



NEMESYS / QMIX Service Guide

7/0/22/2022/00	
tion ** * / Object Dictionary - EPOS2 [Node 3]	
A Object Di Li	
o-CAN comment o	EDGG
	EPOS2
nde 21 //	Is disabled
de 3] // Index	
A SubIndex Name	Active Observer
- 0x1001 0x00 Device Type	All Objects
A DOX1003 UX00 Error Register	Type Access Value
- 0x1005 Proc Error History	UInt32 RO 1211E
OX1008 CX00 COB-ID SYNC	UInt8 RO 131474
Manufacturer Dovide to	
Guard Time	//Int22 pt
Lifetime Factor	String RW 128
160-0x1011 Store Paramote	String Const EPOSS
Restore Default	UINTI6 RW 0
COB-ID Time of Parameters	UInt8 RW
High Resolution Stamp Object	
COB-ID EMOLION Time Stamp	
Consumer Consumer Line Y	(JIntaa
1 0x1018 0x00 Producer Heartbeat Time	UT=1032 RW 256
1 Ux1020 Idents	OINE32 RW
Will Ux1200 Verse View	UInt32 RIM
Ox1400	

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1.2. Change history

REV	DATE	CHANGES
1.00	2016-02-05	Creation of service guide document
1.01	2016-04-28	Added clearing of initial CAN passive error
1.02	2016-05-10	Added section for editing device parameters
1.03	2016-09-27	Added section for editing device configuration with neMESYS UserInterface
1.04	2016-10-24	Added section about export of QmixElements project, device configuration and log files
1.05	2017-01-06	Added documentation for QmixIO-B module terminal configuration
1.06	2017-07-03	Added documentation for neMESYS firmware update
1.07	2018-06-26	Added documentation for QmixIO-B register access Added documentation for configuration of bus terminal KL316x calibration interval
1.08	2018-07-25	Added BASE 120 / 600 Firmware Update procedure
1.09	2018-08-13	Added section for fixing Node ID conflicts of neMESYS Double Modules
1.10	2019-02-06	Added documentation for QmixIO-B sensor type configuration for K320x PT100 bus terminals
1.11	2019-03-27	Added section Adding Terminals to Qmix I/O-B Module

2. Introduction

2.1. Foreword

With this service guide we want to support you as much as possible in handling the device service or failure cases. Please do not hesitate to contact us in case of any questions or suggestions.

2.2. Symbols and keywords used

The following symbols are used in this manual and should assist you in navigating through this document:

|--|

TIPP. Describes practical tips and useful information to facilitate the handling of the device.



IMPORTANT. Describes important information and other especially useful notes, in which no dangerous or damaging situations can arise.



ATTENTION. Identifies a potentially harmful situation. Failure to avert this situation may result in damage to the product or anything in its proximity.



CAUTION. Indicates a potentially dangerous situation. Failure to avert this situation may result in light or minor injuries or damages.

3. neMESYS Service Tool

3.1. Download

For most service procedures in this guide you need special software – the neMESYS Service Tool – **EPOS Studio**. You can download this service tool from this location:

http://www.cetoni.de/support/downloads/software.html

3.2. Installation

Run the downloaded .exe file to start the installation. Select the custom setup and ensure that the following components are selected (EPOS, EPOS2 and EPOS Studio):

BPOS Positioning Controller - InstallShield Wizard	×
Custom Setup Select the program features you want installed.	E
Click on an icon in the list below to change how a feature is in FPOS Positioning Controller FPOS P FPOS Studio	This feature requires 0KB on your hard drive. It has 0 of 6 subfeatures selected. The subfeatures free up 98MB on your hard drive.
InstallShield	Next > Cancel

3.3. Start

Before you start the EPOS Studio make sure that your Starter Module / Base Module is properly connected to your PC and switched on. Make sure that no other pump is connected to your Starter Module and that only one neMESYS pump is connected to your Base Module.



IMPORTANT. Only one single pump should be connected to your PC when using the service tool to avoid communication issues and to prevent accidental modification of device parameters.

Then start the EPOS Studio software. The Startup wizard appears and guides you through the creation of an EPOS Studio project.

First select Create New Project.

📑 New Project		×
maxon motor driven by precision	Step 1: Introduction Please select a project Please Select a project PPOS Project PPOS Project PPOS Project Create New Project Don't show at program start	
	< Zurück Weiter > Abbrechen Hilfe	

Then enter a project name.

📑 New Project	×
Step 2: Settings	me. ject1 re your project. Files (x86)\maxon motor ag\EPOS Positioni
< Zurück	Weiter > Abbrechen Hilfe

Skip step 3

📑 New Project		×
maxon motor driven by precision	Add Devices to your network. Devices: Devices in your network: PPOS2 POS3 PEPOS2 POS PEOS MCD EPOS POS P MCD EPOS P	
	< Zurück Weiter > Abbrechen Hilfe	

Then select the communication driver **CANopen** (1) (or RS232, if you are connected via RS232) and add (2) it to your drivers in the network on the right side.

📑 New Project		×
maxon motor driven by precision	Step 4: Communication Drivers to your network. Communication Drivers: Drivers in your network: RS232 >> CANopen DEL DEL DEL	
	< Zurück Weiter > Abbrechen Hilfe	

In Step 5 simply click the **Finish** button.

New Project		×
maxon motor driven by precision	Step 5: Allocation Allocation of Devices and Communication Drivers. Devices in your network: Network Structure: Image: Step 1 and Structure: Image: Step 1 and Structure: Image: Step 2 and Structure: Image: Step 2 and Structure: Image: Step 2 and Structure: Image: Step 2 and Structure: Image: Step 2 and Step 2	
	< Zurück Fertig stellen Abbrechen Hilfe	

Now you should see the applications screen.

🕼 EPOS Studio 2.1 [C:\Program Files (x86)\maxon motor ag\EPOS Positioning Controller\EPOS Studio\MyProjects\Service_Proje — 🛛 🛛 🗙
<u>Elle View Extras W</u> indow <u>H</u> elp
i 🛄 📦 🕞 I 💵 🥔 🔊 🖕 i 🚱 💂
Navigation P ×
Communication
*
E IXXAT_USB-to-CAN compact 0 └ CAN0
Workspace
Communication
""> Wizards
Tools
» •
Status
Type Node Code Name Description

3.4. Searching for devices (nodes)

Right click on the **CAN0** communication interface and select **Scanning Devices**.

DEPOS Studio 2.1 [C:\Program Files (x86)\maxon motor ag\EPOS Positioning Controller\EPOS Studio\MyProjects\Service_Proje	-	×
Elle View Extras Window Help		
i 🔼 🥎 🔚 💵 🖋 🖉 😰 💂 i 🔞 💂		
Navigation 4 ×		
Communication		
*		
E 👤 LocalHost		
IXXA7_USD to-CAN compact 0		
CAND		
1X Scanning Devices		

In the following Scanning Devices dialog, click the **Settings** button.

	Transfer Rate	Device Name	Vendor ID	Product Code	Revision Number	Serial Number	Scanning Method
ting:IX tus :0°	XAT_USB-to-CAN co %	mpact 0, CAN0, CANop	en, Transfer Rate 100	0000 Bit/s, Timeout 500	ms		
				/			

In the Scanning Settings dialog, deselect all Transfer Rates except **1000000 Bit/s 1**. Then deselect **LSS Method 2** and click **OK 3**.

	tungs		Scanned Transfer Rates		
☐ Interfac	ce IXXAT_USB-to-	CAN compact 0	☑ 1000000 Bit/s □ 800000 Bit/s □ 500000 Bit/s □ 250000 Bit/s □ 1250000 Bit/s		
Number of (50000 Bit/s		
Standa	ard Method 🗖 LSS Me	ethod			
Range		Low Limit	High Limit	High Limit	
Ran	ge	Low Limit	Tingit Entric		
Ran	ge lange	1	127		

Now click the **Start Scanning** Button in the Scanning Devices dialog. The software now tries to communicate with all devices starting from ID 1 to ID 127.

Iode ID	Transfer Rate	Device Name	Vendor ID	Product Code	Revision Number	Serial Number	Scanning Method
ode 2	1000000 Bit/s	EPOS	0x000000FB	0x6010001C	0x20330110	0x00000000	Standard Method
		1					
tting : IX	XAT_USB-to-CAN com	npact 0, CANO, CANoper	n, Transfer Rate 1000	0000 Bit/s, Timeout 500	ms		
atus : 75	/0						
andard N andard N	/ethod: Node 7 /ethod: Node 8						
andard N andard N	Nethod: Node 9 Nethod: Node 10						

As soon as a node appears in the list of scanned devices **1**, you can stop the scanning by clicking the **Stop Scanning** button **2**. Then close the Scanning Devices dialog by clicking the **OK** button in the

bottom right. Now you should see the main application window again with the detected node below CAN0 interface:



Now click with the right mouse button on the node and then select **Connect** from the context menu.



Now the red cross should disappear from the node item and you are connected to the device. It is possible that the device indicates a **CAN Passive Mode Error** right after connection in the status panel at the bottom (see figure below). This is not a real error but just an indication that no other device was connected to the bus at the time when the device was turned on.

DEPOS Studio 2.1 [C:\Program Files (x86)\maxon motor ag\EPOS Positioning	Controller\EP —	o x
<u> </u>			
🔁 😋 🔒 🛛 🖉 🥒 🥔 🖗	- · · · · · · · · · · · · · · · · · · ·		
Navigation	p ×		
Communication			
	*		
🗉 夏 LocalHost			
IXXAT_USB-to-CAN compact 0			
CAN0			
式 EPOS2 [Node 2]			
🗆 💴 🤊	▶ /		
Status			₽ ×
Type Node Code	Name	Description	
Error EPOS2 [Node 2] 0x8120	CAN Passive Mode Error	Device changed to CAN pa	ssive Mode be
<			>

To clear this error, simply click with the right mouse button on the error message, and select the menu item **Clear All Entries** from the context menu (figure below).

	EP ■ CANU	POS2 [Node 2	2]		
Status	_		II 💓 :	»1 »	₽ ×
Туре	Node	X	Code	Name	Description
Error	x	Clear Al	0x8120 I Entries	F1	Device changed to CAN passive Mode be

Now your device should be properly connected and you are ready to proceed with further operations. The following picture shows, how your communication panel should look like if everything went well.



