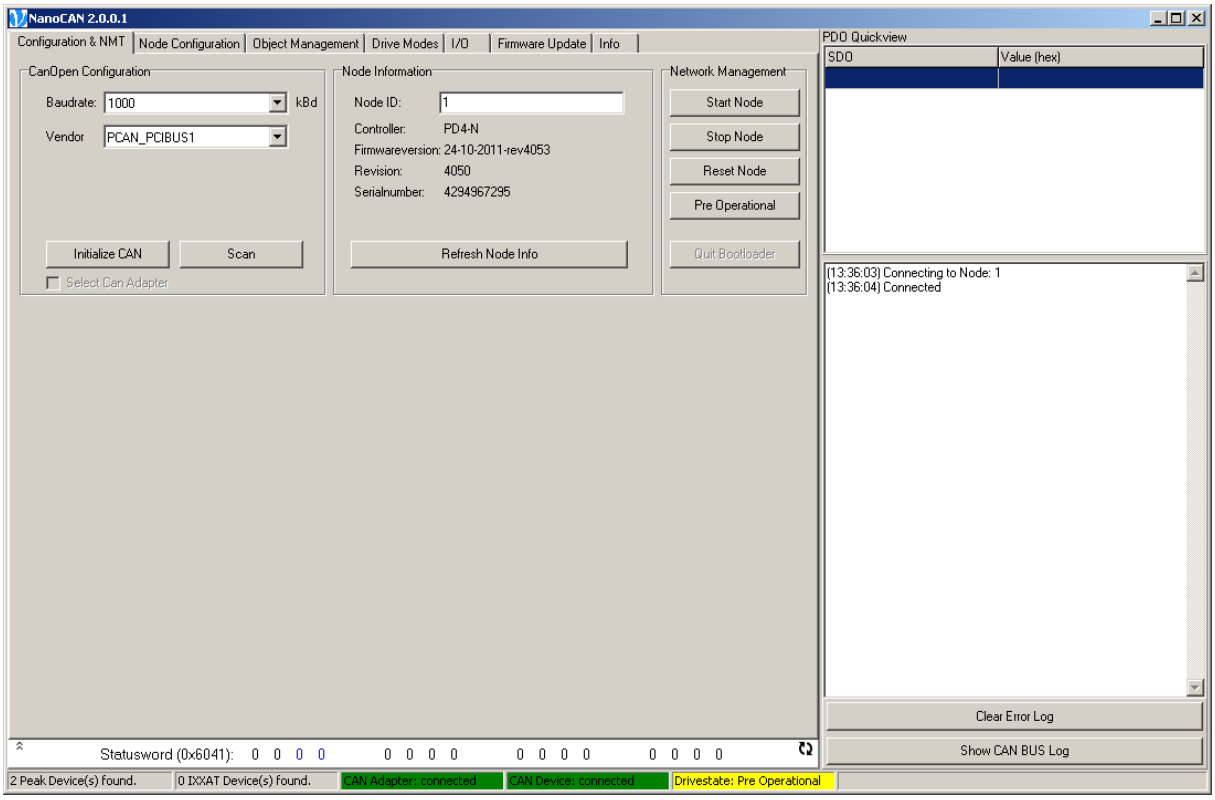
User Manual



NanoCAN

Application for stepper motor controllers and Plug & Drive motors (version V2.3.x.x)

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Translation of original handbook

Version/Change overview

Version	Date	Changes
1.0	20.06.2009	New issue
1.1	14.12.2009	Revision
1.2	13.12.2010	Revision, program version 1.35
2.0	03.11.2011	Revision, program version 2.00
2.0.0.1	05.04.2012	Revision, program version V2.0.0.1
2.2	25.06.2013	Revision, program version V2.3.x.x

About this manual

Target group

This user manual is aimed at designers and developers who need to configure a CANopen-capable motor controller from Nanotec® with the aid of the NanoCAN software without much experience in stepper motor technology.

Important information

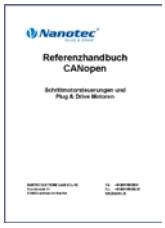
This user manual must be carefully read before installation of the software.

Nanotec® reserves the right to make technical alterations and further develop hardware and software in the interests of its customers to improve the function of this product without prior notice.

For criticisms, proposals and suggestions for improvement, please contact the above address or send an email to: info@nanotec.com

Additional manuals

Please also note the following manuals from Nanotec:

Nanotec CANopen reference	Comprehensive documentation of the CANopen functions	
Technical manuals	Connection and commissioning of stepper motor controllers or Plug & Drive motors	

The manuals are available for download at www.nanotec.com.

Contents

1 Installation

System requirements

The NanoCAN software only operates with adapters from IXXAT and PEAK. The appropriate drivers must be installed.

- IXXAT: The VCI driver (version 3) is available for download under the "Support" section at www.ixxat.de.
- PEAK: The driver is available for download under the "Support" section (download packages) at www.peak-system.com.

Procedure

To install NanoCAN on your PC, you must download the software from the Nanotec website.

To do this, proceed as follows:

Step	Action
1	Open the Nanotec website in your browser: http://www.nanotec.de
2	Go to the "Support –> Software –> NanoCAN" area.
3	Download NanoCAN.
4	Unpack the zip file on your PC in the required directory.
5	Start the program by double-clicking on the "NanoCAN.exe" file.

2 Overview of the user interface

Function and design

The NanoCAN software can be used to easily configure the CAN communication of the stepper motor controllers and the Plug & Drive motors on a PC with a CAN interface.

Transparent interfaces and simple test functions enable rapid entry into operation and facilitate commissioning.

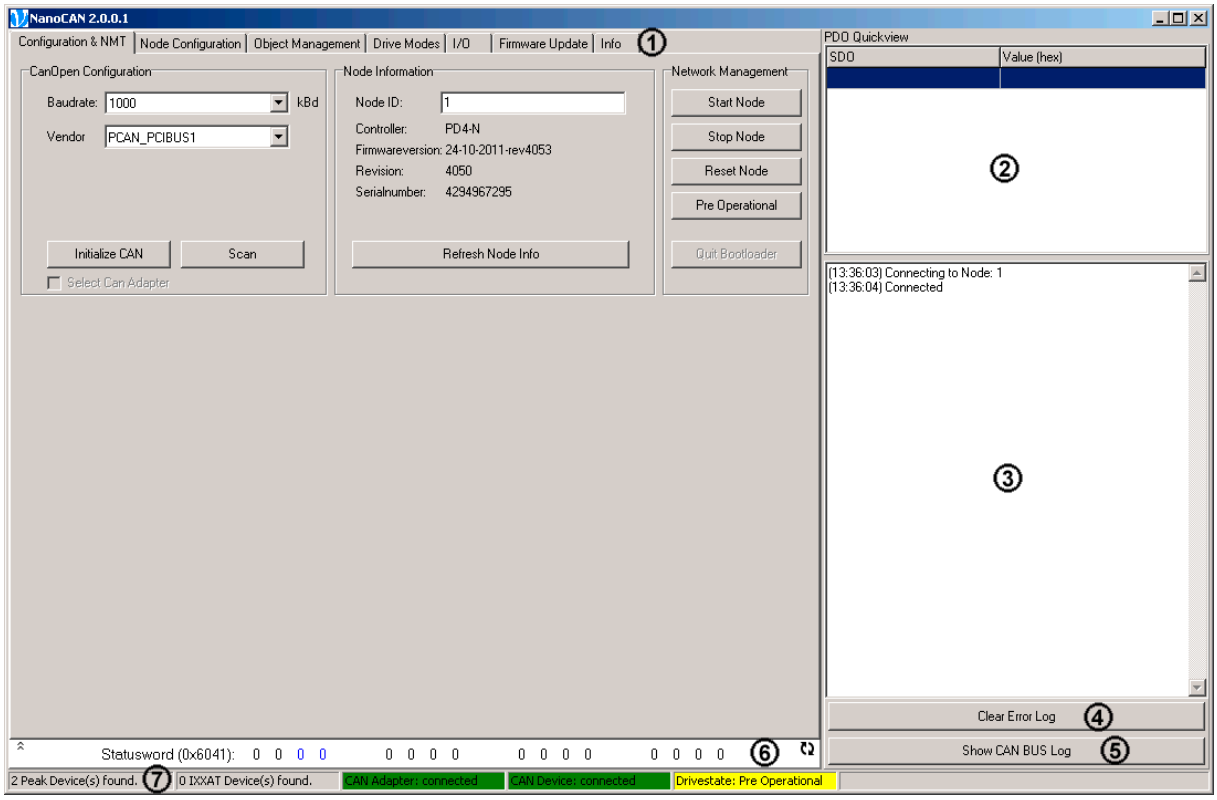
Familiarize yourself with the user interface of the NanoCAN software before starting to configure the stepper motor controllers or Plug & Drive motors.

Scopes

The user interface consists of the following areas:

- Tabs (1)
- PDO Quickview (2)
- Message output (3)
- Button for resetting the message output (4)
- Button for calling up the CAN BUS log (5)
- Statusword display (6)
- Status bar (7)

View



Tabs (1)

The user interface consists of the following tabs:

Tab	Function	See Section
<Configuration & NMT>	CANopen settings and commands	<Configuration & NMT> tab
<Node Configuration>	Error log, motor and closed loop settings	<Node Configuration> tab
<Object Management>	SDO list, PDO (process data objects) configuration, PDO Quickview settings	<Object Management> tab
<Drive Modes>	Settings for the various drive modes	<Drive Modes> tab
<I/O>	Settings and status query of the inputs and outputs of the control	<I/O> tab
<Firmware Update>	Update of the motor controller firmware	<Firmware Update> tab
<Info>	Information on NanoCAN and the DLL versions used	<Info> tab

Note:
When switching to the <Drive Modes> tab, the corresponding SDO (Service Data Object) is sent in order to switch to the selected drive mode (default: Homing Mode).

When offline mode is selected, the <Drive Modes>, <I/O> and <Firmware Update> tabs are hidden.

PDO Quickview (2)

Here, TxPDOs which the controller sends can be displayed in order to always keep their values in view. The values are automatically updated at the same time.

Message output (3)

In the message output, various messages (including error messages) are displayed that occur during the writing of the SDOs to the controller or reading of the SDOs from the controller.

Clear Error Log (4)

This button resets the content of the message window.

Show CAN BUS Log (5)

This button can be used to open the Bus Log window. The messages sent over the CAN bus are displayed in this window.

Further information in Section 11 "CAN Bus log window”.

Statusword display (6)

The current state of the statusword is read and the statusword is updated here. Further information in Section 10 "Statusword display”.

Status bar (7)

The status bar displays the found CAN adapters, the connected CAN devices and the current operating status of the controller.
CAN adapter describes an expansion card integrated in the computer or a device connected by USB over which the computer can understand the CAN protocol.
A **CAN device**, on the other hand, is a CAN-compliant end device such as a CAN controller.

Possible CAN adapter/device operating states:

State	Description
connected	A CAN adapter or controller is connected and NanoCAN can communicate with it.
disconnected	No communication is possible as no CAN adapter or controller is connected.

Possible operating states (Drive state):

State	Description	Display
Unknown	NanoCAN was not previously connected and does not recognize the state of the controller.	gray
Stopped	SDOs and PDOs cannot be written and read. Only NMT messages are possible.	red
Pre-Operational	PDOs cannot be written and read. Configuration of PDOs is possible.	yellow
Operational	PDOs can be written and read.	green
BOOTLOADER	The controller bootloader is active, the state machine is not running. This means that SDOs and PDOs cannot be written and read.	blue

3 <Configuration & NMT> tab

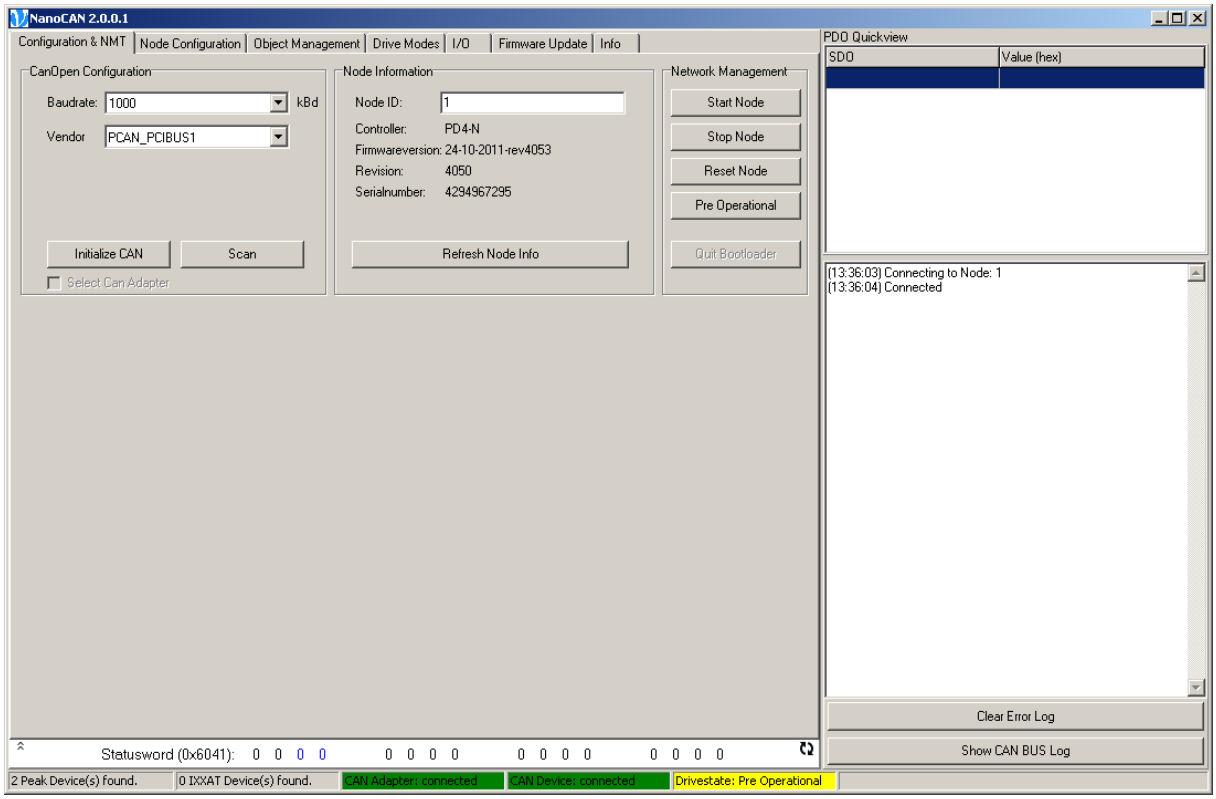
3.1 User interface

Overview

The <Configuration & NMT> tab contains the following areas:

- CanOpen Configuration
- Node Information
- Network Management

View



3.2 Selecting the controller

Introduction

In the [CanOpen Configuration] area the Baudrate and Vendors are selected to select the CAN adapter card used for communication.

The <Scan> button can be used to start a search to find controllers whose node ID and baud rate are not known.

In the "Vendor" selection field, all driver cards found by the program are displayed. In the status line, the number of found cards is displayed.

Requirements

There are two basic ways of setting the CANopen node ID and the baud rate:

- Hardware setting: via rotary switches on the controller
- Software setting: with NanoCAN, see Section 4.2 "<Node Settings & Error> area". This is the only way the Node ID can be set for controllers without a HEX switch (SMCI12, PD2-N).

