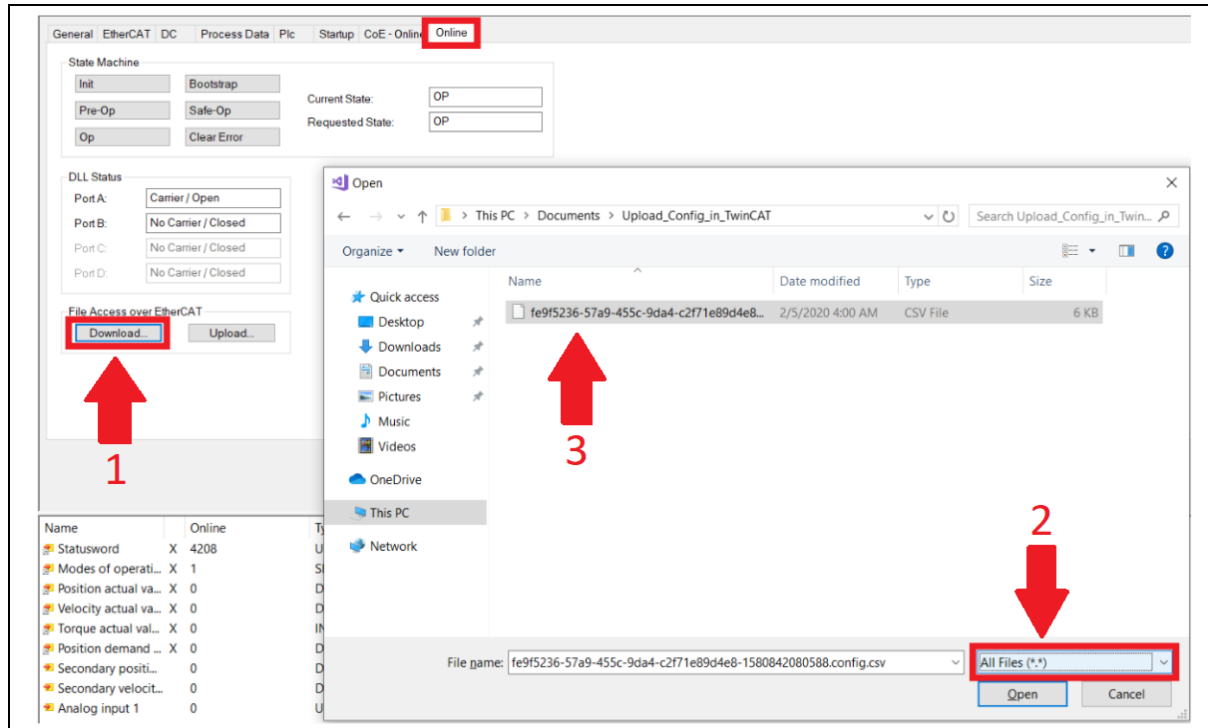
Make sure that the configuration file used is compatible with the firmware version installed.

3.2.2. Operational Steps

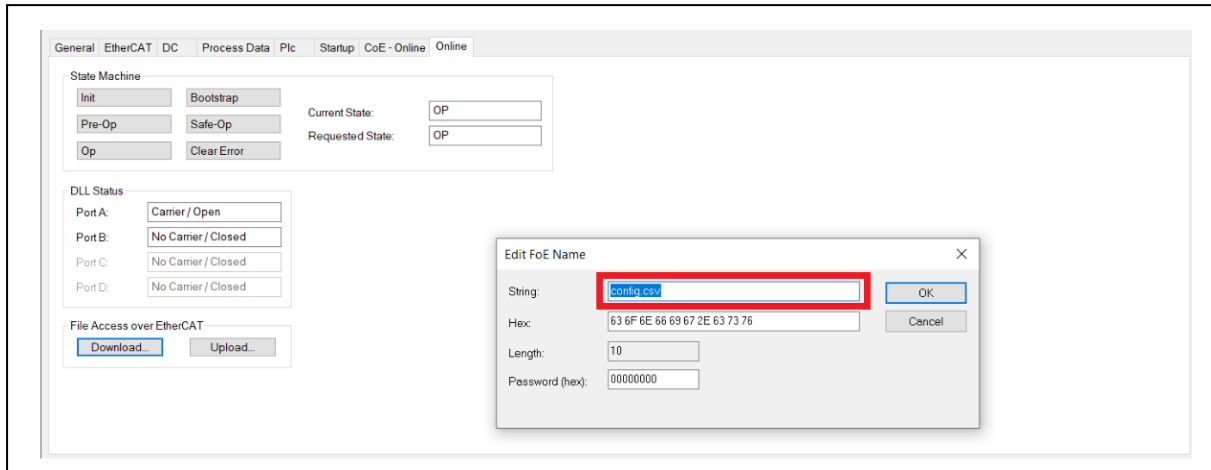
1. In TwinCAT 3, double-click the servo drive under “I/O” - “Devices”, as indicated in the image below, to access the slave operations. Select the tab “Online” for state machine operations and FOE access.