3.5. Parameter export / import

3.5.1. Open parameter export/import wizard



To start the parameter export/import wizard, click with the right mouse button on the node you would like to configure. Then select the **Wizards** from the context menu and in the Wizards menu select **Parameter Export / Import**.

3.5.2. Device Parameter Import



CAUTION. Before you import any parameters into your device, you should export your current device parameters so that you can restore them later in case something goes wrong with the parameter import or in case you imported the wrong parameters.

In the Parameter Export/Import dialog first click the button with the 3 points on the right to select a parameter file.

Parameter Export/Import - EPOS [Node 2]
EPOS [Node 2]
C:\Program Files (x86)\maxon motor ag\EPOS Positioning Controller\EPOS Studio
Export Parameters to file Import Parameters from file Restore All Default Parameters
Exit

Then click the button **Import parameters from file** to import the parameters into the device.

💽 Parameter Export/Import - EPOS	2 [Node 3]	×					
C:\Users\Uwe Kindler\Desktop\CE	[_X3441_Mitteldruck_V3_29_1_oV_	mIO.dcf					
Export Parameters to file	Export Parameters to file Import Parameters from file Restore All Default Parameter						
	Exit						

The software now writes the parameters into your device and stores them permanently into internal non-volatile memory.



The software should report **Parameter Import successful** at the end of the parameter import.



TIPP. If you get an error importing the parameters, you should repeat the parameter import – sometimes this fixes the problem.

3.5.3. Device Parameter Export

In the Parameter Export/Import dialog first click the button with the 3 points on the right to select a parameter filename.

Parameter Export/Import - EPOS [Node 2]	×
EPOS [Node 2]	
C:\Program Files (x86)\maxon motor ag\EPOS Positio	ning Controller \EPOS Studio
Export Parameters to file Import Parameters	ters from file Restore All Default Parameters
Exit	

In the Parameter File dialog navigate to the target folder, enter the name of the parameter file **1** and then click the Open button **2**.

💋 Select Parameter Fil	le - EPOS2 [Noc	de 3]				×
← → • ↑ <mark> </mark>	→ Dieser PC →	Desktop > maxon EP	os 🔪	・ ひ "maxon EPOS	" durchsuchen	P
Organisieren 🔻	Neuer Ordner					?
💻 Dieser PC	^	Name	^	Änderungsdatum	Тур	
📰 Bilder			Es wurden keine Such	ergebnisse gefunden.		
📃 Desktop						
🚆 Dokumente						
👆 Downloads						
👌 Musik						
🚰 Videos	- 1					
🏪 System (C:)						
🛖 Uwe Kindler (E	:)					
🛖 Postfach (F:)						
💼 Leiter (G·)	~	<				>
1	Dateiname: Te	estParameters		✓ Device Confi	guration File (*.do	:f ~
				2 Öffnen	Abbrech	en:

Then click the button **Export parameters from file** to import the parameters into the device.

Parameter Export/Import - EPOS [No	ode 2]	×						
EPOS [Node 2]								
C:\Program Files (x86)\maxon motor ag\EPOS Positioning Controller\EPOS Studio								
Export Parameters to file Import Parameters from file Restore All Default Parameters								
	Exit							

The software now reads the parameters from the device and writes them into a .dcf file (Device Description File).

Parameter Export - EPOS2 [Node 3]	×
Exporting Parameter to DCF File	
Parameter Export successful 100%	
	Stop

The software should report **Parameter Export successful** at the end of the parameter import.

3.6. Edit Device Parameters

You can use der service tool to edit device parameters.

!

CAUTION. Before you edit any parameters, you should export your current device parameters to restore them later in case something goes wrong.

!

CAUTION. Do only change parameters on request of the cetoni service staff. If you change parameters without consulting cetoni service staff, you may lose warranty in case of a device error.

To open the parameter editor, click with the right mouse button on the node you would like to edit. Then select the menu item **Tools** from the context menu and in the Tools menu select **Object Dictionary**.



The software now shows the object dictionary for the selected node. In the object dictionary view select **All Objects** from the **Active Object Filter** in the top right corner to show all object dictionary entries (see figure below).

			Active O	bject Filter	System Parameter
Index	∧ SubIndex	Name	Туре	Access	System Parameter
0x2001	0x00	CAN Bitrate	UInt16		All Objects
0x2002	0x00	RS232 Baudrate	Junt16	RW	5
0x2008	0x00	Miscellaneous Configuration	UInt16	RW	1
0x200A	0x00	CAN Bitrate Display	UInt16	RO	0
⊕ 0x2210		Sensor Configuration			
0x6065	0x00	Max Following Error	UInt32	RW	2000
⊕ 0x60F6		Current Control Parameter Set			
0x60F9		Velocity Control Parameter Set			
0x60FB		Position Control Parameter Set			
0x6402	0x00	Motor Type	UInt16	RW	1
🗄 0x6410		Motor Data			

To edit a parameter, simply double click the parameter row:

C	Object	Dicti	onary Access	EPOS <mark>2</mark>		is dis	abled	/
				Active	Objec	t Filter:	All Objects	•
Inde	ex	∧ SubIn	d Name	Т	Гуре	Acc	Value	^
<u>ا</u>	0x60C4		Interpolation Data Configuration	n				
0	0x60C5	0x00	Max Acceleration	U	JInt3	RW	4294967295	
<u>ا</u>	0x60F6		Current Control Parameter Set					
Ð (0x60F9		Velocity Control Parameter Set					
Ð (0x60FB		Position Control Parameter Set					
0	0x60FF	0x00	Target Velocity	I	nt32	RW	0	
- 0	0x6402	0x00	Motor Type	U	JInt1	RW	1	
0	0x6410		Motor Data					
	- 0x6410	0x01	Continuous Current Limit	-((n)) U	JInt1	RW	281	
	0x6410	0x02	Output Current /	U S	JInt1	RW	562	-
	0x6410	0x03	Pole Pair Num' 2x	U	JInt8	RW	1	
	0x6410	0x04	Maximal Mot	U	JInt3	RW	5240	
	0x6410	0x05	Thermal Time Constant Windin	g U	JInt1	RW	97	
	0x6502	0x00	Supported Drive Modes	U	JInt3	RO	4128869	

Now you can enter the new value 1 in the Edit Value Window and click OK 2.

Edit Value		×
Continuous Current Limit	 Decimal Format C Hexadecimal Format 	
ок (2)	Cancel	

All edited parameters will get lost if the device is turned off or in case of a reset. To save the changed parameters persistent into the device non-volatile memory, click with right mouse button on the node item in the left **Communication** panel and select **Save All Parameter** from the context menu.

💋 EPOS Studio 2.1 [C:\Program	Files (x86)\maxon m	notor ag\EPO	S Positi	oning Conti	roller\EPOS Studio\My	- 🗆	\times
<u> </u>	v <u>H</u> elp						
: 🔼 🕥 🔒 🗊 🥒 🥔 🔊	🔊 🍙 📮 🗑	Ŧ					
Navigation	џ ×	🔲 Object	Dictio	nary - EPO	S2 [Node 2]		₹×
Communication							
□ 및 LocalHost □ ♥ IXXAT_USB-to-CAN co	mpact 0	Ob	ject	Diction	nary Access	EP	05
							4
	Disconnect			SubInd	Name		
1	Stop Refresh				Interpolation Data Configura	ation	
	Delete			0x00	Max Acceleration		
					Current Control Parameter	Set	
	Kename				Velocity Control Parameter	Set	
	Save All Paramete	er			Position Control Parameter	Set	
	Restore All Defau	lt Parameter		0x00	Target Velocity		
Workspace	Reset Node			0x00	Motor Type		
	Clear Errors			0.01	Motor Data		
Communication	Clear Errors			0x01	Continuous Current Limit		
°°₽ Mizarda >	Wizards		•	0x02	Dala Dair Number		
/ Wizarus	Tools		•	0x03			
🖋 Tools 🛛 🔞	Help		F1	0x05	Thermal Time Constant Wir	nding	
	Properties				· · ·		>
		P					

3.7. Firmware Update

To update the firmware, you need to be connected to your device – that means you have successfully completed the steps in section 3.4.



TIPP. To protect other devices from accidental updates, you should only connect the device to your base module, that you would like to update.

To open the Firmware Download Wizard, click with the right mouse button on the node you would like to update. Then select the menu item **Wizards** from the context menu and in the Wizards menu select **Firmware Download Wizard.**



In the window that appears, confirm the warning by clicking the Confirm button and then click the **Next >** button to continue.

下 Firmware Do	ownload Wizard - EPOS2 [Node 2]	×
	Step 1: Download WARNING	_
3	WARNING! The firmware download is a critical procedure!	
	In case of interrupted download procedure:	
	 Connect the device to USB interface Restart the Download Wizard (Step 1) Switch off and on the power supply (power reset) Continue executing the wizard (Step 2,) 	
	Confirm that you've read the warning!	
	< Zurück Weiter > Abbrechen Hilfe	

In the next step of the update wizard, you will see on the left **1** the firmware version, which is currently installed in the device If the version matches the one you want to install, you can now exit the Fimware update.

下 Firmware Do	wnload Wizard - EPOS2 [No	ode 2]		×
	Step 2: Firmware File			2
	Software Version:	0x2126	> 777	
	Hardware Version: Applicaton Number:	0x6120 0x0143	> !!! > ?!?	
	Application Version: Header	0x0100	> ??? ReadMe	
		_		
	< Zurück	Weiter >	Abbrechen	Hilfe

If the correct version is not installed in the device, click on the button with the 3 dots 2 to display the file dialog for selecting the firmware file. Select the firmware file according to the information provided by the CETONI support staff.



TIPP. Normally the firmware files are located in C:\Program Files (x86)\maxon motor ag\EPOS Positioning Controller\EPOS2\03 Configuration

Now you will see the version of the firmware update file on the right side. Click the **Next** button to start the firmware update.

下 Firmware Do	wnload Wizard - EPOS2 [N	ode 2]		×
	Step 2: Firmware File	e		
	C:\\\Epos_2	126h_6120h_0)143h_0100h.bin	
	Software Version:	0x2126	> 0x2126]
-,	Hardware Version:	0x6120	> 0x6120	
	Applicaton Number:	0x0143	> 0x0143	
	Application Version:	0x0100	> 0x0100	
	Header		ReadMe]
	< Zurück	Weiter >	Abbrechen	Hilfe

In the next wizard page, click the button with the 3 dots to select a writable folder for temporary storage of the exported device parameters. You can choose the Desktop folder here or any other writable folder. Then click the **Export** button to export the device configuration file (*.dcf).

