

# Manual

## **NORDAC *vector p-box***

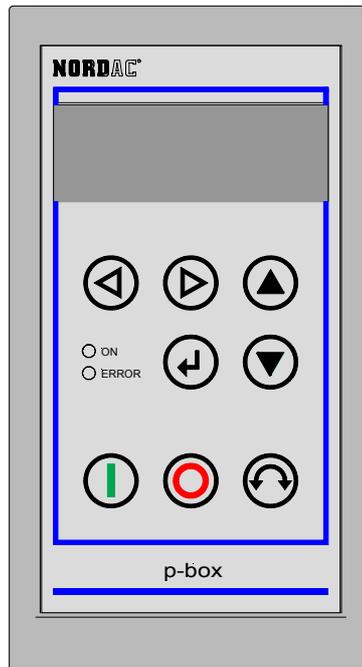
**for setting and storing the parameters of and operating the**

NORDAC *vector mc*

NORDAC *vector*

SK 300E / 700E

**type series**



BU 4040 GB

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## 1 General

### The NORDAC *vector p-box*

With the NORDAC *vector p-box*, a control and parameterization box, the operating parameters of the Nordac *vector ct* and *mc* inverter series can be set, controlled and displayed. The *p-box* is either used as a hand-held device to increase the convenience of parameter setting, or installed in a switch cabinet to operate up to 5 inverter units.

The device is able to manage the parameters of five different inverters. For documentation purposes the *p-box* data can be read into a PC's memory with the NORDCON software and be stored on the hard disk. Reversely, parameter data edited with the PC program can also be transmitted to the *p-box*. Hence the box can well be used as a means of transporting data from the PC to any inverter in the field.

#### 1.1 Features

- illuminated, high-resolution LCD graphics display
- central processing unit for up to 5 inverters connected into a network via RS 485 interfaces
- memory allowing for saving, loading, and editing 5 complete inverter databases
- connection to a standard RS 232 PC interface enabling communication with NORDCON
- can be used to have various operating parameters displayed
- a degree of protection of up to IP 55 can be ensured if the box is installed in the door of a switch cabinet
- automatic inverter irecognition function
- large-size display of any individual operating parameters
- normalization of selected operating parameters for specific system data to be displayed
- data input can be made in six languages
- help texts for error diagnosis
- capable of direct inverter control

#### 1.2 Delivery

When the device is delivered, start looking for possible transport damage (distortion or loose parts) **immediately** both before and after unpacking it.

If there is any indication of the device having been damaged, contact the transport company at once and request that the damage be assessed very carefully.

**Important! Examine the device thoroughly even if the packaging seems all right.**

#### 1.3 Scope of delivery

Standard version: Hand-held unit IP 20  
Operating- Manual

Accessories available: Panel mounting set  
External power supply unit  
Connecting cable linking up the *p-box* with the optional serial RS 232 interface of the SK 700E and *vector mc* inverter  
Connecting cables for the type series SK 300E, 700E, *vector* and *vector mc*  
Connecting cable for connection with the PC