2. Switch the EtherCAT state of the drive to **BOOT** by clicking **Bootstrap**, this allows the following operations.
3. Click **Download** under “File Access over EtherCAT”, switch to browse “All Files”, and select the configuration file to be uploaded, as displayed in the image below.



4. Change the name to *config.csv* and click **OK**, as displayed in the image below.



5. A progress bar is displayed at the bottom of the page in TwinCAT 3 after the FOE operation; see image below.

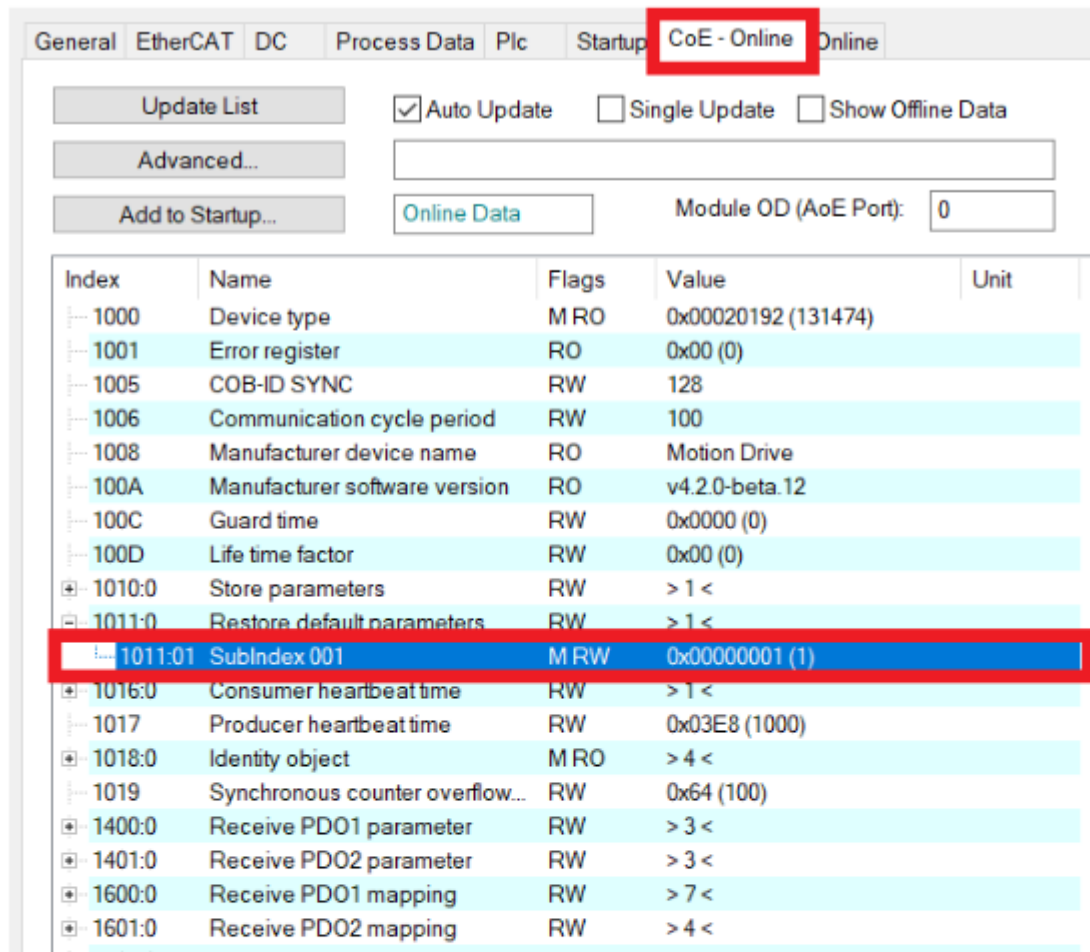


6. The configuration file is successfully uploaded and stored in the permanent storage of the servo drive. It will be used once the drive is reinitialized at the transition from BOOT to INIT (or when the drive is power-cycled).
7. In case resetting or power-cycling the drive is not desired, object 0x1011 (**“Restore default parameters”**) allows loading from the permanent storage through CANopen over EtherCAT (CoE).

Through the SDO operation, read the current value of 0x1011:01 (**“Restore all default parameters”**). Reading a value of “1” indicates that the procedure is ready. Write value 0x64616f6c (“daol”, “load” spelled backwards in ASCII) to 0x1011:01 to start the restore procedure.

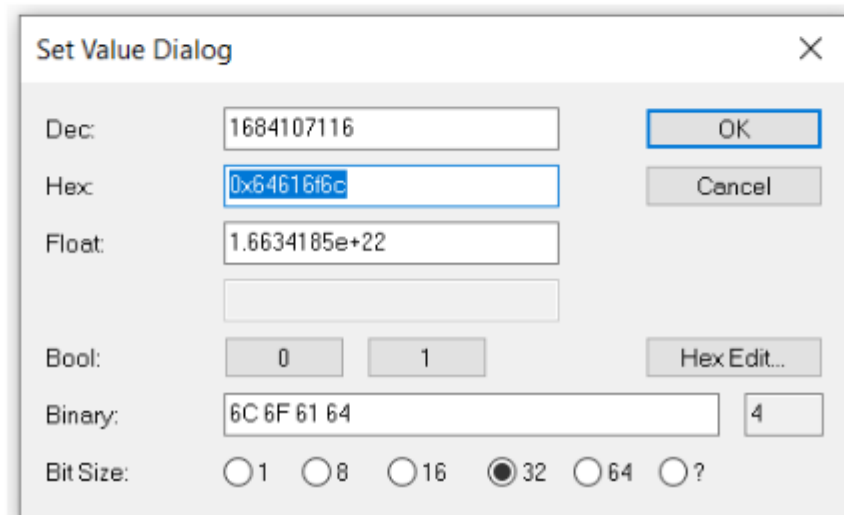
In TwinCAT 3, this can be done in the “CoE - Online” tab.