下 Firmware Do	wnload Wizard - EPOS2 [Node 2]	Х				
	Step 3: Save System Parameters	_				
3	The system parameters are overwritten during Firmware Download.					
	Save the actual system					
	axon motor ag\EPOS Positioning Controller\EPOS Studio					
	Export Parameter 2					
	< Zurück Weiter > Abbrechen Hilfe					
	······································	_				

After the parameter export, click the **Next** button to proceed. On the next Wizard page click the **Start** button to start the firmware download.

Firmware Dow	nload Wizard - EPOS2 [Node 2]	×
>	Click on the start button 0 %	
	Method: Standard Download	
	Start Stop History	
	< Zurück Weiter > Abbrechen Hilfe	

The firmware download starts

Now wait, until the progress bar reaches 100% and proceed by clicking the **Next** button.

下 Firmware Do	wnload Wizard - EPOS2 [Node 2]	×
	Step 4: Firmware Download	
	Firmware Download successful 100 %	
	Method: Standard Download Start Stop History	
	< Zurück Weiter > Abbrechen Hilfe	

On the next page of the Firmware wizard, you can reimport the previously exported device parameters. The input field should already contain the right parameter file. Click the Import **Parameter** button to start the parameter import.

下 Firmware Do	wnload Wizard - EPOS2 [Node 2]	×
	Step 5: Restore System Parameters	_
>	Press the button 'Import Parameter' to import the saved system parameters. Press the button 'Default Parameters' to restore all default EPOS parameters.	
	C:\Users\ Desktop\Test.dcf	
	Import Parameter Default Parameters	
	< Zurück Weiter > Abbrechen Hilfe	

After the parameter import, you can click the **Next** button to finish the firmware download wizard.

3.8. Fixing Double-Module Node ID Conflict

If you have one Double Module connected to one Base Module, a device scan with the EPOS Studio Software should show you two different node identifiers – one for each pump channel of the double module. If only one node has been detected, then there is likely a node conflict - i.e. the two channels have the same node ID.

To fix the node conflict, do the following steps. Connect only the Double Module to your base module – remove any other modules. Then set the service switch into **OFF** position (see picture above). Now scan for devices in EPOS Studio.



The scan in EPOS studio should detect one Node:

Scanning	Devices							>
canned De	vices							
Node-ID	Transfer Rate	Device	Vendor ID	Product Code	Revision Number	Serial Number	Scapping Method	
Node 2	1000000 Bit/s	EPOS	0x000000FB	0x6010001C	0x20330110	0x0000000	Standard Method	
	\sim			~~~	A . A	1	~	_
	Scanning canned De Node-ID Node 2	Scanning Devices canned Devices Node-ID Transfer Rate Node 2 1000000 Bit/s	Scanning Devices canned Devices Node_TD Transfer Rate Device Node 2 1000000 Bit/s EPOS	Scanning Devices canned Devices Node-ID Transfer Rate Device Vendor ID Node 2 1000000 Bit/s EPOS 0x000000FB	Scanning Devices canned Devices Node-ID Transfer Rate Device Vendor ID Product Code Node 2 1000000 Bit/s EPOS 0x000000FB 0x601000 1C	Scanning Devices canned Devices Node-ID Transfer Pate Device Vendor ID Product Code Revision Number Node 2 1000000 Bit/s EPOS 0x000000FB 0x6010001C 0x20330110	Scanning Devices canned Devices Node_ID Transfer Rate Device Vendor ID Product Code Revision Number Serial Number Node 2 1000000 Bit/s EPOS 0x000000FB 0x6010001C 0x20330110 0x0000000	Scanning Devices

If the software does not detect any node, then there is a hardware defect and you should contact the CETONI support for further instructions.

If the software has detected one node, then you can stop the scanning process and then click with the right mouse button on the node row in the table of scanned devices and select the menu item **Change Node-ID** from the context menu.

æ	Scanning	Devices					
5	Scanned De	vices					
	Node-ID	Transfer Rate	Devic-	Vendor ID	Product Code	Revision Number	Serial
	Node 2	1000000 Bit/s	1x	Lovoooooce Automatically Assign Node-	IDs	0x20330110	0x000
				Change Node-ID			
				Change Transfer Rate			

Set the node ID to 114. Then rescan to verify that the software finds the node 114. The node 114 is now your left channel. Now set the service switch back into the **ON** position. Scan for devices in EPOS Studio. The software should find two nodes - the node 114 and a second node.

R	Scanning	Devices							×
	Scanned De	vices							
	Node-ID	Transfer Rate	Device	Vendor ID	Product Code	Revision Number	Serial Number	Scanning Method	
	Node 114	1000000 Bit/s	EPOS	0x00000FB	0x6010001C	0x20330110	0x0000000	Standard Method	
	Node 2	1000000 Bit/s	EPOS	0x00000FB	0x6010001C	0x20330110	0x0000000	Standard Method	
5	had	$\sim \sim$	\sim	\sim	$M \wedge \Lambda$	\sim		$\sim \sim \sim$	

Now change the Node ID of the channel with the Node ID <> 144 to node ID 113 and then set the node ID from Node 114 to 112 and rescan to verify that the two nodes are detected. The software should detect the two nodes 112 and 113.

R	R Scanning Devices X										
	Scanned De	vices									
	Node-ID	Transfer Rate	Device	Vendor ID	Product Code	Revision Number	Serial Number	Scanning Method			
	Node 112	1000000 Bit/s	EPOS	0x000000FB	0x6010001C	0x20330110	0x00000000	Standard Method			
	Node 113	1000000 Bit/s	EPOS	0x000000FB	0x6010001C	0x20330110	0x00000000	Standard Method			
5	\mathbb{W}	\sim	\sim	m	\sim	\sim	~~~~~	m	$ \rightarrow $		

Now you can reconfigure your device in QmixElements software.

If you use a Starter Module instead of a BASE-Module then you might need to change the Node ID of the Starter Module to ID 115 before you connect the Double Module to avoid node ID conflicts with the Starter Module.

4. QmixElements Software

4.1. Lowering Log-Interval of CSV and Graphical Logger

The minimum value of the log interval in QmixElements is limited to 0.1 seconds. Because Windows is not a realtime operating system, there is always jitter when doing things in certain intervals. That means, when the log interval is set to 0.1 seconds it may be up to 0.11 or down to 0.09 seconds. So there is a jitter of ca. \pm 10 ms. The lower the log interval, the higher is the impact of this jitter on the precision of the recorded values. That means for a log interval of 0.1 seconds the jitter of \pm 10 ms will cause a deviation of 10%. For a log interval of 0.01 seconds the jitter may cause a deviation of 100% - that means the interval of the recorded values reaches from 0.005 to 0.02 seconds. Therefore we decided to limit the log interval to a reasonable value of 0.1 seconds.



To lower the minimum log interval of the CSV and graphical logger, you need to edit the current active device configuration. To do this, select Device \rightarrow Browse Configuration Folder from the application main menu.



ATTENTION. It is not recommended to lower the interval below 0.01 seconds because the timestamps of the recorded values will not match the real timestamps and because the precision of the recorded timestamps is too low.



This will open the device configuration folder in the Windows file explorer. Then open the file datalogger.xml in a text editor or XML editor.



Now change the SampleTimeSecs Min value to the required minimum logging interval. Now restart the QmixElements software and open the logger configuration – now you can lower the logging interval to the value entered in the datalogger.xml file.



ATTENTION. Logging intervals below 0.01 seconds may cause high CPU load and may have a negative impact on other QmixElements functions.

4.2. Edit Device Parameters

You can edit device parameters directly in the QmixElements software using the **CANopen Tools Plugin**. To open the CANopen Tools Plugin, create a new project by selecting File \rightarrow New Project from the main menu.



Give the project a meaningful name and click OK.

New Project	?	×
New Project		•
Project name: service Copy current project settings Create empty project		
✓ Use default location		
Location: C: \Users \Public \Documents \QmixElements \Projects	8	rowse
ОК	Ca	ancel

If the new project has been created and activated, select Device \rightarrow Open Configuration from the main menu.



Now select the configuration canopentools (shared) from the list of available configurations and click OK.



The application will now restart with the activated CANopen tools plugin. You will find detailed instructions about the CANopen Tools plugin in the QmixElements software manual.



ATTENTION. Changing device parameters can cause malfunctions or cancel safety mechanisms. Only change device parameters as instructed by the technical support staff.

4.3. Export Device Configuration

If you need to export the device configuration so send it to CETONI support, please select the menu item Device \rightarrow Export Configuration from the application main menu.

🛐 QmixElements - C:\Users\Public\Docum	ents\QmixElements\Projects\CrossFlow[
File Device Edit Window Help	_
🚽 🎄 Import Configuration	🗾 🖪 🕄 🛛 🚻 👪 月
👘 🔯 Open Configuration	
Export Configuration	
📰 Browse Configuration Folder	
👌 🌞 Create Configuration	
📑 🚪 Import Device Database	
Recent Configurations >	
Connect to device	, rogoorson
nelvicoto	

4.4. Export Project

Currently QmixElements does not support the automatic export of complete projects. If you need to send a complete project including all settings to the CETONI support, you need to execute the following steps.

Select the menu item File \rightarrow Browse Project Folder to open the project folder of the current project in file explorer.



The file explorer will open the project folder and show you the project files. Navigate to the parent directory of the project folder by clicking the parent directory name (figure below)

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	ikumente /		Data	02.09.2016 14:11	Dateiordner
			Log	02.09.2016 14:11	Dateiordner
	Rentliche Dokumen #		Pictures	02.09.2016 14:11	Dateiordner
	- 444		Scripts	02.09.2016 14:11	Dateiordner
			Videos	02.09.2016 14:11	Dateiordner
			backup.qsc	21.10.2016 09:55	QSC-Datei
-			CsvLogger.cfg	16.09.2016 16:09	CFG-Datei
	16,08,11,Teepark,His		plotlogger.cfg	21.10.2016 09:55	CFG-Datei
	16, R. 15, Seburtstep,	1	projectsettings.ini	24.10.2016 08:46	Konfigurati
	16.08.22 Selferblaser				>
10 Elemen	nte				

If you are in the parent folder, you can see the project folder of you current project:

Datei Start Freigeben	Ansicht		~
🛧 📙 « Public	> Documents > QmixElements > Projects	ע ט "Pro	jects" 🔎
	^ Name	Änderungsdatum	Тур
Condition 1	canopentools	i6.09.2016 08:48	Dateior
	CrossFlowDevelopment	24.10.2016 08:46	Dateior
E Bite Dating Dating Dataset Dataset Dataset Dataset	default_project	20.09.2016 14:47	Dateior

Press and hold (or right-click) the project folder, select (or point to) Send to, and then select Compressed (zipped) folder. A new zipped folder with the same name is created in the same location that you can send to CETONI support.

