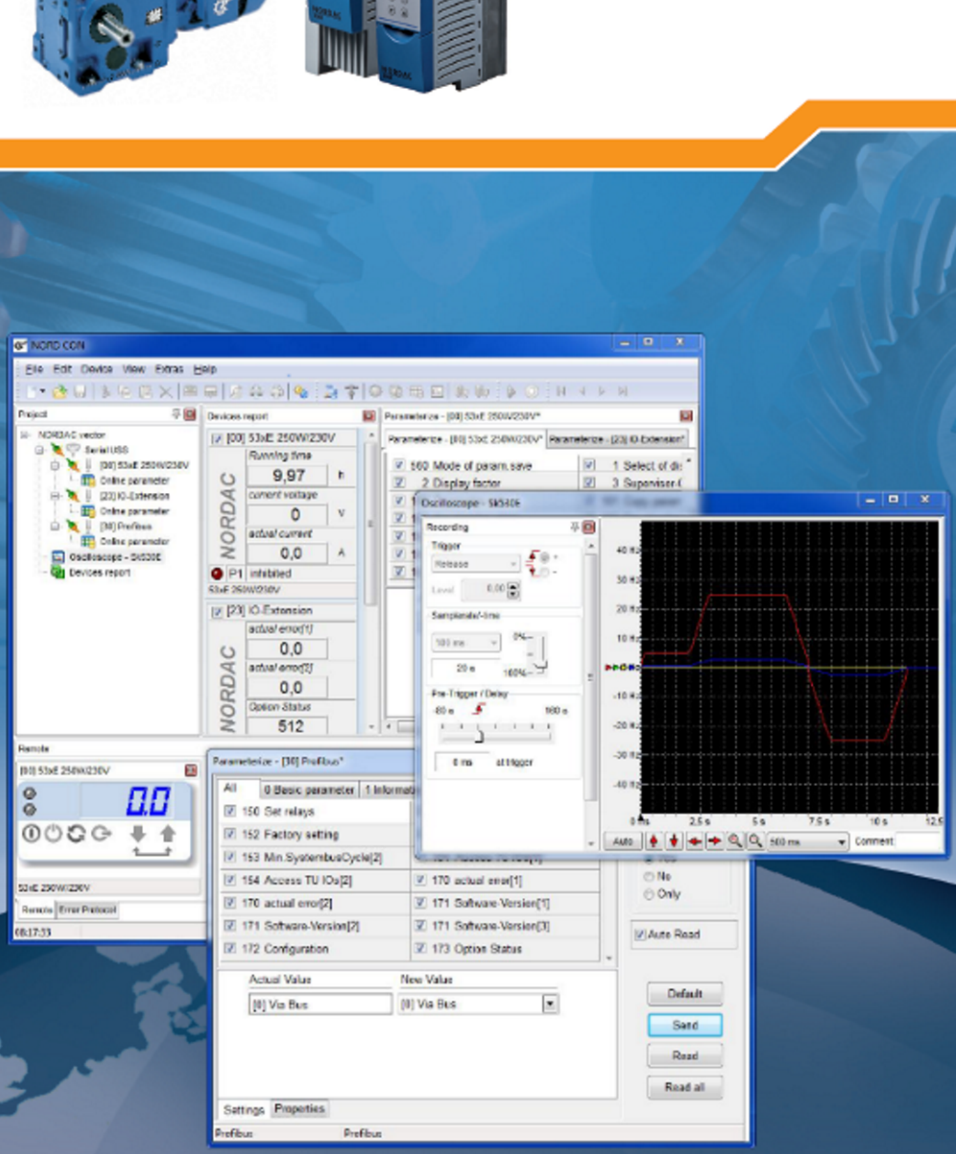
Intelligent Drivesystems, Worldwide Services



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NORD CON

Manual for NORD CON

NORD DRIVESYSTEMS

1 Introduction

1.1 About NORD CON

NORD CON is a PC program intended to control and parameterizes the NORDAC vector Frequenzumrichter inverters produced by Getriebebau NORD and option modules.

With NORD CON, up to 31 frequency inverters can be controlled simultaneously via the integrated RS485 interface. Communication with the frequency inverters is handled by the PC's serial interface.

To enable trial runs or system start-ups, the connected frequency inverters can be controlled via the PC. The program also provides for continuous monitoring of the current status of the frequency inverter while these activities are going on. Complete process sequences can be developed using macros.

With NORD CON, you can perform, document, and save the parameter settings of a frequency inverter which will be read out by the inverter or transmitted to it respectively. Parameter databases can be created or manipulated off-line - i.e. without a frequency inverter being connected.

The program further provides for remote control of the connected frequency inverters. For the frequency inverter to be remote-controlled the operating unit of the type in question is simulated on the PC. This is a convenient way of operating devices which are either difficult to access or haven't got an operating unit themselves.

1.2 How to use NORD CON

Attention	
	**For the parameterization and controlling of the devices with NORD CON, your PC requires a serial interface.**

1. Installation

Please start the installation program of NORD CON on the enclosed CD or load the installation program from the Internet ("http://www2.nord.com/cms/de/documentation/software/software-overview.jsp"). Enter all necessary information and install NORD CON into the standard directory.

2. Connect

If the frequency inverter is equipped with an **RS232 optional interface**, it can be directly connected to the PC with a serial 1-1 cable. In this case, only one frequency inverter can be connected. Each NORDAC vector Frequenzumrichter frequency inverter features an integrated **RS485** interface which can be activated via the control terminals. This interface allows for configuration of a master/slave bus system with up to 31 devices max. For NORD

CON to be connected to such a bus, an RS232 - RS485 converter will be required.

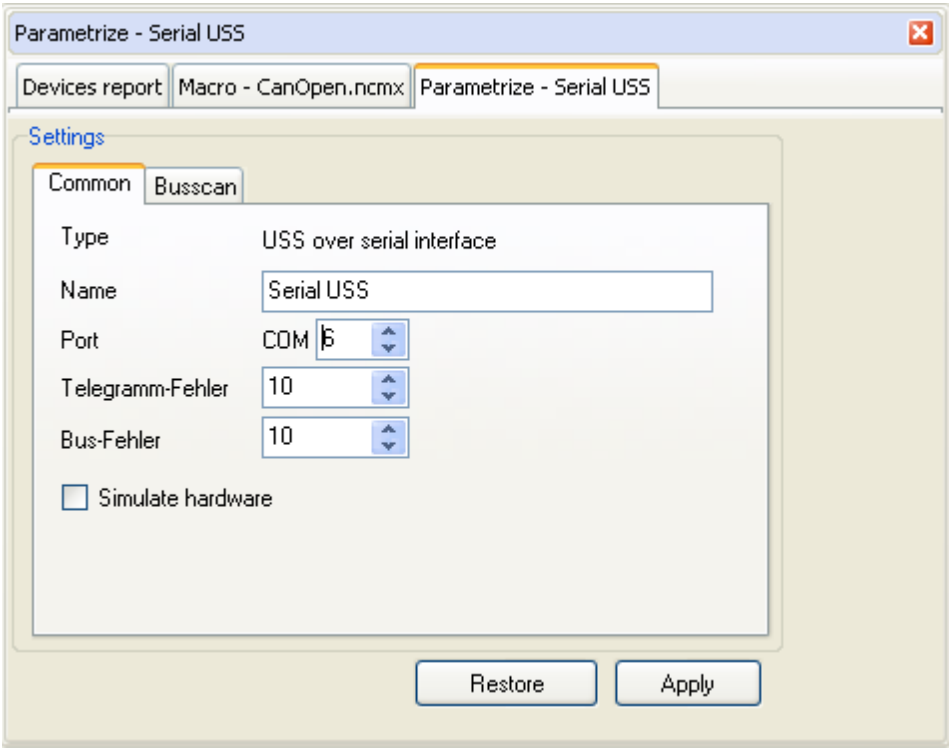
Attention	
	**If several devices are operated simultaneously, make absolutely sure that a unique USS address is assigned to each of the devices connected, and that all of them have the same baud rate setting (see also Operating Instructions of the frequency inverter type involved).**

3. Run NORD CON

In order to start NORD CON, you use the shortcut "NORD CON start" or "Start->Program->Nord->NORD CON 2.1->NORD CON".

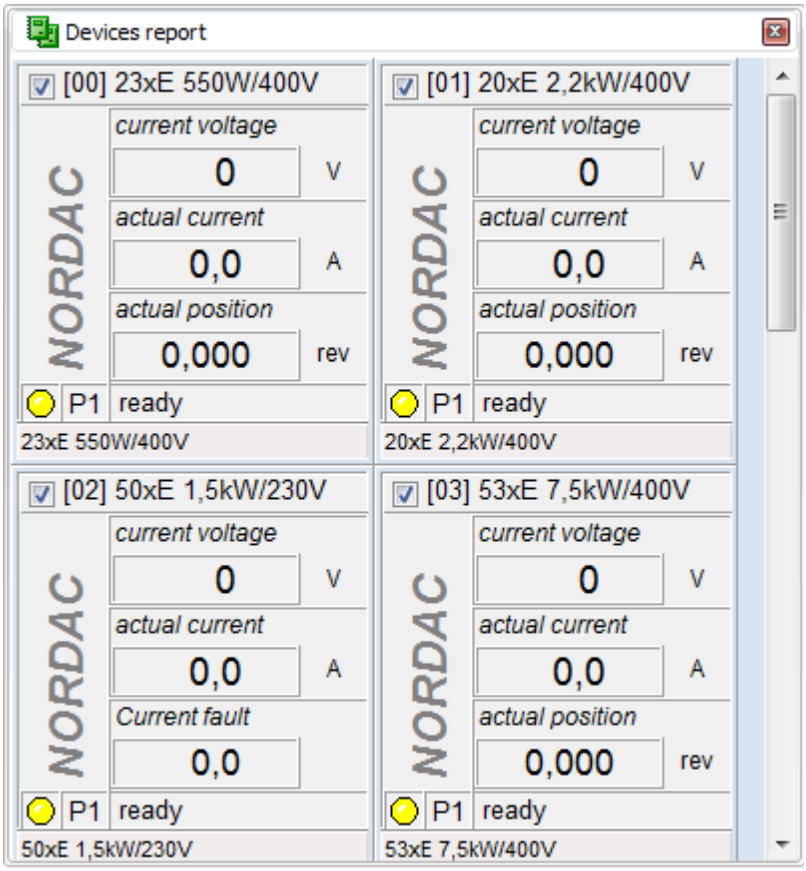
4. Setup of the communication module

In order to set the communication parameters, one must select the appropriate module in the project view. Over the menu entry "Device-> Parameterize" the parameter dialog of the module can be opened. In the edit field "Port" must be insert the correct COM port number. After that you have to push the button "Apply". Additional settings are not necessary for the first application and the window can be closed.



5. Bus scan

After the start of bus scan, all ready and connected devices are searched for. All found devices are represented in the project tree and in the equipment overview. Subsequently, the first device in the list is marked and the users can use all device-specific functions.



6. Work with the devices

The user can now select the device by clicking the device in the device overview or in the project tree. Functions, like control or parametrizes, are available in the popup menu of the project tree, the tool bar or the main menu.

2 Graphic user interface

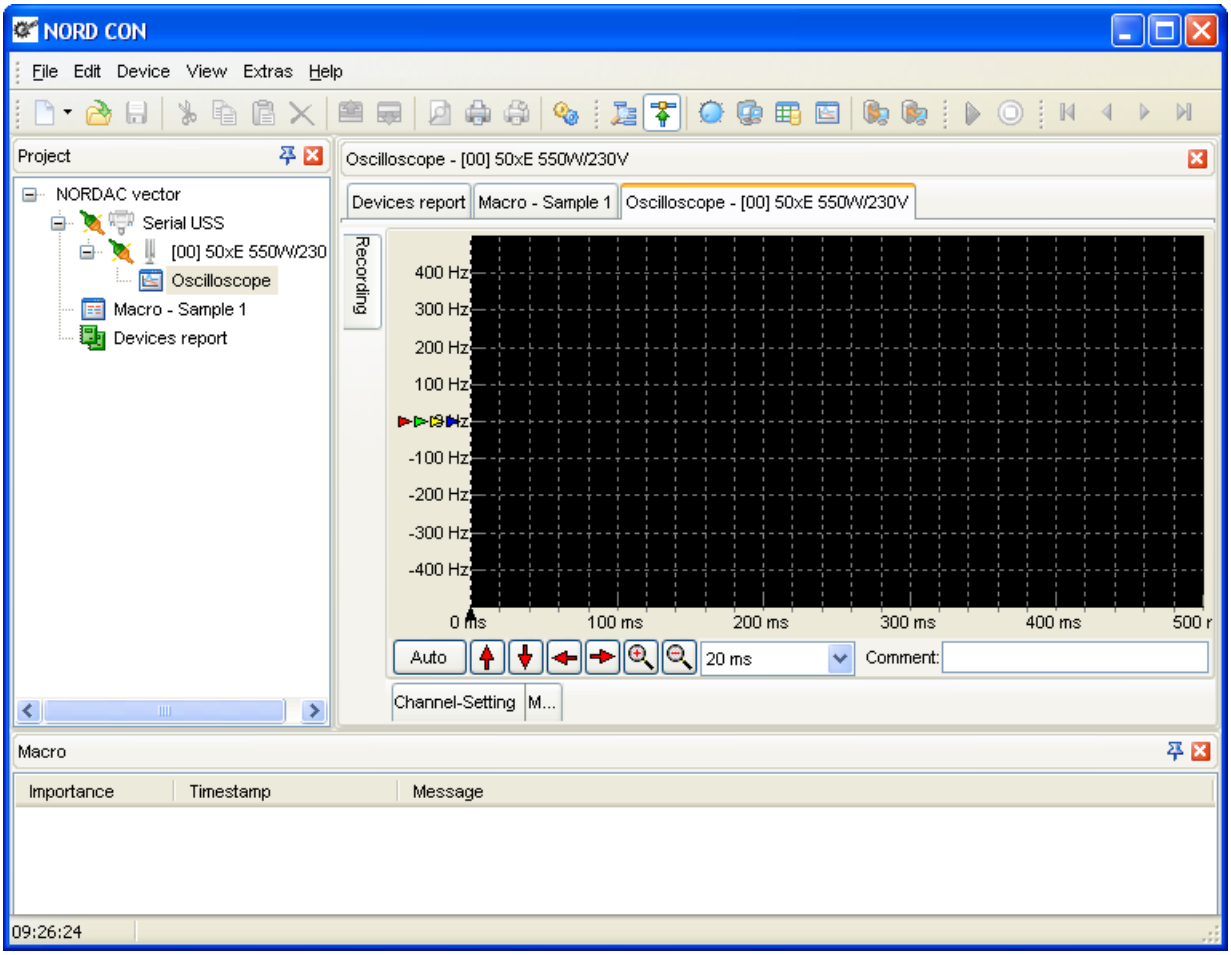
2.1 Structure of the program interface

If you run "**NORD CON**" for the first time, the window shown down is opened. The window consists of main menu, toolbars, work area, and the different views. In the work area the different editor windows like parameter windows or macros are shown. The windows can be positioned freely or be docked at the sides of the work area. In order to change the position of a docked window, click on the header bar of the window and keep the mouse button pressed. Subsequently, the new position can be specified with the pointer of mouse. A colored rectangle shows the current position and dock condition. After releasing the left mouse button, the actual action is implemented. In addition, the user can dock or undock the window by clicking on the header bar. The layout is stored when closing application and resumed with the restart.

The interface is divided into the following areas:

- Main Menu
- Toolbars

- Working Area
- View "Project"
- View "Log"
- View "Remote"

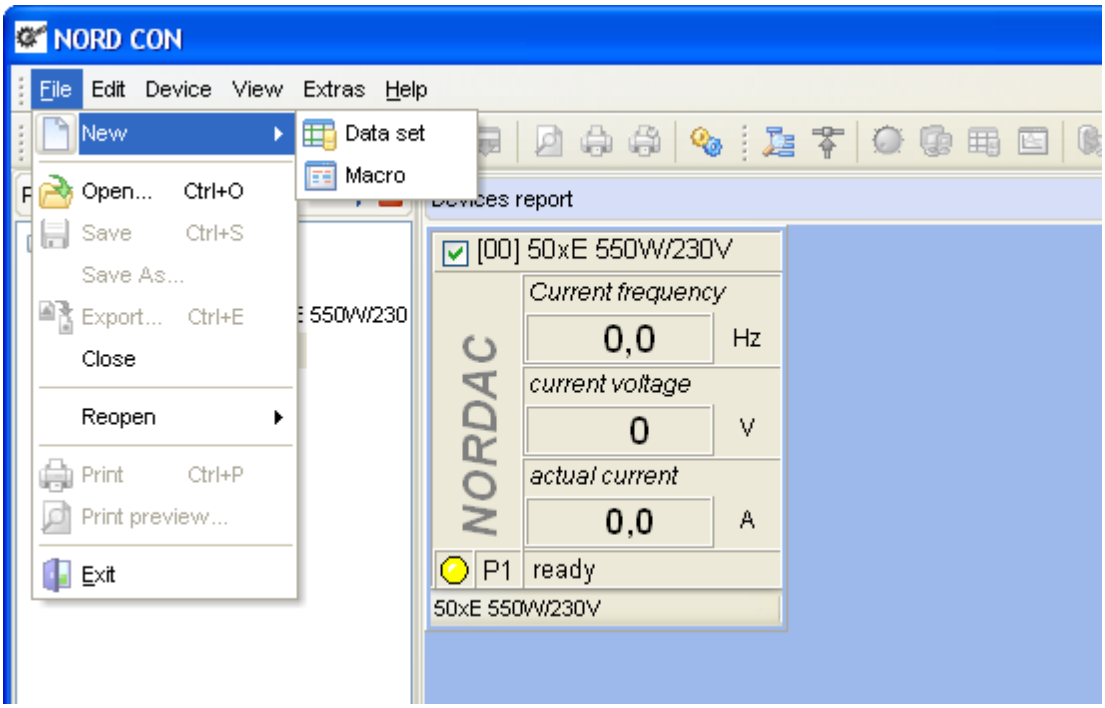


2.2 Main menu

The main menu is the central place for all actions of application. All editor windows register their window-specific actions there. The actions are divided in categories.

- Category "File"
- Category "Edit"
- Category "Device"
- Category "View"
- Category "Extras"
- Category "Help"

2.2.1 Category "File"



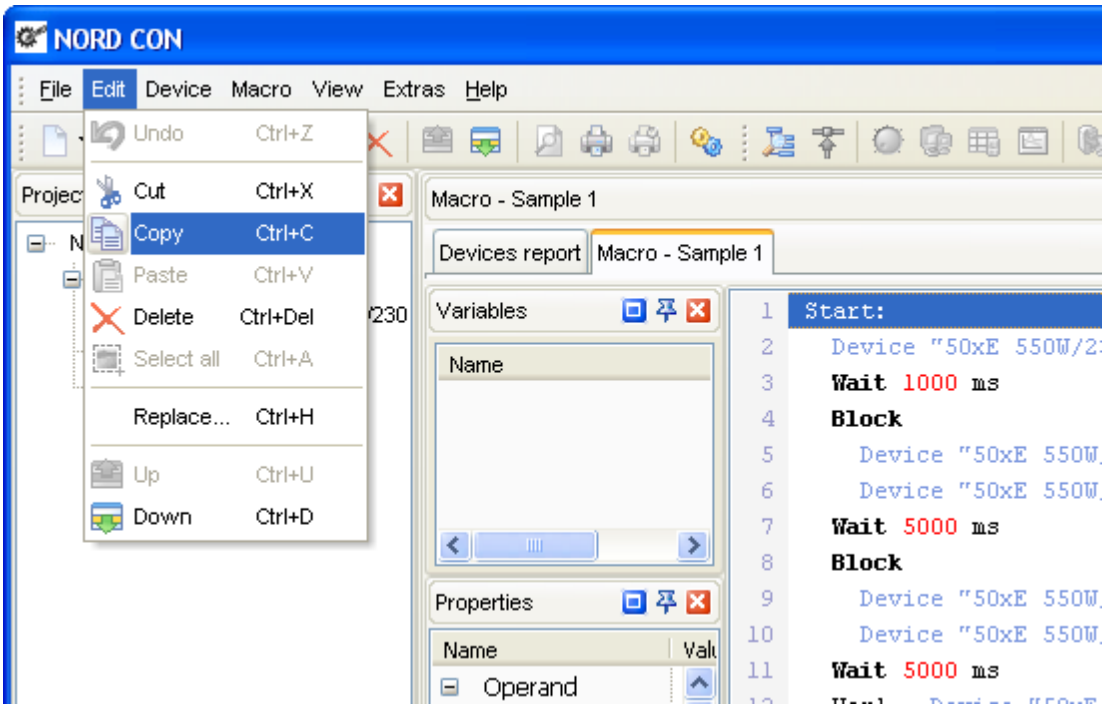
Name of action	Combination of keys	Icon	Description
New dataset			The action opens the parameter window for a new device. The user must select the desired device in a previous window.
New macro			The action opens the macro editor with a new document. If the macro window is already opened, the user can store the current document. **Attention**: In the current version, only one macro window can be opened!
PLC program			The action opens the PLC editor with an empty document. If a PLC program is already opened, the user can store the current document.
Open	Ctrl + O		The action opens the file choice dialog in order to open a stored document. The user selects a document type with the file filter, and selects the file afterwards. The following types are supported: • Parameter files (*.ndbx, *.db (V1.27)) • Scope files (*.scox, *.sco (V1.27)) • Macro files (*.ncmx, *.ncm (V1.27)) • PLC files (*.awlx, *.awl, *.nstx)
Save	Ctrl + S		The action stores the current document. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Save as...			The action stores the current document with a new name. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Export	Ctrl + E		The action exports the data active editor windows into a file. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Reopen			The action contains a submenu in which the opened last documents are

Name of action	Combination of keys	Icon	Description
			listed. History is limited to 5. When clicking on one of the files, it is opened again.
Print	Ctrl + P		The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented. This action is deactivated if no editor window is opened or the editor does not support the action.
Print preview...			The action opens a print preview for the active editor. Depending upon editor, the printing preview can be differently developed. This action is deactivated if no editor window is opened or the editor does not support the action.
Quit			The action closes application.

Note:

A action is deactivated if no editor window is opened or if the editor does not support the action.

2.2.2 Category "Edit"



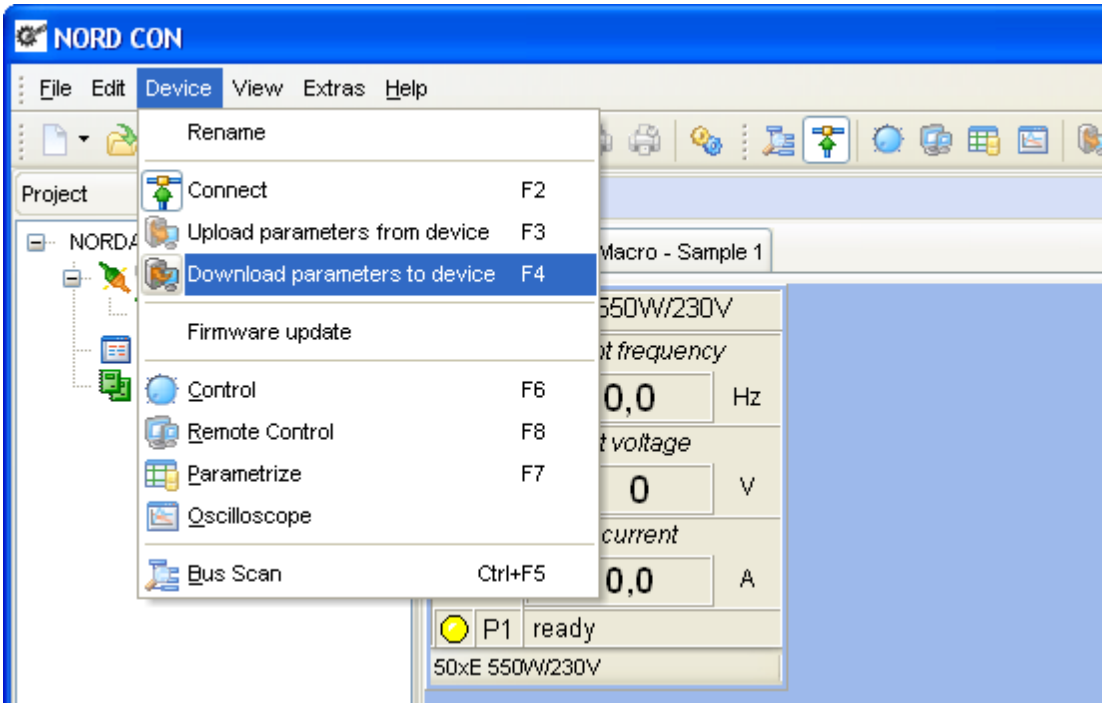
Name of action	Combination of keys	Icon	Description
Undo	Ctrl+Z		The action undoes the last action. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Cut	Ctrl+X		The action cuts the selected object and copies it into the clipboard. The action is passed on to the active control member and implemented there. Depending upon the type of editor, different operations can be implemented.
Copy	Ctrl + C		The action copies the selected object into the clipboard. The action is passed on to the active control member and implemented there. Depending upon the type of editor, different operations can be implemented.
Paste	Ctrl + V		The action copies contents of the clipboard to the selected position. The action is passed on to the active control member and implemented there. Depending

Name of action	Combination of keys	Icon	Description
			upon the type of editor, different operations can be implemented. **Note**: The action is deactivated if the current control element does not support this action or the contents of the clipboard cannot be inserted.
Delete	Ctrl + Del		The action deletes the selected object. The action is passed on to the active control and implemented there. Depending upon the type of editor, different operations can be implemented.
Select all	Ctrl + A		The action selects all objects of the active control.
Replace...	Ctrl + H		The action searches for the indicated text and replaces these then by other text. In a dialog, the appropriate option can be adjusted.
Up	Ctrl + U		The action shifts the delected object one position upward.
Down	Ctrl + D		The action entry shifts the delected object one position downward.