To be able to make a software setting with NanoCAN, a certain value must be set on the rotary switches of the controller; see the following tables:

Control with two rotary switches (e.g. PD6-N)

Rotary switch value dec (hex)	**Node ID**	**Baudrate**
0 (0x00)	from EEPROM	= 1 MBaud
1 – 127 (0x01 – 0x7F)	= rotary switch value	
128 (0x80)	from EEPROM	from EEPROM
129 – 255 (0x81 – 0xFF)	= rotary switch value minus 128	

Control with a rotary switch (e.g. PD4-N)

Rotary switch value dec (hex)	**Node ID**	**Baudrate**
0 (0x00)	from EEPROM	= 1 MBaud
1 – 7 (0x01 – 0x07)	= rotary switch value	
8 (0x08)	from EEPROM	from EEPROM
9 – 15 (0x09 – 0x0F)	= rotary switch value minus 8	

Setting the rotary switches (controllers with two rotary switches)

Note:
The rotary switches must be set to the desired value before the controller is switched on since this value is only read in when the controller is restarted.

The rotary switches can be used to set a two-digit hexadecimal number (0x00 to 0xFF):

Step	**Action**
1	Set the 16th digit with the right rotary switch (e.g. 0xF0).
2	Set the 1st digit with the right rotary switch (e.g. 0x0F).

Example 1:
If the right rotary switch is set to 2 and the left rotary switch is set to 1 (0x21), this results in a number equivalent to the decimal number 33 (= 2*16 + 1*1). In this case, the node ID is set to 33 on the hardware. The baud rate is set to 1 MBaud.

Example 2:
If the right rotary switch is set to 8 and the left rotary switch is set to 0 (0x80), this results in a number equivalent to the decimal number 128 (= 8*16 + 0*1). In this case, the node ID and baud rate are read out of the EEPROM.

Direct connection with a controller

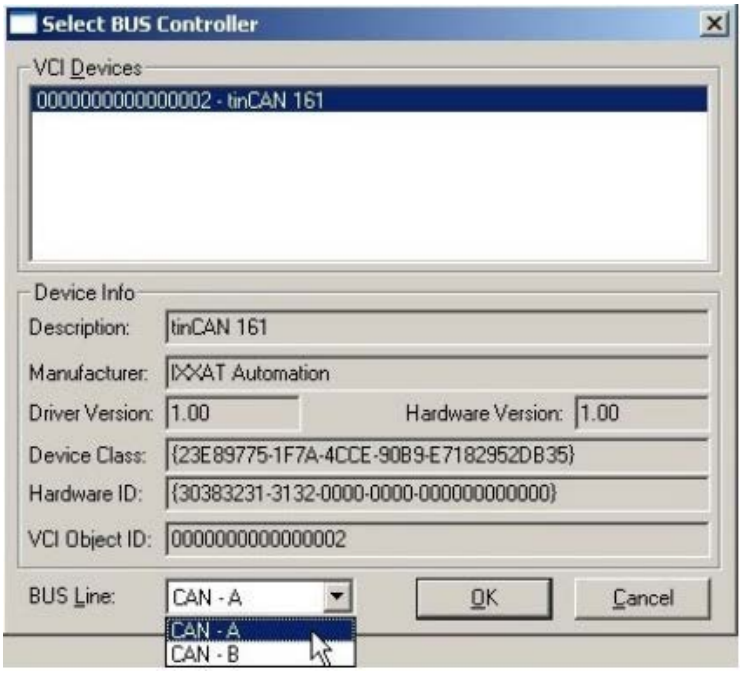
When NanoCAN is launched the following attempt is made:

- Connection setup to the first found CAN adapter
- Connection setup to the CAN device on "Node ID" 1

If the attempt fails, the user must configure the correct settings and start the connection manually.

The procedure differs depending on which driver card vendor is selected (IXXAT or PEAK).

Procedure with IXXAT cards

Step	Action
1	Enter the desired node ID (1 to 127) in the "Node ID" field.
2	Select the baud rate set for the controller in the "Baudrate" selection field.
3	Select the "IXXAT" entry in the "Vendor" selection field.
4	If a CAN adapter with only one channel is connected: • Click on the <Initialize CAN> button. This completes the procedure. • In all other cases: continue with step 5.
5	Activate the <Select Can Adapter> checkbox and then click on the <Initialize CAN> button. The "Select BUS Controller" window is opened. 
6	Select the desired adapter in the [VCI Devices] area.
7	Select the desired channel in the "BUS Line" selection field.

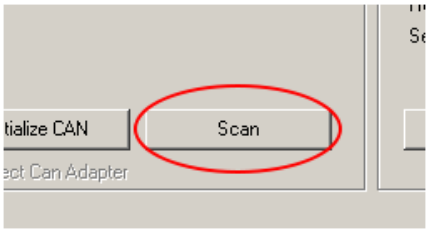
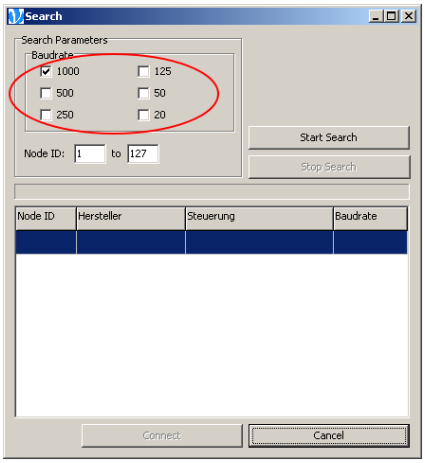
Step	Action
8	Click on the <OK> button. The inputs are saved and the window is closed.

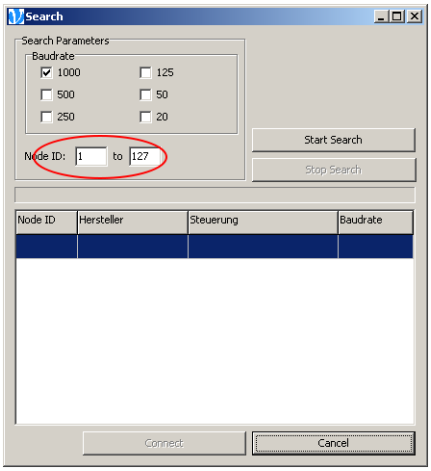
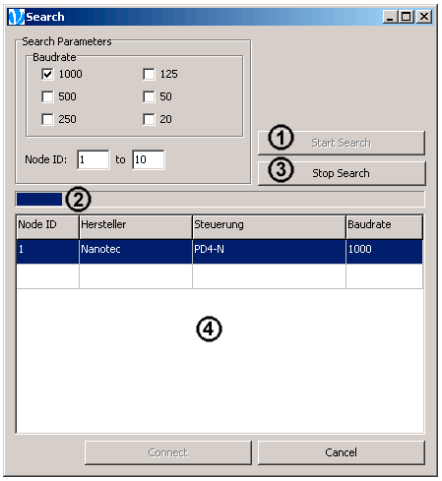
Procedure with PEAK cards

Step	Action
1	Enter the desired node ID (1 to 127) in the "Node ID" field.
2	Select the baud rate set for the controller in the "Baudrate" selection field.
3	In the "Vendor" selection field, select the desired card with the desired channel. Possible designations of PEAK cards: • PCAN_NONEBUS • PCAN_ISABUS1 … PCAN_ISABUS8 • PCAN_DNGBUS1 • PCAN_PCIBUS1 … PCAN_PCIBUS8 • PCAN_USBBUS1 … PCAN_USBBUS8 • PCAN_PCCBUS1, PCAN_PCCBUS2

Searching for a controller

Proceed as follows:

Step	Action
1	Open the search dialog by clicking on the <Scan> button.  The "Search" window is opened: 
2	Select the desired baud rates that are to be used for the search in the [Search Parameters] area.

Step	Action
3	Enter the range of the node ID (1 – 127) to be searched. 
4	Click on the <Start Search> button (1) to begin the search. The progress of the search is displayed by the progress bar (2) above the table. The search can be ended at any time by clicking on the <Stop Search> button (3) or by closing the dialog box. All devices found are listed in the tabular overview (4).  **Note:** Depending on how many baud rates and how wide a node ID range is to be searched, the search can take some time.
5	Establish a connection to the found device: • Double-click on the connection or • Select the desired connection and click on the <Connect> button.

3.3 Network Management

Buttons

The [Network Management] area contains the following buttons:

Button	Function	Effect
<Start Node>	Start the controller	"Operational" status: PDOs can be written and read.
<Stop Node>	Stop the controller	"Stopped" status: SDOs and PDOs cannot be written and read. Only NMT messages are possible.
<Reset Node>	Restart the controller (reset)	All changes that were not stored in the EEPROM are reset.
<Pre Operational>	Return the system to the state after application of the operating voltage or a reset	"Pre-operational" status: PDOs cannot be written and read.
<Quit Bootloader>	Quit bootloader and start the state machine	If the bootloader is active, this function is enabled and it is possible to start the state machine from NanoCAN.

Procedure

Proceed as follows:

Step	Action
1	Depending on the desired function, click on the associated button.

3.4 Reading out the hardware and software version

Introduction

The <Refresh Node Info> button on the <Configuration & NMT> tab can be used to read out the hardware and software version, the CAN revision and the serial number of the controller. Every time a new hardware version is discovered, the controller-specific SDOs are automatically displayed in the SDO list. This button is also used to check that communication of the PC with the controller is functioning properly.

Procedure

Proceed as follows:

Step	Action
1	Click on the <Refresh Node Info> button.
2	To check the messages of the user interface: • When communication is functioning properly, the hardware and software versions are displayed and the status of the controller is displayed on the status bar. • When communication is faulty, one of the following error messages appears: - "protocol: no answer within timeout" - "bus dead"

4 <Node Configuration> tab

4.1 User interface

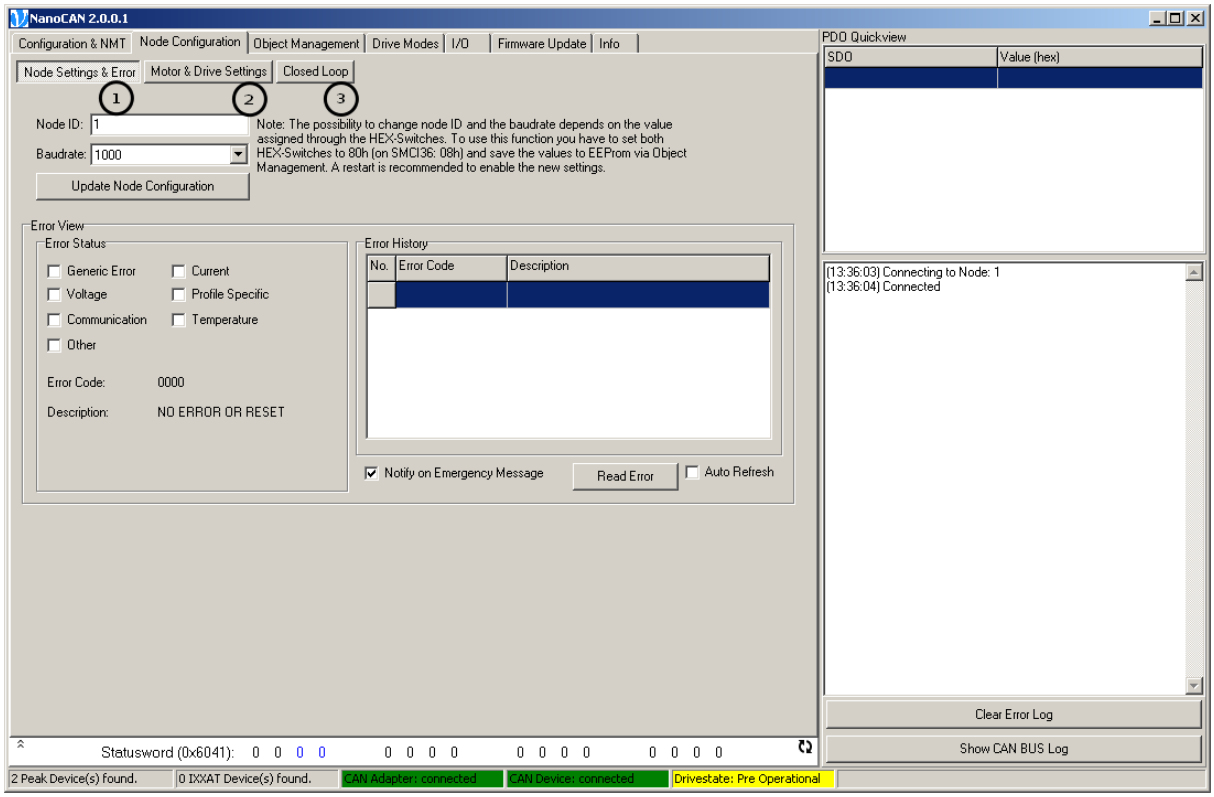
Overview

The <Node Configuration> tab contains three sub-areas that are displayed above the corresponding selection buttons (1) to (3).

The following areas are available:

Area	Function
Node Settings & Error (1)	• Changes the node ID and the baud rate setting of the controller • Displays the current error and the error history
Motor & Drive Settings (2)	Settings of all motor, brake and current parameters
Closed Loop (3)	Settings of the closed loop control parameters

View

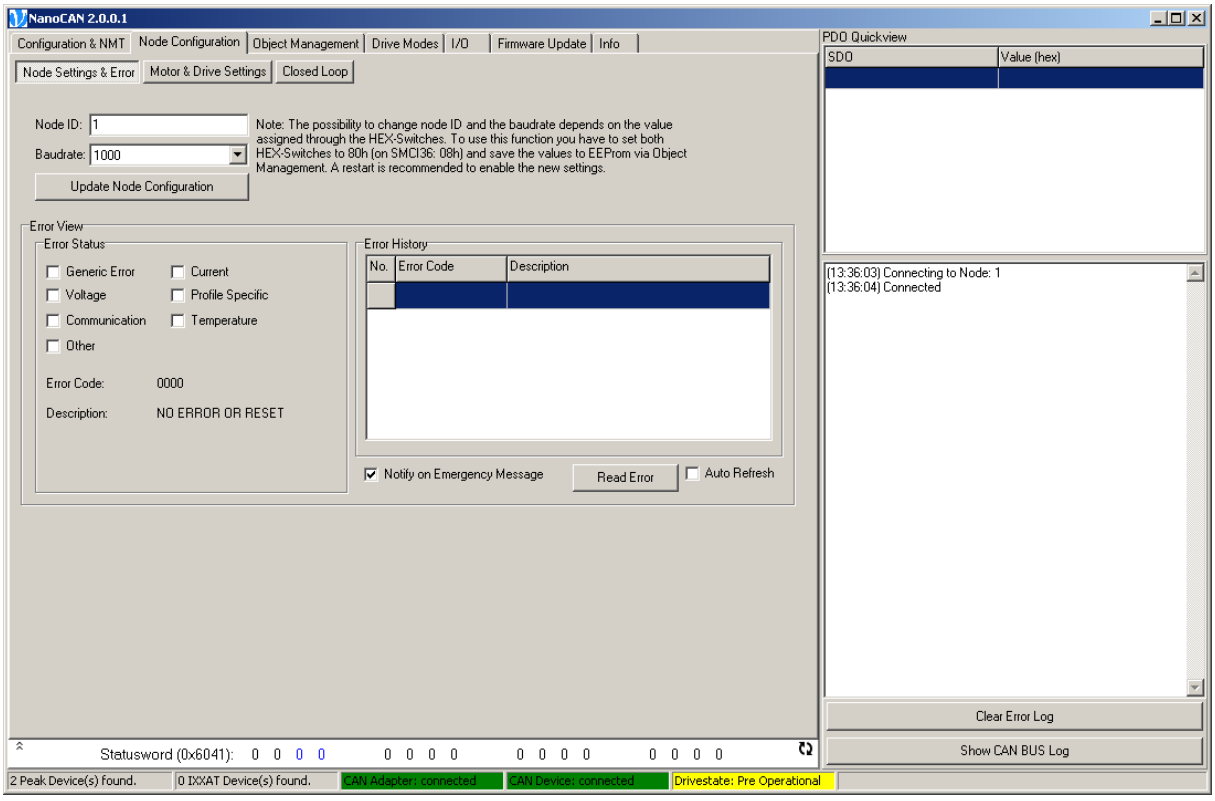


4.2 <Node Settings & Error> area

Overview

The <Node Settings & Error> area provides the possibility of changing the node ID and baud rate of the controller. The current error and the error history are also displayed.