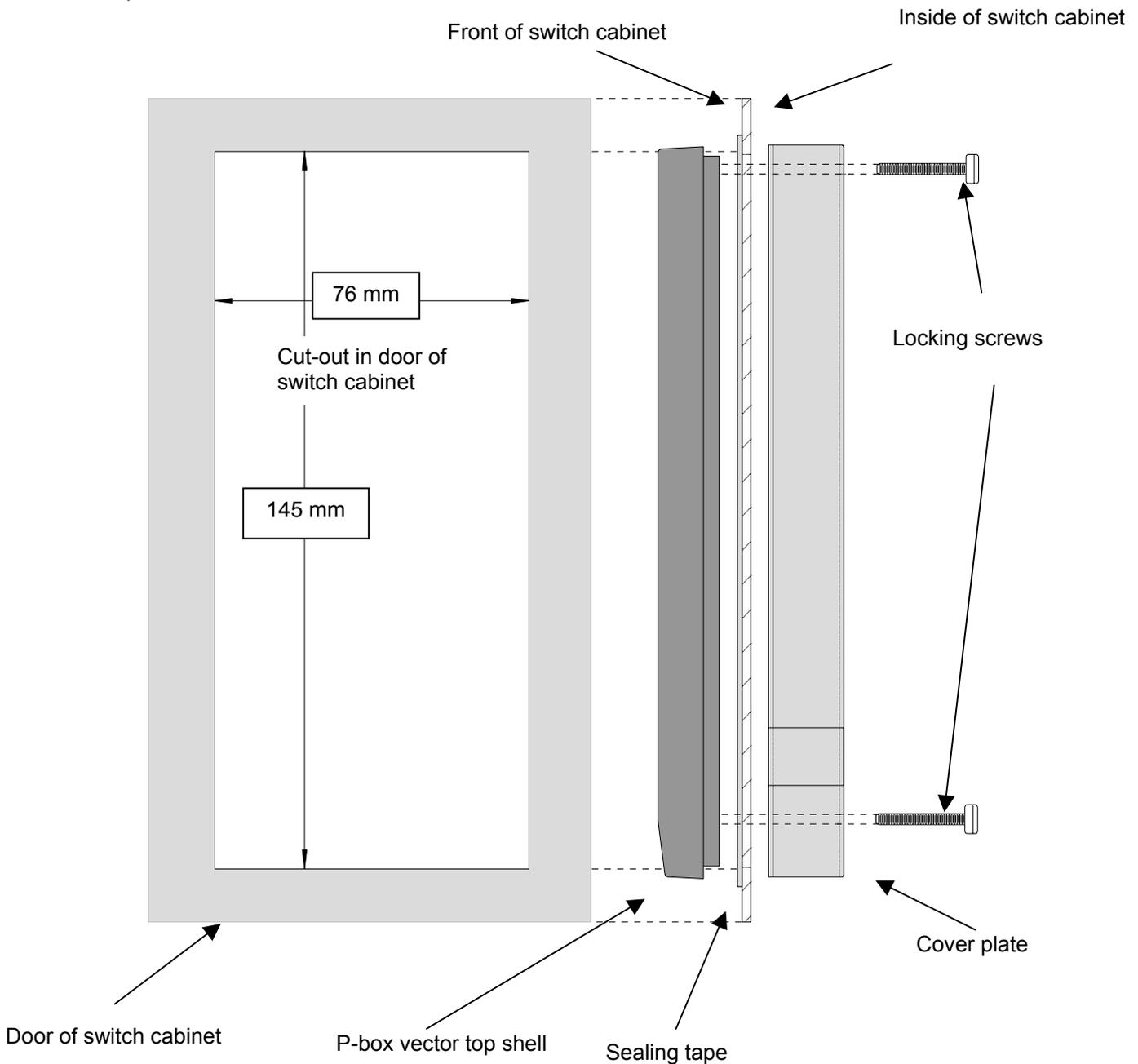
## 2 Installation

### 2.1 Panel mounting (panel mounting set option)

For the NORDAC *vector p-box* to be built into the door of a switch cabinet or into a control panel, a cut-out sized 76mm x 145mm must be provided in the front panel. After detaching the rear part of the *p-box*, the top shell which contains the electronic components is inserted into the cut-out. To increase the degree of protection, fit the sealing tape that comes with each panel-mounting set between the control panel and the top shell of the *p-box*.

By assembling the cover plate which is also part of the panel-mounting set option to the rear of the *p-box* from the inside of the switch cabinet and fixing it to the shell with the screws, installation is completed. Now the *p-box* is permanently mounted on the door of the switch cabinet and will have an IP 55 degree of protection if the insulating tape has been applied.

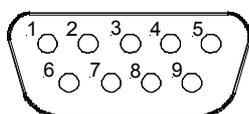
Mounted on a panel as described above, the NORDAC *vector p-box* can be connected using the X4 screw-type terminal. The paragraph below will provide you with detailed information on the assignment of the various connector pins.



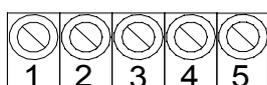
## 2.2 Electrical connection

The *p-box* is connected via the SUB-D connector on the front end of the *p-box*. Depending on the inverter type, either the 5V or the 15V power supply pin on the connector is used. However as all of the terminals are accessible at screw terminal X4 on the p.c. board as well, a direct connection between *p-box* and inverter can be established without a plug and socket connection having to be used.