Note:

The action is deactivated if the current control element does not support this action.

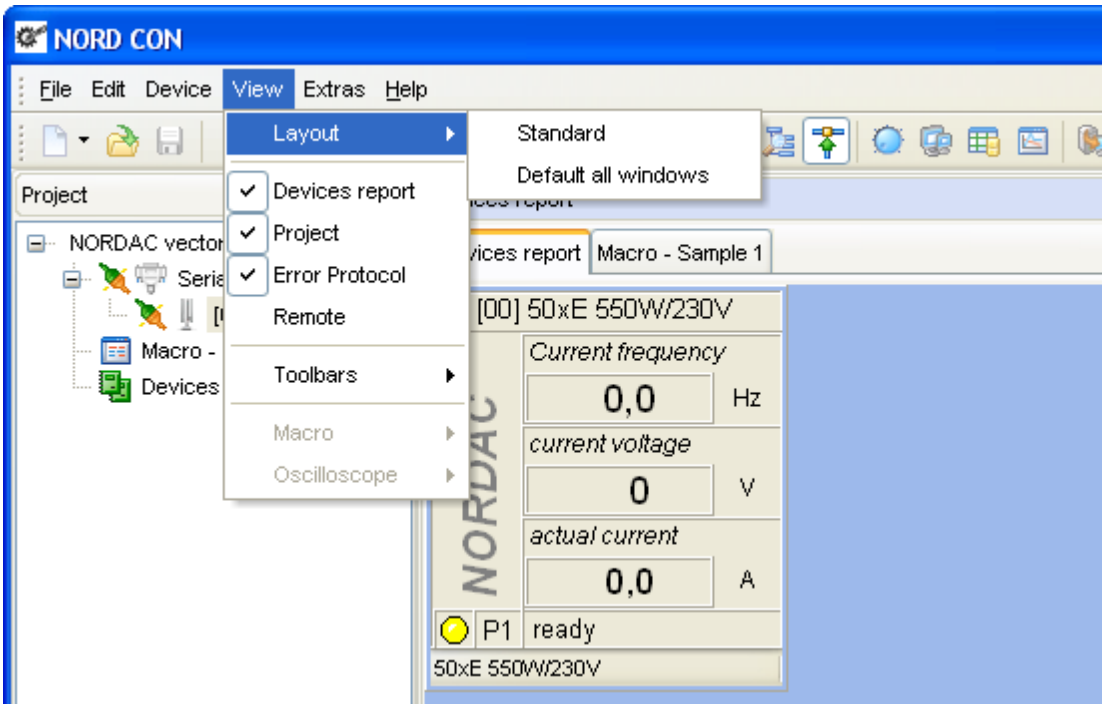
2.2.3 Category "Device"



Name of action	Combination of keys	Icon	Description
Rename			With the action the user can change the name of the selected device.
Connect	F2		The action starts or stops the connection to the selected device.
Upload parameters from device	F3		The action uploads the parameters from the device to the PC.

Name of action	Combination of keys	Icon	Description
Download parameters to device	F4		The action downloads the parameters from the PC to the device.
Update firmware			The action starts the firmware upload program.
Control	F6		The action opens the "control" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Remote	F8		The action opens the "remote" window of the selected device. If the window was already opened, it is brought into the foreground.
Parameterize	F7		The action opens the "Parameter" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Oscilloscope			The action opens the "oscilloscope" of the selected device in the work area. If the window was already opened, it is brought into the foreground.
PLC			The action entry opens the PLC editor of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Bus scan	Ctrl+F5		The action implements a network scan for the selected communication module. **Note**: With a network scan, all devices are removed from the device list and all device-specific windows are closed!

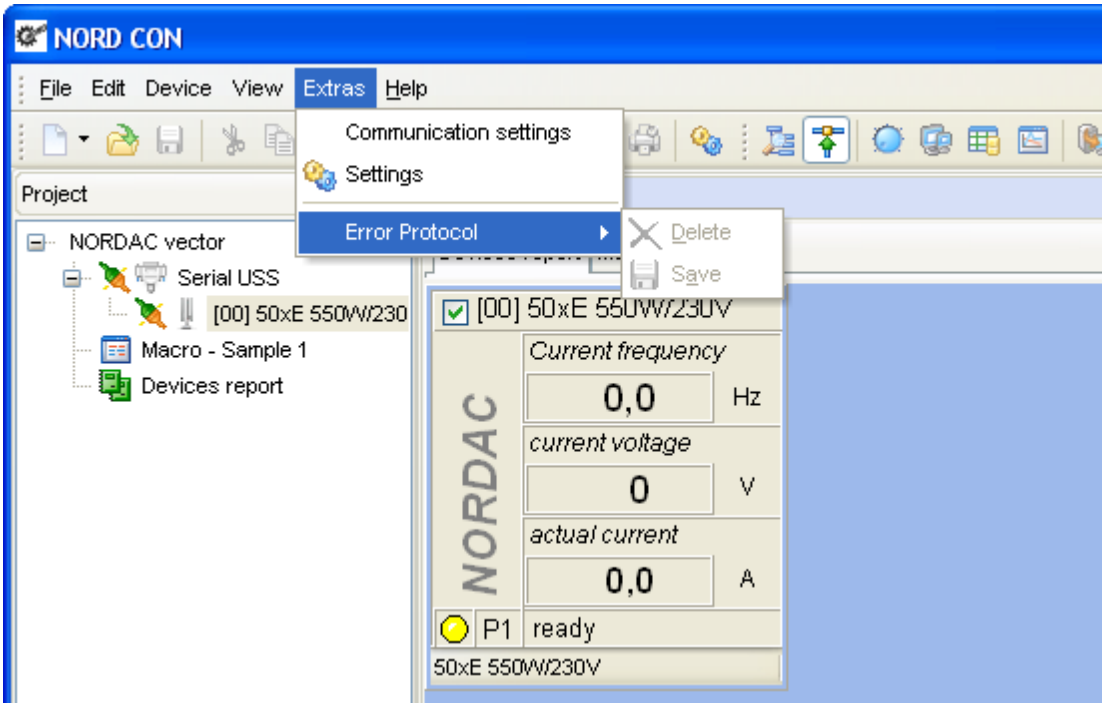
2.2.4 Category "View"



Name of action	Combination of keys	Description
Layout -> Standard		The action build the standard - layout of application for all views. The

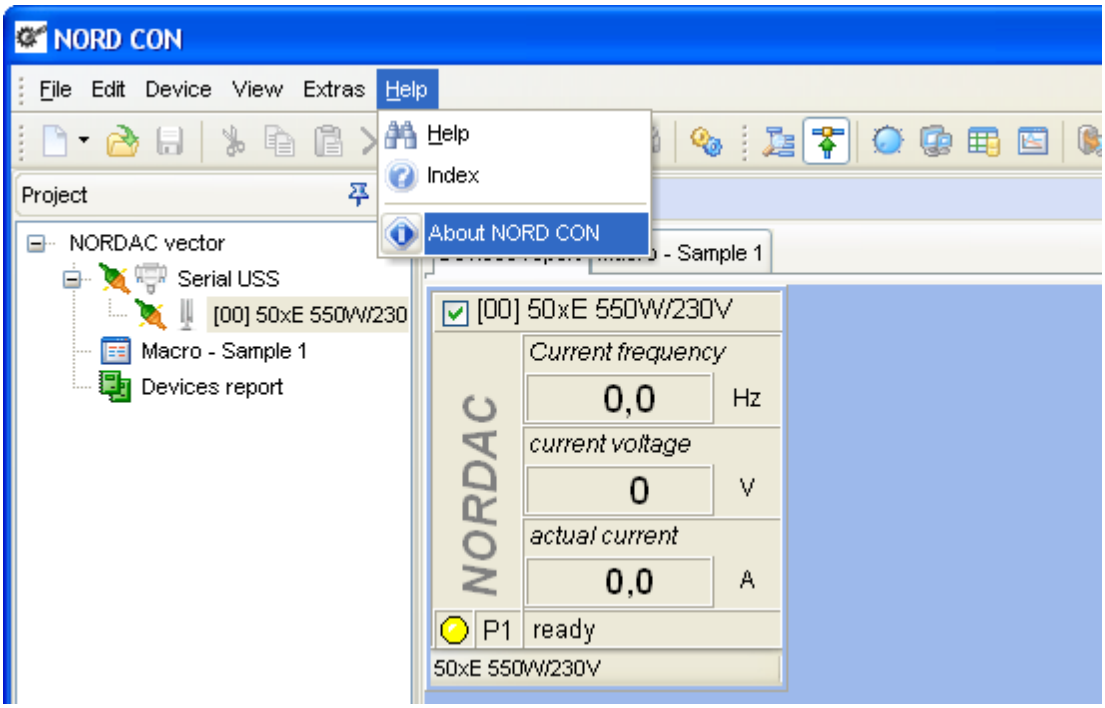
Name of action	Combination of keys	Description
		position of the editor windows is not changed.
Layout -> Standard all windows		The action build the standard layout of application for all windows including the work area.
Device report		The action closes or opens the device report.
Project		The action closes or opens the view "project".
Log		The action closes or opens the view "log".
Remote		The action closes or opens the view "remote control".
Toolbar->Standard		The action closes or opens the toolbar "standard".
Toolbar->Device		The action closes or opens the toolbar "device".
Toolbar ->Start		The action closes or opens the toolbar "device".
Macro		The action opens a submenu. In this submenu, all special actions of the macro editor are listed. The status as well as the execution of the actions is incumbent on the active macro window. If no window is active, all actions are deactivated.
Oscilloscope		The action opens a submenu. In this submenu, all special actions of the oscilloscope are listed. The status, as well as the execution of the actions, is incumbent on the active oscilloscope. If no window is active, all actions are deactivated.

2.2.5 Category "Extras"



Name of action	Combination of keys	Description
Settings		The action opens a window to edit the global settings of the program.
Log		The action opens a submenu. In this submenu all special actions of the view "log" are listed. The status, as well as the execution of the actions, is incumbent on the view.

2.2.6 Category "Help"



Name of action	Combination of keys	Description
Help	F1	The action opens online help and selects the register map "Contents".
Index		The action opens online help and selects the register map "Index".
About NORD CON		The action opens a dialog with the program information.

2.3 Toolbars

In the toolbars, the most common actions are available for fast access. By clicking the appropriate symbol in the bar with the mouse, the desired action is specified.

The following toolbars are available:

- Standard
- Device
- Start

2.3.1 Standard

Name of action	Icon	Description
New data set		The action opens the parameter window for a new device. Before the user can open the dialog, the device must be selected.
New Macro		The action opens the macro editor with an empty document. If a macro is already open, the user can store the current document. Attention: In the current version, only one macro window can be opened!
New PLC program		The action opens the PLC editor with an empty document. If a program is already opened, the user can store the current document.
Open		The action opens the file dialog in order to open a stored document. The user selects a document type with the file filter and select the file afterwards. The following types are supported: • Parameter dataset V1.27 (*.db) • Parameter dataset (*.ndbx) • Scope-File (*.sco) • Scope-File V2.1 (*.scox) • Macro (*.ncmx) • Macro V1.27 (*.ncm) • PLC Program (*.awlx)
Save		The action stores the current document. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Cut		The action cut the selected object and copies it into the clipboard. The action is passed on to the active control element and implemented there. Depending upon the type of editor, different operations can be implemented.
Copy		The action copies the selected object into the clipboard. The action is passed on to the active control element and implemented there. Depending upon the type of editor, different operations can be implemented.
Paste		The action copies contents of the clipboard to the selected position. The action is passed on to the active control member and implemented there. Depending upon the type of editor, different operations can be implemented. **Note**: The action is deactivated if the current control element does not support this action or the contents of the clipboard cannot be inserted.
Delete		The action deletes the selected object. The action is passed on to the active control member and implemented there. Depending upon the type of editor, different operations can be implemented.
Up		The action shifts the selected object a position upward.
Down		The action shifts the selected object a position downward.
Preview		The action opens a print preview for the active editor. Depending upon editor, the printing preview can be differently developed. This action is deactivated if no editor window is opened or the editor does not support the action.
Print		The action print the content from the active editor. This action is deactivated if no editor window is opened or the editor does not support the action.
Fast print		The action print the content from the active editor without the print dialog. This action is deactivated if no editor window is opened or the editor does not support the action.

Name of action	Icon	Description
Settings		The action opens a window to edits the global settings of the program.

2.3.2 Device

Name of action	Icon	Description
Bus scan		The action implements a network scan for the selected communication module. Note: With a network scan, all devices are removed from the device list and all device-specific windows are closed!
Connect		The action connects or disconnects the connection to the selected device.
Control		The action opens "control" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Remote		The action opens "remote" window of the selected device. If the window was already opened, it is brought into the foreground.
Parameterize		The action opens the "parameter" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Oscilloscope		The action opens the "oscilloscope" of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Plc		The action opens the PLC editor of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Upload parameters from device		The action uploads the parameters from the device to the PC.
Download parameters to device		The action downloads the parameters from the PC to the device.

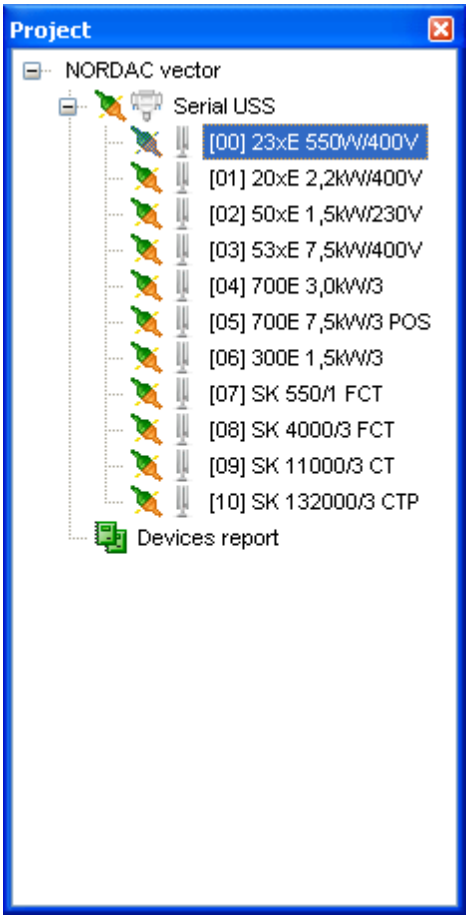
2.3.3 Start

Name of action	Combination of keys	Icon	Description
PLC settings			The action opens the settings of the PLC.
Compile	Shift + F7		The action starts the translation of a PLC program.
Programming	Shift F8		The action loads a PLC program to the Device.
Run	F9		The action runs a PLC program or a macro. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Cancel	F11		The action terminates running a PLC program or macro. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.
Next	F12		The action executes the next instruction. The action is passed on to the active editor window and implemented there. Depending upon the type of editor, different operations can be implemented.

Name of action	Combination of keys	Icon	Description
Debug	Shift + F5		The action runs the PLC program with the debug mode.

2.4 View "Project"

In View "Project", all devices of the project are shown in a tree structure. It can be closed or opened with the main menu option "View->Project ". With the help of the mouse, you can navigate between the individual devices. If the view possesses the input focus, you can additionally select a device with the arrow keys "up" and "down ". If the pointer of mouse is over a device entry, a reference about the type of device and fieldbus address is indicated. After the selection of a device, the user can execute all actions with the tool bar as well as the popup menu. If an action is shaded grey, the selected devices do not support. The popup menu is opened by clicking the right mouse button in the view.



Status of device

 The connection to the device is online

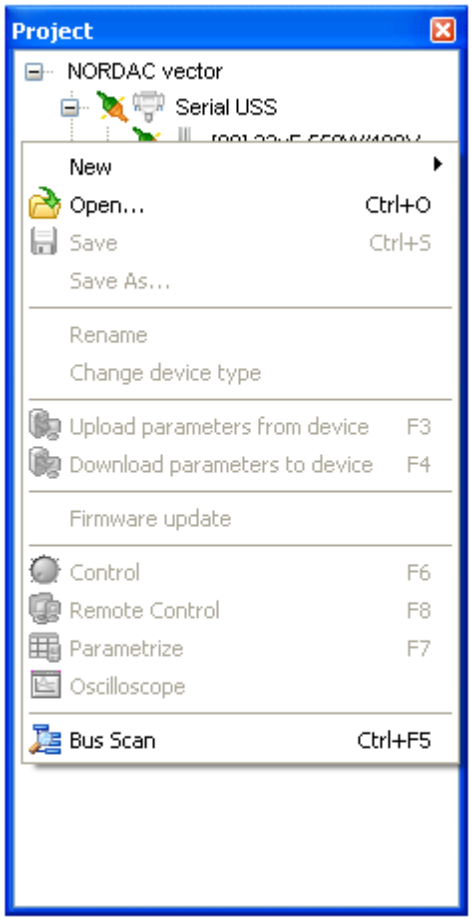
 The connection to the device is offline

Used topics:

Structure of popup menu, Structure of the program interface, Main menu, Toolbars, View "Log", View "Remote", Docking and Undocking

2.4.1 Structure of popup menu

The representation shows the popup menu of the project view. The menu always refers to the selected nodes in the project tree.



Name of action	Combination of keys	Description
Rename		With the action the user can change the name of the selected device.
Upload parameters from device	F3	The action uploads the parameters from the device to the PC.
Download parameters to device	F4	The action downloads the parameters from the PC to the device.
Update firmware		The action starts the firmware upload program.
Control	F6	The action opens then "control" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Remote	F8	The action opens the „remote" window of the selected device. If the window was already opened, it is brought into the foreground.
Parameterize	F7	The action opens the "parameter" window of the selected device in the work area. If the window was already opened, it is brought into the foreground.

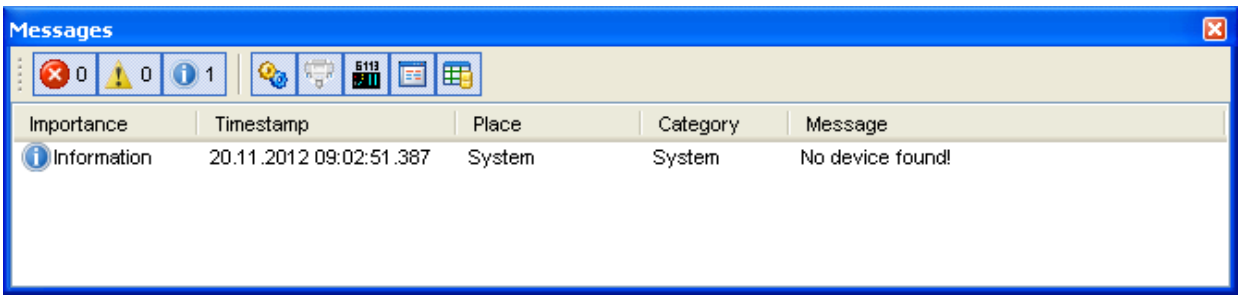
Name of action	Combination of keys	Description
Oscilloscope		The action opens the „oscilloscope" of the selected device in the work area. If the window was already opened, it is brought into the foreground.
PLC		The action opens the PLC editor of the selected device in the work area. If the window was already opened, it is brought into the foreground.
Bus scan	Ctrl + F5	The action implements a network scan for the selected communication module. **Note**: With a network scan, all devices are removed from the device list and all device-specific windows are closed!

2.5 View "Messages"

The view contains a list of all „NORD CON" messages. The entries are displayed by default time ascending. The sortation can be adjusted by clicking on a column header. Following filters available are for the filtering:

Filter	Icon	Description
Error		This filter is enabled, displays all errors. In addition, it shows the number of errors in the caption of the button.
Warning		This filter is enabled, all warnings are displayed. The number of warnings is displayed in the caption of the button.
Information		This filter is enabled, all information will be displayed. The number of information is displayed in the caption of the button.
System		This filter is enabled, all messages of the "System" category are displayed.
Communication		This filter is enabled, all messages of the "Communications" category are displayed.
PLC		This filter is enabled, all messages of the "PLC" category are displayed.
Macro		This filter is enabled, displays all messages in the "Macro" category.
Parameter		This filter is enabled, displays all messages in the "Parameter" category.

The messages can be saved or deleted via the popup menu (right mouse button). These actions can be carried out via the main menu ("Extras/Messages").

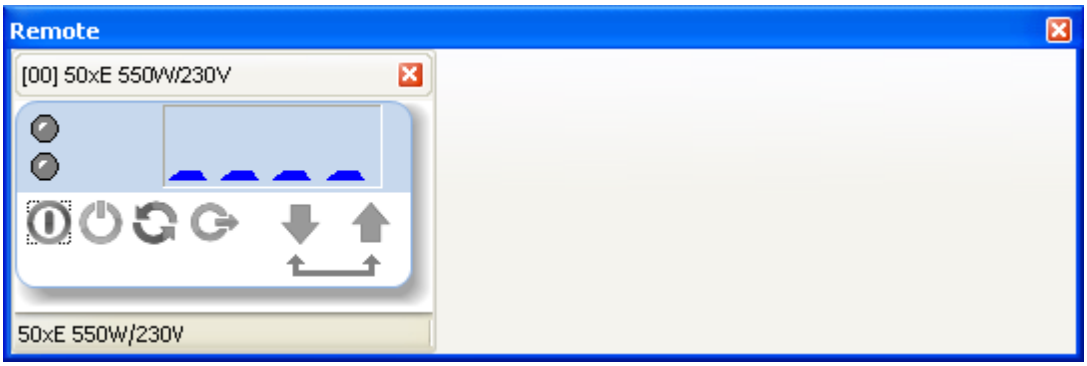


Name of action	Description
Delete	The action deletes the list.

Name of action	Description
Save	The action stores the entries into a file.

2.6 View "Remote"

The view "remote" contains all windows of the function „Remote". The view opens automatically when opening the first window and closes after closing the latest. The view can be docked or undocked like all views to the work area. If the view was closed by the user, it can be opened by the action "Remote" again. The new windows are always docked to the left side of the last window. With the help of the mouse, it can be undocked or docked again. If the view is opened for the first time with the menu "View->Remote", each device in the list the window "Remote" is opened automatically.



Note:

Windows of type "Remote" can be docked only into the view "Remote".