View



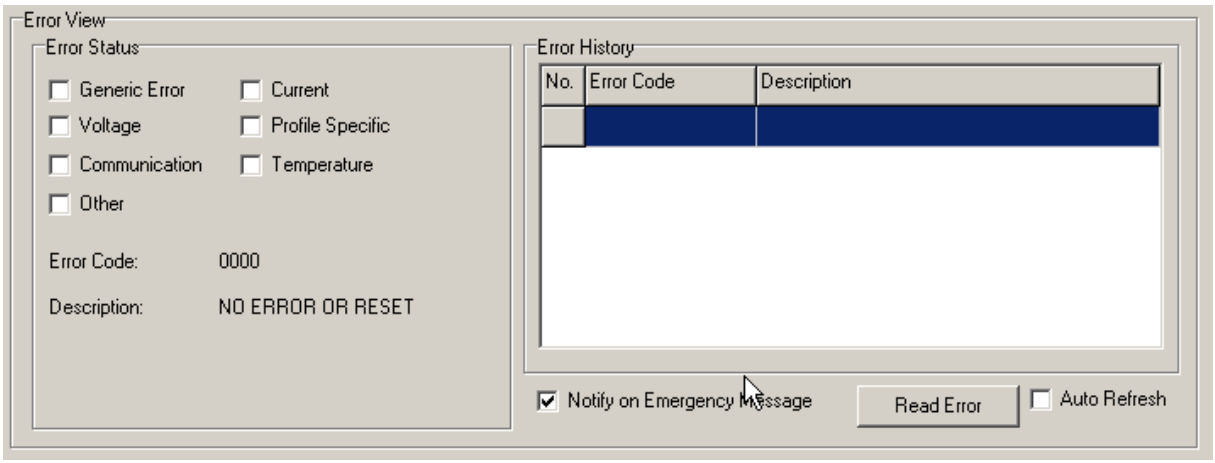
Node ID and baud rate configuration

Proceed as follows:

Step	Action
1	Enter the new node ID in the "Node ID" field.
2	Select the desired baud rate in the "Baudrate" selection field.
3	Click on the <Update Node Configuration> button.
4	On the <Object Management> tab, switch to the <SDO List> area (see Section 5.2 "<SDO List> area").
5	Click on the <Save to EEPROM> button.

Note:
The HEX switches must be set correctly so that the controller applies the set configuration at the next restart. For controllers with two switches, the value is to be set to 80h, and for controllers with one switch as well as for the SMCI36, the value is to be set to 08h.

[Error View] area



Functions

[Error Status] area

The following functions are available in the [Error Status] area:

Field	Function
Error categories	Depending on the error that occurred, a checkmark is set next to the associated category.
"Error Code" display	Display of the error code
"Description" display	Description of the error code

[Error History] area

The right sub-area contains a history of the last five errors that occurred. The error code and a description of the error code are displayed in this list view.

Lower area

The following functions are available in the lower area:

Button/Field	Function
<Notify on Emergency Message> checkbox	Activate or deactivate display of emergency messages. When activated, these messages are displayed in red in the respective log field of NanoCAN.
<Read Error> button	Read out the current status of the controller
<Auto Refresh> checkbox	Activate cyclical reading of the control status

4.3 <Motor & Drive Settings> area

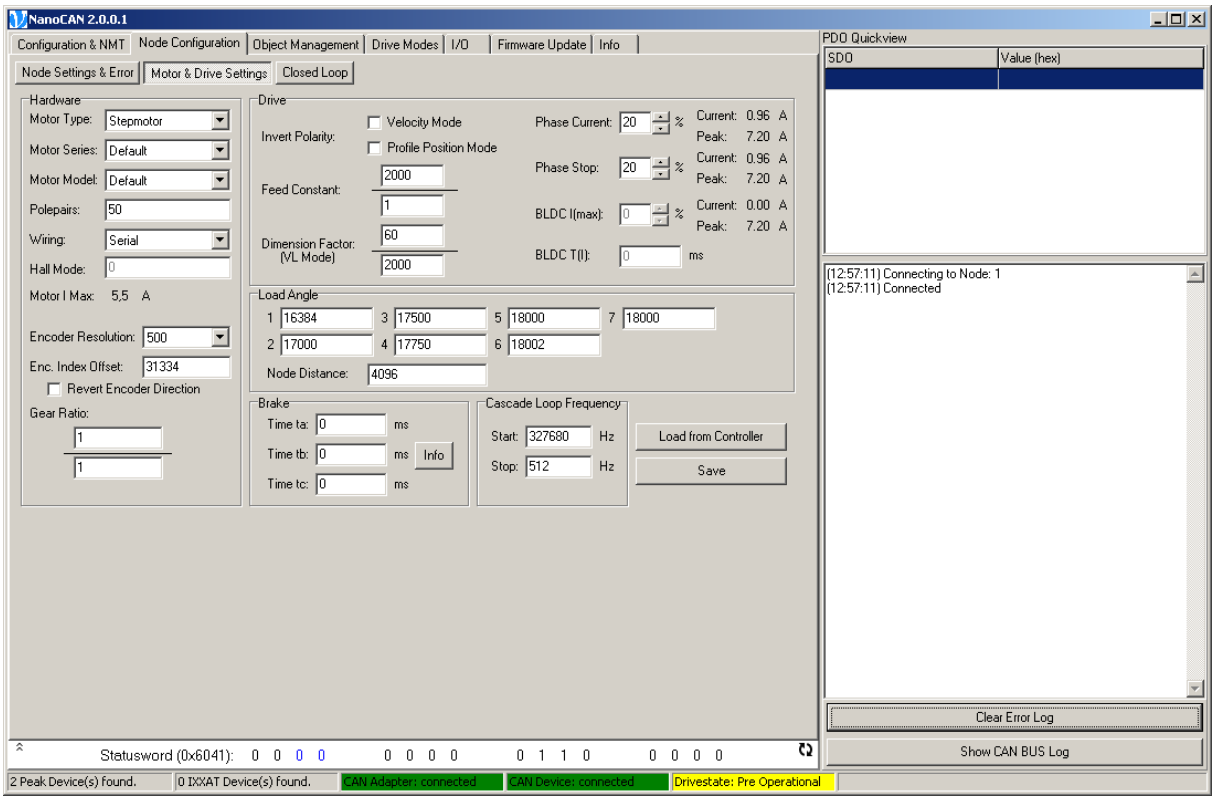
Overview

The <Motor & Drive Settings> area is divided into the following sub-areas:

- [Hardware] area
- [Drive] area
- [Load Angle] area
- [Brake] area
- [Cascade Loop Frequency] area

Note:
Changes to these parameters are only accepted when the controller power section is switched off (<Power Off> under Drive Modes).

View



Functions

[Hardware] area

Note:
The "BLDC" setting under "Motor Type" or "Hall Mode" should only be selected with caution as the motor controller and the stepper motor may become damaged if the "BLDC" setting is accidentally set.

The following functions are available in the [Hardware] area:

Button/Field	Function
"Motor Type" selection field	Selection of the motor type. The following values can be set: • Stepmotor • BLDC • BLDC with encoder
"Motor Series" selection field	Selection of the motor series
"Motor Model" selection field	Selection of the motor model for the series
"Polepairs" input field	Input of the pole pairs
"Wiring" selection field	Selection of the wiring of the motor windings. The following values can be set: • Serial • Parallel **Note:** The type of wiring determines the maximum current for the motor.
"Hall Mode" input field	Input of the Hall configuration. Only activated when "BLDC" or "BLDC with Encoder" is selected as the motor type. For more detailed information, see <Hall Sensor mode> in Nanotec CANopen Reference
"Motor I Max" display	Display of the maximum current of the motor. This depends on the wiring of the motor windings.
"Encoder Resolution" selection field	Selection of the resolution of the encoder (number of encoder strokes)
"Enc. Index Offset" input field	Input of the mechanical offset of the encoder and rotor of the motor. The values range from -32768 to 32767. The default value is 0.
<Revert Encoder Direction> checkbox	Determination of whether the encoder direction should be reversed by software
"Gear Ratio" upper input field	Input of the translation ratio of a gear. The ratio is entered as a fraction.
"Gear Ratio" lower input field	

[Drive] area

The following functions are available in the [Drive] area:

Button/Field	Function
<Invert Polarity> option buttons	Invert the direction of rotation for velocity mode and activate profile position mode
"Feed Constant" upper input field	Input of the feed constant as a fraction. This specifies the number of steps per revolution of the motor shaft.
"Feed Constant" lower input field	
"Dimension Factor" upper input field	Conversion factor as a fraction for the target specifications in the VL Mode for rpm. For further details, see CANopen Reference.
"Dimension Factor" lower input field	
"Phase Current" input field	Input of the current (% of rated current) with which the motor is operated during the drive
"Phase Current – Current" display	Display of the set value (A)
"Phase Current – Peak" display	Display of the maximum configurable value (A)

Button/Field	Function
"Phase Stop" input field	Input of the current (% of rated current) with which the motor is operated at a standstill.
"Phase Stop – Current" display	Display of the set value (A)
"Phase Stop – Peak" display	Display of the maximum configurable value (A)
"BLDC I(max)" input field	Input of the peak current (% of rated current) with which the motor is operated. This field is only available when <BLDC> or <BLDC with Encoder> is selected as the motor type.
"BLDC I(max) – Current" display	Display of the set value (A)
"BLDC I(max) – Peak" display	Display of the maximum configurable value (A)
"BLDC T(I)" input field	Input of the maximum duration (ms) for which the peak current may be present

[Load Angle] area

The following functions are available in the [Load Angle] area:

Button/Field	Function
"1" – "7" input fields	Input of the motor load angle values. The lead values for the magnetic field are entered. The value range for the load angle goes from -32768 to 32767 (corresponds to -180° to +180°). Default values differ according to the motor type. The value 65536 = 2^{16} for the load angle value corresponds to 360°.
"Node Distance" input field	Input of the distances of the individual load angle, where the value 8192 corresponds to 1000 revolutions per minute

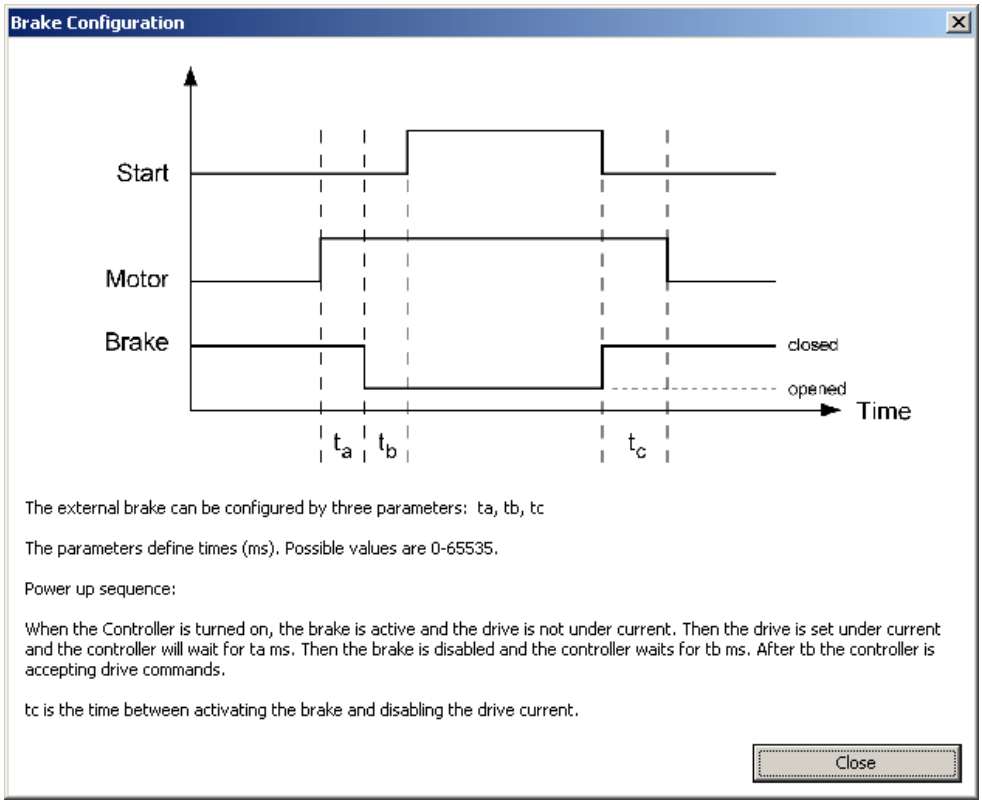
[Brake] area

The following functions are available in the [Brake] area:

Button/Field	Function
"Time ta" input field	Input of the time (ms) between switching on the motor current and releasing the brake
"Time tb" input field	Input of the time (ms) between releasing the brake and accepting of drive commands by the controller
"Time tc" input field	Input of the time (ms) between activating the brake and switching off the motor current
<Info> button	Calling up of a dialog box in which the three times for setting the brake are described in detail

"Brake Configuration" dialog box

The following dialog box can be opened with the <Info> button:



The external brake can be configured by means of the three ta, tb and tc parameters.

These three parameters define times in milliseconds where the range of values lies between 0 and 65535.

When the controller is switched on, the brake is active and the motor is de-energized. In the next step, the motor current is switched on and the controller waits ta milliseconds before the brake is released. tb milliseconds after releasing the brake, the controller accepts move commands.

The time between activating the brake and switching off the motor current is described by tc.

Note:
The brake is not activated during the current reduction.

[Cascade Loop Frequency] area

The following functions are available in the [Cascade Loop Frequency] area:

Button/Field	Function
"Start" input field	Input of the cascade controller start frequency (Hz)
"Stop" input field	Input of the cascade controller stop frequency (Hz)

The cascade controller comprises two control loops:

- Inner control loop which controls the speed
- Outer control loop which controls the position

The outer control loop does not directly control the motor current, but the setpoint (set speed) of the inner control loop.

Buttons

There are two buttons available for the following functions:

Button	Function
<Load from Controller> button	Reading of parameters from the controller
<Save> button	Transmits the settings to the controller

Note:
The values are only transferred to the controller by clicking on the <Save> button. The values can be read from the controller again by means of <Load from Controller>.