4.5. Send Log-Files

The QmixElements log files are located in c:\Users\Public\Documents\QmixElements\Log. The main application log file is QmixElements.log.



In case the CETONI support requests the log files, you can send the QmixEleemnts.log file or you can send the compressed Log folder. To send the compressed Log folder, navigate to the c:\Users\Public\Documents\QmixElements directory. Press and hold (or right-click) the Log folder, select (or point to) Send to, and then select Compressed (zipped) folder. A new zipped folder with the same name is created in the same location that you can send to CETONI support.

5. Qmix P / Q+ / Q- / TC and V Modules

5.1. Edit device parameters - Overview

To edit the device paramaters of the above mentioned Qmix devices you can use the QmixElements CANopenTools Plugin. To open the CANopenTools Plugin, start the QmixElements software and select from the main menu the menu item **Device -> Open Configuration**.



Then select the canopentools (shared) configuration:



Connect your Qmix module to you BASE module and turn it on. Then click the connect **1** button in the QmixElements software and scan for connected devices **2**.



The software should detect the connected module **1**. Click with the right mouse button on the entry with the detected device and select **Assign EDS File 2** (see figure below).



Select the valid EDS file ChipF40.eds for the Qmix module from the existing EDS-files.

Nopen EDS file			×
← → × 📙 « Qr	nixElements > eds	✓ ט "eds" duro	hsuchen 🔎
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at these of	🖺 Basson_Gold_neMESYS2XL.dcf	09.07.2015 00:02	DCF Document
Offentliche D #	Beckhoff_Buskoppler_BK5151.eds	09.07.2015 00:02	CANeds Document
🖌 (FAR) //	Ebs ChipF40.eds	09.07.2015 00:02	CANeds Document
AT 1	EPOS_2032h_6010h_0000h_0000h.eds	09.07.2015 00:02	CANeds Document
	EPOS2_2121h_6220h_0000h_0000h.eds	09.07.2015 00:02	CANeds Document
	Festo_CTEU-CO.eds	09.03.2017 00:34	CANeds Document
	Nanotec_CANopen_ED_eds	09.07.2015 00:02	CANeds Document
	📑 rotAXYS_TMCM-343305.eds	09.07.2015 00:02	CANeds Document
- ·	<		>
Dateir	name: ChipF40.eds	~ Electronic	tal Data Sheets (*.eds * 🗸
		Öffne	n Abbrechen:

You can now access all device and configuration parameters of the device:

🛐 QmixEleme	📓 QmixElements - C:\Users\Public\Documents\QmixElements\Projects\service - [canopentools (shared)] - 🛛 🗙							
File Device	Edit 1	Window Help						
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20000000000000000	Index		Name	Туре	Access	Data	Data (he 🔨	
CAN	× 🛽	0x02 (2d)		Generic I/O (401)				
CANanan		1000	Device Type	UNSIGNED32	ro			
Tools		1001	Error Register	UNSIGNED8	ro	0	0x00000	
		III 1003	Pre-defined Error Field	ARRAY	ro	0x0000000A	0x00000	
		1005	COB-ID SYNC	UNSIGNED32	rw			
		1 007	Synchronous Window Length	UNSIGNED32	rw			
		1008	Manufacturer Device Name	VISIBLE_STRING	const			
		1 009	Manufacturer Hardware Version	VISIBLE_STRING	const			
		100A	Manufacturer Software Version	VISIBLE_STRING	const			
		100C	Guard Time	UNSIGNED16	rw		~	
	<						>	
			Connected					



ATTENTION. Changing device parameters can cause malfunctions or cancel safety mechanisms. Only change device parameters as instructed by the technical support staff.

6. Qmix I/O-B Module

6.1. Configuring a bus terminal

6.1.1. Overview

The QmixIO-B module is equipped with a series of bus terminals with different functions, depending on the configuration. Each individual bus terminal contains a set of registers for configuration or for reading status information. These registers are numbered starting at 0 and can therefore be easily addressed via the index. The following picture shows the register overview of the KL3162 analog input terminal.

Register no.	Comment		Default value		R/W	Memory
R0 [43]	Raw ADC value		0x0000	0 _{dec}	R	RAM
<u>R1 [) 43]</u>	Calibration value: Offset		typically 0x0046	typically 70 _{dec}	R	RAM
<u>R2 [) 43]</u>	Calibration value: Gain		typically 0xF1CC	typically 61900 _{dec}	R	RAM
R3	reserved		-	-	-	-
R4	reserved		-	-	-	-
R5	reserved		-	-	-	-
<u>R6 [) 43]</u>	Diagnostic register		0x0000	0 _{dec}	R	RAM
<u>R7 [) 43]</u>	Command register		0x0000	0 _{dec}	R/W	RAM
R8 [44]	Terminal type	KL3132:	0xC3C	3132 _{dec}	R	ROM
MAN	$h \wedge \mathcal{M} \wedge \mathcal{M} \wedge \mathcal{M}$	1/1/12.	10/016-1-		γ	$\sim \sim \sim$

To obtain an overview and description of all registers for a specific terminal, simply download the documentation for the terminal from Beckhoff.

6.1.2. Device parameter access

To access and configure a certain bus terminal you can use the QmixElements CANopenTools Plugin. To open the CANopenTools Plugin, start the QmixElements software and select from the main menu the menu item **Device > Open Configuration**.



Then select the canopentools configuration:

	?	×
		~
ОК	Cano	el
	ОК	? OK Cano

Connect your QmixIO-B module or your Beckhoff bus coupler with your PC and turn it on. Then click the connect 1 button in the QmixElements software and scan for connected devices 2.



The software should detect the connected module **1**. Click with the right mouse button on the entry with the detected device and select **Assign EDS File 2** (see figure below).

QmixElem	ents - C:\Users\Public\Docu	ments\QmixElements\Projects\canopentools - [canopentools (shared)]	_	×
File Device	Edit Window Help			
*	📥 📥 🖷	ا ها ها ها ایو 🗊 🕼 🕹 🖡 ا	74	
000000000000000000	Index	Vame Type Access Data Data (hex)		
CRN CANopen Tools	> 0x02 (2d)	Image: Generic I/O (401) I Image: Node: Store Parameters Image: Node: Restore Default Parameters Image: Assign EDS file Image: Node: Reset Image: Node: Reset Image: Node: Reset Image: Node: Reset Image: Node: Start Image: Node: Preoperational Image: Node: Stop		
		Connected		.::

Select the valid EDS file for the Beckhoff BK5151 bus coupler from the existing EDS-files.

🔊 Open EDS file				×
$\leftarrow \rightarrow \checkmark \uparrow $. «	QmixElement	s > eds v Č	"eds" durchsuchen	Ą
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📰 Bilder	*	Beckhoff_Buskoppler_BK5151.eds	09.07.2015 00:02	CANeds Doc
Offentliche Dolo	mants #	🖭 ChipF40.eds	09.07.2015 00:02	CANeds Doc
- units		暨 EPOS_2032h_6010h_0000h_ 200h.eds	09.07.2015 00:02	CANeds Doc
100		EPOS2_2121h_6220h_0000h_0000h_eds	09.07.2015 00:02	CANeds Doc
		🔤 Nanotec_CANopen_EDS.eds	09.07.2015 00:02	CANeds Doc
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Da	ateiname: Bec	khoff_Buskoppler_BK5151.eds ~	Electronical Data Sheet	s (*.eds * ∨
			Öffnen Al	bbrechen

Now navigate to the object dictionary entry **0x4501– Register Communication Bus Terminal**. Select the sub entry (0x4501subx) that matches the channel of your bus terminal that you want to configure. The bus terminals are numbered in the order they are attached to the bus coupler. I.e. if you have two terminals and the first terminal is an analog input terminal and the second terminal is a thermocouple terminal, then the object dictionary entry would be 0x4501sub2 – Register Communication Bus Terminal 2 for the configuration of the thermocouple bus terminal.

🔊 QmixElem	QmixElements - C:\Users\Public\Documents\QmixElements\Projects\canopentools - [canopentools (shared)]								×
File Device	Edit \	Window Help							
#	4	🖧 📥 📥) 📥 📝 📴 🔤 🎼	To To To	1				
		3000		ARRAY	ro				^
CON		3100		ARRAY	ro				
Shin		4500	Register Communication Bus Coupler	UNSIGNED32	rw 0		0x00000000		
CANopen Tools	~	4501	Register Communication Bus Terminal	ARRAY	ro				
		4501sub0	NrOfObjects	UNSIGNED8	ro				
		🔲 4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw 0		0x00000000		
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw				
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32	rw				
		- 4004 1.4		onnected					

6.1.3. Register access

Register values are read and written via the corresponding object dictionary entry for the terminal **0x4501subX** where X is the index of the terminal. The register is accessed by reading and writing a 32-bit value. The following table shows the bits of this 32-bit value

31	30	24	23		16	15	9	7	0
Access bit	Channel numbe	r		Register number		High byte	register value	L	ow byte register value
MSB									LSB

- Access bit: 0 = read access, 1 = write access
- **Channel number**: If a bus terminal has multiple channels, like the Kl3162 bus terminal with 2 analog input channels, this channel number addresses the corresponding channel of the terminal. Channel number 0 corresponds here to the first channel, 1 to the second channel, and so forth.
- **Register number**: The register that should be accessed. Read the bus terminal documentation for a register overview.
- **Register value**: The 16-bit register value consists of high and low byte

6.1.4. Reading register values

To read a register value, you first need to write to object **0x4501subX** to identify the channel and the register and then you can read the register value from the same object. So each read consists of a write access followed by a read access from the same object.

The following example shows how to read a parameter. For this example, we assume that we want to read the calibration interval (register 40) from the second channel of the KL3162 analog input terminal. This terminal is the 1st terminal on our QmixIO-B module so we need to access the object dictionary entry 0x4501sub**1**.