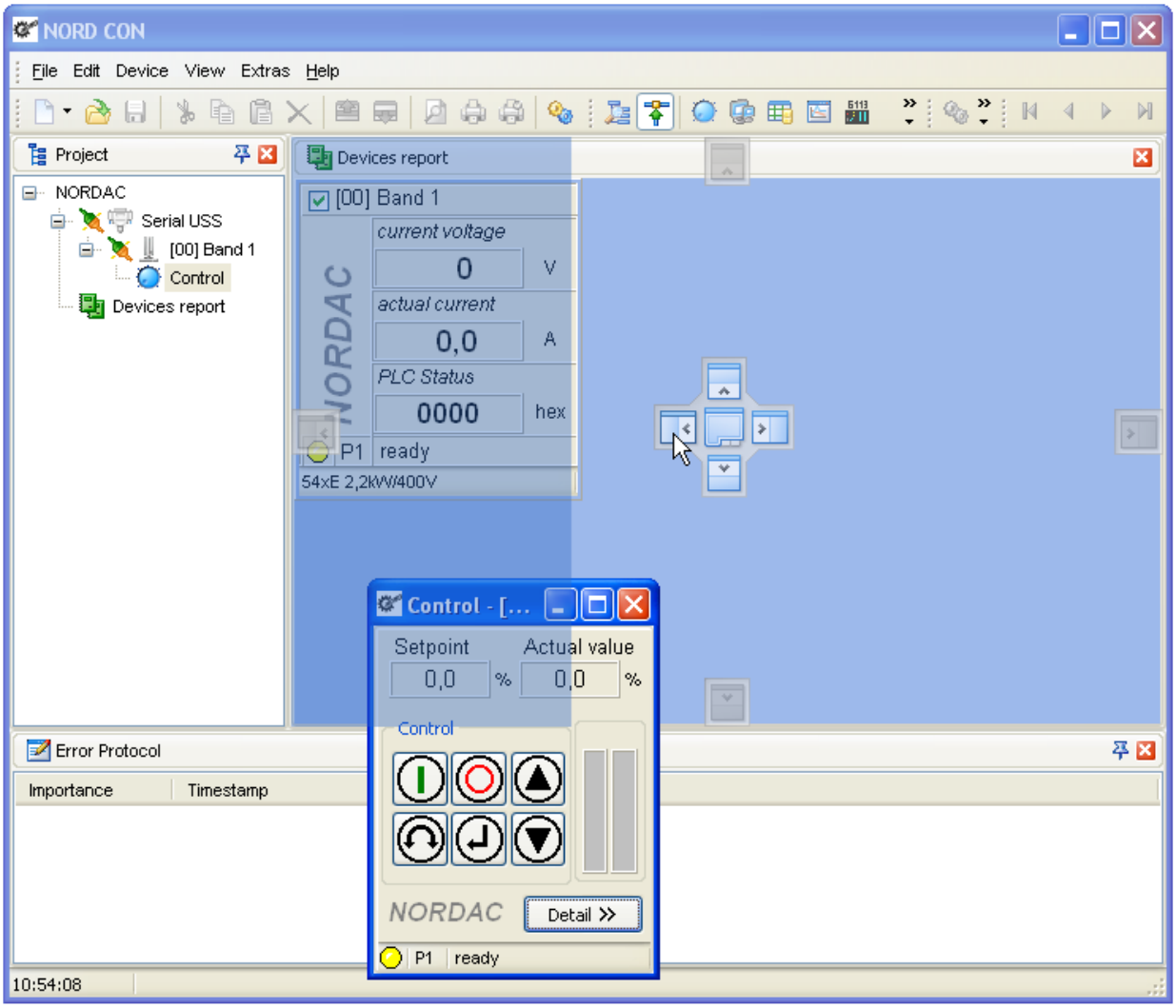
2.7 Docking and Undocking

With the new design of NORD CON, the user has the possibility to adapt the layout of the surface to their own requirements. In principle, you can undock each view and editor window and position them freely on the screen. For this, the user must press the left mouse button over the title border and pull the colored rectangle to the desired position. After releasing the mouse button, the view or editor windows remains in those positions as independent windows. With the editor windows, there is additionally the possibility - with the popup menu, which opens when clicking with the right mouse button on the title border, to undock the windows. The docking functions are similar to the undocking functions. The colored rectangle indicates in each case the current docking position.

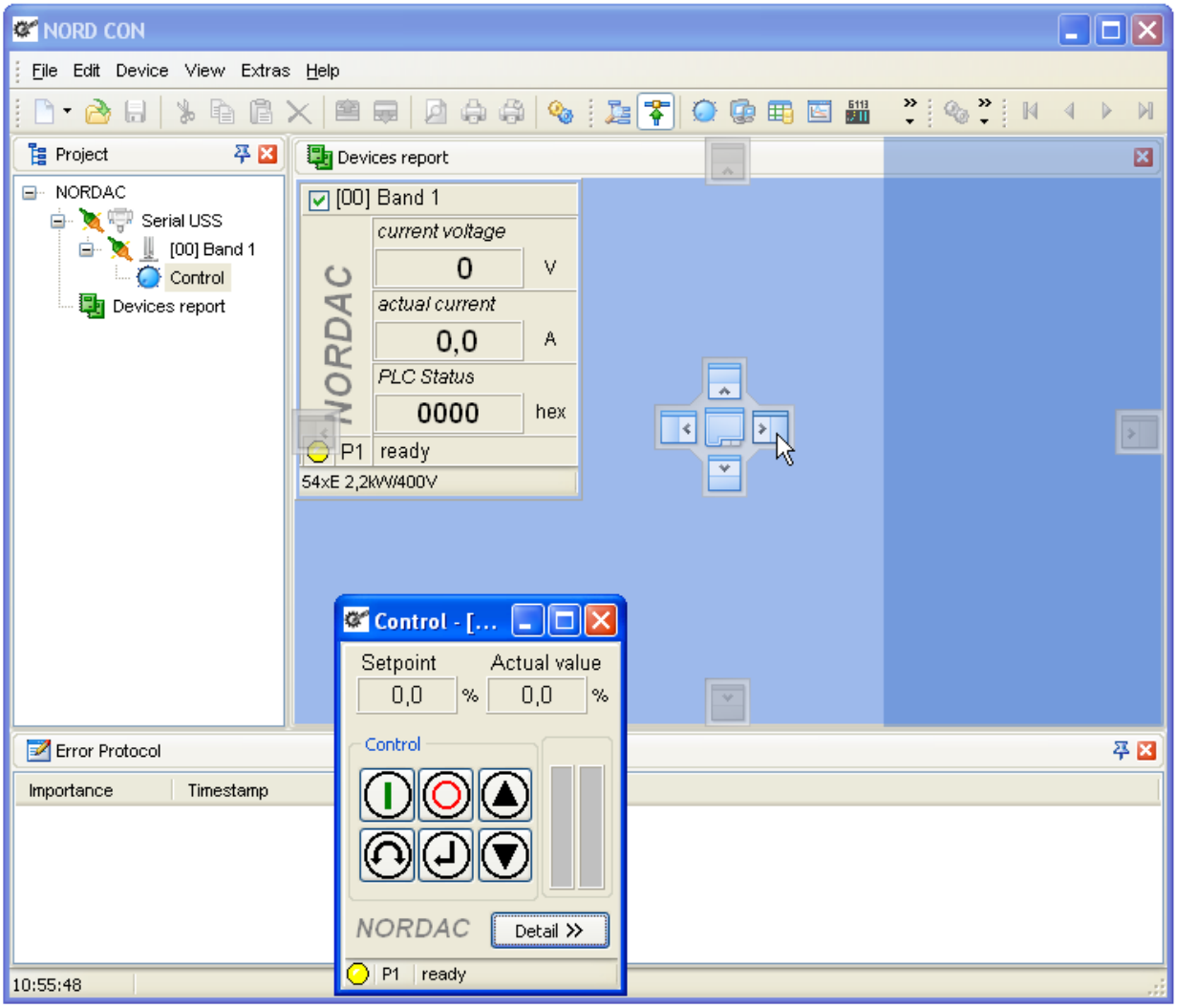
Type of window	Rule
View of main window(e.g. Project, Logs, Remote)	The views of the main window can be docked only to the left, right and/or lower edge of the work area. Within these windows, there are no rules and the user can select the position freely.
Editor window (e.g. Macro editor, Parameter window, Oscilloscope)	The editor windows can only be docked into the work area. The adjustment is fixed however on down and/or above, or as register map.
Views of the Macro editor	The views of the macro editor can be docked only to the macro window. The adjustment here is fixed on left, right or down. Within

Type of window	Rule
	the views, no rules are defined.
Views of the oscilloscope	The views of the oscilloscope window can be docked only to the oscilloscope window. The adjustment here is fixed on left, right or down. Within the views no rules are defined.
„Remote" windows	"Remote" windows can only be docked to the view "Remote". Here the adjustment is fixed on left.

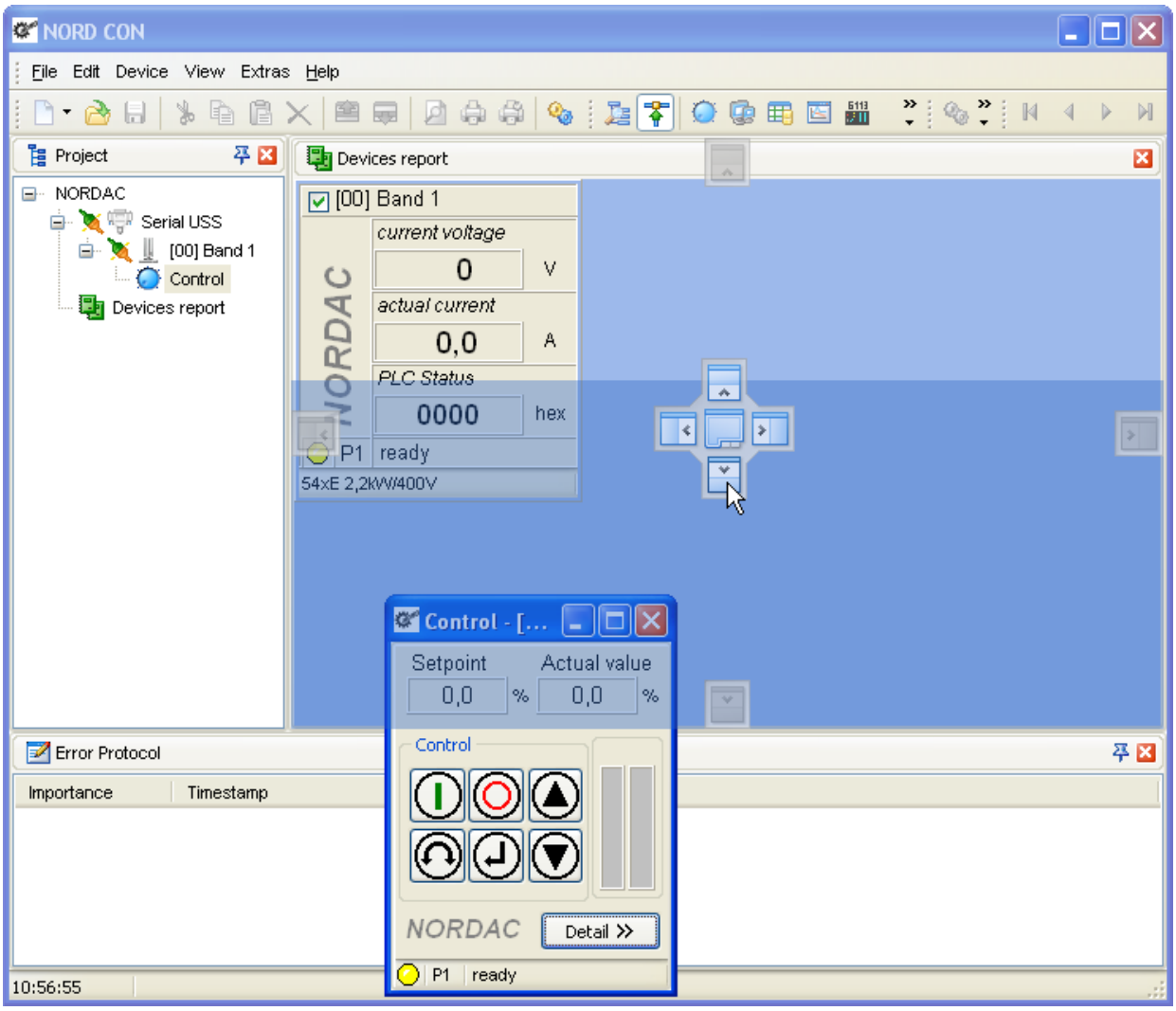
Docking position left



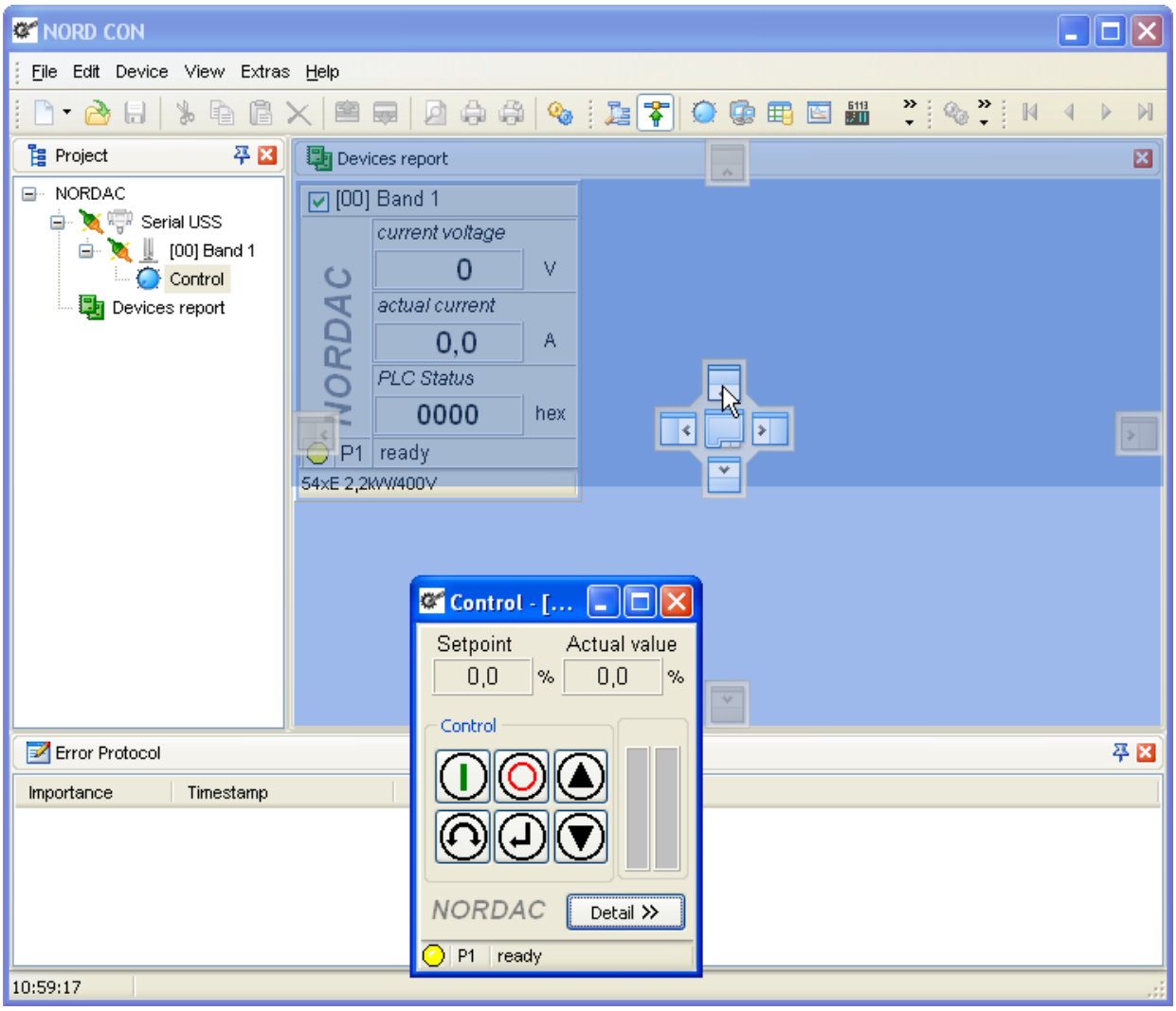
Docking position right



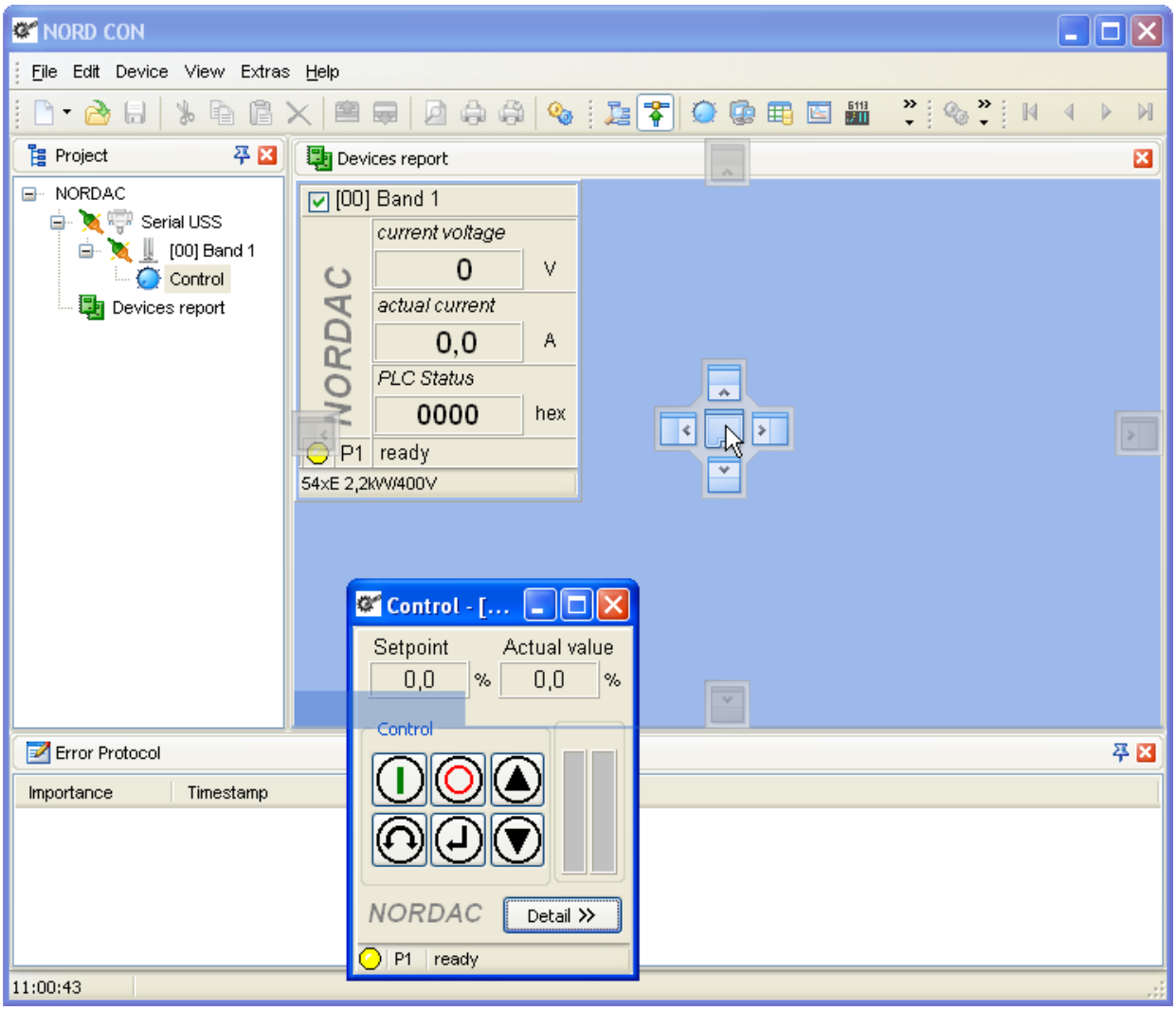
Docking position down



Docking position up



Docking position tab



3 Communication

3.1 Overview

In order to start a connection to a device, you must insert the appropriate communication module in the project. After the installation, a USS module is configured. With the action "Parameterize" the user can modified the parameters of the module.

Presently the following communication modules are supported:

- USS over serial interface

3.2 USS

3.2.1 General settings

Name

In the edit field, the user can assign a name for the communication module.

Port

In the communication window, you can choose the COM-Ports of the computer where the inverter is connected to.

Telegram error

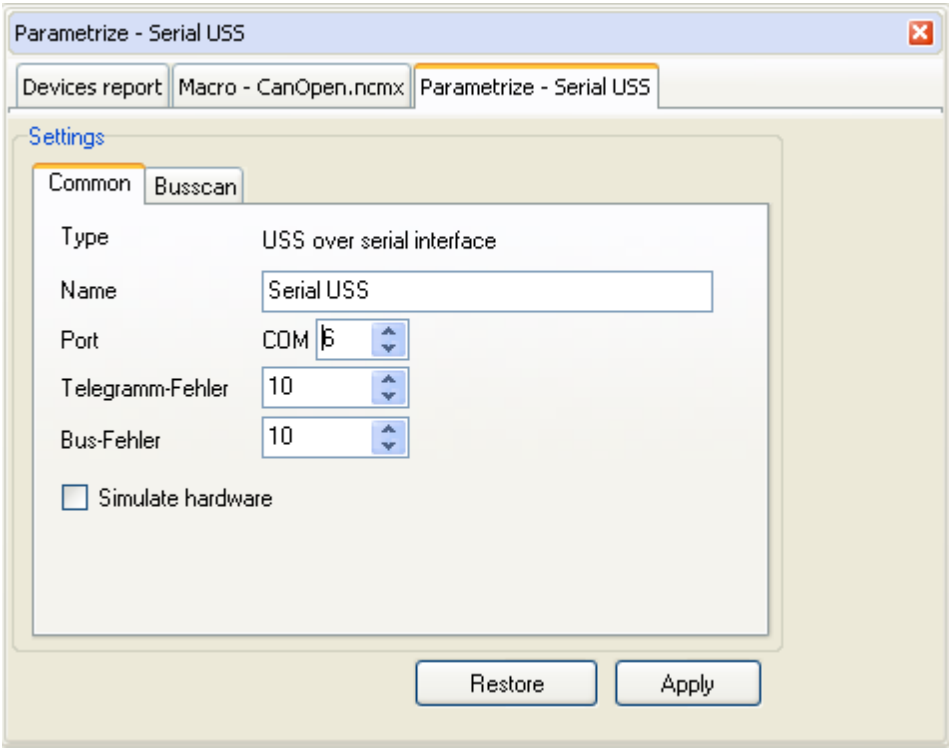
The user defines the max number of allowed telegram errors.Telegram errors occur if the content of a telegram is not correct. That means the answer does not fit to the parameter order. Normally, each parameter order is answered after 2 telegrams. The number of allowable telegram errors is the number of tries before the error message appears.

Bus error

The user defines the max number of acceptable bus errors. The bus error appears in the case when the receiving telegram or the sending telegram was wrong. Incorrect telegrams are ignored. Here you can program the max number of incorrect bus telegrams before the error message is generated. In an installation with many interferring signals, the setting of acceptable errors should be programmed to a higher number.

Simulation of Hardware

With this feature, the user activates or deactivates the simulation of the connected hardware.



Attention:

All changes are only available if the user push the button "apply". With the button "Restore" then user can undo all changes.

3.2.2 Bus scan

Baud rate

In the selection box, the user can choose the communication speed of the serial interface. The same value must be chosen on the frequency inverter. When using multiple frequency inverters, the setting must be identical on all connected devices. The Baud rates over 115200 Bit/s are user specific Baud rates and not by all devices are supported.

Attention	
	**Older serial PC interfaces are sometimes not able to justify the accurate user specific Baud rate. From this reason no connection can be made to the device.**

Bus-Scan with all baud rates

With the action, the user activates or deactivates the bus scan with all baud rates. If the baud rate of the connected device is unknown, the search with all baud rates can find the right one to start communication.

Starting baud rate

In the selection box, the user can define the baud rate for start of the baud rate search.

Starting address

In this field, the USS address can be defined, from where the search run of NORD CON starts to find connected devices. All frequency inverters with lower address cannot be found by NORD CON.