4.4 <Closed Loop> area

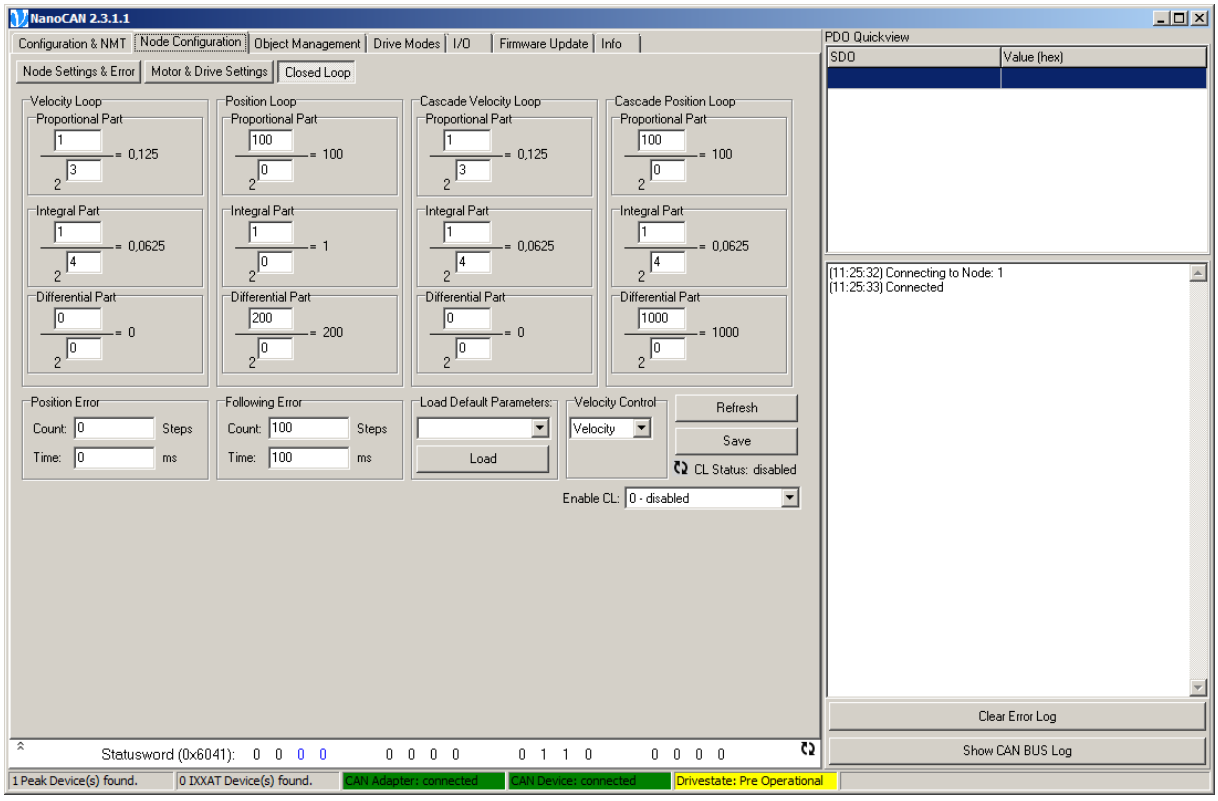
Overview

In the <Closed Loop> area the control parameters of the Closed Loop mode of the controller can be configured. Each control loop has its own setting field. The parameters for Position Error and Following Error can also be specified.

The <Closed Loop> area is divided into the following sub-areas:

- Closed loop control parameters
  - [Velocity Loop] area
  - [Position Loop] area
  - [Cascade Velocity Loop] area
  - [Cascade Position Loop] area
- [Position Error] area
- [Following Error] area
- [Load Default Parameters] area
- [Velocity Control] area

View



Description

Closed loop control parameters

The PID control parameters can be specified for each of the four available control loops. Each of the three control parameters are calculated according to the following formula:

W = (numerator / 2^variable)

where W is the value which is displayed next to the input fields.

The numerator can accept values from 0 to 65535.

The denominator is saved as a power of two and therefore only values from 0 to 15 are allowed as a variable.

[Position Error] area

The following functions are available in the [Position Error] area:

Button/Field	Function
"Count" input field	Input of a symmetrical range relative to the target position within which the target is considered as reached
"Time" input field	Input of the time (ms) during which the position must be within the above-specified tolerance range to be considered as reached

[Following Error] area

The following functions are available in the [Following Error] area:

Button/Field	Function
"Count" input field	Input of the maximum position error symmetrical to the set position
"Time" input field	Input of the time (ms) after which a "Following Error" is triggered when the maximum position error is exceeded

[Load Default Parameters] area

The following functions are available in the [Load Default Parameters] area:

Button/Field	Function
<Load Default Parameters> selection field	Selection of the corresponding motor series for which the PID control parameters of the closed loop controller should be set to default values
<Load> button	Loading of the default values of the closed loop controller of the selected motor series

[Velocity Control] area

The following functions are available in the [Velocity Control] area:

Button/Field	Function
<Velocity Control> selection field	Selection of the controller type in velocity mode: • Velocity • Position Note: In some cases, better results can be achieved with "Position" at lower speeds.

Selection list "Enable CL"

The selection list can be used to define the closed loop status. After the closed loop status changes, it is immediately written to the motor controller but not into the EEPROM.

Buttons

There are two buttons available for the following functions:

Button	Function
<Refresh> button	Reading of the PID control parameters from the controller
<Save> button	Transmits the settings to the controller

Note:
The values are only transferred to the controller by clicking on the <Save> button. The values can be read from the controller again by means of <Refresh>.

5 <Object Management> tab

5.1 User interface

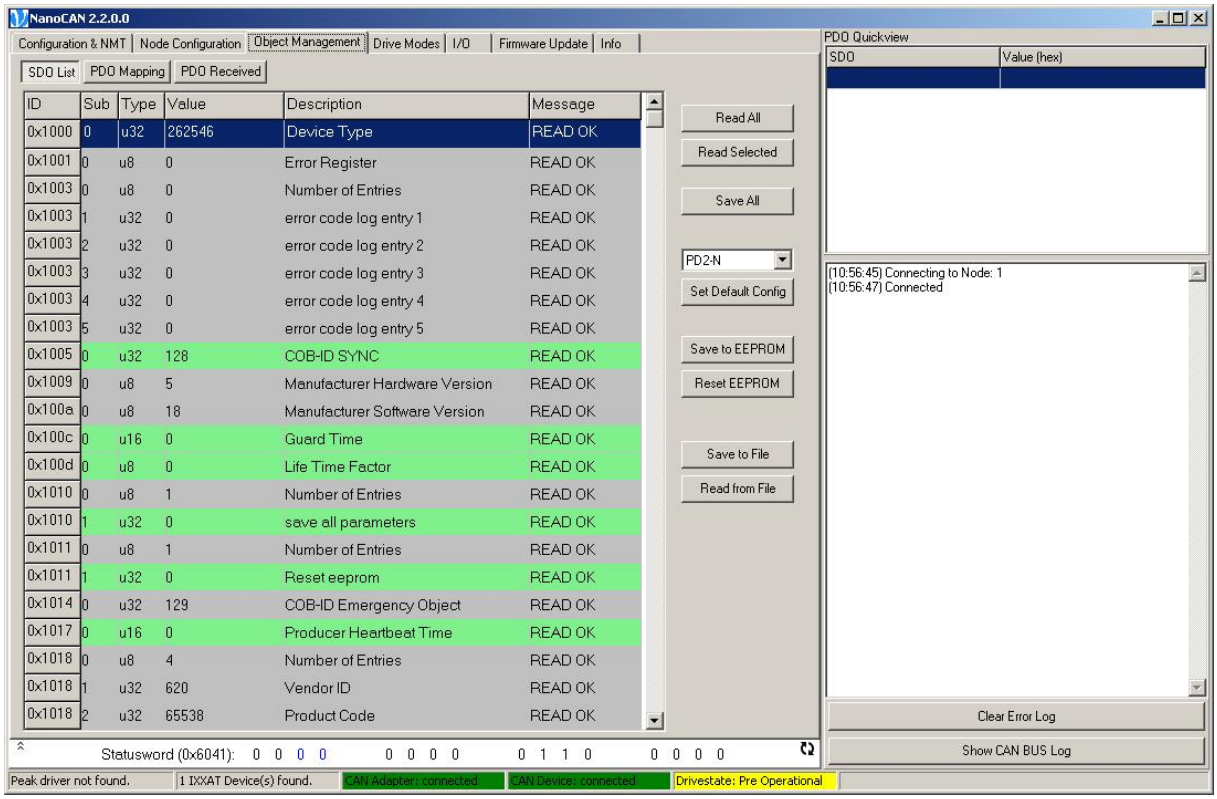
Overview

The <Object Management> tab contains three sub-areas which are displayed above the corresponding selection buttons.

The following areas are available:

Area	Function
SDO List	Overview of all CAN objects of the controller and the possibility of changing the values of these objects
PDO Mapping	This is used for the configuration of PDOs for the controller
PDO Received	Settings in order to be able to display TxPDOs in the Quickview area

View



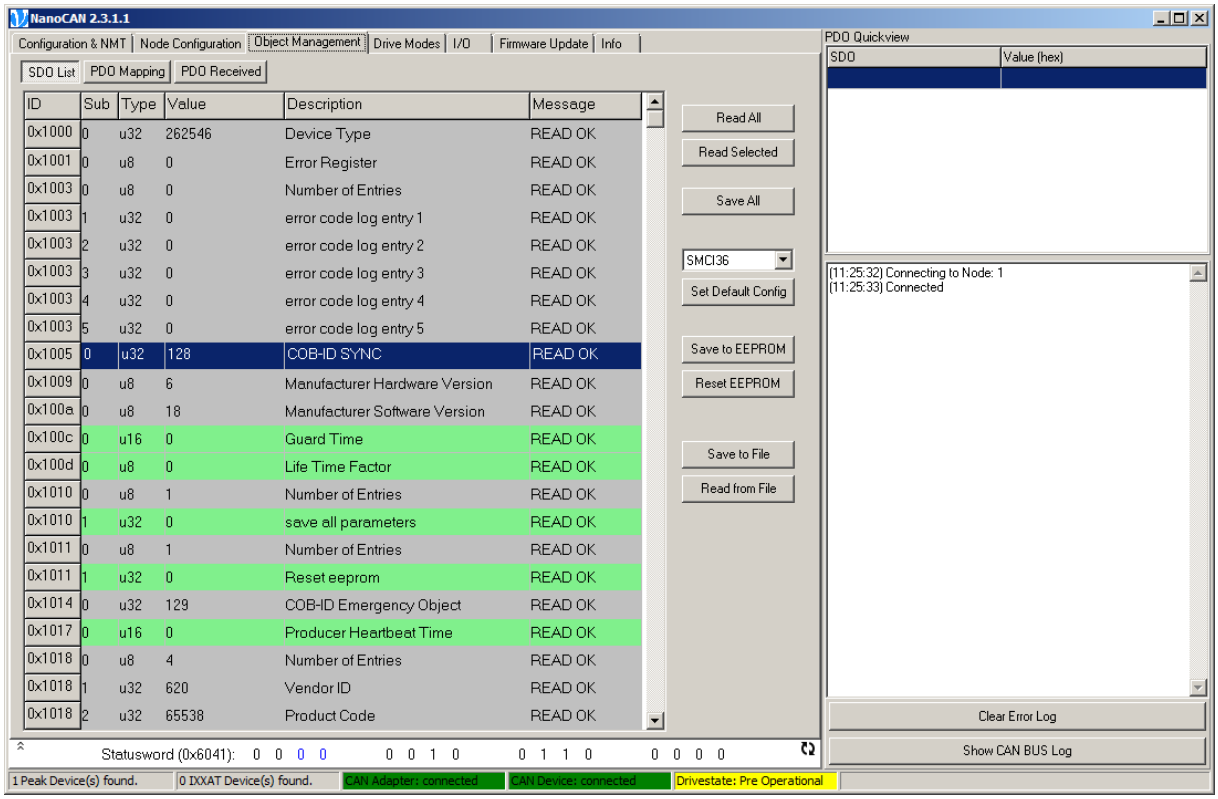
5.2 <SDO List> area

Overview

The buttons in the <SDO List> area can be used to read and write the service data objects (SDOs) of the controller.

More detailed information on Service Data Objects can be found in the Nanotec CANopen reference.

View



List window

The list window contains one row for each existing SDO, and if there are multiple sub-indices, one row per sub-index.

The list window consists of the following columns:

Column	Contents
ID	Address of the service data object
Sub	Sub Index
Type	Data type
Value	Current value of the SDO
Description	Brief description of the SDO
Message	Messages • READ OK — Objects could be read out successfully • WRITE OK — Objects could be written successfully • SKIPPED — Object was skipped during the last operation • Other messages: exact error message (drag the column wider)

The different colours in the list window indicate whether an object can only be read (grey) or also written (green).

Buttons

The following buttons are located to the right of the list window:

Button	Function
Read All	Reads all SDOs from the controller
Read Selected	Reads the SDO selected in the list field from the controller
Save All	Writes all SDOs to the controller
Motor controller selection list	Contains a list with the XML files of available motor controllers that contain the default values for the respective motor controller. If a motor controller is selected here, the default values of this XML file are displayed in the SDO list as a preview but are not yet transferred to the motor controller. The values are transferred to the motor controller by pressing the <Set Default Config> button.
Set Default Config	Sets some SDOs back to their controller-specific default values. The motor controller is defined by the selection list.
Save to EEPROM	Writes the current values existing in the controller to the EEPROM of the controller. (Changes that are not saved are lost after a restart of the controller.)
Reset EEPROM	Resets some SDOs to their default values and writes all values into the EEPROM of the controller.
Save to File	Saves the current configuration as a file
Read from File	Loads a configuration from a file

Selection field

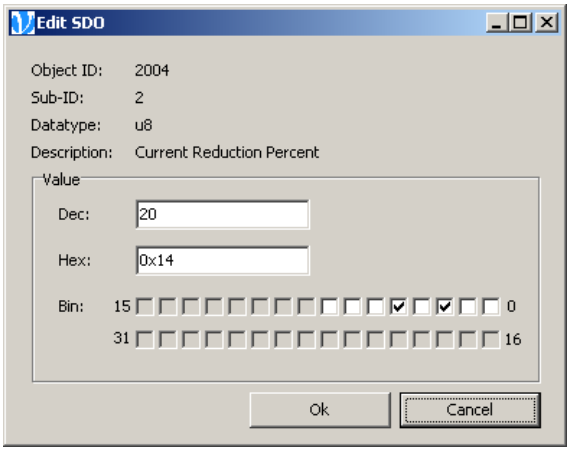
The selection field is used to select the SDO configuration (objects and default values) of a certain controller type.

The configuration is automatically set by NanoCAN on the basis of the existing controller type while the entire controller configuration is being read out.

By selecting a certain controller type and clicking on the <Save All> button, the selected default configuration is written to the current motor controller.

Changing values of an SDO

Proceed as follows:

Step	Action
1	Double-click on the object to be changed. The "Edit SDO" window is opened:  The object data are displayed in the upper area.

Step	Action
2	Enter the value as follows: • Decimal in the "Dec" input field or • Hexadecimal in the "Hex" input field or • Bits of the value via the <Bin> checkboxes
3	**Attention:** As soon as the <Ok> button is clicked, the values are immediately written to the controller. Click on <Ok>. The values are written to the controller.

5.3 <PDO Mapping> area

5.3.1 General information

Purpose of the PDOs

Process data objects (PDOs) are used to transfer objects that frequently need to be updated while the controller is running. For example, this is useful for the "Position Actual Value" object.

Advantages of PDOs

PDOs have the following advantages compared to SDOs:

- Higher and adjustable priority
- Low overhead
- Additional functions, such as "Automatic sending upon change" or "Cyclical sending"

The higher priority and the low overhead of the PDOs result because the corresponding objects from the object directory are allocated to a CAN object with a certain COB ID without use of the SDO protocol. These allocations are set during the PDO mapping.

Receive and transmit PDOs

PDOs can be differentiated into receive PDOs (RPDO) and transmit PDOs (TPDO):

- RPDOs are received by the controller and the received data are used in the set objects.
- TPDOs are transmitted by the controller in certain (adjustable) situations.