To read the calibration offset value, we first need to write the following value:

- Access bit **0** = **read access**
- Channel number **1** (0 = first channel, **1 = second channel** ...)
- Register index 40 (Calibration interval) →hexadecimal 28
- Register value **0**

So we have the following value that we need to write: 0x01280000

	4500	Register Communication Bus Coupler	UNSIGNED32	rw	19400456	0x01280708
~ 💶	4501	Register Communication Bus Terminal	ARRAY		0x01	0x01
	4 501sub0	NrOfObjects	UNSIGNED8	ro		
	📨 4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	19398656	0x1280000
	4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw		

To see the value that has been read from device, you need to click on another object **1**, e.g. 4501sub0 and then click on the index 0x4501sub1 again **2**. This will trigger a read of the object 4501sub1.

	13400430	0x01280708
🗸 🎟 4501 🛛 🦳 Register Communication Bus Terminal ARRAY ro	0x01	0x01
4501sub0 (() NrOfObjects UNSIGNED8 ro	1	0x01
📮 4501sub1 🐬 🕼 🖉 exister Communication Bus Terminal1 UNSIGNED32 rw	19400456	0x01280708

Now you can see the value read from the device. It is 0x01280708. So the value read from the device contains the same configuration for Access bit, channel number and register index, but the register value field has been updated with the value read from device. The hexadecimal value of 708 corresponds to 1800 decimal. The calibration value is given in multiple of 100 ms so the 1800 indicates a calibration interval of 180 seconds.

6.1.5. Writing register values

Before you can change any register value of a terminal channel, you need to disable the write protection for the channel. In normal mode all user registers are read-only with the exception of Register 31. In order to deactivate this write protection you must write the code word (**0x1235**) into Register 31. If a value other than 0x1235 is written into Register 31, write protection is reactivated. Please note that changes to a register only become effective after restarting the terminal (power off/power-on). So to deactivate write protection, the value 0x1y1F1235 (**y** = Channel number) needs to be written first.

For the following example we want to change the calibration interval of the first channel of a KL3162 dual channel analog output terminal to 300 seconds. The first step we need to do is to disable write

protection for the first channel. This terminal is the 1^{st} terminal on our QmixIO-B module so we need to access the object dictionary entry 0x4501sub**1**.

6.1.5.1 REMOVING WRITE PROTECTION

First we disable write protection by writing the codeword 1235 to the register 31:

- Access bit **1** = write access
- Channel number **0** (**0** = **first channel**, 1 = second channel ...)
- Register index 31 (Code word register) →hexadecimal 1
- Register value **1235**

So we write the following value to disable write protection: 0x801F1235

QmixElem	QmixElements - C:\Users\Public\Documents\QmixElements\Projects\canopentools - [canopentools (shared)]						
File Device	Edit	Window Help					
=	-	👍 📥 📥	📥 📝 🝺 📠 🍒	1 3 1 3 1 3 1 3	:		
		3100		ARRAY ro			^
CON		4500	Register Communication Bus Coupler	UNSIGNED32 rw		0x00000000	
	~	4501	Register Communication Bus Terminal	ARRAY ro			
CANopen Tools		4501sub0	NrOfObjects	UNSIGNED8 ro			
		🜌 4501sub1	Register Communication Bus Terminal1	UNSIGNED32 rw	0	0x801F1235	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32 rw			
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32			
		AE01L A	D	nected			

6.1.5.2 WRITING NEW VALUE

Now we can change the calibration time:

- Access bit **1** = write access
- Channel number **0** (**0** = **first channel**, 1 = second channel ...)
- Register index 40 (Calibration interval) → hexadecimal 28
- Register value 300 seconds, the value is given in multiple of 100 ms, that means value is 3000 decimal → hexadecimal OBB8

So we write the following value to change the calibration interval to 300 seconds: 0x80280BB8

6.1.5.3 READING BACK WRITTEN VALUE

Now we can verify the written value by reading the register value back.

- Access bit **0** = **read access**
- Channel number 0 (0 = first channel, 1 = second channel ...)

- Register index 40 (Calibration gain) →hexadecimal 28
- Register value 300 seconds, the value is given in multiple of 100 ms, that means value is 3000 decimal → hexadecimal 0000

So we write the following value to read the calibration interval: 0x00280000

Now click on another object dictionary entry and then on this entry again, to force an update of the value read from device, like it is written in the section <u>Reading register values</u>.

6.1.5.4 STORING DATA PERSISTENTLY

If you have configured all channels properly, you can write the configuration persistently into the non-volatile memory of the Beckhoff device. Click with the right mouse button into the device entry **1** and select **Node Store Parameters** from the context menu **2**.



6.2. KL316x - Analog input terminal 0...10 V

6.2.1. Configuring Auto Calibration

To configure the KL316x terminal you can use the QmixElements CANopenTools Plugin. Please read the section <u>Configuring a bus terminal</u> to learn how to read and write registers of a bus terminal.

Sometimes the Auto Calibration of the KL316x analog input terminal may fail or cause problems. You can prevent this by disabling auto calibration and setting the interval for forced calibration to a very long time. The following picture shows relevant registers of the bus terminal (copied from manual).

1.38~	man Marine Ma	$\sim\sim\sim$	$\sim\sim\sim\sim$		r M
R39	reserved	-	-	-	-
<u>R40 [▶ 48]</u>	Calibration interval *)	0x0708	1800 _{dec}	R/W	SEEPROM
R41	reserved	-	-	-	-
	reserved	-	-	-	-
R43	reserved	-	-	-	-
<u>R44 [) 481</u>	Interval for forced calibration **)	0x0003	3 _{dec}	R/W	SEEPROM
R45	reserved	-	-	-	-
R46	reserved	-	-	-	-
<u>R47 [) 48]</u>	Number of stable measured values	0x0032	50 _{dec}	R/W	SEEPROM
<u>R48 [) 48]</u>	Tolerance for measured value stability	0x0005	5 _{dec}	R/W	SEEPROM
R49	reserved	-	-	-	-
	reserved	-	-	-	-
R63	reserved	-	-	-	-
*) In multiple **) In multipl	es of 100 ms les of register <u>R40 [▶ 48]</u>				

Before you can change any value, you need to disable write protection for the channel of the terminal. Read the section <u>Removing Write Protection</u> to learn how to disable the write protection for the registers of a single channel.

If write protection is removed, we can start writing other registers. First you can set the calibration interval (R40) to the maximum value 0xFFF \rightarrow decimal 65536. The value is given in multiple of 100 ms so this means calibration interval of 6553 seconds:

- Access bit **1** = write access
- Channel number **y** (**0** = **first channel**, 1 = second channel ...)
- Register index 40 (Calibration interval) →hexadecimal 28
- Register value maximum hexadecimal **FFFF**

Write value 0x8y28FFFF to object 0x4501subX and replace y with the channel number. You can now read the value back, to verify if it has been written properly by writing 0x0y280000.

Now we also set the interval for forced calibration (R44) to a maximum value 0xFFFF:

- Access bit **1** = write access
- Channel number **y** (**0** = **first channel**, 1 = second channel ...)
- Register index 44 (Interval for forced calibration) →hexadecimal 2C
- Register value maximum hexadecimal **FFFF**

Write value 0x8y2CFFFF to object 0x4501subX and replace y with the channel number.

	4500	Register Communication Bus Coupler	UNSIGNED32	rw	2949119	0x002CFFFF
~	4501	Register Communication Bus Terminal	ARRAY		0x01	0x01
	4 501sub0	NrOfObjects	UNSIGNED8	ro	1	0x01
	4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	2150432767	0x802CFFFF
	4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw		

You can now read the value back, to verify if it has been written properly by writing 0x0y2C0000.

Then you can disable auto calibration via the feature register R32.

R30	reserved		-	-	-	-
R31 [▶ 45]	Code word register		0x0000	0 _{dec}	R/W	RAM
<u>R32 [▶ 46]</u>	Feature register	KL3162, KL3172, KL3142, KL3152:	0x0180	384 _{dec}	R/W	SEEPROM
		KL3132, KL3182:	0x0182	386 _{dec}		

This register contains several configuration bits. Read the KL316x manual for a detailed description of the bits in the feature register.

Bit	Name	Desc	ription	default		
R32.13	-	reserv	/ed	0 _{bin}		
R32.12	-	reserv	/ed	0 _{bin}		
R32.11	disChannel	0 _{bin}	Channel switched on	0 _{bin}		
		1 _{bin}	Channel switched off			
R32.10	enTh2	0 _{bin}	Limit value 2 is not active	0 _{bin}		
		1 _{bin}	Limit value 2 is active			
R32.9	enTh1	0 _{bin}	Limit value 1 is not active	0 _{bin}		
		1 _{bin}	Limit value 1 is active			
R32.8	enOverProt	Prot O _{bin} Measuring range limitation not active				
		1 _{bin}	Measuring range limitation active			
R32.7	enStable	0 _{bin}	Stabilization [▶ 15] of the calibration value not active	1 _{bin}		
		1 _{bin}	Stabilization [▶ 15] of the calibration value active			
R32.6	disDiffMeasure	0 _{bin}	Differential measurement active	0 _{bin}		
		1 _{bin}	Differential measurement not active (only KL3132, KL3162, KL3172, KL3182)			
R32.5	disCali	0 _{bin}	Cyclic calibration of the A/D converter active	0 _{bin}		
		1 _{bin}	Cyclic calibration of the A/D converter not active			
F.3V~	Active alle and a	on	S S MAR S S MAR S S S S S S S S S S S S S S S S S S S	mr-		

So we need to set Bit 5 of this register to 1 to disable. To ensure that no other bits are modified, you first need to read the register value from the device:

- Access bit **0** = **read access**
- Channel number **y** (**0** = **first channel**, 1 = second channel ...)
- Register index 32 (Calibration gain) →hexadecimal 20
- Register value 0000

So we write the following value to read the feature register: 0x00200000

Normally the device should return the default configuration value: 0. Now you can set bit 5 – that means the value to write will be the value read from device ored with 0x0020 (Bit 5 set).

- Access bit **1** = **read access**
- Channel number **y** (**0** = **first channel**, 1 = second channel ...)
- Register index 32 (Calibration gain) → hexadecimal 20
- Register value **0020**

Write value 0x8y200020 to object 0x4501subX and replace y with the channel number. You can now read the value back, to verify if it has been written properly by writing 0x0y200000.