End address

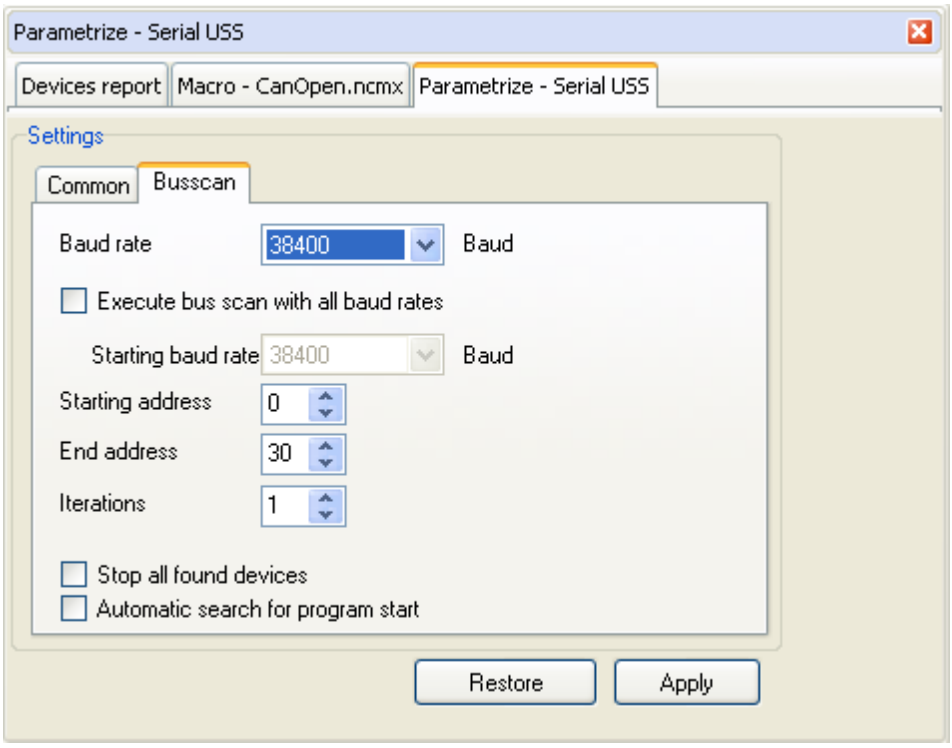
In this field, the user can define the USS address for the ending of the search for connected devices. All inverters with a higher address number cannot be found by NORD CON.

Stop all connected devices

With the action, the user can activate or deactivate the stopping (disable) of connected devices. When this function is active, all enabled devices are stopped if the interface of the device is programmed to "bus".

Automatic device search after start of program

With this action the user can activate or deactivate the automatic device search after start of the program. When this function is active, NORD CON automatically starts the bus scan after the program is started.



Attention	
	**All changes are only available if the user push the button "apply". With the button "Restore" then user can undo all changes.**

4 Parameterization

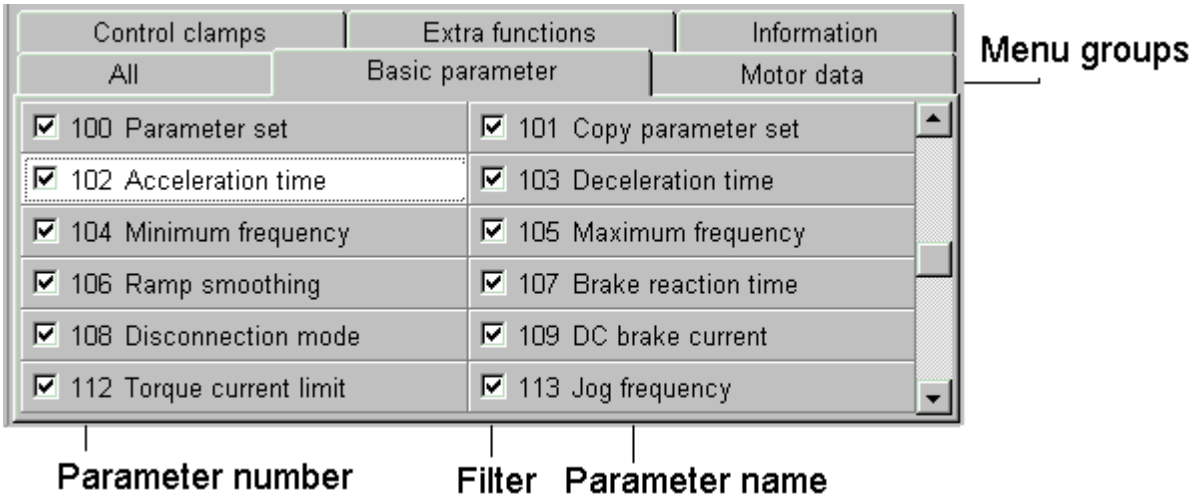
4.1 Overview

All parameters of the frequency inverter that can be changed can also be changed by NORD CON. All of the parameters can be stored and retransmitted to the frequency inverter. Parameters which have been read out can be printed out for documentation purposes.

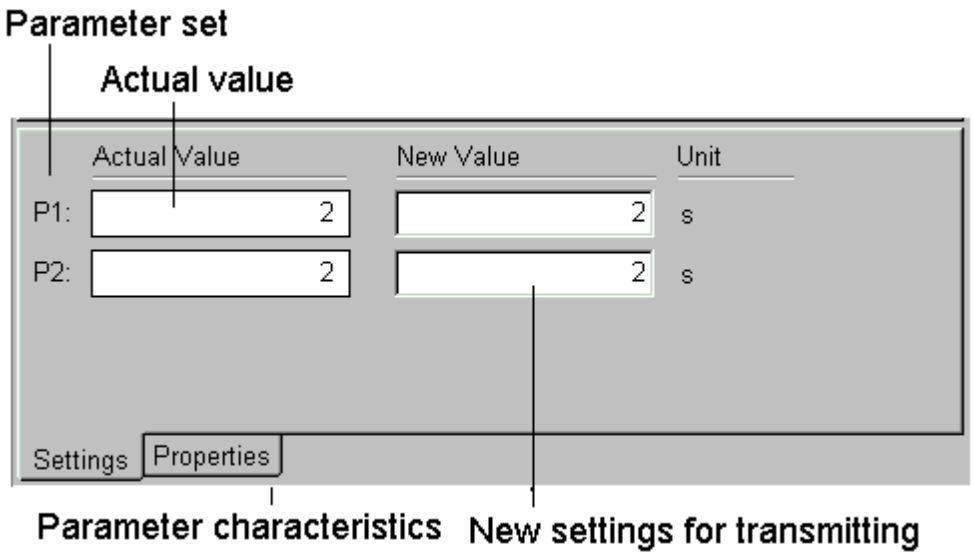
- Parameter Viewing
- How to manipulate parameters
- Selective parameterization
- Off-line Parameterization
- Comparison
- Parameter upload from device
- Parameter download to device

4.2 Parameter Viewing

Each parameter has a parameter name and a unique parameter number by which it can directly be accessed. The parameters are devided into menu groups.



Each parameter has a parameter value and parameter characteristics:



When a parameter has been selected, values of all parameter sets, if it can be set differently in the sets, are displayed.

4.3 How to manipulate parameters

The selected parameter is read out and the value transferred to the 'Current Setting' box. Management of the parameters of a frequency inverter is ensured by databases. These databases can be stored, printed out or manipulated again at a later date.

Note	
	**The menu "Parameterize" is indicated only if a parameter window were marked.**

NORD CON features two ways of parameter manipulation:

Aktion	Place	Description
New	File -> New -> Dataset	The current database is re-initialized, in other words the current and the new settings are deleted.
Open	File -> Open	Any database that was saved can be reopened.
Save	File -> Save	The current database is saved by the current name.
Save us...	File -> Save us...	The current database is saved with a new name.
Print preview...	File -> Print preview...	The current parameter settings are printed out.
Read all parameter or Read all	Parameterize -> Read -> All Parameter	All of the parameters of the frequency inverter are read out and entered into the database.
Read actual menu group	Parameterize -> Read -> Actual menu group	The parameters of the selected menu group are read out and entered into the database.
Send new settings	Parameterize -> Send -> new Values	All parameters for which a new value was entered in the 'New settings' box are transmitted to the frequency inverter.

Aktion	Place	Description
		A selection is possible as to whether this operation is to be performed on all parameters or only on those belonging to the current menu group.
Send Factory settings	Parameterize -> Send -> Reset values	The settings transmitted will be the default settings of all parameters or of the parameters of the current menu group respectively
Selection Enable	Parameterize -> Selection -> Release	All of the parameters (or those included in the current menu group respectively), are enabled.
Selection Disable	Parameterize -> Selection -> no Release	None of the parameters (or of those belonging to the current menu group), are enabled.
Standard	Button "Standard"	The default value is allocated to the currently selected parameter.
Send	Button "Send"	The value "new setting" of the current parameter is transferred to the inverter
Read	Button "Read"	The selected parameter is read out and the value transferred to the 'Current Setting' box.

With the Auto-read option the selected parameter is read out automatically.

4.4 Selective parameterization

NORD CON allows for masking some parameters or other, a feature which may facilitate manipulation or serve the purpose of restricting parameter readout or transmission to those which remain unmasked or in other words have been filtered out.

Note	
	**When a filter has been activated, all operations are executed only on those parameters which are displayed.**

Before any parameter can be masked the enable command must be inactivated. This can be done using the checkbox preceding the parameter, or via the Selection menu. The Filter box provides for the setting options mentioned below :

- Selection only Only the enabled parameters are displayed (i.e. where the check box preceding the parameter was clicked upon once).
- No standard Only the parameters with a value that is different from the standard setting are displayed.

- Info parameters
  - Yes Information parameters are displayed.
  - No Information parameters are not displayed.
  - Only Information parameters are displayed exclusively.

4.5 Off-line Parameterization

Off-line parameterization implies that a database is manipulated which is not allocated to any frequency inverter connected.

Off-line parameterization is started via the database menu in the main window.

Name	Description
New	A new database can be created. The new database is allocated to a frequency inverter type which is set using a selection box.
Open	Any database that was read into memory can be opened and manipulated.

4.6 How to compare parameters

The report shows the differences and/or thing in common of two data record. In principle only data records of one device family can be compared. The parameters are represented in form of a list. If two parameter values are different, the line with a grey bar is marked. Additionally it is examined whether a value differs from the default value. In this case the value is red represented.

Online / Offline compare

Connect the device with NORD CON. Afterwards the parameter window must be opened and it be recommended to readout all parameters. With the parameter filters you can limit the selection of the parameters. Over the menu option " Parameterize - > Compare" you can generate a report. After the call of the function the user must select a stored data record. If the selected parameters are to be used as backup, the user must store afterwards the current data record. Thereupon the report is generated and showed.

Attention	
	As reference for the parameters and the default values the configuration of the equipment is used. A data record with the configuration of the equipment not agrees selected, possibly non-existent parameters are empty represented and marked as difference.

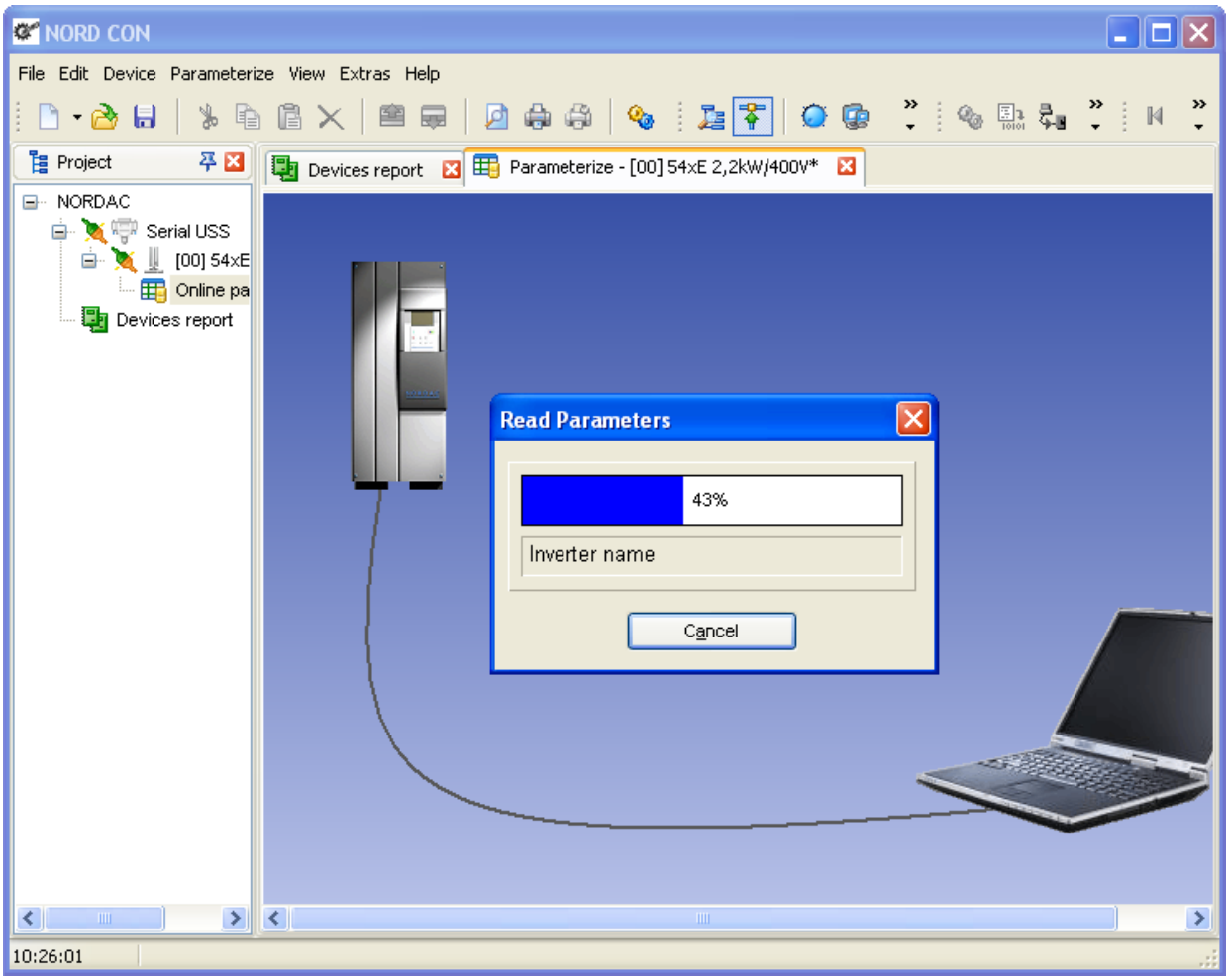
Offline / Offline compare

For the comparison a stored or new data record must be opened. With the parameter filters you can limit the selection of the parameters. Over the menu option " Parameterize - > Compare" you can generate a report. After the call of the function the user must select a stored data record.

Attention	
	As reference for the parameters and the default values the configuration of the opened parameter set is used. A data record with the configuration of the equipment not agrees selected, possibly non-existent parameters are empty represented and marked as difference.

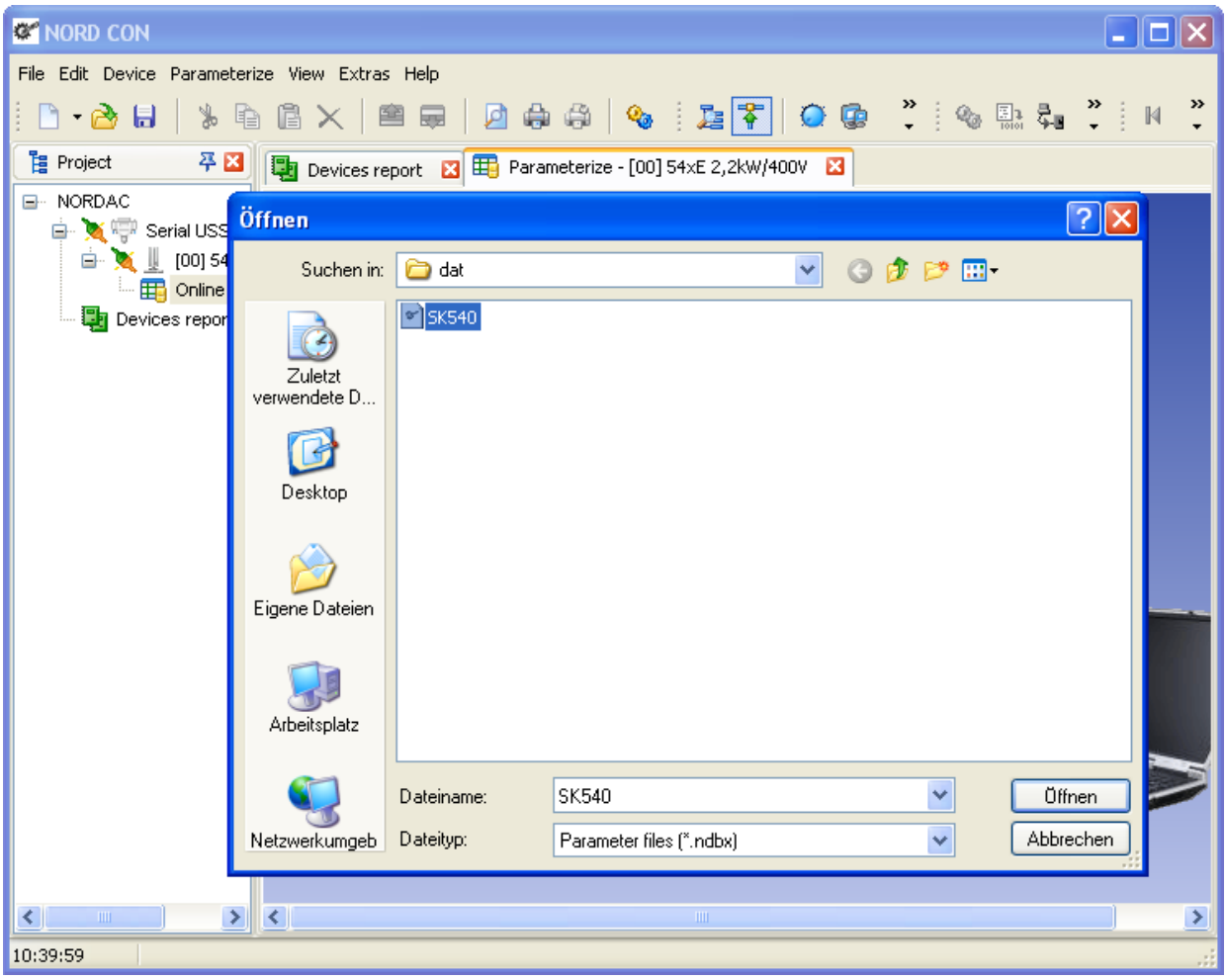
4.7 Parameter upload from device

The function loads the parameters of a device to the PC and then stores the values in a parameter file. The action can be started through the tool bar "Device" or over the menu option "Device/Parameter upload from device". After executing the function that opens following window and the upload the parameter starts automatically. Communication errors occur during the transfer, they displayed in the message window. At the end of the transfer the user prompts one to enter a file name for the file. The user must confirm with "Save" to store the values.



4.8 Parameter download to device

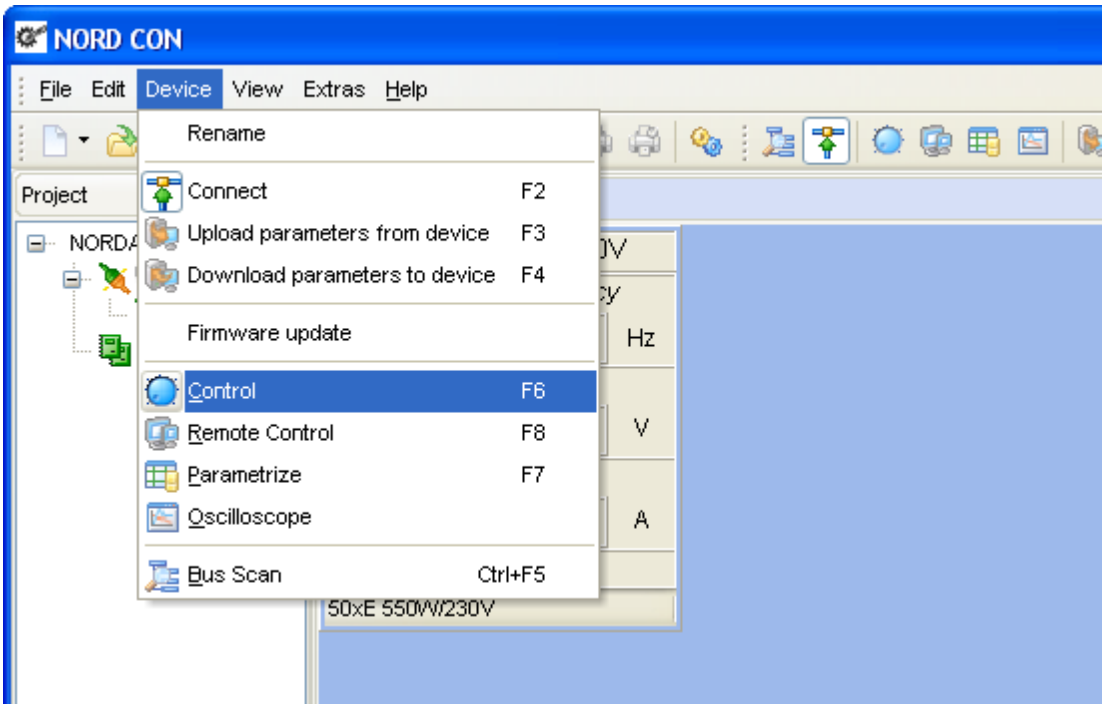
The function opens a parameters file on the PC and sends all values to the device. The action can be started via the tool bar "Device" or "Device/parameter download to the device" menu item. After executing the function, the following window and a file dialog opens. In this dialog selects the user the parameter file and confirm with "Open". The program checks whether the parameter file to the selected device fits. In this case the download will start.



5 Control

5.1 Overview

The program **NORD CON** can be used to control **NORDAC vector Frequenzumrichter**. To use this function the inverter must be parametriesed in the right way. Because of different settings of different inverter types the user must check the manual to find the right settings. Before the inverter can be controlled the Bus-scan must be done. After the scanning process has finished all connected inverter are displayed in the main window. Now the inverter to be controlled can be chosen by mouse click. The window „control" can be opened via "device/ control (F6) in the main menu or via pull-down menu (right mouse click).



Now the control configuration of the inverter is read and checked with the standard setting (setting/control/control configuration check). If the "control" of inverter limited or impossible there will be a warning note on the screen.

In the window „Control" there are two versions available:

Standard	The frequency inverter can be released and the setting value can be increased or decreased. Direction change and error acknowledge is possible, too.
Detailed Control	Mit diesem Fenster können sämtliche Steuerungsmöglichkeiten ausgenutzt werden.

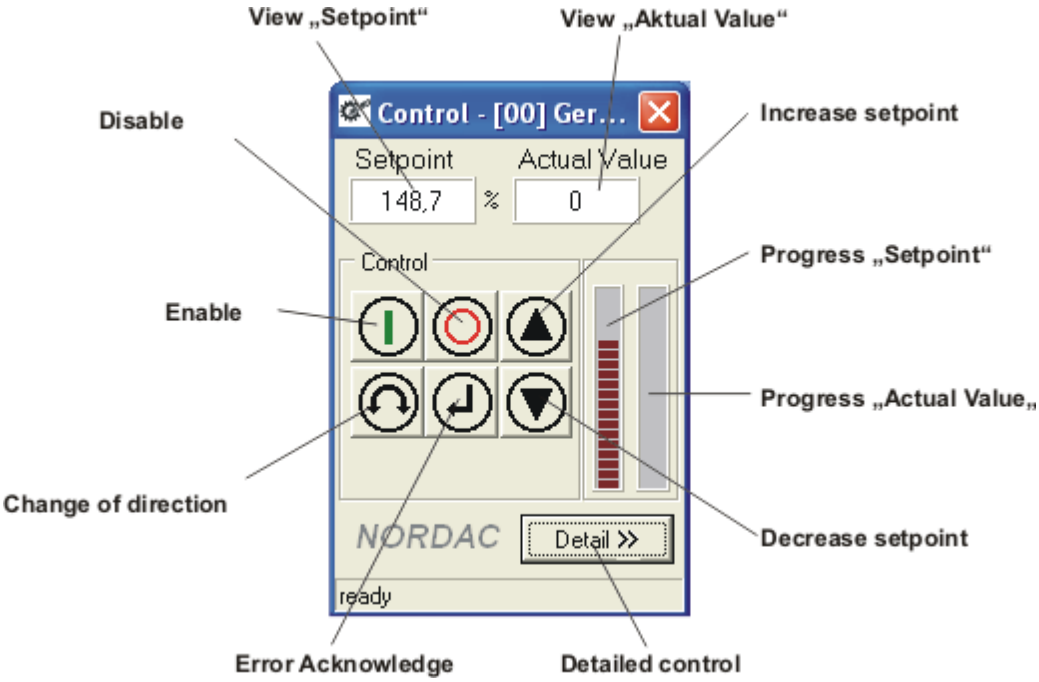
5.2 Standard control

Using the **Standard Control** the following functions are available:

- Enable of the frequency inverter

- Increase or decrease of the setting value
- Change of direction
- Error Acknowledge

To use this functionality, the inverter must be programmed for control via bus. You can find the required parameter and settings in the manual available for each inverter type.



On the „Standard" display only the first setting value and first actual value are displayed. The form of value is fixed for each configuration.