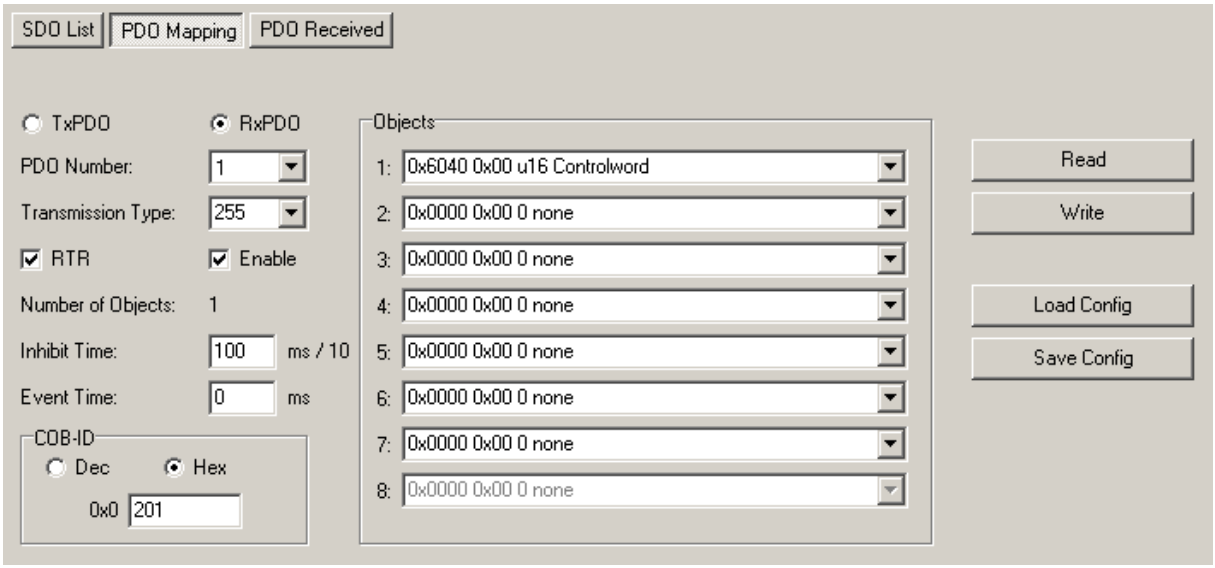
5.3.2 PDO mapping

Overview

Process data objects can be mapped via the <PDO Mapping> area.

More detailed information on this can be found in the Nanotec CANopen reference.

View



Functions

The following functions are available in the <PDO Mapping> area:

Button/Field	Function
<TxPDO>/<RxPDO> option buttons	Selection of the PDO type: • TxPDO = transmit PDO • RxPDO = receive PDO
"PDO Number" selection field	Selection of the PDO object to be mapped. Four PDOs can be mapped for each PDO type.
"Transmission Type" selection field	Setting of the transmission mode: • asynchronous = the data are sent immediately • synchronous = the data are sent after a sync object Applies to: • RxPDOs – 0 – 240: synchronous – 255: asynchronous • TxPDOs – 0: synchronous after change – 1 – 240: synchronous for each 1 - 240 sync object – 255: asynchronous
<RTR> checkbox	Activation/deactivation of the Remote Transmission Request (RTR). When the checkbox is activated, a configured PDO is sent on request.
<Enable> checkbox	Activation/deactivation of the PDO mapping of the selected PDO
"Number of Objects" display	Display of the number of selected objects in the Objects field

Button/Field	Function
"Inhibit Time" input field	Input of the Inhibit Time (in ms *0.1) When transmission type 255 is used, this value indicates the minimum time between the transmission of two consecutive objects in 100µs steps. For example, this can prevent the current position which changes continuously during travel from blocking the CAN bus.
"Event Time" input field	Input of the Event Time (in ms) When transmission type 255 is used, this value indicates the maximum time between two transmitted objects of the same type in ms steps. This setting can be used to cyclically send objects that rarely change. A value of "0" deactivates this behaviour (default).
[COB-ID] area <Dec>/<Hex> option buttons	Selection of the input type for the "0x0" input field: • Dec – decimal • Hex – hexadecimal
Input field "0x0"	Input of the CAN object identifier (COB-ID) as a decimal or hexadecimal number **Notes:** • The COB-ID is assigned for the actual mapping. • Each COB-ID may only be assigned once. The smaller the COB-ID, the higher the priority on the CAN bus.
[Objects] area	Selection of the objects to be mapped. A maximum of 64 bits can be transferred, e.g. 2x 32 bits (e.g. pos demand + pos actual value) or 4x 16 bits, etc.
<Read> button	Read the settings from the controller
<Write> button	Write the settings into the controller
<Load Config> button	Load the settings from a file or preset
<Save Config> button	Save the settings to a file

Mapping of PDOs

Proceed as follows to map the RPDOs and TPDOs:

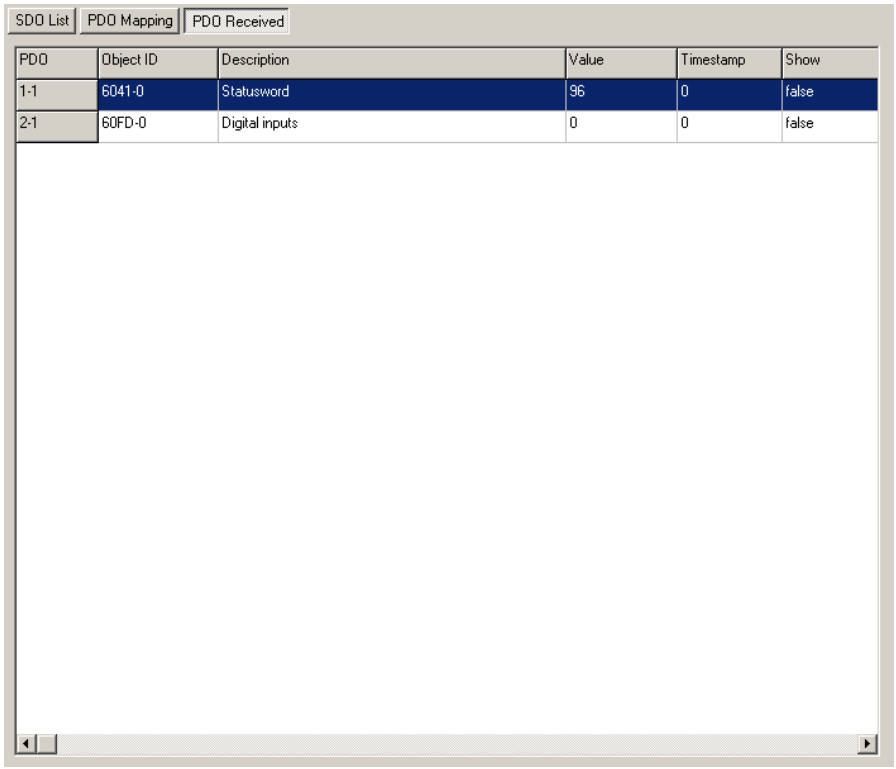
Step	Action
1	Put the controller into the "Pre-operational" status (see Section 3.3 "Network Management").
2	Change the PDOs or remap them.
3	Click on the <Write> button. The settings are written to the controller. The PDO is mapped automatically (all necessary transitions of the state machine according to the CANopen reference are executed).
4	On the <SDO List> tab, click on the <Save to EEPROM> button. The PDO is retained even after a reset.
5	Put the controller into the "Operational" status (see Section 3.3 "Network Management"), in order to be able to receive PDOs.

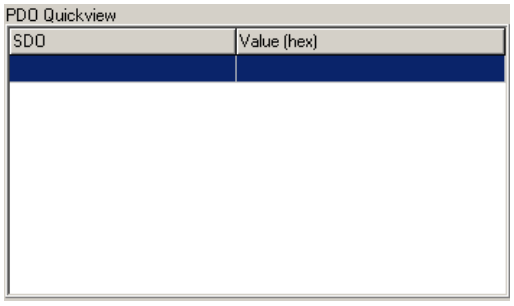
5.4 <PDO Received> area

Overview

The <PDO Received> area is used for the configuration of the PDO Quickview. The PDO Quickview can display TxPDOs which the controller sends and automatically update their values. This is used to keep special values always in view.

View





Functions

The following list elements are available in the <PDO Received> area:

Button/Field	Function
PDO	PDO number and object index within the PDOs separated by "–"
Object ID	Object address and sub-index of the mapped object separated by "–"
Description	Description of the mapped object
Value	Current value of the mapped object
Timestamp	Timestamp when a PDO was last received
Show	• true: is displayed in the PDO Quickview • false: is not displayed in the PDO Quickview

PDO Quickview

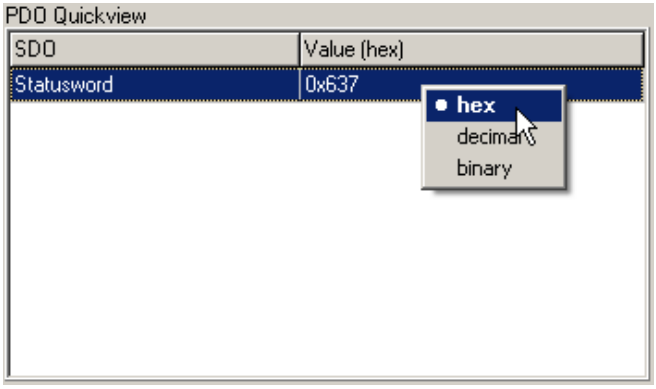
Overview

The number system can be configured to meet own requirements by using a context menu or shortcut key. The focus must be on the PDO Quickview window to make settings using a shortcut key. The following options are available:

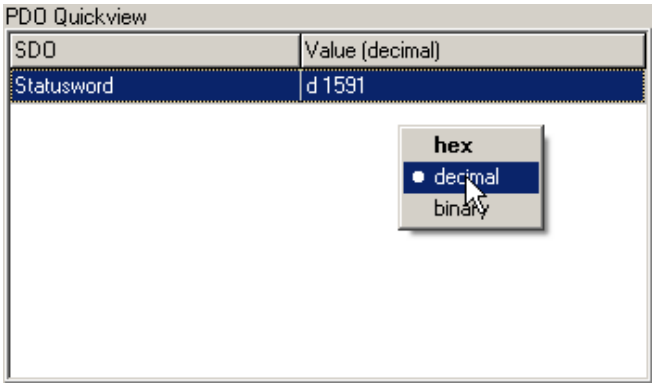
Type	Context menu	Shortcut key
Hexadecimal	hex	h
Decimal	decimal	d
Binary	binary	b

View

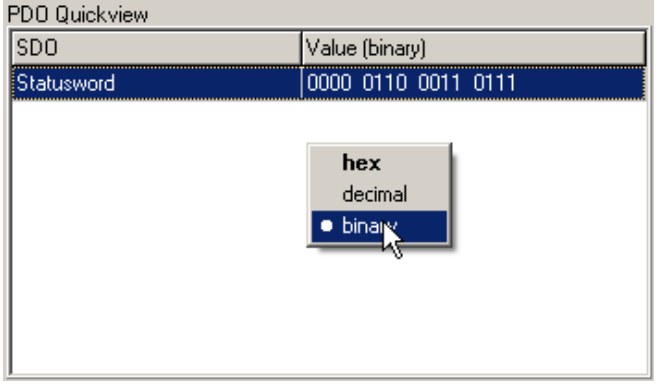
Hexadecimal



Decimal



Binary



Configuration

Proceed as follows:

Step	Action
1	Double-click on an object in the <PDO Received> list area. • If "false" was displayed beforehand in the "Show" column displayed, the object is now displayed in the PDO Quickview. "true" is then displayed in the "Show" column. • If "true" was displayed in the "Show" column "true" beforehand, the object is now deleted from the PDO Quickview. "false" is then displayed in the "Show" column.

6 <Drive Modes> tab

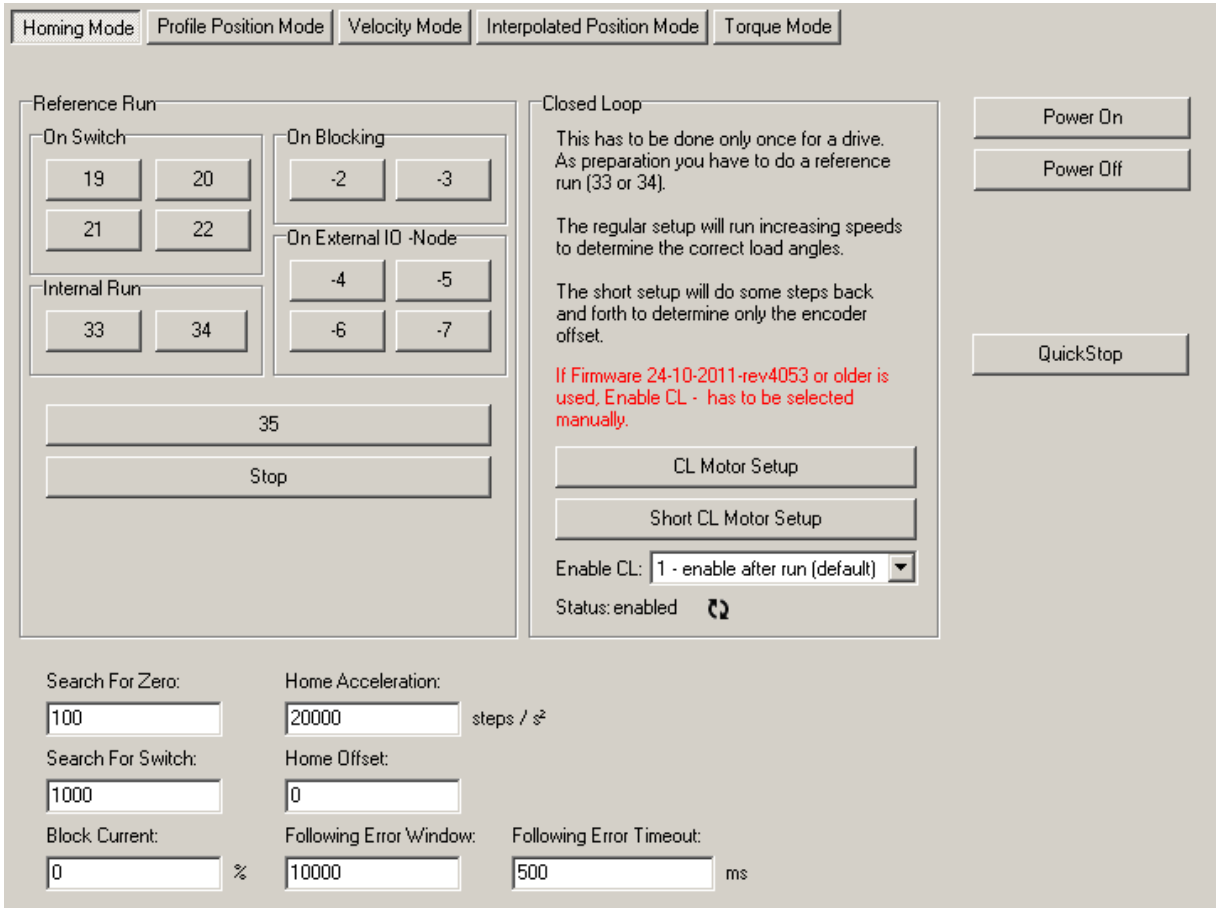
6.1 General functions

Overview

The connected motor can be operated in various operation modes:

- <Homing Mode>: reference run
- <Profile Position Mode>: positioning mode
- <Velocity Mode>: velocity mode
- <Interpolated Position Mode>: interpolated position mode
- <Torque Mode>: torque mode

View



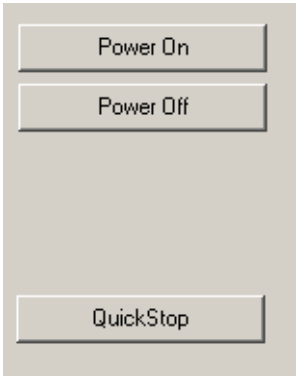
Activating the operation mode

Proceed as follows:

Step	Action
1	Click on one of the <Homing Mode>, <Profile Position Mode>, <Velocity Mode>, <Interpolated Position Mode> or <Torque Mode> areas. The corresponding SDO is immediately written to the controller in order to activate the selected mode.