SUB-D connector



X4



SUB-D PIN	X4 terminal	Assigned to
1	3	RS-485 +
2		RS-232 RxD
3		RS-232 TxD
4	4	RS-485 -
5	2	GND
6	1	+ 5V/300mA / +15V/120mA
7		not assigned
8		not assigned
9		+ 5V/120 mA ( no background lighting)
Housing	5	screen

When the NORDAC vector *p-box* leaves the factory, the terminating resistor for the RS 485 bus system is activated ( to enable the NORDAC vector *p-box* to be used as a terminal unit), in other words a jumper has been connected on the X300 programming bridge. If the terminating resistor must be removed, it can be plugged in at the X305 parking position.

### 2.2.1 Connection to the inverter

One *p-box* allows for controlling a number of 5 different inverters from the NORDAC vector *mc* and NORDAC vector type series.

The signal line used for data communication between the *p-box* and the inverter should be shielded-type. The supply voltage may be either 5V or 15V. The respective amount is recognized by the *p-box* automatically. Apart from being connected to the inverter via the SUB-D connector or the terminal strip, the *p-box* may also be operated via the jack socket and a separate power supply unit at 12V/200mA or 5V/300mA respectively.

Please observe the connection schematic represented below when connecting the *p-box* with the respective inverter type used.

<i>p-box</i>		Allocated to	Inverter type	
SUB-D PIN	X4 Terminal		vector <i>mc</i>	vector
1	3	RS-485 +	17	21
4	4	RS-485 -	18	22
5	2	GND	16	14
6	1	+ 5V/300mA / +15V/120mA	15	13
Housing	5	Screen	16	23

**Please note:** Any more inverters you wish to operate on the same bus are connected to the RS-485 + and RS-485 - lines in parallel. The pins feeding the voltage to the inverters must on no account be intercoupled. Whenever the NORDAC vector *p-box* is not used as a terminal unit within the bus configuration, the terminating resistor in the box should be inactivated by plugging in the jumper X300 at the X305 parking position.

Communication between a NORDAC vector *p-box* and a single inverter of the NORDAC vector *mc* series may be handled via the RS 232 option of the device without additional provisions. For this serial communication the RS232 connecting cable should be used which is available as an extra.

## 2.2.2 Connection to the PC

Connection between the *p-box* and the PC is ensured with SUB-D female connectors and a connecting cable. Only the contacts for the RS232 TxD and RS232 RxD data lines and GROUND will be required. Please note that with this type of linkage crossed read / write wires will be required (0 – modem connection).

Best use the PC adapter and the RS 232 connecting cable available as optional features.

<i>p-box</i>		PC
PIN SUB-D	description	COM1....( SUB-D9 )
2	RS-232 RxD	3
3	RS-232 TxD	2
5	GND	5
-		Bridge between PIN 7+8 in the connector housing
Housing	Screen	Housing

When operated in this mode, the NORDAC vector *p-box* can be supplied with power via the 2.5 mm jack socket on its the front panel. A matching power supply connector ( 12V, 200mA ) is among the optional accessories available.