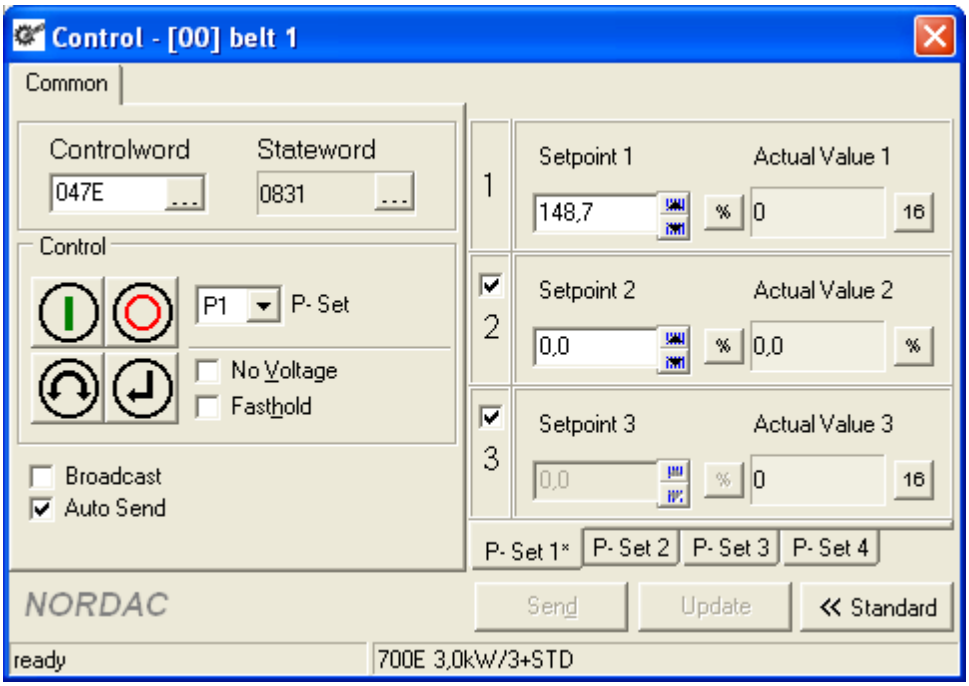
By pressing the button 'Detail' you can switch to the extended control function.

5.3 Detailed control

5.3.1 Overview

In the mode „**Detailed Control**" some extra functions are available:

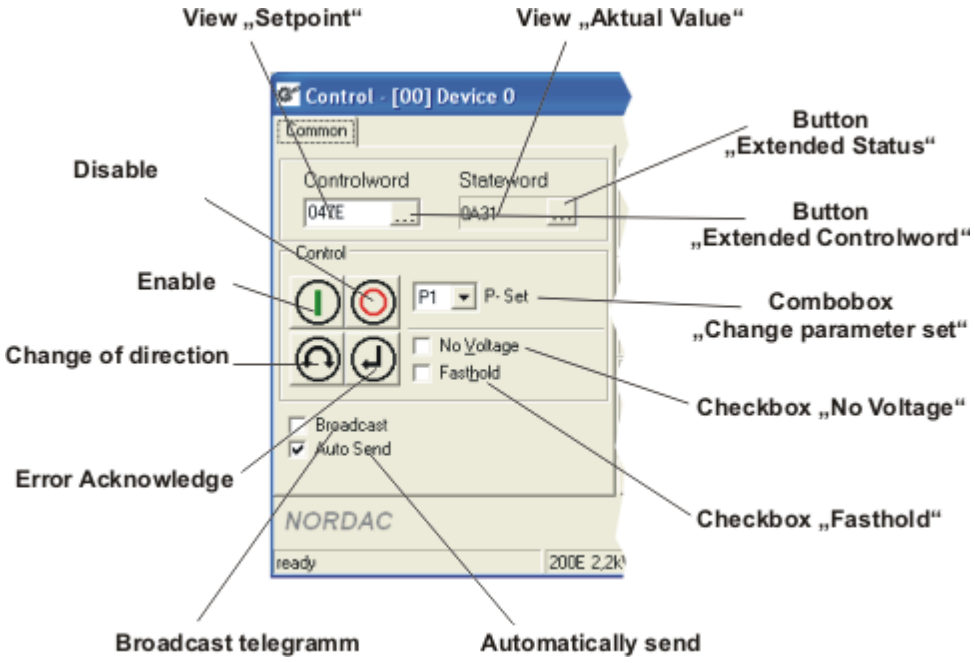
- Setting of control word and display of status word
- Management of setting values and actual values
- Sending of broadcast telegramme
- Choice of different parameter sets
- Automatic sending of control word and setting values



5.3.2 Control

The **controlword** is displayed as a hexadecimal value in the field „control word". By entering a new value (hexadecimal) the user can change the control word. For a bit-coded setting of control word the user can open up a new editorial window by pressing the button "control word edit". In this window the control word is displayed in bits.

The **status word** is displayed hexadecimal in the screen „status word". To display the status word in the bit resolution the button „bit orientated detail view" can be chosen. The status is displayed in the status line of the status machine as clear text.

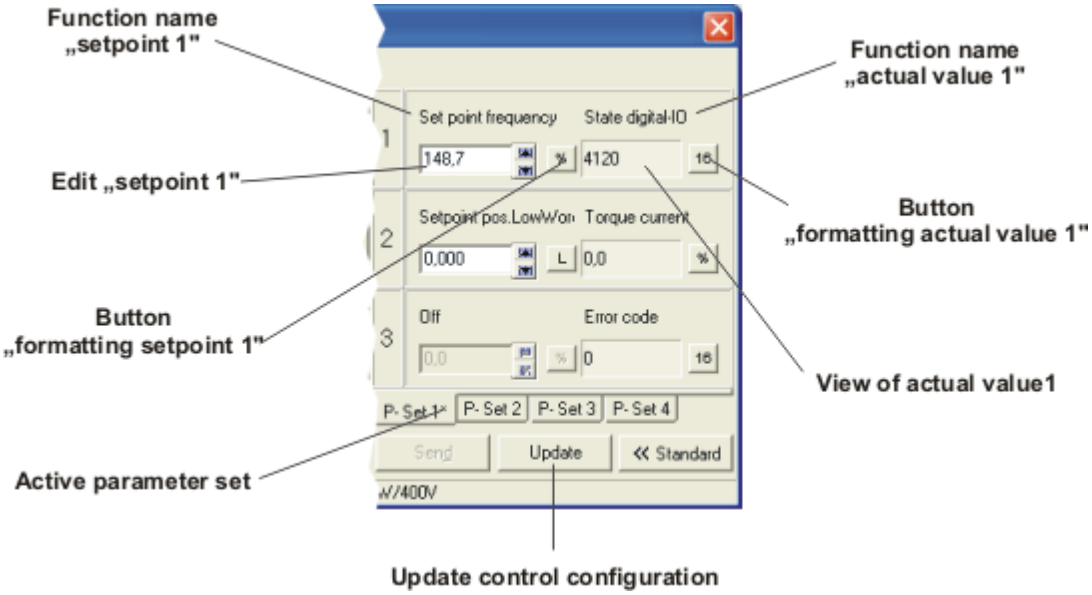


5.3.3 Management of setting values and actual values

For controlling the inverter the user can define up to 3 different setpoints and actual values (see user manual). The setpoints and actual values are displayed according to the formatting (Button „formatting setting value x"). The input of setpoins can be done in same way.

With the option „setting/control/ parameter set individual management" the setting values and actual values can be managed individually. So setting values can be set for each parameter set. With activation of a parameter set its setting values are transmitted to the frequency inverter. This is necessary because for each parameter set the setting values and actual values can be defined individually. The active parameter set is marked with a star.

If the option „setting/control/configuration automatically checked" was not activated, the user can transmit the new configuration by pressing the button „update".



5.3.4 Formatting of Setpoint and/or actual value

Char	Name	Description
"%"	16 Bit standardised values	This standardisation transforms the setpoint/actual value to a 16 Bit standardised value. Standardisation means a scaling of value range and is between -200% and 199% of a basic value (e.g. nominal frequency).
"16"	16 Bit not standardised	By this formatting the setpoint and actual value are transformed to 16 Bit value and transmitted to inverter and displayed without any scaling.
"B"	DigInBits	By this Formatting the setpoint and actual value are transformed to 8 Bit value. The bit status is displayed individual in check boxes. In these check boxes each bit of setting value can be changed.
"L"	32 Bit Low-Word	By this formatting the setpoint and actual value are taken as the low word (16 Bit) of a 32 Bit word..If there is another setpoint or actual value parametriesed with formatting "32 Bit High-Word", then both values are combined in the top display. The setting

Char	Name	Description
		value can be given as a 32 Bit value.
"H"	32 Bit High-Word	By this formatting the setpoint and actual value are taken as the high word (16 Bit) of a 32 Bit word. (see "32 Bit Low-Word").

"P"	16 Bit Posicon Arr control clamps (SK7xx, Vector CT with Posicon)	By this formatting the setpoint and actual value are taken as the „Posicon position array". The meaning of each bit you can find in the Posicon manual. This option is only available for inverter with Posicon functionality.
"I"	16 Bit Posicon Inc control clamps (SK7xx, Vector CT with Posicon)	By this formatting the setpoint and actual value are taken as „Posicon position increment array". You can find the meaning of each bit in the Posicon manual. This option is only available for inverter with Posicon functionality.
"32"	32 Bit standardised (SK7xx, Vector CT with Posicon)	By this formatting the setpoint and actual value is taken as an 32 Bit value without standadisation. This option is only available for inverter with Posicon functionality.

5.3.5 Control word

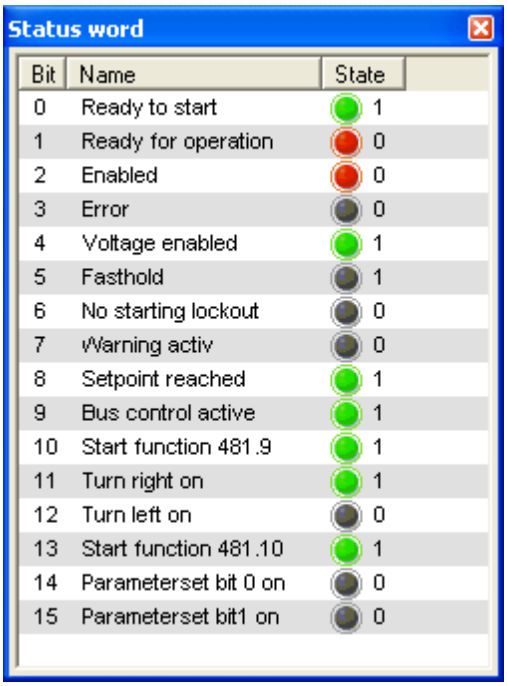
The present status word is displayed with each bit in the window „status word". All bits are listed in a table including bit number, name and status. According to bit value and function there is a coloured LED shown.

Importance of LEDs:

LED	Importance
	The Bit is set and/or the inverter is enabled.
	An error is active or an enable signal is missing.
	The Bit is not set.

With the standard setting the status word is read in cycles and the changes are displayed in the window. For deactivating the cyclic reading switch off the function „automatic" in the menu (right mouse click).

The window is docked left next to the „control" window. If the window should be free on desktop, you should choose the popup menu "docking/no". To save space the window can be added as an index card next to the index card „general". To do this the window must be moved (pressed left mouse button) over the index card "general". After release of the button the window is shown as an index card. With double click (left mouse button) on the index card you get back to window mode.



5.3.6 Status word

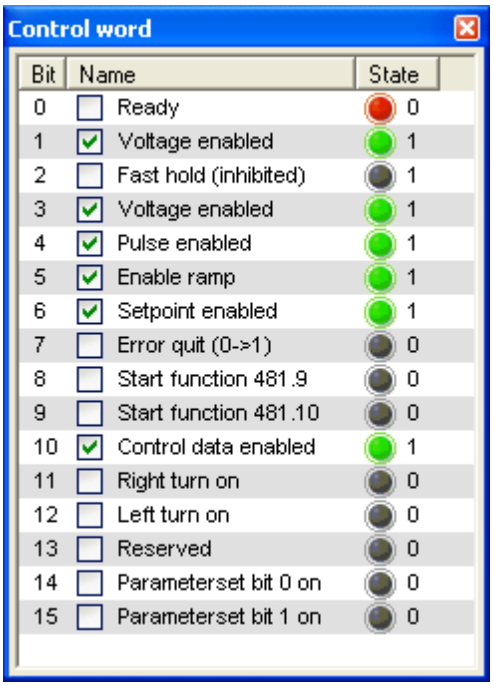
The present control word is displayed with each bit in the window „status word". All bits are listed in a table including bit number, name and status. According to bit value and function there is a coloured LED shown. If inverter is programmed to USS control then the bits can be set by control buttons. Each change of control word is sent immediately to the inverter (see „automatic sending").

Importance of LEDs:

LED	Importance
	The Bit is set and/or the inverter is enabled.
	An error is active or an enable signal is missing.
	The Bit is not set.

With the standard setting the control word is read in cycles and the changes are displayed in the window. For deactivating the cyclic reading switch off the function „automatic" in the menu (right mouse click).

The window is docked left next to the „control" window. If the window should be free on desktop, you should choose the popup menu "docking/no". To save space the window can be added as an index card next to the index card „general". To do this the window must be moved (pressed left mouse button) over the index card "general". After release of the button the window is shown as an index card. With double click (left mouse button) on the index card you get back to window mode.



6 Remote

6.1 Overview

NORD CON can simulate the control unit of the respective frequency inverter. For this purpose the frequency inverter transfers the content of its display to NORD CON. The key functions are simulated on the PC and transmitted to the frequency inverter.

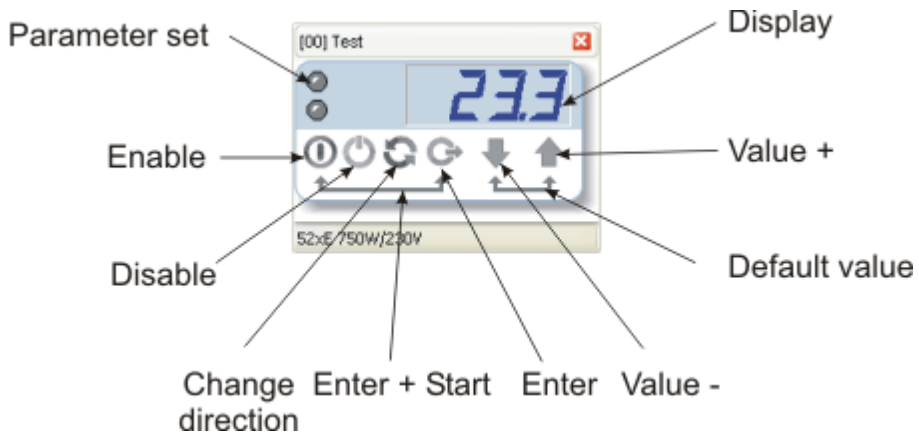
The frequency inverter can only be controlled via the Remote, if it has not previously been enabled via the control terminals or via a serial interface (P509 = 0 and P510 = 0). In addition, for this the parameter “PotentiometerBox Function” (P549) must not be set to function {4} “Frequency addition” or function {5} “Frequency subtraction”.

- Remote Standard
- Remote NORDAC SK2xxE
- Remote NORDAC SK7xxE/SK5xxE/SK300E
- Remote NORDAC vector mc
- Remote NORDAC vector ct

Note	
	**NORDAC vector Frequenzumrichter can be controlled via the keyboard (enable, setpoint +/-, phase sequence etc.). As the timeout monitoring function is not active in this mode, any breakdown of the connection between PC and frequency inverter will make further control impossible.**

6.2 Standard

The standard window for the function "Remote" is used for all Devices, if the option "Use device-specific remote windows" were not activated.

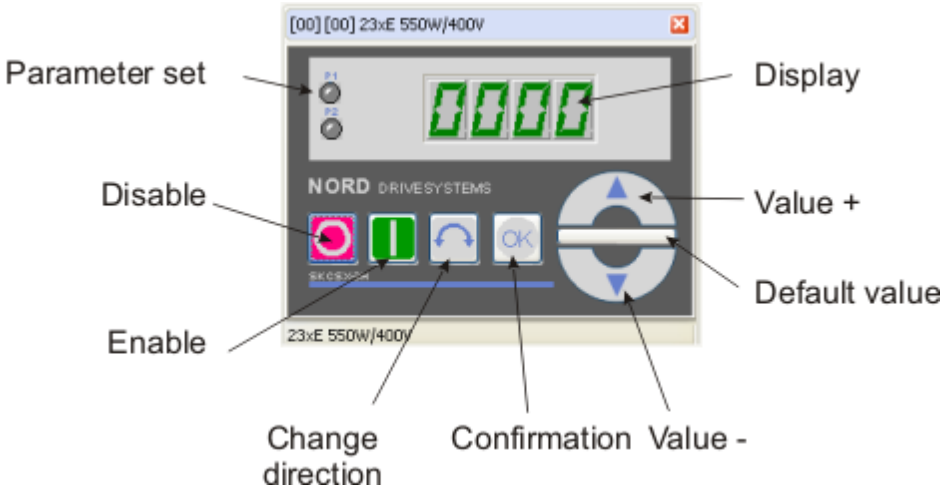


Name	Icon	Description
Enable		Switching on the frequency inverter. The frequency inverter is now enabled with the set jog frequency (P113). A preset minimum frequency (P104) may at least be provided. Parameter >Interface< P509 and P510 must = 0.
Disable		Switching off the frequency inverter. The output frequency is reduced to the absolute minimum frequency (P505) and the frequency inverter shuts down.
Change dir		The motor rotation direction changes when this key is pressed. "Rotation to the left" is indicated by a minus sign. **Attention:** Take care when operating pumps. screw conveyors, ventilators, etc. Block the key with parameter P540.
Up		Press key to increase the frequency. During parameterisation, the parameter number or parameter value is increased.
Down		Press the key to reduce the frequency. During parameterisation, the parameter number or parameter value is reduced.
Enter		Press "ENTER" to store an altered parameter value, or to switch between parameter number or parameter value. **Note**: If a changed value is not to be stored, the key can be used to exit the parameter without storing the change.
Change Dir + Stop		By simultaneously pressing the STOP key and the "Change direction key" , an quick stop can be initiated.
Enter + Start		If the inverter is enabled via the "ON" key, the parameterisation mode can be reached by pressing the ON and ENTER keys simultaneously.

All functions available with the operating unit (control box) of the frequency inverter can be performed.

6.3 NORDAC SK200E

The window for remote control of the frequency inverters of the NORDAC SK 200 E series looks like this:

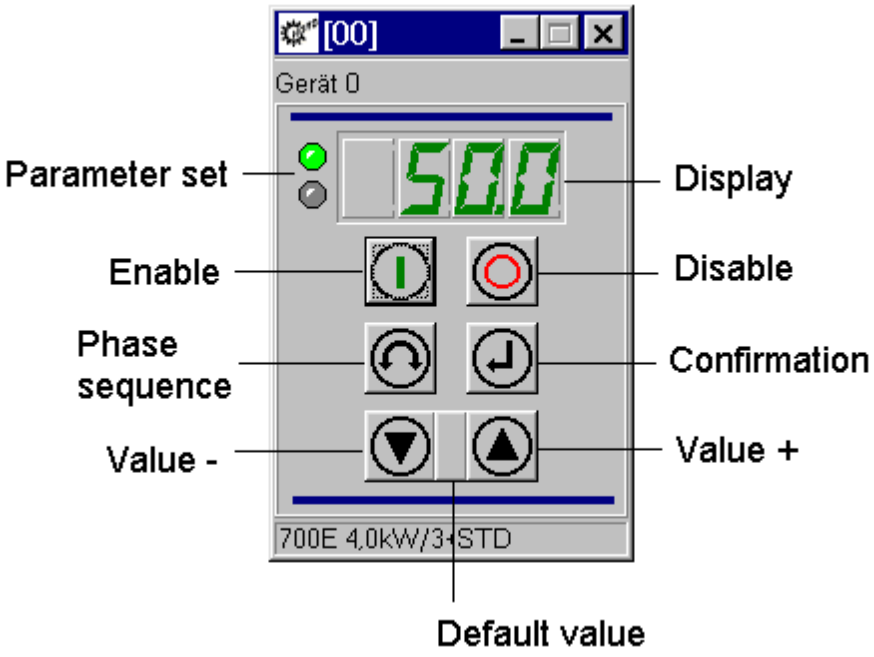


Name	Icon	Description
Enable		Switching on the frequency inverter. The frequency inverter is now enabled with the set jog frequency (P113). A preset minimum frequency (P104) may at least be provided. Parameter >Interface< P509 and P510 must = 0.
Disable		Switching off the frequency inverter. The output frequency is reduced to the absolute minimum frequency (P505) and the frequency inverter shuts down.
Change dir		The motor rotation direction changes when this key is pressed. "Rotation to the left" is indicated by a minus sign. **Attention:** Take care when operating pumps. screw conveyors, ventilators, etc. Block the key with parameter P540.
Up		Press key to increase the frequency. During parameterisation, the parameter number or parameter value is increased.
Down		Press the key to reduce the frequency. During parameterisation, the parameter number or parameter value is reduced.
Enter		Press "ENTER" to store an altered parameter value, or to switch between parameter number or parameter value. **Note**: If a changed value is not to be stored, the key can be used to exit the parameter without storing the change.
Change Dir + Stop		By simultaneously pressing the STOP key and the "Change direction key" , an quick stop can be initiated.
Enter + On		If the inverter is enabled via the "ON" key, the parameterisation mode can be reached by pressing the ON and ENTER keys simultaneously.

All functions available with the operating unit (control box) of the frequency inverter can be performed.

6.4 NORDAC SK 700/500/300 E

The window for remote control of the frequency inverters of the NORDAC SK 700/500/300 E series looks like this:

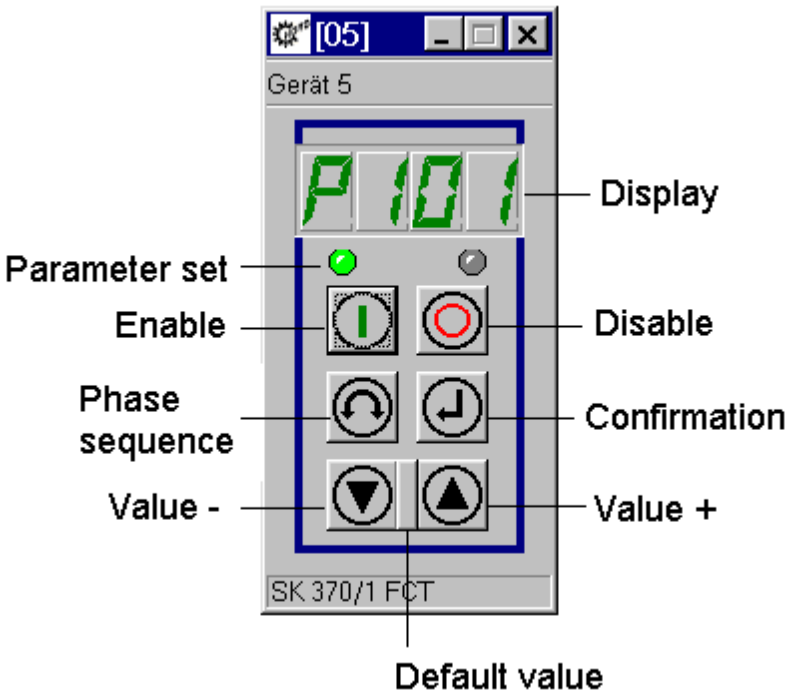


Name	Icon	Description
Enable		Switching on the frequency inverter. The frequency inverter is now enabled with the set jog frequency (P113). A preset minimum frequency (P104) may at least be provided. Parameter >Interface< P509 and P510 must = 0.
Disable		Switching off the frequency inverter. The output frequency is reduced to the absolute minimum frequency (P505) and the frequency inverter shuts down.
Change dir		The motor rotation direction changes when this key is pressed. "Rotation to the left" is indicated by a minus sign. **Attention:** Take care when operating pumps. screw conveyors, ventilators, etc. Block the key with parameter P540.
Up		Press key to increase the frequency. During parameterisation, the parameter number or parameter value is increased.
Down		Press the key to reduce the frequency. During parameterisation, the parameter number or parameter value is reduced.
Enter		Press "ENTER" to store an altered parameter value, or to switch between parameter number or parameter value. **Note**: If a changed value is not to be stored, the key can be used to exit the parameter without storing the change.
Change Dir + Stop		By simultaneously pressing the STOP key and the "Change direction key" , an quick stop can be initiated.
Enter + On		If the inverter is enabled via the "ON" key, the parameterisation mode can be reached by pressing the ON and ENTER keys simultaneously.