Functions for all operation modes

The following functions are available in all operation modes:



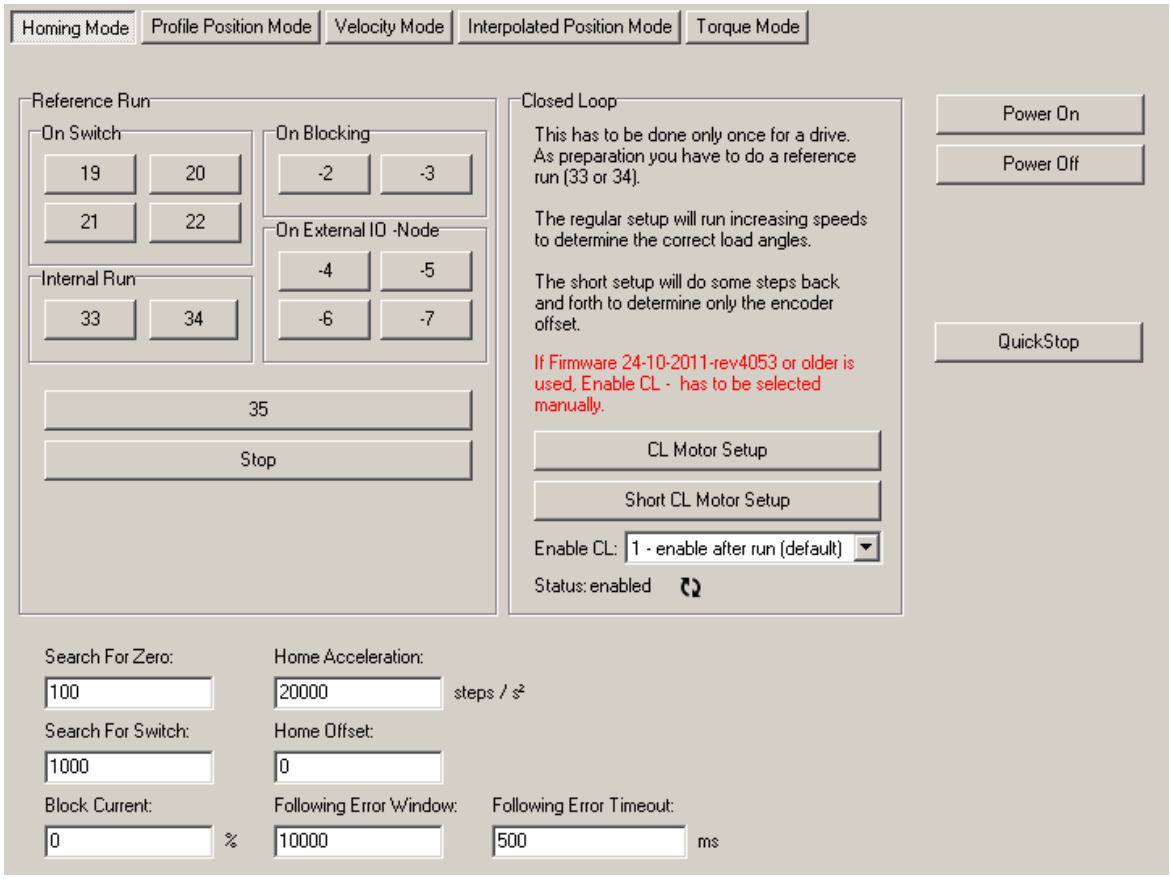
Button/Display	Function
<Power On>	Switch on the power section of the controller
<Power Off>	Switch off the power section of the controller
<QuickStop>	Carries out emergency braking with the quick stop ramp selected in the active mode.

6.2 <Homing Mode> area

Overview

The various reference runs can be performed via the <Homing Mode> area. More detailed information on reference runs can be found in the Nanotec CANopen reference.

View



Functions

The following functions are available in the <Homing Mode> area:

Button/Field	Function
Buttons in the [Reference Run] area	Selection of the reference run and starting at the same time. See Section "reference run ". **Note:** The motor must be switched on first.
<Stop> button	Interruption of the reference run
<CL Motor Setup> button	Carrying out a closed loop calibration run. This requires the controller to have been referenced (Homing attained) and the "Enable CL" object is set not equal to 0. **Note:** Communication with the controller is not possible during the closed loop calibration run. This means that the move cannot be deactivated by <QuickStop> or <Power Off>!
<Short CL Motor Setup> button	Carrying out a short closed loop calibration run (load angle values are not determined here, only the encoder offset)
"Enable CL" selection field	Method of activating the closed loop mode
"Status" display	Displays the momentary closed loop status. Can be updated by the double arrow symbol next to the display.

Button/Field	Function
"Search For Zero" input field	Input of the speed for the search for the reference position
"Home Acceleration" input field	Input of the acceleration ramp for the reference drive
"Search For Switch" input field	Input of the speed for the search for the switch **Note:** The value must be greater than the speed for the reference position.
"Home Offset" input field	Input of the reference position offset
"Block Current" input field	Input of the current in %, which should be used for the reference run (if 0 is specified, the normal current of the run is used)
"Following Error Window" input field	Input of the maximum position error symmetrical to the set position. The maximum deviation within the configurable time must lie above the set error limit before a following error is triggered.
"Following Error Timeout" input field	

Notes:
The ramp is used when starting off and also when braking. When the switch is reached, braking is carried out using the set ramp and movement is carried out freely or to the end position with the lower speed. When the ramp is flat it is possible that the switch is firstly overrun and the actual destination point is only moved to afterwards.

For the <CL Motor Setup> and <Short CL Motor Setup> functions, it is necessary for an encoder to be connected and correctly configured.

Method of activating the closed loop mode / "Enable CL" selection field

When the value is set to '1', '2' or '3', the firmware is instructed to activate the control loop. However, this is only activated when certain prerequisites are fulfilled:

Value	Activation of the closed loop
0	Immediate deactivation of the control loop
1	As soon as the encoder index has been recognized and the controller is again in the ready status (after the move during which the index was recognized)
2	As soon as the encoder index has been recognized (after the move during which the index was recognized)
3	As soon as a short CL calibration run has been carried out (Short CL Motor Setup – SDO 0x6060 = -2)

Selecting and starting a **reference run**

The following reference runs are selected and started using the buttons in the [Reference Run] area:

Mode 19: External reference travel – switch as normally closed

- Search of the switch
- Motor rotates in a clockwise direction
- Speed from object 0x6099:1 (Search for switch)
- As long as input 6 is high
- As soon as input 6 becomes low (switch reached) the direction is reversed
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until input 6 is high again (switch free again)
- Motor stops

Mode 20: External reference travel – switch as normally open

- Search of the switch
- Motor rotates in a clockwise direction
- Speed from object 0x6099:1 (Search for switch)
- As long as input 6 is low
- When the switch is reached (input 6 high), the direction is reversed
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until input 6 becomes low again
- Motor stops

Mode 21: External reference travel – switch as normally closed

- Search of the switch
- Motor rotates in a clockwise direction
- Speed from object 0x6099:1 (Search for switch)
- As long as input 6 is high
- When the switch is reached (input 6 low), the direction is reversed
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until input 6 becomes high again
- Motor stops

Mode 22: External reference travel – switch as normally open

- Search of the switch
- Motor rotates in a clockwise direction
- Speed from object 0x6099:1 (Search for switch)
- As long as input 6 is low
- When the switch is reached (input 6 high), the direction is reversed
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until input 6 becomes low again
- Motor stops

Mode 33: Internal reference run

- Search for the index mark of the internal encoder
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until index mark is reached
- When the index mark is reached, the direction is reversed
- Motor rotates in a clockwise direction
- Motor shuts down as of the index mark
- Motor stops

Mode 34: Internal reference run

- Search for the index mark of the internal encoder
- Motor rotates in a clockwise direction
- Speed from object 0x6099:2 (Search for zero)
- Until the index mark is reached
- When the index mark is reached, the direction is reversed
- Motor rotates in a clockwise direction
- Motor shuts down as of the index mark
- Motor stops

Mode 35: Position Reset

- Sets the current position to home offset without the shaft moving

Mode -2: Reference run set to blocking

- Mode only functions with an encoder (OL and CL)
- First run: Motor rotates in a clockwise direction with speed from object 0x6099_1 (Search for switch) until the shaft is blocked. The "Following Error Window" and "Following Error Timeout" objects are evaluated here.
- Motor moves backwards by one electrical revolution
- Second run: Motor rotates in a clockwise direction with speed from object 0x6099_2 (Search for zero) until the shaft is blocked. The "Following Error Window" and "Following Error Timeout" objects are evaluated here.
- Motor moves backwards by one electrical revolution
- Motor moves to precisely the blocked position of the second run and sets the position to "Home Offset"

Mode -3: Reference run set to blocking

- Like Mode -2, only counter-clockwise

Mode -4: Reference run to external IO node

- Like Mode 19, only instead of input 6 an external IO node is used as the limit switch (see also SDO 0x2010)

Mode -5: Reference run to external IO node

- Like Mode 20, only instead of input 6 an external IO node is used as the limit switch (see also SDO 0x2010)

Mode -6: Reference run to external IO node

- Like Mode 21, only instead of input 6 an external IO node is used as the limit switch (see also SDO 0x2010)

Mode -7: Reference run to external IO node

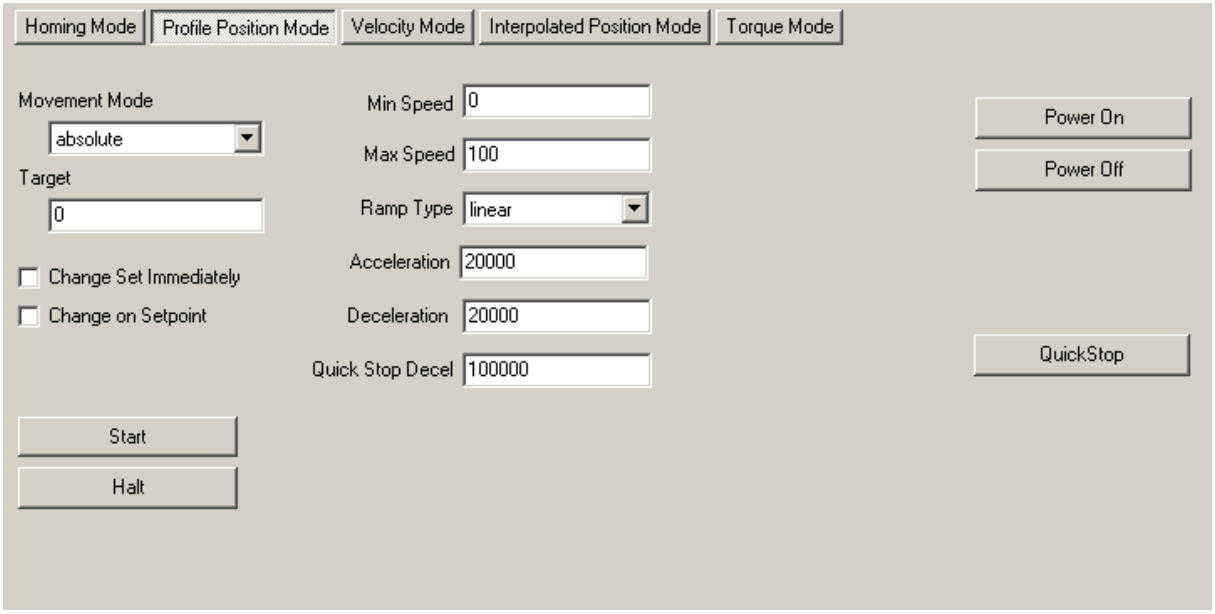
- Like Mode 22, only instead of input 6 an external IO node is used as the limit switch (see also SDO 0x2010)

6.3 <Profile Position Mode> area

Overview

The motor can be operated in position mode via the <Profile Position Mode> area.

View



Functions

The following functions are available in the <Profile Position Mode> area:

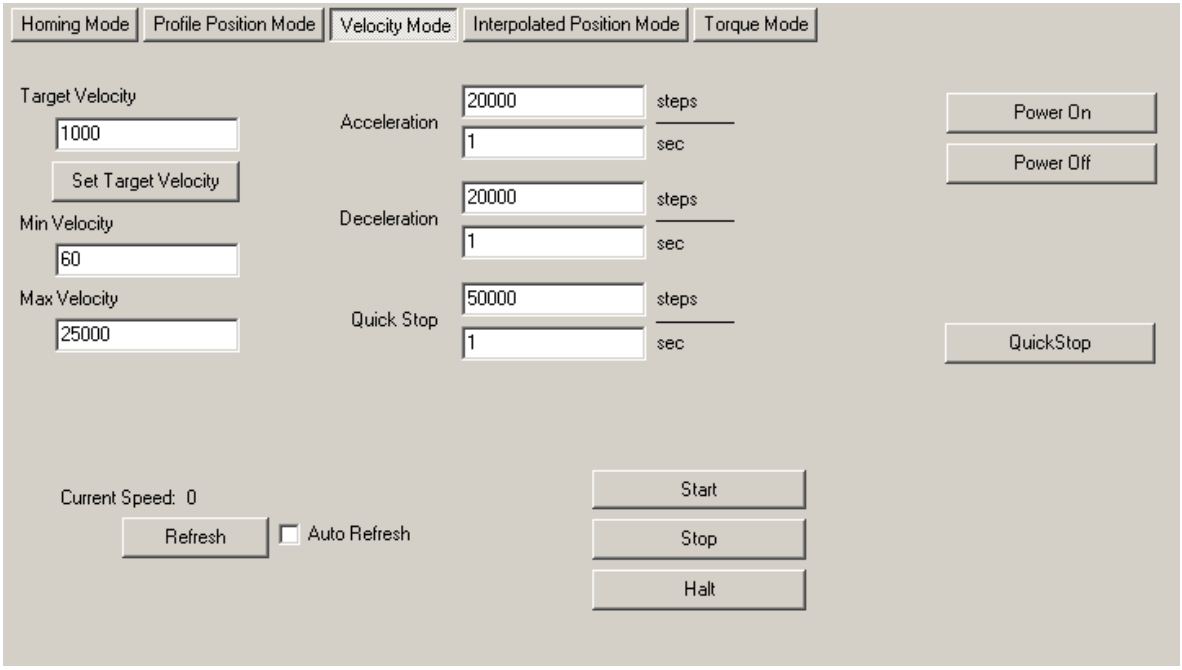
Button/Field	Function
"Movement Mode" selection field	Selection of the positioning type (absolute or relative to the current position)
"Target" input field	Input of the move destination. With a relative move, the sign of the value determines the direction of rotation.
<Change Set Immediately> checkbox	If the checkbox is activated, an activated run command is executed immediately, even if the current run command is not yet finished.
<Change on Setpoint> checkbox	If the checkbox is activated, the speed is only changed upon reaching the first destination position. Before the first destination is reached, braking is not performed since the motor should not stop at this position.
<Start> button	Starts the move
<Halt> button	• Set the motor stop (with the ramp setting in each case) • Reset the motor stop if the motor has not yet come to a halt
"Min Speed" input field	Input of the start speed of the move order
"Max Speed" input field	Input of the maximum speed of the move order
"Ramp Type" selection field	Selection of the acceleration and braking ramp type (trapezoidal, sinus or jerk-free)
"Acceleration" input field	Input of the acceleration ramp slope
"Deceleration" input field	Input of the braking ramp slope
"Quick Stop Decel" input field	Input of the braking ramp for emergency stop

6.4 <Velocity Mode> area

Overview

The motor can be operated in the velocity mode via the <Velocity Mode> area.