If you have configured all channels properly, you can write the configuration persistently into the non-volatile memory of the Beckhoff device like written in section <u>Storing data persistently</u>.

6.3. KL320x – PT100 (RTD) Terminal

6.3.1. Configuring Sensor Type

To configure the thermocouple type of a KL320x terminal you can use the QmixElements CANopenTools Plugin. Please read the section <u>Configuring a bus terminal</u> to learn how to read and write registers of a bus terminal.

You can select the sensor type via the feature register (**32**) of the KL320x bus terminal. Here is a snippet from the KL320x manual that shows the register **R32**. You can select the type via bits 12-15.

Feature bit no.		Description of the operating mode
Bit 0	1	User scaling (R33, R44) active [0]
Bit 1	1	Manufacturer scaling (R19, R20) active [1]
Bit 2	1	Watchdog timer active [1]
		In the delivery state, the watchdog timer is switched on.
Bit 3	1	Sign / amount representation [0]
		Sign / amount representation is active instead of two's- complement representation
		$(-1 = 0 \times 8001).$
Bit 4	1	Siemens output format [0]
		This bit is used for inserting status information on the lowest 3
		bits (see below).
Bit 5,6	-	reserved, do not change
Bit 7	1	Activates filter constant in R37 [0]
Bit 8	1	Over range Protection [1]
		If the temperature exceeds 850°C the status bits are
		correspondingly set and the output value is restricted to
		850°C.
Bit 9	-	reserved, do not change
Bit 10	1	Two-wire connection [0]
Bit 11	-	reserved, do not change
Bit	- L .	
15,14,13,12	Element	Valid measuring range
0000	PT100	-200°C to 850°C
0001	NI100	-60°C to 250°C
0010	PT1000	-200°C to 850°C
0011	PT500	-200°C to 850°C
0100	PT200	-200° C to 850°C
0101	NI1000	-200°C to 850°C
0110	NI120	-80°C to 320°C
1110	Output in Ω	10.0 Ω to 5000.0 Ω
1111	Output in Ω	10.0 Ω to 1200.0 Ω

When writing data to the terminal or reading data to the terminal, the register value of the feature register is mapped into the lower 16 bits of the 32 bit message value:

31	30 2	4 2	23	16	15	12		0
Access bit	Channel number		0x20 (decimal 32)			Featu	ure register value	
					Senso	or Type	Other Feature bits	
MSB								LSB

Now navigate to the object dictionary entry **0x4501– Register Communication Bus Terminal**. Select the sub entry (**0x4501subX**) that matches the channel of your thermocouple terminal. I.e. if you have two terminals and the first terminal is an analog input terminal and the second terminal is your thermocouple terminal, then the object dictionary entry would be 0x4501sub2 – Register Communication Bus Terminal 2.

🛐 QmixEleme	QmixElements - C:\Users\Public\Documents\QmixElements\Projects\canopentools - [canopentools (shared)]										
File Device	Edit \	Window Help									
#	-	🖧 📥 📥	, 📥 🥻 🝺 🔤 🎼	<u>7</u> 7 7 7							
		3000		ARRAY					^		
CON				ARRAY							
Shin		4500	Register Communication Bus Coupler	UNSIGNED32	rw		0x00000000				
CANopen Tools	~	4501	Register Communication Bus Terminal	ARRAY							
		4501sub0	NrOfObjects	UNSIGNED8	ro						
		🚨 4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	0	0x00000000				
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw						
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32	rw						
		- 4504 L 4	0 0	onnected							

Before you can change any register value of a terminal channel, you need to disable the write protection for the channel. Read section <u>Removing Write Protection</u> to learn how to disable the write protection.

To disable write protection for a channel, write 0x8y1F1235 to the channel. Replace the y with the channel number. If you would like to change the first channel (channel **0**) then write 0x801F1235 to the terminal register.

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File Device	Edit	Window Help					
#	4	। 📥 📥 📥	, 📥 📝 📑 📠 🍡	To To To 1	6		
2000000000000000		III 3100		ARRAY ro			^
CON		4500	Register Communication Bus Coupler	UNSIGNED32 rw		0x00000000	
	- ~	4501	Register Communication Bus Terminal	ARRAY ro			
CANopen Tools		4501sub0	NrOfObjects	UNSIGNED8 ro			
		4501sub1	Register Communication Bus Terminal1	UNSIGNED32 rw	0	0x801F1235	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32 rw			
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32			
		AE01L A	D:-+ C:: D T:	nected			•

Now you can write the RTD sensor type to the terminal. Use the values from the feature register table above. Replace **y** with the channel number. Please note, that writing the feature register may change other bits in the feature register:

- PT100 0x8y200106
- PT1000 0x8y202106

To configure the PT100 sensor for channel **0** write 0x80200106 to the terminal.

CAN CA	Nop	en Tools 🗙					- ⊅	\times
- 1	-		📥 i 📝 🔞 🖻 📴 🐻 🐻	5 🖪 🖪 🖪				
Index			Name	Туре	Access	Data	Data (hex)	^
		4500	Register Communication Bus Coupler	UNSIGNED32	rw			
~		4501	Register Communication Bus Terminal	ARRAY		0x02	0x02	
		4 501sub0	NrOfObjects	UNSIGNED8	ro	2	0x02	
		4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	2149581062	0x80200106	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw			
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32	rw			~

Now you can verify that the thermocouple has been configured properly, by reading back the configured register value. To do this, first write 0x0y200000 to the terminal. (e.g. 0x00200000 for channel **0**).

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File	Device	Edi	t۱	Vindo	w Help																
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20000				III 3	100								ARRA	Y							^
	CON			4	500			Register	Commu	inication	n Bus Cou	upler	UNSIC	GNED32	2	w		0	«0000000	0	
			~		501			Register	Commu	inication	n Bus Teri		ARRA								
C	ANopen Tools				4501su	b0		NrOfObj	ects				UNSIC	GNED8	1	o					
				2	4501su	b1		Register	Commu	inicatior	n Bus Teri	minal1	UNSIC	GNED32	2 1	rw	2149584934	0x	0020000	0	
					4501su	b2		Register	Commu	inicatior	n Bus Teri	minal2	UNSIC	GNED32	2 1	w					
					4501su	b3		Register	Commu	inication	n Bus Terr	minal3	UNSIC	GNED32	2	W/					
					4501	с и		n:.	<u></u>	:	- п т	:IA Coi	nnected								

Then click on sub index 0 and then on the sub index of the terminal, to update the value.

CAN CA	Nopen Tools 🗙					- ₽	×
-t. I	💑 📥 📥 🍝	🛶 i 😰 🔯 🖻 💽 📑 🐻	5 🚯 🚯 🚯				
Index		Name	Туре	Access	Data	Data (hex)	^
	4500	Register Communication Bus Coupler	UNSIGNED32	rw			
~	4501	Register Communication Bus Terminal	ARRAY		0x02	0x02	
	1 450 ((4))	NrOfObjects	UNSIGNED8	ro	2	0x02	
	4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	2097414 🛞	0x00200106	
	📕 4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw	~	2	
	4501sub3	Register Communication Bus Terminal3	UNSIGNED32	rw			~

If you have configured all channels properly, you can write the configuration persistently into the non-volatile memory of the Beckhoff device like written in section <u>Storing data persistently</u>.

6.4. KL331x - Thermocouple Terminal

6.4.1. Configuring Thermocouple Type

To configure the thermocouple type of a KL331x terminal you can use the QmixElements CANopenTools Plugin. Please read the section <u>Configuring a bus terminal</u> to learn how to read and write registers of a bus terminal.

You can select the thermoelement type via the feature register (32) of the KL331x bus terminal. Here is a snippet from the KL331x manual that shows the register R32. You can select the type via bits 12-15.

Feature bit no.		Description of the operating mode
Bit 0	1	User scaling (R33, R44) active [0]
Bit 1	1	Manufacturer scaling (R19, R20) active [1]
Bit 2	1	Watchdog timer active [1] In the delivery state, the watchdog timer is switched on.
Bit 3	1	Sign / amount representation [0] Sign / amount representation is active instead of two's-complement representation. (-1 = 0x8001)
Bit 4	1	Siemens output format [0] This bit is used for inserting status information on the lowest 3 bits (see below).
Bit 5	1	Activates filter constant in R37 [0]
Bit 6	1	Deactivates the measuring current for broken wire detection
Bit 7	-	reserved, do not change!
Bit 8	1	Reference temperature off [0]
Bit 9	-	reserved, do not change!
Bit 10	1	Checking of the lower measuring range limit not applicable. [0]
Bit		
15,14,13,12	Element	Valid measuring range
0 0 0 0	Type: L	-25°C to 900°C
0 0 0 1	Туре: к	-100°C to 1,370°C
0010	Type: J	-100°C to 1,200°C
0011	Type: E	-100°C to 1,000°C
0100	Type: 1	-100°C to 4 200°C
0101	Type: N	-100 C to 1,500 C
0110	Type: 0 Type: B	-23 C to 600 C
1 0 0 0	Type: D	0°C to 1 700°C
1001	Type: S	0°C to 1,700°C
	Output in µV	Valid measuring range
1 1 0 1	1 uV* 16 uV**	+30 mV
1 1 1 0	2 µ\/* 3 2 µ\/**	+60 mV
1 1 1 1	4 μV* 6.4 μV**	±120 mV (±80 mV for KL3314)

When writing data to the terminal or reading data to the terminal, the register value of the feature register is mapped into the lower 16 bits of the 32 bit message value:

31	30 2	4 2	23	16	15	12		0
Access bit	Channel number		0x20 (decimal 32)			Fea	ture register value	
					Sensor	r Type	Other Feature bits	
MSB								LSB

Now navigate to the object dictionary entry **0x4501– Register Communication Bus Terminal**. Select the sub entry (**0x4501subX**) that matches the channel of your thermocouple terminal. I.e. if you have two terminals and the first terminal is an analog input terminal and the second terminal is your thermocouple terminal, then the object dictionary entry would be 0x4501sub2 – Register Communication Bus Terminal 2.