All functions available with the operating unit (control box) of the frequency inverter can be performed.

6.5 NORDAC vector mc

The window for remote control of the frequency inverters of the NORDAC vector mc series looks like this:

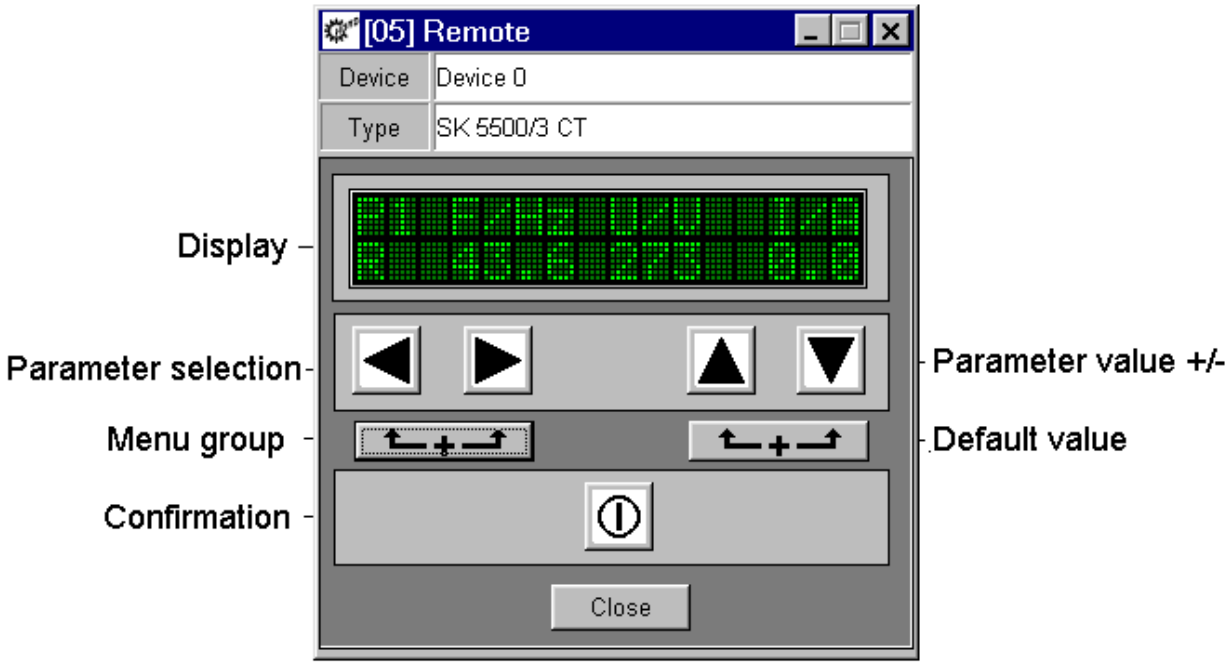


Name	Icon	Description
Enable		Switching on the frequency inverter. The frequency inverter is now enabled with the set jog frequency (P113). A preset minimum frequency (P104) may at least be provided. Parameter >Interface< P509 and P510 must = 0.
Disable		Switching off the frequency inverter. The output frequency is reduced to the absolute minimum frequency (P505) and the frequency inverter shuts down.
Change dir		The motor rotation direction changes when this key is pressed. "Rotation to the left" is indicated by a minus sign. **Attention:** Take care when operating pumps. screw conveyors, ventilators, etc. Block the key with parameter P540.
Up		Press key to increase the frequency. During parameterisation, the parameter number or parameter value is increased.
Down		Press the key to reduce the frequency. During parameterisation, the parameter number or parameter value is reduced.
Enter		Press "ENTER" to store an altered parameter value, or to switch between parameter number or parameter value. **Note**: If a changed value is not to be stored, the key can be used to exit the parameter without storing the change.
Change Dir + Stop		By simultaneously pressing the STOP key and the "Change direction key" , an quick stop can be initiated.
Enter + On		If the inverter is enabled via the "ON" key, the parameterisation mode can be reached by pressing the ON and ENTER keys simultaneously.

All functions available with the operating unit (control box) of the frequency inverter can be performed.

6.6 NORDAC vector ct

The following functions are available for remote control of the NORDAC vector CT series:



All functions available with the operating unit (control box) of the frequency inverter can be performed.

7 Oscilloscope

7.1 Overview

The oscilloscope function integrated inNORD CON can show process data of an NORDAC vector Frequenzumrichter as an arithmetic chart.

Note:

This option is not available in all types of NORDAC vector ct and NORDAC vector mc!

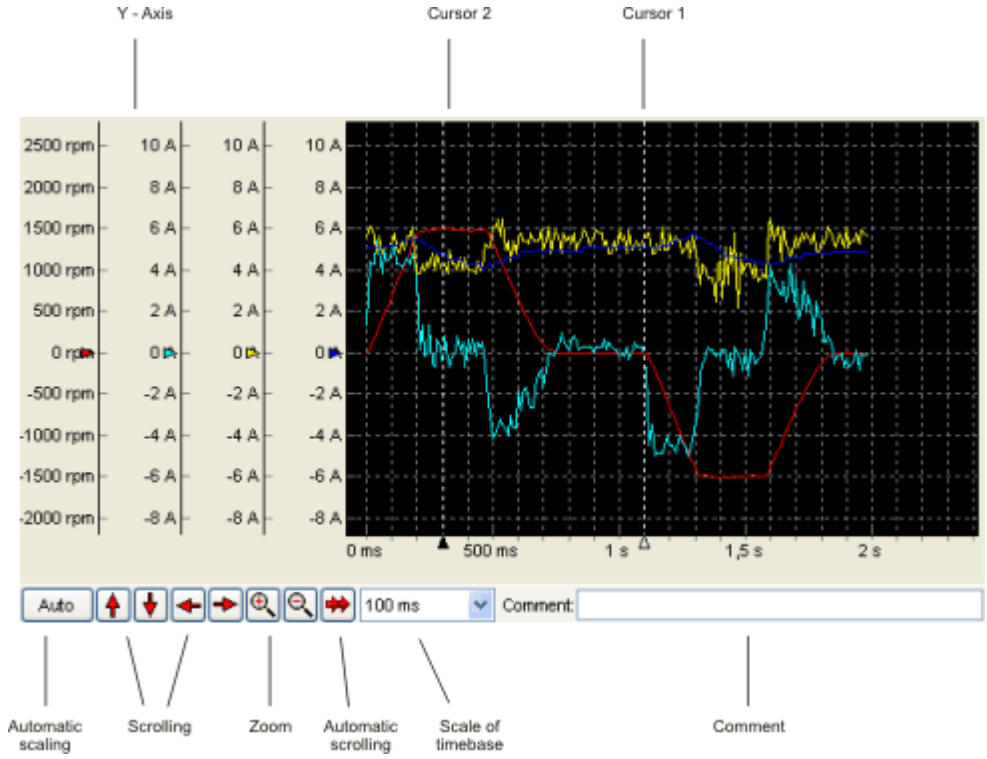
The features of oscilloscope-function are:

- Monitoring of up to 4 channels
- Many different ways of trigger

- Scaling of each measurement
- Calculation of average values, effective value, etc.
- Save, print and export of measurement data

7.2 Display

The oscilloscope function can measure and display 4 channels max:



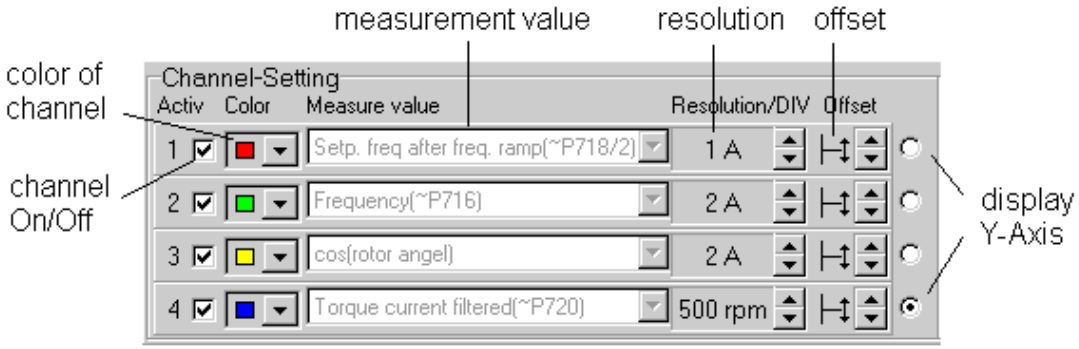
The following settings can be done:

Name	Description
Auto	Automatic Scaling of all measured data
Offset	Selection of display detail (displace of all data in x- or y-direction)
Zoom	Display size (Zoom of all data) **Note**: With the right mouse button you can choose between modi 'Move' and 'Measurement', if the mouse pointer is on the display. In 'Move' mode you can choose the detail of display by mouse pointer by pressing the left mouse button while moving over the display.
Auto scrolling	With this option during a recording the time axis is scrolled automatically to the last point.
Resolution	In this combination field the user can change the scaling of the time axis.
Comment	Additional information field, in that further information to the series of measurements to be stored can (max. 255 indications).
Cursor	Execution of measurement

7.3 Handling

Follow the next steps to execute a measurement:

1. Choise of channels

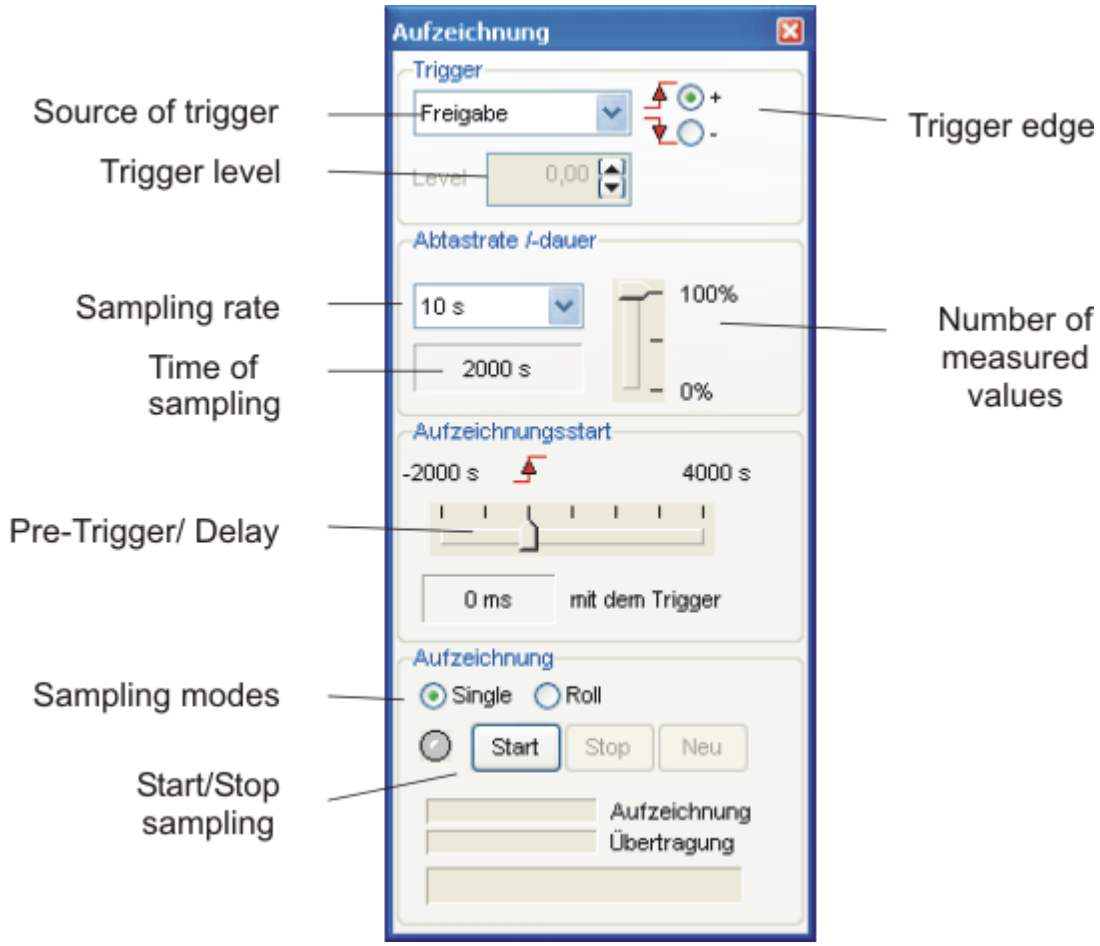


There is a popup menu to make the choice of the 4 channels. There is a color referring to each channel. Each channel can be switched on and off by checkbox's. The resolution and offset can be chosen for each channel separately. Displaying the results of measurement the values of the vertical axis of each channel can be chosen and indicated.

Importance of measure value

Mesure value	Description
(=P[Number]) [Name]	The value of this measuring function is updated in the time slot pattern by approx. 100 ms and corresponds to the value indicated of the parameter.
[Name]	The value of this measuring function is updated in a time slot pattern by approx. 100 ms.
(~ P[Number]) [Name]	The value of this measuring function is updated in a time slot pattern by approx. 50 ms.
(~P[Number]) [Name]	The value of this measuring function is updated in a time slot pattern of approx. 250 µs.

2. Setting of trigger



The trigger starts the measurement. First choose the source of trigger. Trigger sources can be measurement values, digital inputs, status of inverter, etc. The starting conditions are defined by trigger level resp. trigger edge.

ATTENTION	**The increments of the trigger levels are different depending on the trigger source. Therefore not every value can be set. After starting a recording, the closest possible values is calculated and set.**

Time between two measured values is set by sampling rate. Numbers of measured values and sampling rate define the time of sampling.

The Pre-trigger/Delay set the beginning of the measurement in relation to the trigger event.

Note:

The dynamic of measured values defines the best rate of sampling: fast changing values need a low sampling rate. The number of measured values defines the time of sending the values from inverter to NORD CON.

3. Sampling modes

The oscilloscope has 2 differently modes. The user can choose between "Single" and "Roll" mode. The "Single" mode is the standard mode. In this mode starts a recording with the current

trigger settings. The recording time depends on the oscilloscope memory of the device and amounts to max. 2000s. The values are noted in the adjusted sampling rate.

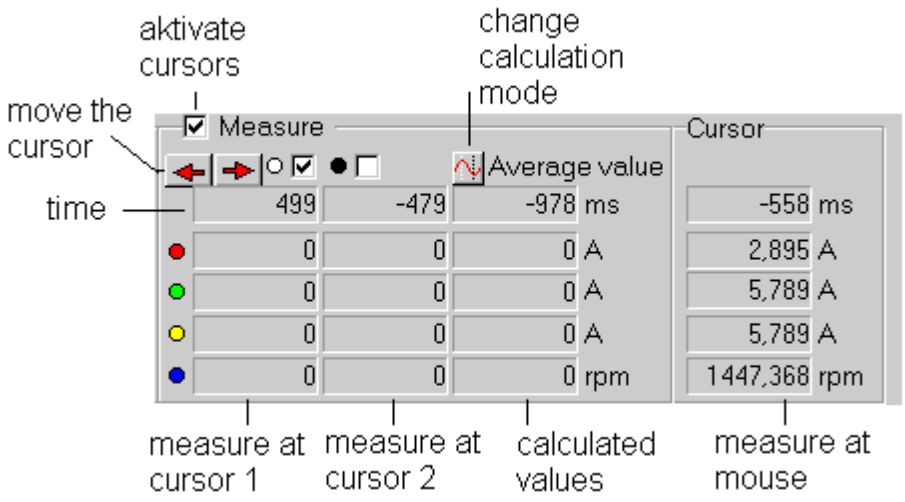
The roll mode makes a recording over larger period. The noted values are transferred immediately to the PC. Therefore the user cannot change the sampling rate. It depends on the speed of the transmission.

4. Starting of measurement

The Start-Button activates the measurement. The event of trigger is detected. When the event appears the record starts in the inverter. The transmission of data to NORD CON starts in the same moment. This can be cancelled by Stop. After transferring all data a new measurement can be started or new settings can be done by pressing the New-Button.

7.4 Measurement

After recording the measurement completely, measurements on the results can be done by cursors.



There are two cursors available for this. The cursors can be moved by  . The choice of cursor is done by  . To choose the mode `move`and `measurement`by right mouse button the pointer has to be on display. In the measure mode the cursors can be set by left mouse button.

The values of the measured lines 1 and 2 are displayed on cursor 1 and cursor 2. Additionally the calculations like average values are performed. Pressing on calculation button starts the shift of calculation.

7.5 Save and Print

The recorded series of measurement can be saved, exported or printed.

Menu item "File"

Name	Description
Open	A stored measurement data file can be chosen and loaded. During loading there is the choice if only the setting should be loaded or all data of measurement.
Save as	The present measurement data and settings are saved with new name.
Export	The data can be exported as graphic file or data table.
Print	The lines of measurement are printed with present settings (colour of background: white).

Scope Offline

In Offline-mode (no inverter is connected) a saved measurement file can be loaded by menuitem File|Open.

8 Macro editor

The macro editor is designed in order to provide simple process cycles. The surface offers the possibility to create a macro by popup menus, toolbars or tool window. The individual instructions can be shifted by drag n drop in the opinion. The built-in functions, as memory and shop macros are integrated likewise into the popup menu. The macros are stored in the standard format „XML ". The format of the previous version can be imported over the menu option "opening" type of file „macro files V1.27".

8.1 Graphic user interface

More views are required for handling of the macro generator additionally to the editor window. These views are available as tool windows. These windows can be docked or undocked to the edge of the main window. With the menu option „view" of the popup menu all views can be opened and closed.

- Window "Variables"
- Window "Properties"
- Window "Log"

8.1.1 Window "Variables"

The view „variables" can be opened and closed over the menu option „View->Macro->Variables ". It is used for debugging. In this window after starting macros all variables and objects macros with current rating are indicated. The expenditure of the value can be stopped in the view „Properties->Display format".

There are the following formatting:

- Decimal

- Hexadecimal
- Binary

8.1.2 Window "Properties"

The view „properties" can be opened and closed over the menu option „View->Macro->Properties". In this window all characteristics are indicated to the current instruction. Depending upon instruction the kind and number of characteristics can be change.

Name	Description
Result	With this characteristic one can change the object to give a new value. Only objects can be selected, which one can assign a new value (e.g. control word, parameter or variable).
Operand	With this characteristic the user can select the object, which is to be used with an assignment or an operation.
Operator	With this characteristic the user can select the object, which is to be used with an assignment or an operation.
Comment	With this feature the user can add a comment to each command.

In the macro variables, control word or status word, setpoints, actual values or parameters are called objects. Each of these objects has different parameters.

Object	Parameter	Description
Variable	Name	The parameter specifies the name of the variable or absolute term. In the selection box all variables already used are indicated. If one would like to put on a new variable, a name not used yet must be registered with case insensitivity.
	Display format	The parameter specifies the display format in the view „variables ". It can be selected between the following representations: • Decimale • Hexadecimale • Binary
Constant	Value	The parameter specifies the value of the absolute term.
	Display format	The parameter specifies the display format in the view „variables ". It can be selected between the following representations: • Decimale • Hexadecimale • Binary
Control word or status word	Node ID	The parameter specifies the USS address of the desired device. **Note**: Since the current control word cannot be read from the device, when starting scheduler the control word is set to 0.
	Display format	The parameter specifies the display format in the view „variables ". It can be selected between the following representations:

Object	Parameter	Description
		• Decimale • Hexadecimale • Binary
Set point and Actual values	Node ID	The parameter specifies the USS address of the desired device. **Note**: Since the current control word cannot be read from the device, when starting scheduler the control word is set to 0.
	Type	The parameter specifies the type of a value (see actual setpoint and actual value types).
	Format	The parameter specifies formatting from set point and/or actual values (see set point and actual value of formatting").
	Resolution	The parameter specifies the resolution to set point and/or actual values. It is used only for the display in the editor.
	Display format	The parameter specifies the display format in the view „variables ". It can be selected between the following representations: • Decimal • Hexadecimal • Binary
Parameter	Node ID	The parameter specifies the USS address of the device.
	ParamNo	The value specifies the number of the parameter.
	Subindex	The value specifies the Subindex of the parameter.
	Resolution	The parameter specifies the resolution to set point and/or actual values. It is used only for the display in the editor.
	Data type	The value specifies the data type of the parameter. In the current devices only 2 data types are used (16 bits Integer and 32 bits Integer).
	Display format	The parameter specifies the display format in the view „variables ". It can be selected between the following representations: • Decimal • Hexadecimal • Binary

Types of set point and/or actual value

Type	Description
Value 1 (16bit)	The 1.2 and/or 3 set point and/or actual value is to be used.
Value 12 (32bit)	The first and second set point and/or actual value is to be used as a 32bit value. **Note**: For this configuration the device must be accordingly configured accordingly (see „ Set point and/or actual value formatting").
Value 13 (32bit)	The 1st and 3rd set point and/or actual value are to be used as a 32bit value. **Note**: For this configuration the device must be accordingly configured accordingly (see Set point and/or actual value formatting ").

Type	Description
Value 23 (32bit)	The 2nd and 3rd set point and/or actual value are to be used as a 32bit value. **Note:** For this configuration the device must be accordingly configured accordingly (see „ Set point and/or actual value formatting").

Formatting of Set point and/or actual value

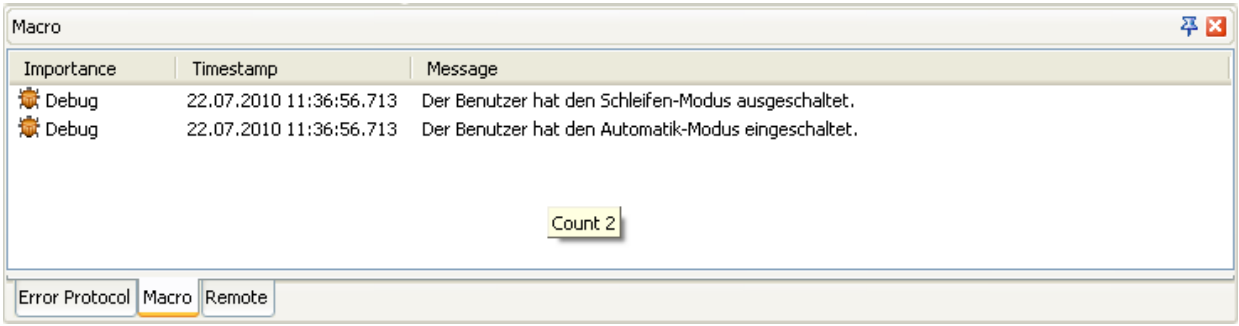
Formatting	Description
Normiert	This formatting interprets the set point and/or actual value as 16 bits standardized value. Normalization means a scaling of the range of values and lies between -200% and 199% of a base value (e.g. nominal frequency).
Unnormiert	IIn this formatting the set point or actual value is interpreted as 16 bits value, which is indicated without scaling.
Lowword (32bit)	This formatting specifies, that the first value is the Low word and the 2nd value is the High word value 12 (32bit). This value can be selected only with the 32bit types.
Highword (32bit)	This formatting specifies, that the first value is the high word and the 2nd value is the low word value 12 (32bit). This value can be selected only with the 32bit types.

Note:

Please consider that the configuration of the device must be identical to the settings.

8.1.3 Window "Log"

All events of the scheduler are stored in log. In order to indicate logs, one must open over the menu entry „View->Log" the view „Log". The window is likewise a tool window and can to the edge of the main window be docked or undocked. In the window all log entries in a sorted list are represented. Here the last entry is in at the beginning of the list.



Name of action	Description
Delete	The action deletes the list.
Save	The action stores the entries into a file.

8.2 Working with macros

8.2.1 Create a new macro

A new document (macro) is generated by the menu option „New" in the context menu. Depending if document was opened before, the macro editor offers a storing of the old document. If the user does not confirm with „Cancel", a new document is generated. At the same time only one document can be opened in the current version.

8.2.2 Open a macro

Opening macros is implemented in the menu option „open" or with the combination of keys „Ctrl+O ". Subsequently, a selection of files dialog opens, in which the user can select the desired macro. If the user would like to open a macro of the previous version, he must change the data type in the selection of files dialog accordingly.

8.2.3 Save a macro

Storing macros is implemented in the menu option „Save" or the combination of keys „a Ctrl+S ". This function is available however only for already generated documents. For all new documents the function must be implemented „Save as… ".

The function is implemented in the menu option „Save as…". Subsequently, a selection of files dialog opens, in which the user must select the file name as well as the path. After the confirmation with „Save" the macro is stored. After the completion of the procedure the new name macros in the title bar is indicated.