View



Functions

The following functions are available in the <Velocity Mode> area:

Button/Field	Function
"Target Velocity" input field	Input of the target velocity to be reached. A negative value changes the direction of rotation of the motor.
<Set Target Velocity> button	Change the set target velocity while the motor is rotating.
"Min Velocity" input field	Input of the minimum speed
"Max Velocity" input field	Input of the maximum speed **Note:** If a higher rpm is entered than the target rpm, the target rpm is set to the maximum rpm.
"Acceleration" input field	Input of the acceleration ramp (in X steps per Y seconds)
"Deceleration" input field	Input of the braking ramp (in X steps per Y seconds)
"Quick Stop" input field	Input of the acceleration ramp for the emergency stop (in X steps per Y seconds)
"Current Speed" display	Display of the current speed. This function can only be used in closed loop mode.
<Refresh> button	Reads the current speed from the controller and display the value read under "Current Speed"
<Auto Refresh> checkbox	Continuously updates the speed display
<Start> button	Starts the motor
<Stop> button	Stops the motor
<Halt> button	• Set the motor stop (with the ramp setting in each case) • Reset the motor stop if the motor has not yet come to a halt

Note on closed loop mode:
If the motor does not respond to the start command, the set final speed is not reached or if a drive continues to rotate after a stop, this indicates that the CL parameters are not set correctly.
In such a case, check the PID parameters and the load angle values.

6.5 <Interpolated Position Mode> area

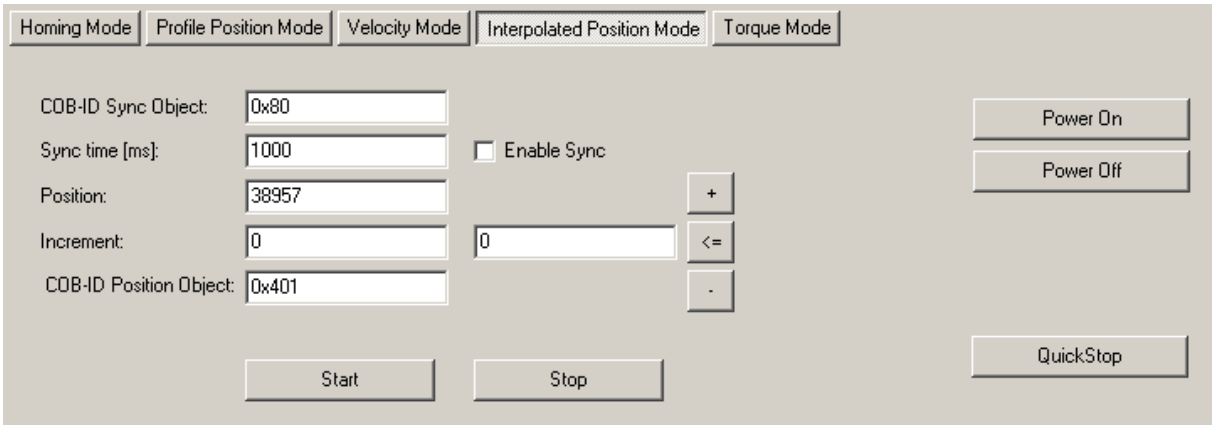
Overview

The <Interpolated Position Mode> area is used to test the interpolated position mode: the controller moves to predefined PDO positions within the synchronization period.

Requirements

In order to use the tab, an RxPDO in the motor controller must be mapped to object "0x60C1 Sub Index 0x01 <1st set-point>". This COB ID must be entered in the "COB ID Position Object" field.

View



Functions

The following functions are available in the <Interpolated Position Mode> area:

Button/Field	Function
"COB-ID Sync Object" input field	Input of the ID of the sync object. By default, this object is set to COB-ID 0x80 and should not be changed.
"Sync time [ms]" input field	Input of the time in ms with which the sync object is sent. This time should be between 100 and 1000 ms.
"Position" input field	Input of the current target position to which the controller is to move
"Increment" input field	Left field: Position change per sync (speed) Right field and +, <=, – buttons: Specifically changes the increment (= speed change): • <= adopts the value from the right field in the left field • +/– increases/decreases the increment by the value shown in the right field
"COB-ID Position Object" input field	Input of the COB-ID of the mapped Rx-PDO; see above
<Enable Sync> checkbox	Activation/Deactivation of the transmission of sync messages
<Start> / <Stop> buttons	Starting/Stopping of the motor

Starting the Interpolated Position Mode

Proceed as follows:

Step	Action
1	Map object 0x60C1 Sub Index 1 (1st set-point) as synchronous Rx PDO. **Note:** This mapped PDO must be the first object in the list in NanoCAN. No other object must be mapped in front of it. Enter the desired value in the "Sync time [ms]" field.
2	Put the controller into the "Operational" status (see Section 3.3 "Network Management").
3	Switch on the power section with <Power On>.
4	Input the mapped PDO in the "COB-ID Position Object" field.
5	Activate the <Enable Sync> checkbox. Sync messages are transmitted.
6	Click on the <Start> button. The controller adopts the predefined position.
7	Enter the desired value in the "Increment" field.
8	The motor travels at a constant speed.

Stopping the Interpolated Position Mode

Proceed as follows:

Step	Action
1	Set the value in the "Increment” field to "0”.
2	Click on the <Stop> button.
3	Deactivate the <Enable Sync> checkbox.

6.6 <Torque Mode> area

Overview

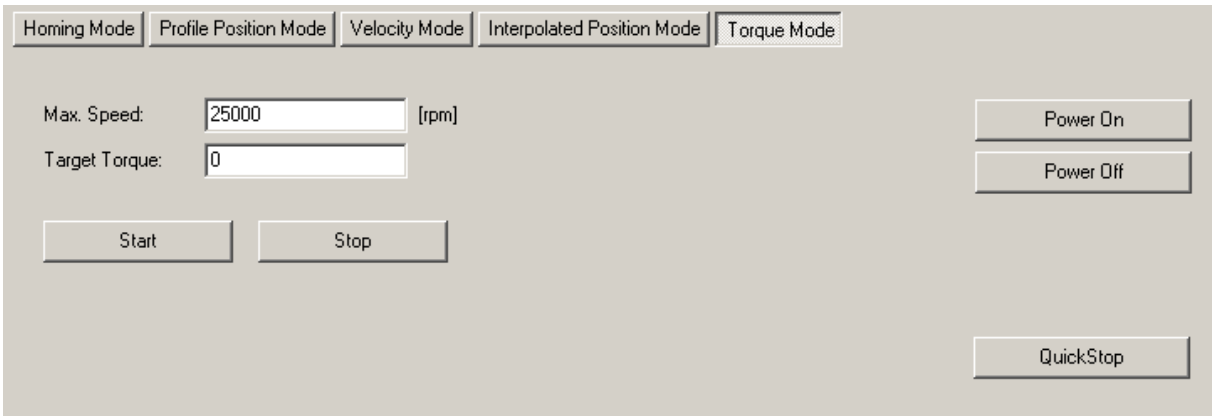
The <Torque Mode> area is used for testing the torque drive mode where the motor is operated with a constant torque.

Requirements

To operate the controller in torque mode, it has to be in closed loop mode. If this is not the case, a warning is automatically output.

This mode is not possible for controllers that are not closed loop-capable (SMCI12).

View



Functions

The following functions are available in the <Torque Mode> area:

Button/Field	Function
"Max. Speed" input field	Specifies the maximum speed in [rpm]. Range of values from 0 to 25000. If the value is 0, the speed is not limited.
"Target Torque" input field	Presets of the torque. For detailed information: See Nanotec CANopen Reference, SDO 0x6071
<Start> button	Starts the move in torque mode
<Stop> button	Stops the move in torque mode

7 <I/O> tab

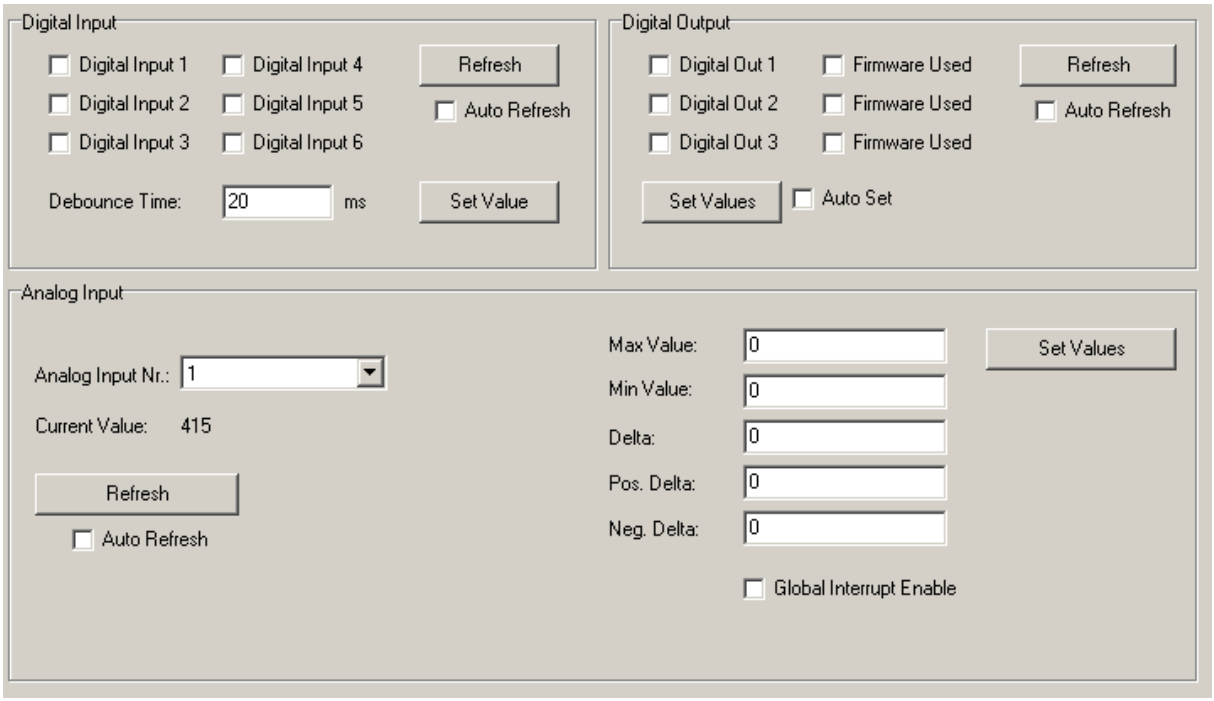
7.1 General information

Overview

The inputs and outputs of the controller can be monitored and set on the <I/O> tab. An Auto-Refresh function is used to constantly refresh the data. There are three areas available:

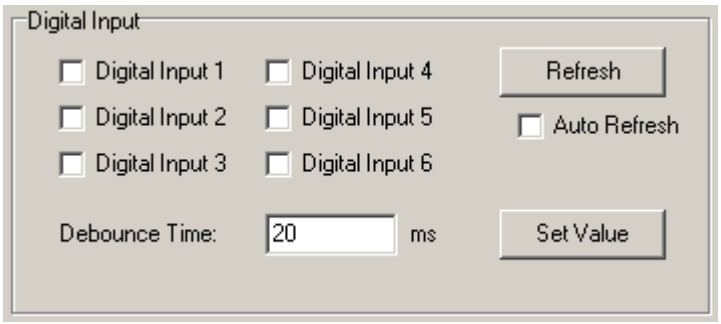
Area	Function
Digital Input	• Monitoring of the digital inputs of the controller • Setting the debounce time of the inputs
Digital Output	• Monitoring and setting of the digital outputs • Masking of outputs to make them available to the firmware
Analog Input	• Read out of the values of the analog inputs • Configuration of the conditions for sending the analog value as PDO

View



7.2 [Digital Input] area

View



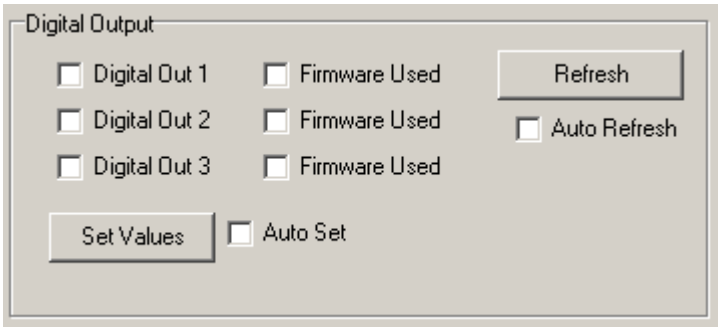
Functions

The following functions are available in the [Digital Input] area:

Button/Field	Function
<Digital Input 1 ... 6> checkboxes	Display of the respective status of the digital input. (The digital inputs cannot be set here.)
<Refresh> button	Reads the current status of the digital inputs from the controller
<Auto Refresh> checkbox	Continuously updates the display of the digital inputs
"Debounce Time" input field	Input of the debounce time for the digital inputs in milliseconds
<Set Value> button	Writes the value for the debouncing time to the controller

7.3 [Digital Output] area

View



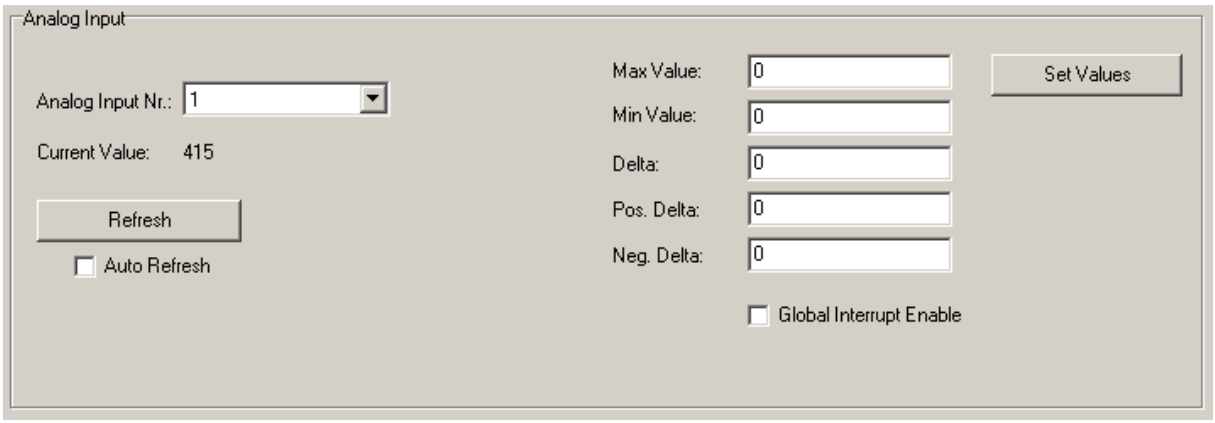
Functions

The following functions are available in the [Digital Output] area:

Button/Field	Function
<Digital Out 1 ... 3> checkboxes	Display and setting of the digital outputs
<Firmware Used> checkboxes	Masking of a digital output so that only the firmware of the motor controller can use this output
<Refresh> button	Reads the current status of the digital outputs from the controller
<Auto Refresh> checkbox	Continuously updates the display of the digital outputs
<Set Values> button	Writes changes related to the status of the digital outputs to the controller and thus switches the digital outputs on or off as necessary
<Auto Set> checkbox	If this field is activated, changes related to the status of the digital outputs are immediately written to the controller by the user and thus digital outputs are switched on or off as necessary.

7.4 [Analog Input] area

View



Functions

The following functions are available in the [Analog Input] area:

Button/Field	Function
"Analog Input Nr." selection field	Selection of the analog input to be read out
"Current Value" display	Displays of the value of the analog input
<Refresh> button	Reads the value from the controller and updates "Current Value"
<Auto Refresh> checkbox	Cyclically reads the new value from the controller and updates "Current Value"
"Max Value" input field	Input of the upper threshold value for sending the analog value as PDO
"Min Value" input field	Input of the lower threshold value for sending the analog value as PDO
"Delta" input field	Input of the minimum change of the value from which only a PDO should be sent again
"Pos. Delta" input field	Input of the condition for negative change of the analog input
"Neg. Delta" input field	Input of the condition for positive change of the analog input
<Global Interrupt Enable> checkbox	If this checkbox is set, PDOs are sent. **Note:** The corresponding SDO (6401:1) must be mapped as a PDO for this.
<Set Values> button	Writes the Global Interrupt configuration to the controller

Configuration of the Global Interrupt

Introduction

The Global Interrupt is used to send the analog value as a PDO if this is within a specific range. A delta value can also be specified which presets the min. change of the value so that a new PDO is sent.