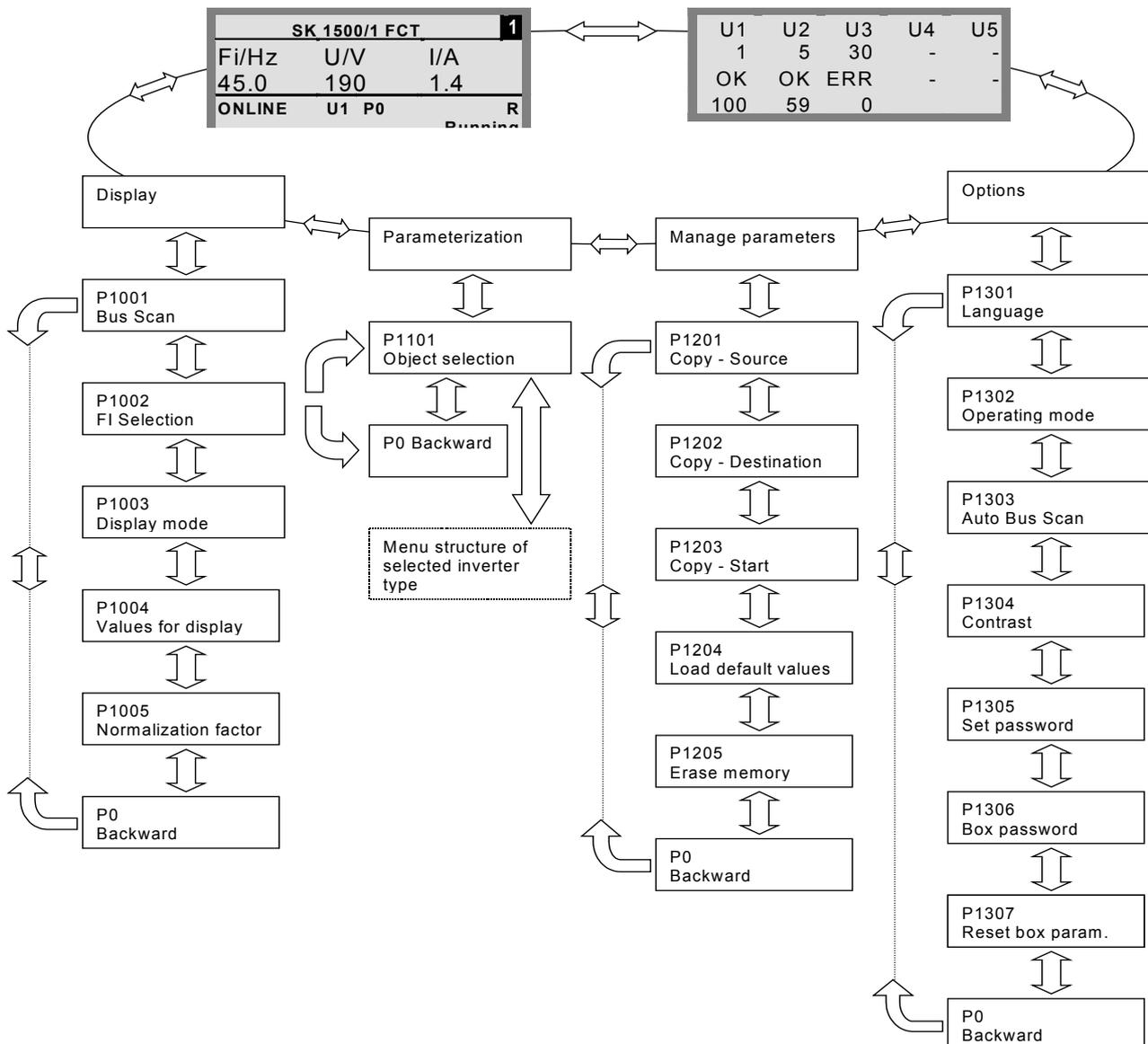
### 3 Configuration of menus

#### 3.1 Menu groups and their main functions

Menu group	No.	Main function
Display	(P10xx):	Selection of operating values and display layout
Parameterization	(P11xx):	Programming all of the inverters connected and all of the storage objects
Parameter management	(P12xx):	Copying and storing inverter data records from storage objects and inverters
Options	(P14xx):	Setting the p-box functions and all of the automatic operations

#### 3.2 Menu structure

The menus are linked to one another in ring-shaped structures arranged on different levels. Press the ENTER key to go forward one level. To return to the previous level press both SELECTION keys.