8.2.4 Copy from instruction

The function is implemented in the menu option „Copy" or the combination of keys „Ctrl+C ". It copies the marked line into the clipboard of the editor. In the current version in each case a line can be marked. Accordingly an instruction can be copied, too. The exception forms the instruction for block. It can be copied only as a whole.

8.2.5 Cut from instruction

The function is implemented in the menu option „Cut" or the combination of keys „Ctrl+X ". It copies the marked instruction into the clipboard of the editor. With the inserting cut out of the instruction the old instruction is deleted from the document. The restriction to cut only one instruction can exists also with this function.

8.2.6 Paste from instruction

The function is implemented in the menu option „Paste" or the combination of keys „Ctrl+V ". It adds a before copied or low-cut instruction below the current position in the document. The

menu is deactivated if no instruction was copied or low-cut before. In the current version you can insert each copied or low-cut instruction only once.

8.2.7 Delete from instruction

The function is implemented in the menu option „Delete" or the combination of keys „Ctrl + Del". It deletes the marked instruction from the document.

8.2.8 Search and replace

The function „Search and replace" is implemented in the menu „Search and replace" or the combination of keys „Ctrl+H". Then the dialog „Search and replace" opens..Here you can insert the search and replacement vocabulary and start the change procedure.

8.2.9 Shift up a instruction

The function is implemented in the menu option „Up". It shifts the marked instruction a line upward. If the top line of document is marked no action is implemented. Shifting of instructions can be done by drag n drop with the mouse, too.

8.2.10 Shift down a instruction

The function is implemented in the menu option „Down". It shifts the marked instruction one line downwards. If the last line of the document is marked no action is implemented. Shifting instructions can be done by by drag n drop with the mouse, too.

8.2.11 Generate new instructions

Generating of new instructions can be done in the menu option „Functions" in the context menu. The new instructions are always inserted below the marked line. Subsequently, the user can change the position of the new instruction (see „Upward and downward shift").

The following functions are to the user at the disposal in this version:

Name	Description
Allocation	The instruction assigns a new value to a macro object. The new value can be picked out from another object, or the user defines a constant. According to standard the line is inserted in the example 1. The parameters of the function can be changed in the view „Properties". **Example**: Device 00 Control word = 047F hex // Assign to the control word the value 1151

Name	Description
	Var1 = Device 00 Status word // Assign to the variable the value of the status word **Note:** *An assignment of desired values can be implemented only within an instruction for block.*
Jump mark	The instruction defines a jump mark in macro. With the help of the function „Goto" you can jump to the place of the jump mark. According to standard the line is inserted in the example 1. The parameters of the function can be changed in the view „Properies". The name of the jump marks are to be changed in any case, as double names causes problems. The generator always jumps to the first branch mark in the macro. **Example:** Label1: // Defined the label „Label1"· **or** Start: // Defined the label „Start"
Sleep	The instruction produces a break in the expiration macros. The time base is in „ms ". According to standard the instruction is inserted in the example 1. The time can be changed in the view „Properties". **Example:** Sleep 1000 ms // Wait 1s **or** Sleep 500 ms // Wait 0,5s
Goto	The instruction generates a jump in the macro. After activation of this instruction the generator jumps into the line of the jump mark with the contained name. If the generator does not find a label with the name, the line is ignored. Still if no label is defined in the macro, the menu entry is deactivated. According to standard the first label is always registered. The names of the label can be changed in the view „Properties". **Example:** Goto Start // goto jump mark „Start"
Condition	The instruction produces a conditioned jump in the macro. If the condition is true then the generator jumps into the line of the jump mark with the name. According to standard the line is inserted in the example 1. The instruction can be changed in the view „Properties" **Example:** if Device 00 Controlword == 047F hex then // Status word is of value 1150 Goto Start // then go to jump mark „Start"
Block	The instruction makes it possible to increases assignments in an instruction to implement. These assignments are limited to the objects „control word" and set point values". Depending upon configuration of the device and intended purpose the user can select between „control word with 1 set point value" , „control word with 2 set point values" or „control word with 3 set point values ". **Example**: · Block Device 00 Controlword = 1151 // assign to control word the value 1150 Device 00 Setpoint1 = 20,0 // assign to setpoint 1 the value 20
Mathematics and logic	These instructions realize some simple mathematical and logical operations of objects. The computed value is assigned afterwards to an object. The instruction can be changed in the view

Name	Description

function	„Properties"
	
	Example:
	Var1 = Device 00 Controlword + 047F hex // Addition ·
	Var1 = Device 00 Statusword AND 047F hex // logic „And "

8.3 Scheduler

The scheduler controls the sequence of the macros. For the module there are two options.

Auto

With this option activated (automatic mode) after starting the scheduler line for line is processed. If it is deactivated (single step mode) (menu entry „Next" or combination of keys „F12 ") you must run each instruction manually.

Loop

With this option activated the macro in a continuous loop is implemented. That means after doing the last instruction the scheduler jumps back to the beginning of the

macro.

Used topics:

Run a macro, Cancel a macro, Execute next instruction

8.3.1 Run a macro

The scheduler is started in the menu option „Start" or the combination of keys „F9 ". The automatic mode is actively processed now line for line now. In the single step mode after starting only the first line is implemented. For the next lines the user must call in each case the action „next ones ". The scheduler can be started only again if the macro was processed or the user has canceled the expiration. While the scheduler runs the characteristic of the instructions cannot be changed.

8.3.2 Cancel a macro

The scheduler is terminated in the menu option „Cancel" or the combination of keys „F11 ".

8.3.3 Execute next instruction

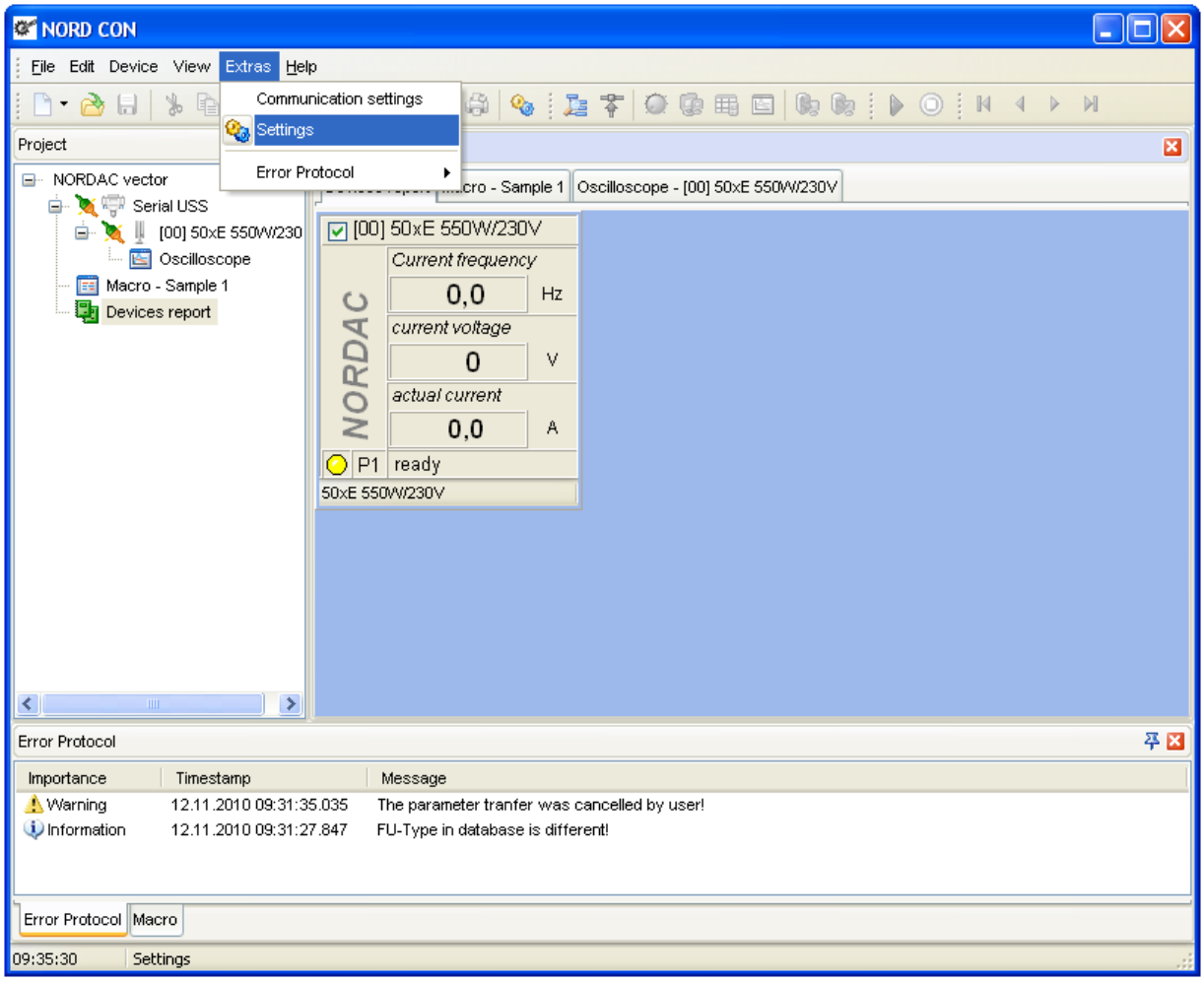
This function can be found in the menu option „Next" or with the key „F12 ". It is available only in the single step mode and instructs the scheduler to implement the next instruction in the macro. If the last instruction was implemented, the scheduler is terminated automatically.

9 Settings

9.1 Overview

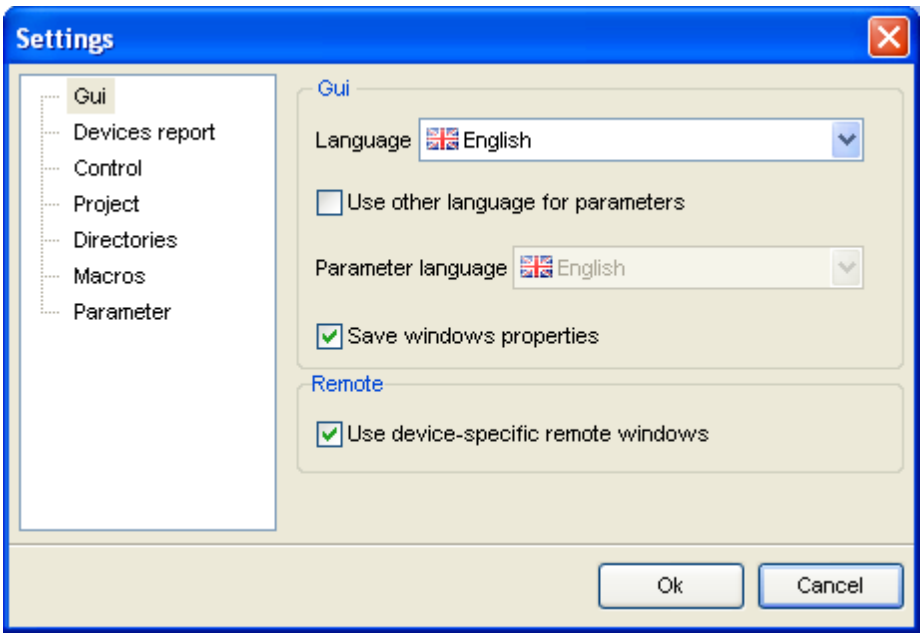
The user can change the current program settings with the menu option "Extras->Settings". The attitudes are divided into the following categories:

- Interface
- Device report
- Control
- Communication
- Project
- Directories
- Macro editor
- Parameter



9.2 Interface

In this category the user can change the settings of the user interface. The following options are available:



Language

With this option the user can choose the language for the interface.

Use other language for parameter setting

With choice of this option the user can choose a different language for the parameter names in the dialog "Parameterisation" in the choice box "Parameter language".

Parameter language

With this option the user can choose a different language for the parameter name in the dialog „Parameterisation". This choice is activated by the option "**Use other language for parameter setting**".

Save window setting

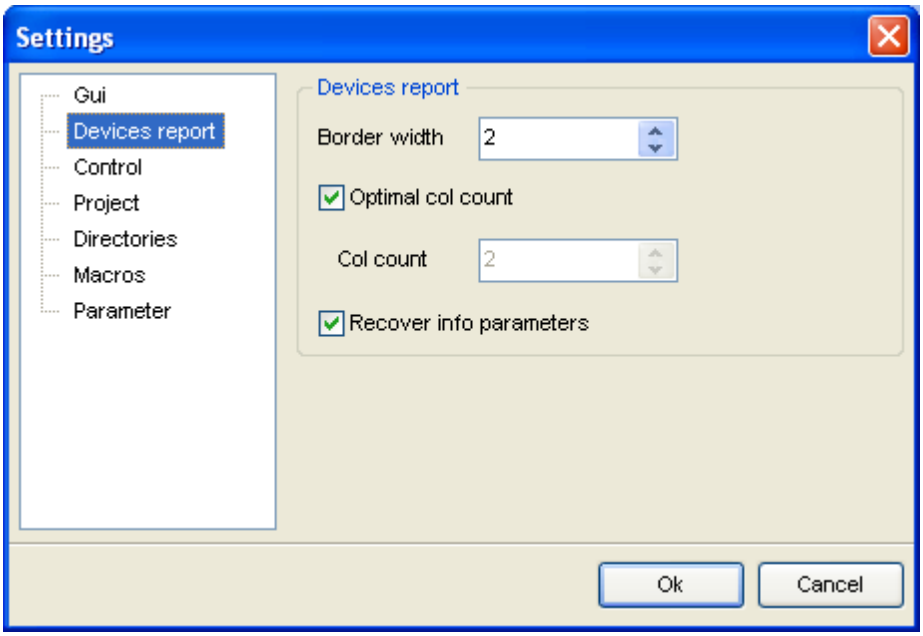
By activation of this option the window settings like position and size is stored and re activated after opening again.

Use device-specific remote windows

If this option is activated, for each type of device special remote windows are produced. Otherwise the standard window is used.

9.3 Device report

In the category the user can change the settings of the window "Device overview".



Border width

With the parameter the user can change the border width of the device display. A value can be set between 0 and 10 pixels. More largely or if smaller value is registered, the largest or smallest value is used automatically.

Optimal number of columns

If this option is selected than the application calculates the optimal number of columns.

Number of columns

With this parameter the user specifies a firm number of columns. The value can be set between 1 and 10. If a larger or smaller value is registered, the largest or smallest value used automatically.

Attention:

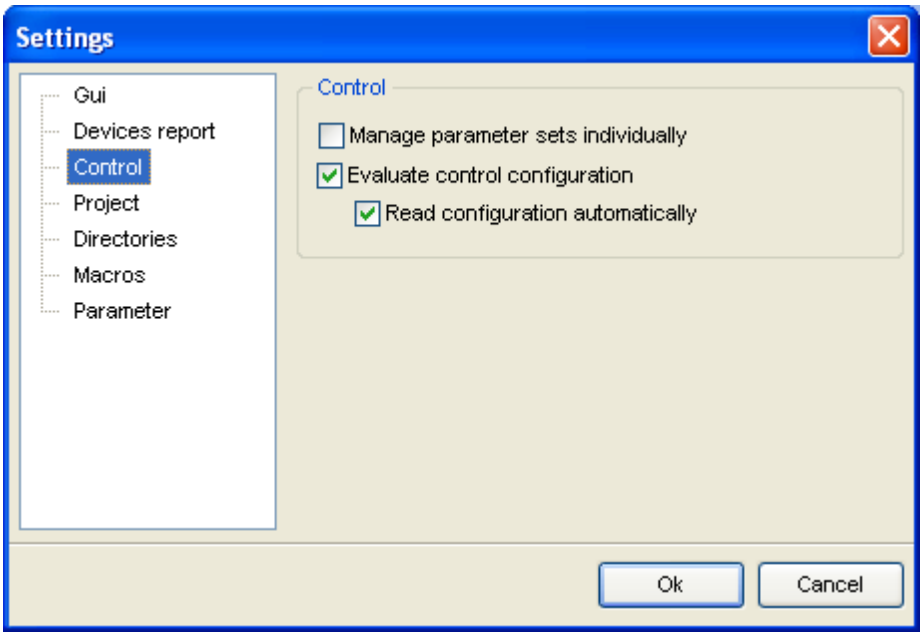
This parameter can be only changed, if the option "optimal number of columns" was not selected.

Recover info parameters

If this option is selected, the adjusted info parameters of the device are stored and restored with a bus scan or a restart of application.

9.4 Control

In the category „**Control**" the user can change the settings of the „control" window.



Manage parameter sets individually

By activation of the option the setting values and actual values are managed individually in the window „control".

Evaluate control configuration

The option activated or deactivates the control configuration. With this function being active some functions are released or blocked after checking the configuration. Additionally the names of the parameterised setting value functions or actual value functions are displayed in the window in cleartext.

Read configuration automatically

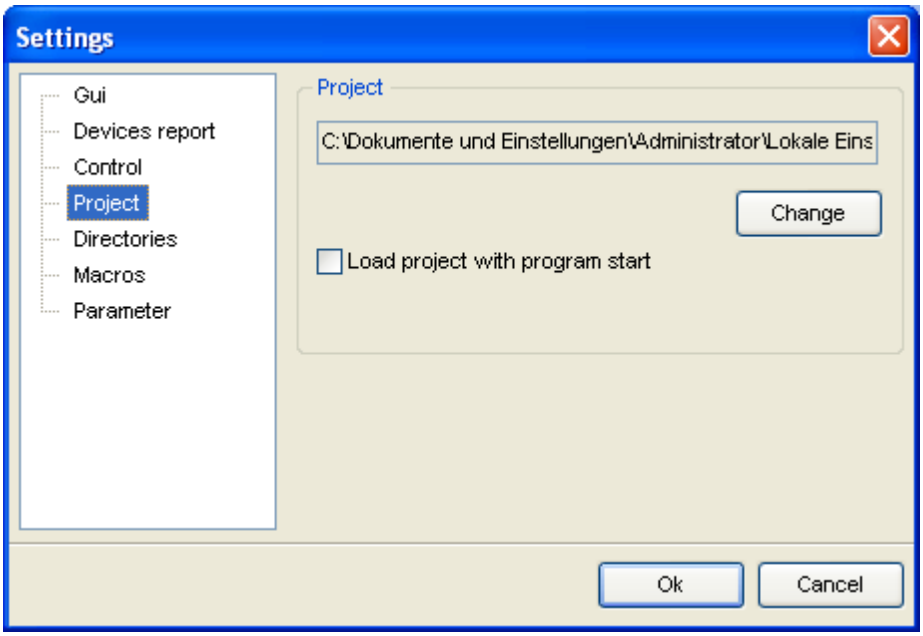
The option activates or deactivates the automatic checking of the configuration. With this function activated the control configuration is checked again after focusing of the window.

Note:

The function "Evaluate control configuation" is not available in all devices!

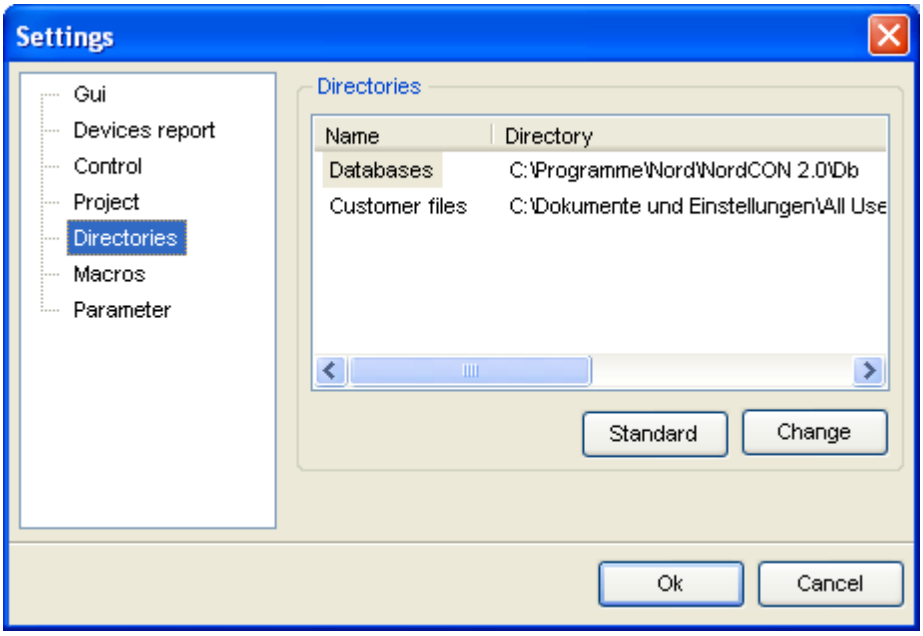
9.5 Project

In the category „Project" the user can define the path of the project file. This file stores settings like used interface, bus scan settings, devices names, etc. By choice of an exisitng file old settings might be used.



9.6 Directories

In this category you can set the directories, where the parameter data base, configuration files, macro files and internal data bases are stored. To change one of the paths choose the directory in the list with left mouse button and choose the new path by pressing the button „change". With the buttons „**Standard**" you can choose a standard directory for each directory.



Parameter date bases

The changed parameter data bases are stored inside this directory.

Configuration files

These files contain all settings (e.g. used interface, bus scan settings, device name, etc.).

Macro files

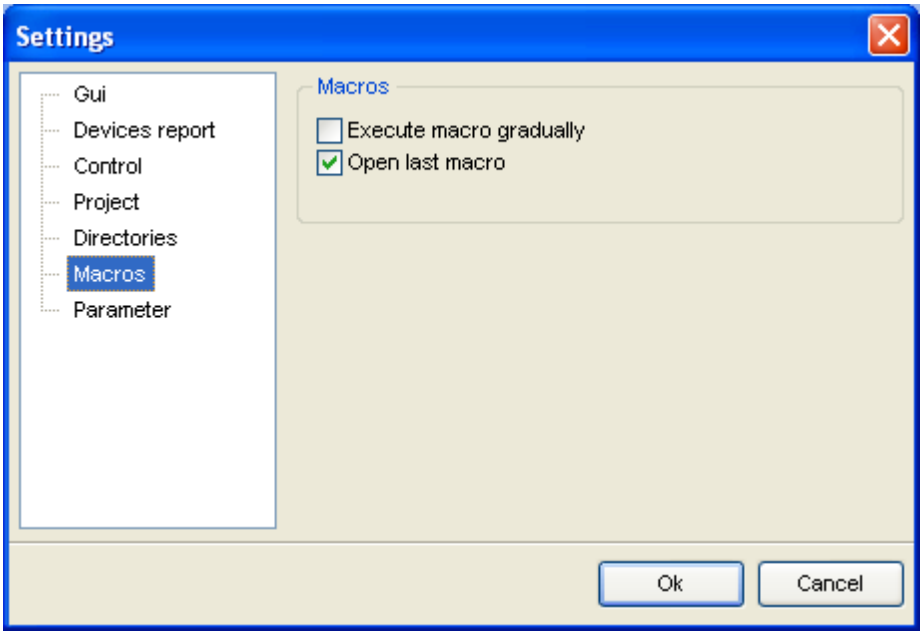
In these Files macros are stored.

Internal data bases

These files are used for internal program run. Here the parameter structure of the inverter types is provided.

9.7 Macro editor

In the category you can do settings of macro editor.



Macro execution step by step

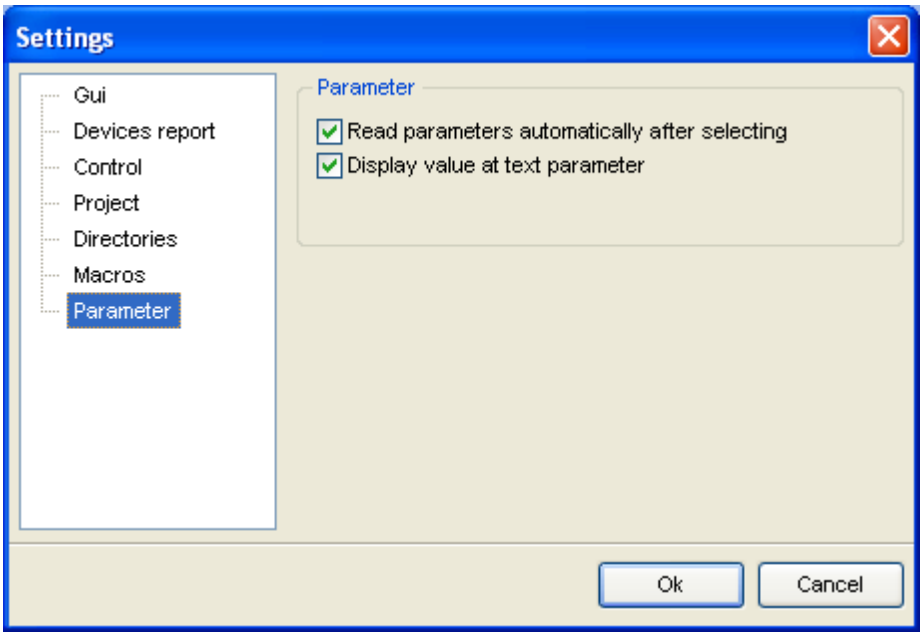
The option activates or deactivates the macro execution step by step. With this option being activated each macro step must be activated separately (cycle/start).