🛐 QmixEleme	QmixElements - C:\Users\Public\Documents\QmixElements\Projects\canopentools - [canopentools (shared)]										
File Device	Edit \	Window Help									
#	-	🖧 📥 📥	, 📥 🥻 🝺 🔤 🎼	<u>7</u> 7 7 7							
		3000		ARRAY					^		
CON				ARRAY							
Shin		4500	Register Communication Bus Coupler	UNSIGNED32	rw		0x00000000				
CANopen Tools	~	4501	Register Communication Bus Terminal	ARRAY							
		4501sub0	NrOfObjects	UNSIGNED8	ro						
		🚨 4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	0	0x00000000				
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw						
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32	rw						
		- 4504 L 4	0 0	onnected							

Before you can change any register value of a terminal channel, you need to disable the write protection for the channel. Read section <u>Removing Write Protection</u> to learn how to disable the write protection.

To disable write protection for a channel, write $0x_{8y1F1235}$ to the channel. Replace the **y** with the channel number. If you would like to change the first channel (channel **0**) then write $0x_{801F1235}$ to the terminal register.

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e	4	i 📥 📥 📥	, 📥 📝 📑 🔤 🎼	la 🛯 🖉	6			
		3100		ARRAY ro				^
CAN		4500	Register Communication Bus Coupler	UNSIGNED32 rw		0x0000000		
	~	4501	Register Communication Bus Terminal	ARRAY ro				
CANopen Tools		4501sub0	NrOfObjects	UNSIGNED8 ro				
		🚨 4501sub1	Register Communication Bus Terminal1	UNSIGNED32 rw	0	0x801F1235	j	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32 rw				
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32				
		AE01L A	D:-+ C:	nnected				

Now you can write the thermocouple type to the terminal. Use the following values for the different types:

- Typ K 0x<mark>8y201026</mark>
- Typ J 0x8y202026

To configure the Typ K thermocouple for channel **0** then write 0x80201026 to the terminal.

QmixEleme	ents - C	\Users\Public\Documents\Qm	ixElements\Projects\canopentools - [canop	entools (shared)]			-	<
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а а розродовово								^
CON		4500	Register Communication Bus Coupler	UNSIGNED32	ro rw	0	0x00000000	
СНМ	- ~	4501	Register Communication Bus Terminal	ARRAY				
CANopen Tools		4501sub0	NrOfObjects	UNSIGNED8	ro			
		4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw	2149584934	0x80201026	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw			
		4501sub 3	Register Communication Bus Terminal3	UNSIGNED32	rw 🔔			
		■ AE01LA	Denistra Communication Due Terraina M Con	nected				· •

Now you can verify that the thermocouple has been configured properly, by reading back the configured register value. To do this, first write 0x0y200000 to the terminal. (e.g. 0x00200000 for channel **0**).

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File Device	Edit	Window Help					
*	-	🖧 🖧 📥 🖧	📥 📝 🔯 🗟 🌆	7 5 7 5 7 5			
							•
		3100		ARRAY	ro		
CAN		4500	Register Communication Bus Coupler	UNSIGNED32	rw 0	0x00000000	
	~	4501	Register Communication Bus Terminal	ARRAY			
CANopen Tools		4501sub0	NrOfObjects	UNSIGNED8	ro		
		🜌 4501sub1	Register Communication Bus Terminal1	UNSIGNED32	rw 2149584934	0x00200000	
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32	rw		
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32	TW		
		AEN1LA	D:	INCOMPANY			•

Then click on sub index 0 and then on the sub index of the terminal, to update the value.

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File Device	Edit)	Window Help					
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25 1 25 200000000000000000000000000000000000							^
CON		4500	Register Communication Bus Coupler	UNSIGNED32 rw		0x0000000	0
CHIN	~	4501	Register Communication Bus Terminal	ARRAY ro			
CANopen Tools		1 ((с))ьо	NrOfObjects	UNSIGNED8 ro		0x0000000	1
_		450 N ub1	Register Communication Bus Terminal1	UNSIGNED32 rw	2101286 ((1)	0x0020102	6
		4501sub2	Register Communication Bus Terminal2	UNSIGNED32 rw		2	
		4501sub3	Register Communication Bus Terminal3	UNSIGNED32 rw			
		- AE01LA	Denistra Communication Due Tomaio IA Con	nected			

If you have configured all channels properly, you can write the configuration persistently into the non-volatile memory of the Beckhoff device like written in section <u>Storing data persistently</u>.

6.5. Adding Terminals

Before you start, please contact the application and sales team of CETONI and tell them which device you are going to update (CET-number) and which terminals you are going to add to your Qmix-I/O-B. CETONI will send you an updated device database which you have to import into your QmixElements software or, if necessary, an updated software version if the terminals are not supported by QmixElements at the moment. After you have imported the updated device database or reinstalled the software, please perform the following instructions.

6.5.1. Preparations

Please add your Qmix-I/O-B module only to your Qmix system and check that your device is switched off. Physically add your new terminals to your Qmix-I/O-B. Terminate the Qmix-I/O-B with the Beckhoff KL 9010 end terminal. Finally switch on your device.



ATTENTION. Do not forget to terminate your Qmix-I/O-B using the KL 9010 bus end terminal. Otherwise the device will not work..

6.5.2. Restore Factory Default Settings

Factory default settings need to be restored in order to let the device properly set up it's communication parameters. Therefore in QmixElements load the device configuration *canopentools*. Connect the software to your Qmix system and scan for devices connected to your base module. A generic I/O device should be displayed (please see figure below).

QmixElem	ents - C:\Users\Public\Documents\0)mixElements\Projects\	\SDL - [canopentools (s	shared)]			-	o x
File Device	Edit Window Help							
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	CON CANonen Tools X			_		_		- ⊓ ¥
CAN		10 16 In In I						
CANopen Toos	ndex	Name Type	Access Data	D	ata (hex)			
	> 🔂 0x03 (3d)	BK5151 Generic I/C	D (401)					
			3					
	🙆 Event Log CAN Bus Trace PD	O Configuration 🗙						• @ X
	•							
	PDO CAN-ID	RTR	Trans. Type	Sync	Inhibit (ms)	Event	Map Num	Map 1 (hex)
	<							
				Co	nnected			

Next please look for the object dictionary entry 1011 Restore default parameters. In sub-index 4 Restore Manufacturer Defined Default Parameters please enter the value 0x64616F6C in Data (hex). Subsequently please reset the device pressing the All nodes: Reset button (please see figures below).

Inc	dex		Name	Туре	Access	Data	Data (hex)
	× 🛄		Restore Default Parameters	ARRAY			
		1011sub0	Number of Entries	UNSIGNED8	ro		
		1011sub1	Restore all Default Parameters	UNSIGNED32	rw		
		1011sub4	Restore Manufacturer Defined Default Parameters	UNSIGNED32	rw	1684107116	0x64616F6C

QmixEleme	ents - C:	\Use	rs\Public\Documents\Qm	ixElements\Projects\SDL - [canopentools (shared)]						
File Device	ile Device Edit Window Help									
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	CAN CA	Nope	n Tools 🗙							
CAN	4	-6	🐴 📥 📥 💷	2 12 🗈 🗈 🖪 14 15 16 16 16						
CANopen Tools	Index	6		Name	Туре	Access	Data	Data (hex)		
CAN	nen Tor	2	100D		INVALID TYPE	const				
CANC	pen io	5/15	100E		INVALID TYPE	const				
				Store Parameter Field	ARRAY					
	~			Restore Default Parameters	ARRAY					
			1 011sub0	Number of Entries	UNSIGNED8	ro				
			1011sub1	Restore all Default Parameters	UNSIGNED32	rw				
			= 1011sub4	Restore Manufacturer Defined Default Parameters	UNSIGNED32	rw	1684107116	0x64616F6C		
			1014	COB-ID EMCY	UNSIGNED32	rw	131	0x83		
	>		1016	Consumer Heartbeat Time	ARRAY	ro				

6.5.3. Adapt Inhibit Time and Save Parameters

As second last step you need to set the inhibit time of all *Transmit PDO Communication Parameter* entries for analog input devices. Starting from object dictionary entry 1801 till 1803, please click the sub-index 1 *COB-ID* and check whether the first digit in Data (hex) is 8. If it is not, in sub-index 3 *Inhibit Time* please enter the value 1000 in the Data field. If you have found a COB-ID carrying 8 as the first digit in Data (hex), the communication parameter is deactivated. That means you have successfully finished this step (please see figure below).



IMPORTANT. Object dictionary entry 1800 is reserved for digital input channels. Please leave it's configuration untouched.

Index		Name	Туре	Access	Data	Data (hex)
>	160F		INVALID TYPE	const		
>	1800	Transmit PDO Communication Parameter	RECORD			
~	1801	Transmit PDO Communication Parameter	RECORD			
	1801sub0	Number of Entries	UNSIGNED8	ro	5 🚺	0x05
	1801sub1	COB-ID	UNSIGNED32	rw	643	0x00000283
	1801sub2	Transmission Type	UNSIGNED8	rv 2	255	0xFF
	1801sub3	Inhibit Time	UNSIGNED16	rw	1000	0x03E8
	1801sub4	Compatibility Entry	UNSIGNED8	rw	3	0x3
	1801sub5	Event Timer	UNSIGNED16	rw		0x0000
~	1 802	Transmit PDO Communication Parameter	RECORD			
	1802sub0	Number of Entries	UNSIGNED8	ro	5	0x05
	1802sub1	COB-ID	UNSIGNED32	rw	899	0x00000383
	1802sub2	Transmission Type	UNSIGNED8	rw 4	255	0xFF
	1802sub3	Inhibit Time	UNSIGNED16	rw	1000	0x3E8
	1802sub4	Compatibility Entry	UNSIGNED8	rw	3	0x03
	1802sub5	Event Timer	UNSIGNED16	rw		0x0000
×	1 803	Transmit PDO Communication Parameter	RECORD			
	1803sub0	Number of Entries	UNSIGNED8	ro	5 5	0x05
	1803sub1	COB-ID	UNSIGNED32	rw	2147484803	0x80000483
	1803sub2	Transmission Type	UNSIGNED8	rw F	irst digit is 8	⁰ Stop here
	1803sub3	Inhibit Time	UNSIGNED16	rw	0	0x0000
	1803sub4	Compatibility Entry	UNSIGNED8	rw	3	0x03
	💶 1803sub5	Event Timer	UNSIGNED16	rw	0	0x0000

Finally you'll just have to save the configured parameters by pressing the *Node: Store Parameters button* and accept the following question for storing the parameters permanently to the device.(please see the figure below).