Configuration

Note:
For the Global Interrupt function, the SDO 0x6401 Sub Index 1 must be mapped as a PDO. Proceed in this regard as described in Section 5.3 "<PDO Mapping> area".

Procedure

Proceed as follows:

Step	Action
1	Enter "Max Value" and "Min Value". This defines a range in which a PDO is not sent. This also makes it possible to specify an inverse area by simply defining the "Max Value" smaller than the "Min Value".
2	• Enter "Delta" value to specify the delta size or • Enter "Pos. Delta" and "Neg. Delta" if an asymmetric delta condition is necessary.
3	Activate <Global Interrupt Enable>.
4	Click on <Set Values> to transfer the inputs to the controller.

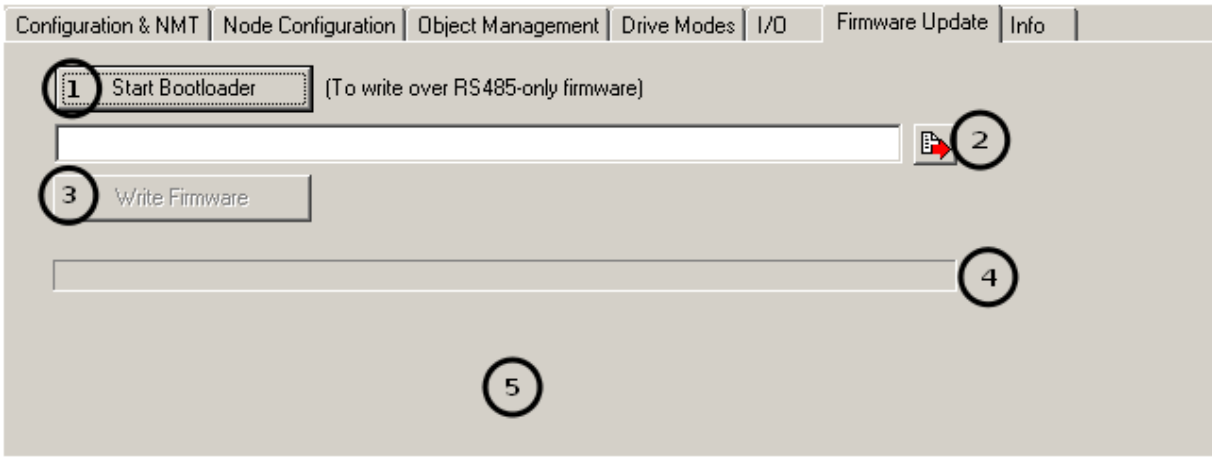
Note:
If you want to configure the <Global Interrupt Enable> function, it is advisable to deactivate "Auto Refresh" as otherwise its inputs are always overwritten again with the values from the controller.

8 <Firmware Update> tab

Overview

The firmware of the motor controller can be updated in the <Firmware Update> tab.

View



Functions

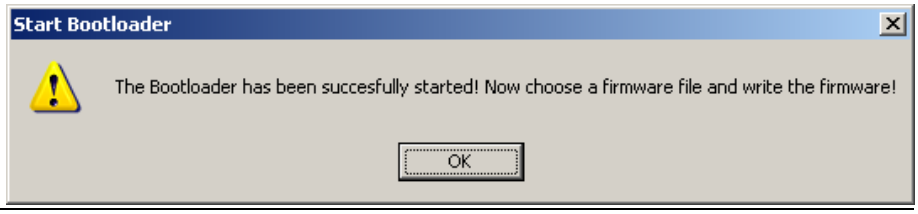
The following functions are available on the <Firmware Update> tab:

Button/Field	Function
<Start Bootloader> button (1)	Starts the bootloader of a controller with RS485 firmware
Firmware selection dialog (2)	Selection of the firmware version to be flashed
<Write Firmware> button (3)	Is only switched to active when a valid firmware file is selected. Starts the firmware update procedure
Progress bar (4)	Indicates the current progress of the firmware update process
Status text (5)	Indicates the status of the update process

8.1 Firmware update: RS485 to CAN

Procedure

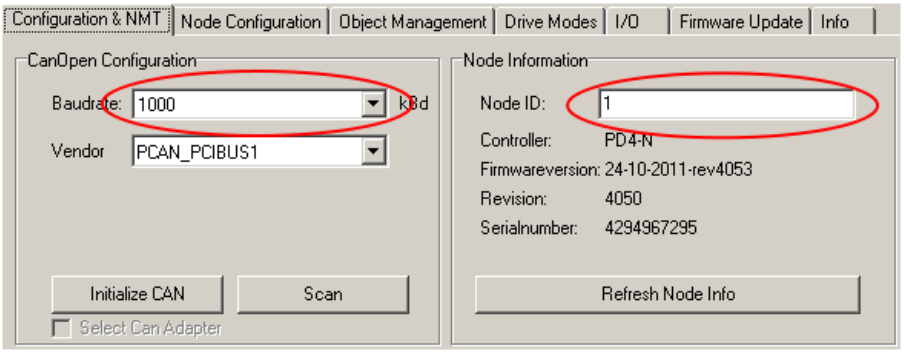
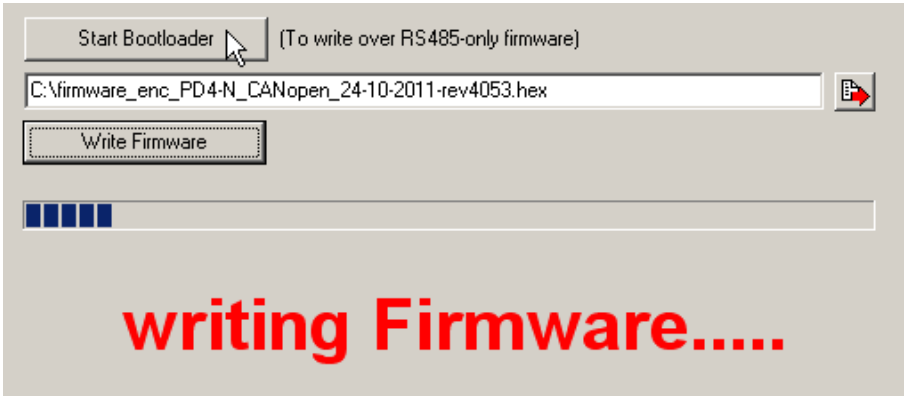
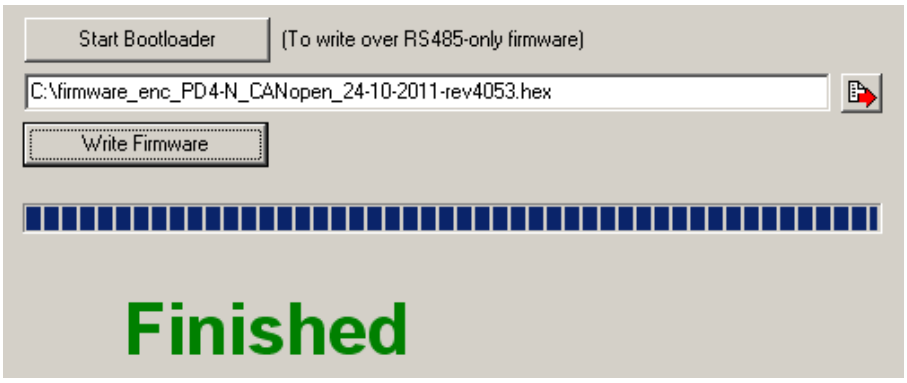
Proceed as follows:

Step	Action
1	Ensure that the correct node ID and baud rate are set on the <Configuration & NMT> tab.
2	Click on the <Start Bootloader> button (1). The following message appears: 
3	Switch off the controller.
4	Click on <OK>. The following message appears: 
5	Click on <OK>.
6	Start the controller. If the controller was found, the following message appears: 
7	If the controller was not found, switch the controller off and on again.
8	Continue with Step 2 of Section 8.2 "Firmware update: CAN to CAN”.

8.2 Firmware update: CAN to CAN

Procedure

Proceed as follows:

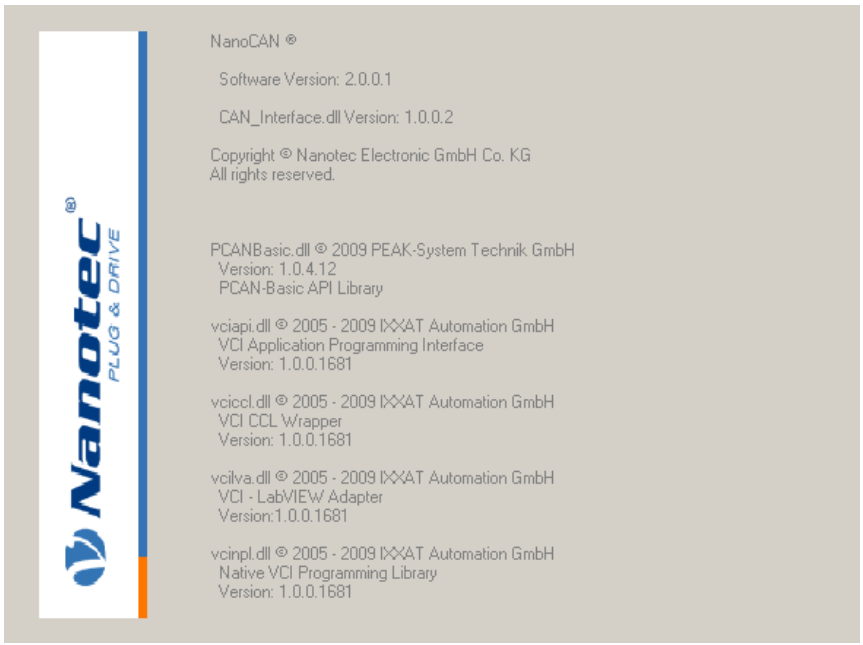
Step	Action
1	Ensure that the correct node ID and baud rate are set on the <Configuration & NMT> tab. 
2	Select the firmware file by starting the firmware selection dialog (2).
3	Click on the <Write Firmware> button (3). The firmware update process is started. The current progress is indicated by the progress bar (4) and the status is displayed in the status text (5): 
4	The process is completed when "Finished" appears in green type in the status text (5): 

9 <Info> tab

Overview

The NanoCAN version number and the library routines (DLL) used are displayed on the info page.

View

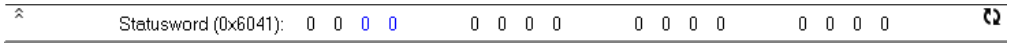


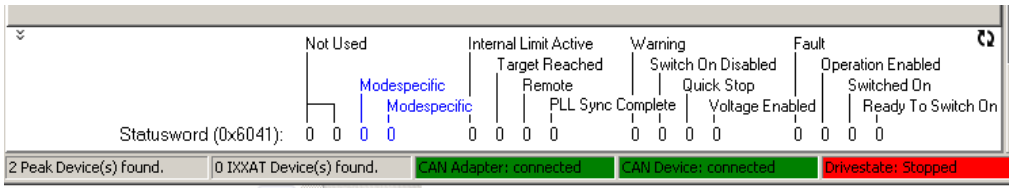
10 Statusword display

Overview

The current statusword state (0x6041:0) can be read in the statusword display.

View





Functions

When NanoCAN reads the statusword for internal purposes, the statusword display is updated at the same time. The statusword is updated by the double arrow symbol. The two blue "Modespecific" displays (bit 12 and 13 of the statusword) are dependent on the set drive mode and adapt themselves accordingly.

Driving mode	Denominator bit 13	Denominator bit 12
Profile Position	Following error	Acknowledge set point
Homing	1 when error	Homing attained
Velocity	not used	not used
Interpolated Position	not used	IP Mode active
Torque	not used	not used

Tip: The statusword request can be tracked with the CAN Bus log.

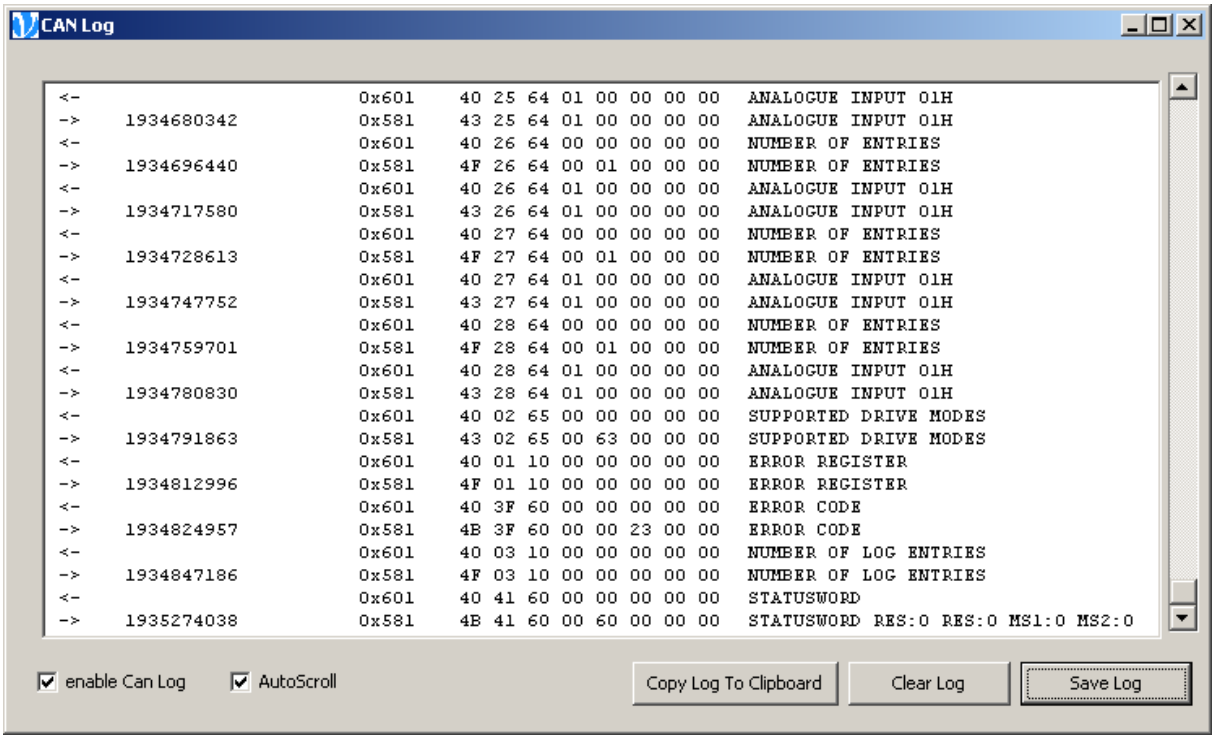
Button/Symbol	Function
	Display the statusword display additional information
	Hide the statusword display additional information
	Update the statusword display

11 CAN Bus log window

Overview

The CAN bus log window from NanoCAN provides you with the possibility of tracking the messages on the CAN bus.

View



"CAN Log" window

The received messages are shown in the log area. Outgoing messages are indicated by a left arrow and incoming messages by a right arrow.

The second column shows the COB-ID of the message, followed by the data of the message.
The received object is identified at the end.

The statusword, the control word and the digital inputs are broken down in more detail.

Functions

The following functions are available in the "CAN Log" window:

Button/Field	Function
<enable Can Log> checkbox	Activates/deactivates the logging of CAN messages
<AutoScroll> checkbox	Activates/deactivates the automatic scrolling of the CAN log area. New messages are indeed added, but the currently displayed area remains in place.
<Copy Log To Clipboard> button	Copies all log window entries to the clipboard
<Clear Log> button	Deletes all entries in the log window
<Save Log> button	Saves the messages displayed in the log window