Open last macro

The option activates or deactivates the function to load the last opened macro.

9.8 Parameter

In the category you can choose settings of the parameter window.



Read parameter automatically after selection

The option activates or deactivates the automatic reading of a parameter after selecting.

Show also the value with text parameter

The option activates or deactivates the display of numerical value with a text parameter.

10 Messages

10.1 Errors and informations

When a fault has occurred, the number of the error by which it is registered in the program is displayed along with a concise error information.

The error messages are to be interpreted as follows:

No	Description
100	Parameter num. inadmissible
101	Parameter Value cannot be changed
102	Parameter limit exceeded
103	Error in sub-index
104	Not an array
105	Description cannot be changed
106	Description data does not exist
107	Time out receive data
108	Time out send data
109	Error in receive data
110	Different order and answer
200	Could not open serial port!
201	Could not close serial port!

No	Description
202	First close old serial port!
203	Serial port is not open!
204	The settings of the communication module could not be set. Examine whether the current baud rate are supported.
205	Buffer setup impossible!
206	Timeout setup impossible!
207	Communication not possible!
208	Internal object error!
210	Error writing file!
211	Telegramm not created!
212	No high-resolution Timer found!
213	No device found!
214	Only with 16 Bit SetPoint!
215	Inverter is running. Close ?
216	The firmware update can only be executed if the device address is zero!
217	The firmware update tool could not be started! Please install NORD CON again, in order to repair the problem.
218	Please add a communication module!
219	Do you want to import the file into online view?
220	Here no device can be added!
221	Were found more to than 1 device at the bus! An update could cause problems. Would you like to continue?
222	It comes to the inconsistency of the control data, if you use macros and control windows simultaneously! Please close all control windows or the macro editor.
223	The transfer cannot be started, because the parameter editor is opened! Please close the editor and restart the function.
224	The on-line help could not be found! Please install NORD CON again, in order to repair the problem.
225	The device cannot be disconnected, because still at least one window of the device is opened.
226	The file cannot be opened. The format of the file is unknown.
227	The file could not be read!
228	The format of the file is unknown!
229	The file was changed by the user!
230	The action cannot be executed, because the device is not connected!
231	The settings were changed. Would you like to store the changes?
232	Their computer does not support Chinese characters, therefore representation error can occur!
233	The value cannot be converted into INT16!
234	The current version of the device does not support a firmware update over the system bus!
235	The current version of the technology box does not support a firmware update over the system bus!
236	The device at address 0 doesn't support a firmware update over the system bus!
300	The path for the internal database have got to correct!
301	The path for the internal database is not correct. NORD CON will abort.
302	Error while open database!
303	FU-Type in database is not compatible!
304	FU-Type in database is different!
305	Save actual database?
306	Cannot open database!
307	Unallowed folder!

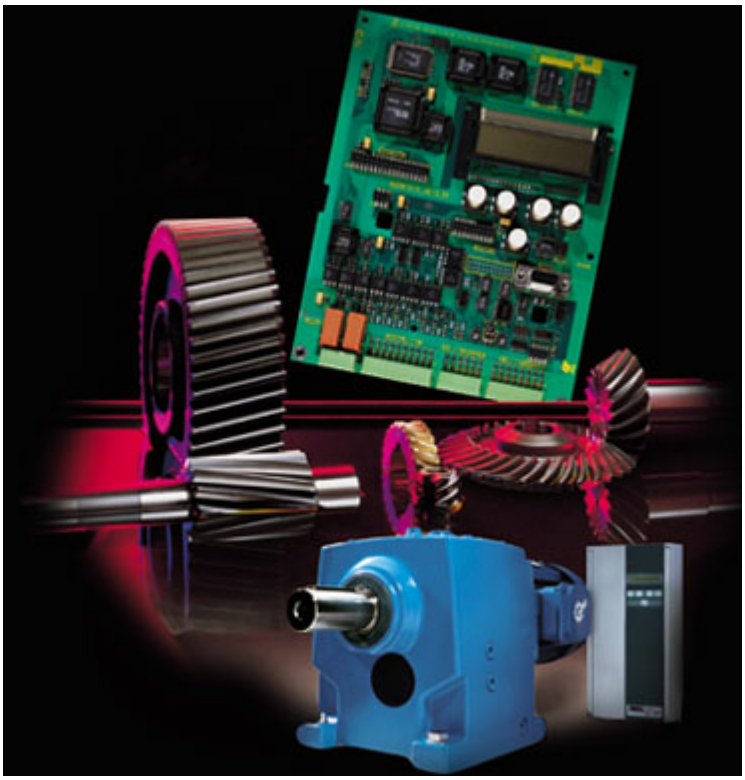
No	Description
308	Cannot store database!
309	Read all parameter immediately?
310	Please update NORD CON ! Faultless parameter transfer isn't guaranteed.
311	Printer isn't correct installed!
312	Sorry, two parameter window cannot run simultaneously. View the open window?
313	You have to close to parameter window to quit NORD CON !
314	You have to close to parameter window to make a Busscan!
400	The file could not be loaded, since the file version is unknown!
401	The file could not be loaded, since the file format is unknown!
402	The file was changed by the user!
403	Error open file!
405	No macro file!
406	Empty macro list!
407	Macro list executed!
408	Jump-Label not found!
409	The function cannot be executed, because the scheduler was started.
410	Would you like to save the changes in the macro?
411	The file was changed by the user! Would you like to open the file?
500	Load only the settings?
501	The types of device are different? Would you like to open the file?
502	The file could not be opened, because the version of the file format is unknown!
503	The file could not be opened, because the file format is unknown!
504	The file was changed by the user! Would you like to open the file?
600	The controlling of the device is reduced or not possible from the following reason: the controlword (P509) is not for USS configures!
601	The controlling of the device is reduced or not possible from the following reason: the source of setpoint 1 (P510.0) is not for USS configures!
602	The controlling of the device is reduced or not possible from the following reason: the source of setpoint 2 (P510.1) is not for USS configures!
603	The controlling of the device is reduced or not possible from the following reasons: the controlword (P509) and the source of setpoint 1 (P510.0) are not for USS configures!
604	The controlling of the device is reduced or not possible from the following reasons: the controlword (P509) and the source of setpoint 2 (P510.1) are not for USS configures!
605	The controlling of the device is reduced or not possible from the following reasons: the source of setpoint 1 (P510.0) and 2 (P510.1) are not for USS configures!
606	The controlling of the device is reduced or not possible from the following reasons: the controlword (P509), the source of setpoint 1 (P510.0) and 2 (P510.1) are not for USS configures!
700	The action cannot be executed, because the connection to the device is interrupted!
800	The parameter transfer was successfully executed
801	Errors occurred during the parameter transfer!
802	The parameter tranfer was cancelled by user!
803	Errors occurred during the parameter transfer! Would you like to save?
804	The parameter tranfer was cancelled by user! Would you like to save?
900	Maximally 5 variables can be registered into the watch list!
901	The file must be stored, before you can translate it. Would you like to create a new file?
902	The file could not be opened, because the file format is unknown!
903	The file could not be read!
904	The file was changed by the user! Would you like to open the file?

11 Getriebebau Nord

11.1 NORD In Short

NORD is a manufacturer of high-performance mechanical and electrical drive components which are distributed worldwide.

In fact we have sales agencies in 48 countries from which the following drive varieties can be obtained: helical in-line, shaft-mount, bevel, worm and planetary reducers for outputs between 0.12 kW and 200 kW and for torques from 10 Nm up to 60.000 Nm.



- Corporate history
- Frequency inverters

11.2 NORD corporate history

Ever since NORD was founded in 1965, all companies of the group have adhered to the common strategy of satisfying the demands of our customers.

- **1965** The company is founded
- **1977** A modern gear-producing factory is built
- **1979** Subsidiaries are established all over the world
  Expansion of the worldwide presence by setting up assembly shops
- **1980** From now on all NORD gearboxes are manufactured as "UNICASE" types, according to the company's own design
- **1983** A plant is constructed where NORD can produce its own electric motors
- **1985** Construction of a factory for the production of frequency inverters
- **1992** A factory for the machining of iron and steel castings is established
- **1997** Another NORD motor production plant is built in Italy
- **1998** A new assembly shop is built in France
- **2000** New assembly plants in Great Britain and Austria
- **2001** New assembly plant in China
- **2002** Expansion of Gadebusch machining plant (app.7.200 m²)
- **2003** Construction of an assembly plant in Russia
- **2004** Construction of a new motor plant in Italy
- **2005** 40 years of Nord Gear
  Opening of the high-rack storage system in Bargteheide
  Germany Construction of a new assembly centre in China.
- **2006** New production plant for electronic products opened in Aurich, Germany
- **2007** Construction of new assemly plants in India and Czech Republic
- **2008** Expandation at Getriebebau NORD, Bargteheide
  - Construction of a parking garage
- **2009** Expandation at Getriebebau NORD, Bargteheide

- Construction of a next high rack storage
- Construction of a assembly center for industrial gear units

2010 Expandation at Getriebebau NORD, Bargteheide
- Expansion of a assembly center for industrial gear units

11.3 Frequency Inverters

11.3.1 General

- NORDAC SK 200 E 0,25 kW bis 7,5 kW
- NORDAC SK 300 E 0,55 kW bis 4,0 kW
- NORDAC SK 500 E 0,25 kW bis 7,5 kW
- NORDAC SK 700 E 1,5 kW bis 160 kW

11.3.2 NORDAC SK 200 E

General information

The NORDAC SK 200E is based on the tried and tested NORD platform. These devices feature a compact design with optimum control characteristics.

These devices are provided with sensorless vector current control which in combination with asynchronous three-phase motor types constantly ensures an optimised voltage-to-frequency ratio. This has the following significance for the drive: Peak start-up and overload torques at constant speed.

This series of devices can be adapted to individual requirements by means of extension modules. Due to the numerous setting options, these inverters are capable of operating all three-phase motors. The power range is from 0.25kW to 7.5kW with an integrated mains filter.

This manual is based on the device software V1.2 R0 (see P707) of the SK 200E. If the frequency inverter used has a different version, this may lead to some differences. If necessary, you can download the current manual from the Internet (http://www.nord.com/).

For the SK 215E/225E/235E there are additional descriptions for functional safety (BU 0230), the integrated AS interface (BU 0200, Section 5.4) and the positioning system (BU 0210). These contain all the necessary additional information for start-up. If a bus system is used for communication, a corresponding description (e.g. BU 0220 für PROFIBUS DP) is provided, or this can be downloaded from the Internet (http://www.nord.com/).

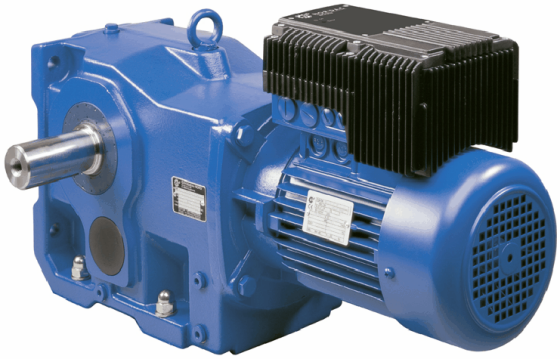
Typically, this series of devices is installed directly on a three-phase asynchronous motor. Alternatively, there are optional accessories for mounting the devices in the vicinity of the motor, e.g. on a wall or the frame of a machine.

In the simplest configuration, even without an EEPROM, there is the possibility of setting all important parameters via two potentiometers and eight DIP switches. LEDs are provided for the diagnosis of the operating status. The use of a control module is therefore not absolutely necessary. In order to gain access to all parameters, the internal RS232 PC interface (RJ12) can be used, or an optional SimpleBox or ParameterBox may be used. In this case, the parameter settings which have been changed by the operator are stored in the plug-in

EEPROM. The EEPROM must then always remain plugged in during operation.

11.3.3 NORDAC SK 300 E

General



The **NORDAC *trio* SK 300E** is a combination of geared motor and highly functional frequency inverter which enables process-oriented, decentralized system configurations to be implemented very conveniently. Designed to ensure maximum ease of handling and operation the inverter is user-friendly in every respect. The inverter is provided with what can be described as an "electronic type plate" which the motor will read and permanently store with the effect that the inverter data are not lost to the motor even if the inverter is removed. As the inverter can be upgraded with a number of modules within the scope of a well thought-out concept, appropriate control components are available to establish the optimal configuration for any process to be controlled.

Outputs between 0.55 kW … 4.0 kW (3 AC 380 … 480V) are provided.

Basic features

- High protection class (IP66)
- Class B integrated line filter

- Modular sub-assemblies with an adequate number of inputs and outputs for the inverter to be linked to other control loops
- Optional potentiometer function permitting the frequency to be set directly on the inverter
- Automatic saving of data in the motor due to the "electronic type plate"
- Universal, easily accessible connection unit enabling user-friendly manipulation
- Parameter setting is conveniently carried out with a control box or a dedicated PC software

Operation

The inverter can be parameterised and controlled with either of the 2 components described below:

- NORDAC Parameter-Box (SK PAR 2H)
  Handy operating device with a display and a set of operating buttons enabling the inverter to be parameterised and controlled right on the spot where the drive is installed.

- NORD CON software
  Convenient software for easy operation, control and parameterisation of the inverter from a PC.

Control options

With its modular architecture, the NORDAC trio SK 300E is a device allowing for a great variety of expansion options. Indeed it is possible to add to the basic control equipment various custom interfaces with inputs and outputs in adequate numbers or one or the other bus access module as required.

Technology Boxes

Technology Boxes are optional modules with which additional functionality can be added to the inverter, dependent on requirements. As well as bus connections for all marketed BUS systems, a module with switch and potentiometer is available for direct speed adjustment for on-site operation of the inverter. The inverter^s high protection grade is maintained with every technology box.

Technology Boxes

Potentiometer-Box SK TU2-POT	This box enables infinitely variable speed setting directly at the inverter.	1 switch left-o-right Potentiometer0 ... 100 %
Profibus module SK TU2-PBR	This interfaces enable control of the NORDAC trio SK300E via the serial Profibus port.	1 Profibus- Interface 2x 5 pole M12 system plug
Profibus module SK TU2-PBR-KL	This interfaces enable control of the NORDAC trio SK300E via the serial Profibus port.	1 Profibus- Interface 1x 8 pole plug 1x SUB-D9
Profibus DP SK TU2-PBR-24V	This interfaces enable control of the NORDAC trio SK300E via the serial Profibus port. By external 24V supply the bus partner is contacted still, although the supply voltage of inverter itself is switched off.	1 Profibus- Interface 2x 5 pole M12 system plug 1 external 24V voltage supply
CANbus SK TU2-CAO	This interfaces enable control of the NORDAC trio SK300E via the serial CANopen port.	1 CANopen- Interface 2x 5 pole M12 system plug
DeviceNet SK TU2-DEV	This interfaces enable control of the NORDAC trio SK300E via the serial DeviceNet port.	1 DeviceNet- Interface 1x 5 poliger M12 system plug
InterBus SK TU2-IBS	This interfaces enable control of the NORDAC trio SK300E via the serial Interbus port.	1 InterBus- Interface 2x 5 poliger M12 system plug 1 externe 24V voltage supply
AS-Interface SK TU2-AS1	This interfaces enable sensors and cctors. Additionally the parameter setting of 300E is possible via Asi-Interface.	2x 5 pole M12 system plug for actor and sensor 1x 5 pole M12 system plug for AS-Interface and 24V auxilary voltage

1x 5 pole M12 system plug 24V auxilary voltage

Customer Units

Customer units are optional modules, which offer a variety of control inputs and outputs. The options for controlling the inverter can be modified according to requirements. A customer unit can be integrated

in each inverter. After the mains voltage is connected and switched on,

this is automatically recognized by the inverter and the functions contained are made available..

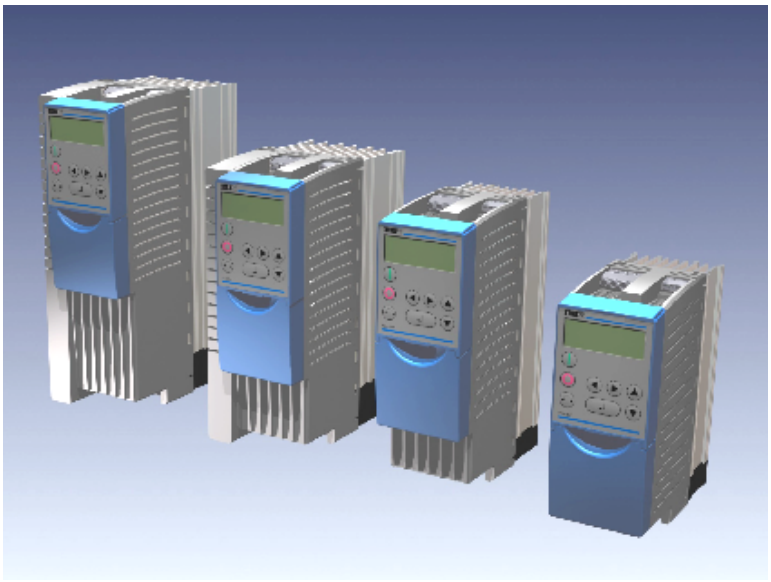
Custom interface	Data
Basic equipment	1 brake control module 1 multifunction relay 1 digital input RS 485 interface (M12)
Basic I/O	3 digital inputs 1 analogue input 0...10V
Standard I/O	4 digital inputs 2 analogue input 0...10V 1 analogue/digital

11.3.4 NORDAC SK 500 E

General

THE NEW NORDAC SK500E OFFERS NEW SOLUTIONS

The new NORDAC SK500E family of inverters in bookshelf design brings intelligent technical solutions with a competitive price. With its wide range of functionality and options there are virtually no limitations in the field of applications.
System start-up of the SK500E on standard applications is convenient with its easy parameterization and fully automatic intelligent motor identification.



The SK500E offers outputs from 0.25 kW (1/3 hp) to 7,5 kW (10 hp) and accepts AC inputs from 200 ... 480 V. 1 and 3 phase.

The sophisticated mechatronic concept of the NORDAC SK500E provides convenient mounting and quick installation with removable (plug/unplug) termination strips.

Local control is provided with the following ergonomic options:

- **SIMPLE BOX, CSX**, extra-user-panel with "Single-Button-Operating"
- **CONTROL BOX**, for parameter management
- **PARAMETER BOX**, Plain language text panel (in 6 different languages).

SK500E – basic features

- Four separate parameter sets switchable on-line
- High starting torque (up to 400%) and precise speed control due to vectorial current control without a feedback sensor.
- Automatic motor parameter identification
- 7 control inputs, that can be configured for digital or analog signals.
- 2 digital outputs, 1 analog output
- Integrated brake chopper and separate control of electromagnetic motor brake
- PID-controller and process-controller
- RS 232 & RS 485 Interface
- 32 fixed frequencies
- Motorized pot function
- Limit switch control
- Flying Start

Parameters of the NORDAC SK500E can be accessed and changed via parameter box or the optional NORD CON programming software. Serial communication between the inverter and the computer is achieved using standard interface cables and connectors All actual operating values can be monitored to optimise drive adjustment. All diagnostic values can be viewed for easy troublehooting and quick assessment. Inverter faults and total operating hours are also viewable in a historical log to aid in troubleshooting and maintenance.

Available interface options include:

- PROFIBUS
- CAN
- CANopen
- DeviceNet
- INTERBUS
- AS-Interface

Enhanced control functions have been integrated into the SK500E for maximum inverter performance and reliability. The EMC suppression circuitry allows the integration of SK500E in domestic areas.

For added motor safety and protection the SK500E monitors input voltage, output current, motor temperature and motor brake.

SK520E – INVERTER FOR THE UPPER CLASS

The SK520E model with its expanded capabilities is the perfect fit for more complex applications.

SK520E - expanded features:

- Encoder interface (TTL)
- CANopen Interface
- 2 additional digital inputs
- 2 additional digital outputs

11.3.5 NORDAC SK 700 E

NORDAC 700E

The new NORDAC SK 700E type series was developed on the basis of the proven vector type series to which a couple of sophisticated features have been added. Compared with previous models, the modularity has been substantially increased and the control performance optimised.

Sensorless vectorial current (ISD) control

These devices are provided with sensorless vectorial current control system which will constantly ensure an optimised voltage-to-frequency relation based on the simulated operation of an asynchronous three-phase motor.

Thus maximum starting and overload torques are available to the drive while speed remains constant.

Owing to the huge variety of setting options these inverters are capable of controlling any three-phase motor on the market.

Outputs between 1.5 kW and 160 kW (3 AC 380 ... 480 V) are provided.

Basic Features:

- High starting torque (up to 400%) and precise control of the motor speed owing to vectorial current control without a sensor being involved
- Variable configuration according to customer requirements using special equipment boxes, custom interfaces, and special extensions
- Easy and convenient installation, parameterisation, and system start-up
- The great variety of setting options allow for configuration of any commonly available three-phase motor. For NORD geared motors the parameter values are preset in the factory.
- Installation of one unit right beside the other in the cabinet without the need of spacing
- Admissible ambient temperature up to 50°C
- (S3 duty cycle)
- Integrated line filter for limit curve A (up to 22kW)
- Automatic measurement of the stator resistance
- Four separate parameter sets switchable on-line
- Analogue PI / PID controller
- Programmable relay outputs
- Programmable d.c. braking
- Integrated braking chopper for four-quadrant operation
- Adjustable ramp smoothing
- Scalable analogue output, 0 to 10 volt
- Detachable parameterisation and display module
- Multilingual clear text display and data storage function
- Optionally available: incremental shaft encoder feedback for high-precision speed control
- Optionally fitted with integrated positioning control for exact positioning of the drive

Variable equipment boxes (Technology Units)

... are snapped on to the inverter externally. They are used to control the inverter or read out current operating values right on the device.

Option	Description
Parameter box	Used to start up, parameterise, configure and control the inverter via full text instructions. Optional: snap-on installation
Control Box	Used like the parameter box, however with the information displayed in a more simplified fashion. Optional: snap-on installation
Potentiometer	Enables the drive to be controlled directly on the frequency inverter. Optional: snap-on installation
CAN bus module Profibus module RS 232 InterBus CANopen DeviceNet AS-Interface	With these optional CAN / CANopen / Profibus DP / RS 232 / DeviceNet / Interbus /AS-Interface modules the SK 700E can be controlled and parameterised (without a serial port). Optional: snap-on installation

Custom interfaces

... are optional slide-in modules for insertion into slots which are located inside the inverter housing. Having been plugged in they are identified by the inverter automatically. The cables are connected using direct push-lock-type connectors with pull-off spring terminals (ZEC). With them the devices can very conveniently be connected.

Option	Description
Basic I/O unit	Simplest custom interface providing optimum transition to the equipment of the user.
Standard I/O unit	Greater diversification of the functions executed by control signals, including USS bus selection.
Multi I/O unit	Highest functionality of digital and analogue signal processing.
USS unit	This interface allows for control of the NORDAC SK 700E via the serial USS port.
CAN bus unit	This interface allows for control of the NORDAC SK 700E via the serial CAN bus port.
Profibus unit	This interface allows for control of the NORDAC SK 700E via the serial Profibus DP port.

Extension units

... turn the standard inverter into a high-precision control device that will ensure variable response of the system to any conditions and requirements.
Special extensions are used in the inverter in addition to the custom interfaces.

Option	Description	Data
PosiCon special extension unit	Programmed positions are approached and held based on position sensing and displacement calculation. Actual position values are detected by means of incremental and/or absolute value shaft encoders (5 V TTL).	Up to 252 positions available 2 x multifunction relays 6 x digital inputs
Encoder special extension unit	For highly accurate speed control from zero speed to twice the nominal speed (incremental encoder, 5V TTL).	Up to 250kHz 1 x digital input

Apart from being connected to custom interfaces, the variable equipment boxes may also be used for bus access

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Intelligent Drivesystems, Worldwide Services

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