Double-click on the object to write it, as displayed in the images below.



The screenshot shows the 'CoE - Online' tab in the Synapticon software. The 'Index' table lists various parameters, with '1011:01 SubIndex 001' highlighted in blue and a red border.

Index	Name	Flags	Value	Unit
1000	Device type	MRO	0x00020192 (131474)	
1001	Error register	RO	0x00 (0)	
1005	COB-ID SYNC	RW	128	
1006	Communication cycle period	RW	100	
1008	Manufacturer device name	RO	Motion Drive	
100A	Manufacturer software version	RO	v4.2.0-beta.12	
100C	Guard time	RW	0x0000 (0)	
100D	Life time factor	RW	0x00 (0)	
1010:0	Store parameters	RW	> 1 <	
1011:0	Restore default parameters	RW	> 1 <	
1011:01	SubIndex 001	M RW	0x00000001 (1)	
1016:0	Consumer heartbeat time	RW	> 1 <	
1017	Producer heartbeat time	RW	0x03E8 (1000)	
1018:0	Identity object	MRO	> 4 <	
1019	Synchronous counter overflow...	RW	0x64 (100)	
1400:0	Receive PDO1 parameter	RW	> 3 <	
1401:0	Receive PDO2 parameter	RW	> 3 <	
1600:0	Receive PDO1 mapping	RW	> 7 <	
1601:0	Receive PDO2 mapping	RW	> 4 <	



The screenshot shows the 'Set Value Dialog' window. The 'Hex' field is highlighted with a blue border and contains the value '0x64616f6c'.

Dec: 1684107116

Hex: 0x64616f6c

Float: 1.6634185e+22

Bool: 0 1

Binary: 6C 6F 61 64

Bit Size: 1 8 16 32 64 ?