CANopen Tools 🗙				
🐴 📥 📥 📥	🐴 👔 🔊	à 🔥 🔥 i 🎼	To To To To	
Index	ame T	ype Ad	ccess Data	Data (hex)
> 🔂 0x03 (3d)	BK5151 0	ieneric I/O (401)		
	CANopen Tools X CANopen TO A CANOPEN TO A CANOPENT TO A CANOPENTINA CANOPENTINA CAN	CANopen Tools X CANopen Tools X Index Solution Solut	CAN CANopen Tools X CAN CANopen Tools X Index Solution and Type A Solution and Type A So	CANopen Tools X CANopen Tools X CANopen Tools X Canadian Control of the second seco

You have finished adding the new terminals and should now be able to create a new device configuration with your updated Qmix-I/O-B device and use it within your application.

7. neMESYS UserInterface

7.1. Edit Device Configuration

7.1.1. Starting the Configuration Wizard

Start the neMESYS UserInterface and scan for devices with your pump attached. Select the pump you would like to configure by clicking on the label on top of the pump. The label of the selected pump will be highlighted green.



Now enter the service mode by clicking the menu item **Setup** \rightarrow **Enter Service Mode**

🎲 File	neM Setu	ESVS Userbaumac p Dosing Units View Wiza	ırds Help
Scan	Q 	Search Devices	onf. Syringe Conf. Sensors Reference Move Volume Unit Flow Unit
Dosin Pum	1	F move Dosing Unit	Dosing Unit 42 Y Flow Image: Construction of the second sec
	٩	Enter Service Mode	0,000000 µl/s 0,1 ✔ Direct Flow Profile
	_	Quit Service Mode	► E Z Z Z Target Values Volume (μl)

Enter the service password epos241 into the password field that appears.

Enter Service Mode X						
Password ******						
V OK 🗶 Abo	ort					

The title bar now indicates that you are working in service mode.

🍘 neN	neMESYS UserInterface [Service Mode]								
File Set	up Dosing Units	View Wizard	s Heip						
			2	×1	20	4	?		
Scan Dev	ices Sync. Start	Stop All Con	nf. Syringe Conf.	Sensors	Reference Move	Volume Unit	Flow Unit	Star	
Dosing Un	its			× 1	osing Unit 42				
Pumps	Description	💑 Mode	Section Flow	6	💧 Low Pressure N	Module	30		
☑ 2	Dosing Unit	🍐 direct	0,000000 µl/s	0,1	V D	irect Flow Pro	ofile		

Now select the menu item **Setup** \rightarrow **Configure Axis** from the main menu



The neMESYS Configuration Wizard appears.

Konfigurations Assistent	×
neMESYS Configuration Wizard Welcome to the neMESYS syringe pump configuration wizard	
This wizard will assist you in configuring and testing the neMESYS syringe pumps. For configuration and test only one single module or one double module should be connected.	
EST.	
<u>N</u> ext > Cancel	

Now click the **Next** button until you see the desired configuration page.

7.1.2. Setting the Gear Factor

Start the configuration wizard like written in the section above and navigate to the wizard page **Step 2** – **Configuring Pump**. On this page, you can see the gear factor on the left:

Konfigurations Assistent		×
Step 2 - Configuring Pump Configure the selected pump module		
Please set the technical parameters of th memory of the internal motion controller. number). Each motion controller must rec	e selected pump. Th Please make sure to eive a unique serial r	is data is stored in flash assign a unique ID (serial number.
Gear Factor	Type:	Starter 🗸
Numerator: 225	Syringe holder:	Single \checkmark
Denominator: 16	Produc -Type:	Standard \checkmark
	Valve:	valve installed $~~$ \sim
Device-ID: 42	Save con	figuration into device
	< <u>B</u> ack	Next > Cancel

Ensure that the gear factor matches the physical device configuration and modify it accordingly. Finally click **Save configuration into device** to store the changes in non-volatile device memory. Then close the configuration wizard and execute a device scan to apply your changes.

爹 neM	IESYS UserInterf	ace [Service M	ode]					
File Setu	up Dosin units	View Wizards	s Help					
Scan Devi	ic Sync. Start	. Stop All Con	🔎 f. Syringe	Conf. Se	nsors	Reference Move	Jolume Unit	Flow Unit
Dosing Uni	its				🖾 🚺	osing Unit 42		
Pumps	Description	朂 Mode	Flow	v	5	💧 🖕 Low Pressure N	Module	34
2	Dosing Unit	🍐 direct	0,00000	00 µl/s	0,1	- H. 🗸 🗸	irect Flow Pr	ofile

8. BASE 120 / BASE 600 Firmware Update

8.1. Preparation

Connect your BASE module to your PC. Start the software Vci3floadGui or Vci4floadGui via Windows Explorer. You will find the software in C:\Program Files\IXXAT\3.5 or C:\Program Files\HMS\IXXAT VCI 4.0 after the installation of the QmixElements or neMESYS User Interface software (see figure below).

Destination	Judei					
Destination Device	[HW425358 USB	-to-CAN V2 mb	edded - HMS Technology Cente	er Ravensburg G	mbH	~
Source						>>
Get Vci4 hardv	ware information					
[15:12:45] USI	B-to-CAN V2 embedd	led <hms techr<="" th=""><th>nology Center Bayensburg Gmbł</th><th>4></th><th></th><th></th></hms>	nology Center Bayensburg Gmbł	4>		
[15:12:45] USI Hardware Driver Unique HW scan firmwa Vci4 bal	B-to-CAN V2 embedd V 00.01.05.00 V 04.00.124.0000 'ID (HW425358) rre informations (on th V00.01.06.03	led <hms techr<br="">e device) FI ۵SH</hms>	hology Center Ravensburg GmbH	+>		
[15:12:45] USI Hardware Driver Unique HW scan firmwa Vci4_bal	B-to-CAN V2 embedd V 00.01.05.00 V 04.00.124.0000 'ID (HW425358) re informations (on th V00.01.06.03	led <hms techr<br="">ie device) FLASH</hms>	hology Center Ravensburg GmbH < USB-to-CAN_V2 V00.01.	+> 00.00 >		
[15:12:45] USI Hardware Driver Unique HW scan firmwa Vci4_bal	B-to-CAN V2 embedd V 00.01.05.00 V 04.00.124.0000 ID (HW425358) rre informations (on th V00.01.06.03	led <hms techr<br="">e device) FLASH</hms>	nology Center Ravensburg GmbH < USB-to-CAN_V2 V00.01.	+> 00.00 >		
(15:12:45) USI Hardware Driver Unique HW scan firmwa Vci4_bal	B-to-CAN V2 embedd V 00.01.05.00 V 04.00.124.0000 ID (HW425358) re informations (on th V00.01.06.03	led <hms techr<br="">e device) FLASH</hms>	nology Center Ravensburg GmbH < USB-to-CAN_V2 V00.01.	+> 00.00 >		
(15:12:45) USI Hardware Driver Unique HW scan firmwa Vci4_bal	B-to-CAN V2 embedd V 00.01.05.00 V 04.00.124.0000 ID (HW425358) re informations (on th V00.01.06.03	led <hms techr<br="">le device) FLASH</hms>	nology Center Ravensburg GmbH < USB-to-CAN_V2 V00.01.	+> 00.00 >		

The software will show you the detected USB-to-CAN interface. IF the software does not detect any USB-to-CAN interface then please try to connect your BASE module to another USB interface of your PC.

You only need to do an update, if you have a **V2** device, that means, if you have an **USB-to-CAN V2 embedded** or an **USB-to-CAN V2 compact**. If you do not have a V2 device, then you are finished now.

8.2. Update procedure

An USB-to-CAN V2 device should appear in the Device field **1** of the Flashloader window.

Destination Device	[HW425358] US	6B-to-CAN V2 em	bedded - HMS Technology Center Raver	nsburg GmbH	1	~
Source	S:\\USB-to-C	XAN_V2_FW_0_1	_6_3_R380.hex 3		>>	e
Cat Vaid basel	ware information					
(15:19:35) USI Hardware Driver	B-to-CAN V2 ember V 00.01.05.00 V 04.00.124.0000	dded <hms tecł<="" th=""><th>nology Center Ravensburg GmbH></th><th></th><th></th><th></th></hms>	nology Center Ravensburg GmbH>			
[15:19:35] USI Hardware Driver Unique HW scan firmwa Vci4_bal	B-to-CAN V2 ember V 00.01.05.00 V 04.00.124.0000 ID (HW425358) re informations (on V00.01.06.03	dded <hms tech<br="">) the device) FLASH</hms>	nnology Center Ravensburg GmbH> < USB-to-CAN_V2 V00.01.00.00 >			
(15:19:35) USI Hardware Driver Unique HW scan firmwa Vci4_bal Scan file Vci4_bal	B-to-CAN V2 embed V 00.01.05.00 V 04.00.124.0000 ID (HW425358) re informations (on V00.01.06.03 V00.01.06.03	dded <hms tech<br="">the device) FLASH FLASH</hms>	nnology Center Ravensburg GmbH> < USB-to-CAN_V2 V00.01.00.00 > < USB-to-CAN_V2 V00.01.00.00 >			

Click the >> button **2** to select the firmware (eg USB-to-CAN_V2_FW_0_1_6_3_R380.hex). You will find the latest firmware here:

http://www.cetoni.de/english/en-service/downloads/software.html



ATTENTION. Do not interrupt the process while the flash procedure is running!

Now click the **Flash** button to start the update process **4**. Wait for the process to complete and then click **Verify**. If the verification succeeds with an OK message (see Figure below) the update process is complete and your device has been updated successfully.

🐻 Vci4 Flashlo	ader			_		×
Destination Device	[HW425358] US	B-to-CAN V2 em	bedded - HMS Technology Center Ravens	sburg GmbH		\sim
Source	S:\\USB-to-C	AN_V2_FW_0_1	_6_3_R380.hex	[>>	
Vci4_bal	V00.01.06.03	FLASH	< USB-to-CAN_V2 V00.01.00.00 >			^
Scan file Vci4_bal	V00.01.06.03	FLASH	< USB-to-CAN_V2 V00.01.00.00 >			
[15:31:10] write write flash fil OK verify flash fi OK	e Firmware to Flash e ile	(+ Verify)				٦
scan firmwar Vci4_bal	re informations (on V00.01.06.03	the device) FLASH	< USB-to-CAN_V2 V00.01.00.00 >			v
				Flash	Verify	, .