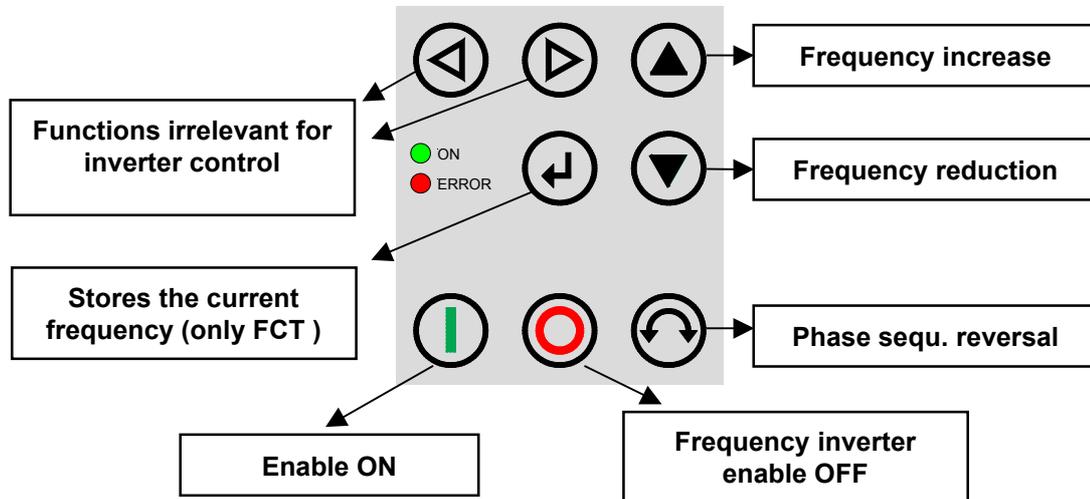
## 4 p-box functions

### 4.1 Control and display elements of the NORDAC vector p-box:

<p><b>LCD Display</b></p>	<p>LCD display with background illumination which, apart from reading out the parameters of the <i>p-box</i> and the operating values and parameters of the inverters connected, is capable of graphics representation as well</p>
	<p>This SELECTION key is used to move on within the range of menu groups available for selection and from one menu item to the next. The next higher level is reached by pressing the  and the  key at the same time.</p>
	<p>This SELECTION key is used to inch backward within the range of menu groups and from one menu item back to the previous one. Press both the  and the  key to access the next higher level.</p>
	<p>With this VALUE key, parameter values and the contents of individual menu items can be increased. To load the default value of the selected parameter press the  and the  key simultaneously. While the "control" function is active, using this VALUE key will increase the setpoint to be transmitted (e.g. the frequency).</p>
	<p>With this VALUE key the contents of any individual menu item or the values of parameters can be reduced. To load the default value of the selected parameter the  and the  keys are pressed simultaneously. While the "control" function is active, the setpoint selected for transmission (e.g. a frequency setpoint) is reduced.</p>
	<p>Operation of the ENTER key will shift control to the selected menu group or, if a menu item or a parameter value has been changed, it will result in the input being transferred to memory. <b>Note:</b> Use either of the SELECTION keys to quit a parameter if you don't want to save a new value. If the "control" mode has been activated in the <i>p-box</i>, frequency inverters of the NORDAC vector mc series will store the current setpoint frequency in the P113 start-off frequency parameter when you press the ENTER key.</p>
	<p>Use this key to switch the inverter ON when the "Control" function has been activated.</p>
	<p>Use this key to switch the inverter OFF when the "Control" function has been activated.</p>
	<p>The sense of rotation of the motor (phase sequence) will be reversed when this key is operated. A Minus sign indicates "anticlockwise rotation" (negative phase sequence). <b>Caution !</b> Better refrain from using this key in pump, screw conveyor, fan and similar applications. <b>Note:</b> With the NORDAC vector mc inverter series this function can be disabled by a corresponding setting in parameter P540.</p>
<p>  ON   ERROR         </p>	<p>The LEDs signal the respective state the <i>p-box</i> is in. ON The <i>p-box</i> is connected to power supply and ready for operation. ERROR An error has occurred in the way data are being processed by the <i>p-box</i> or in the inverter which is connected to it.</p>

## 4.2 How to control the inverter with the p-box

For the p-box to be in complete control of the inverter, the BUS function must have been selected in the "Interface" parameter (as for the vector mc inverter series, set P509 = 0 (default) or = 4 ). When a number of inverters is connected to the bus, choose the settings in the USS address parameter (P512 for vector mc types) so as to ensure that each equipment address is unique, avoiding that the same address is allocated to more inverters than one.



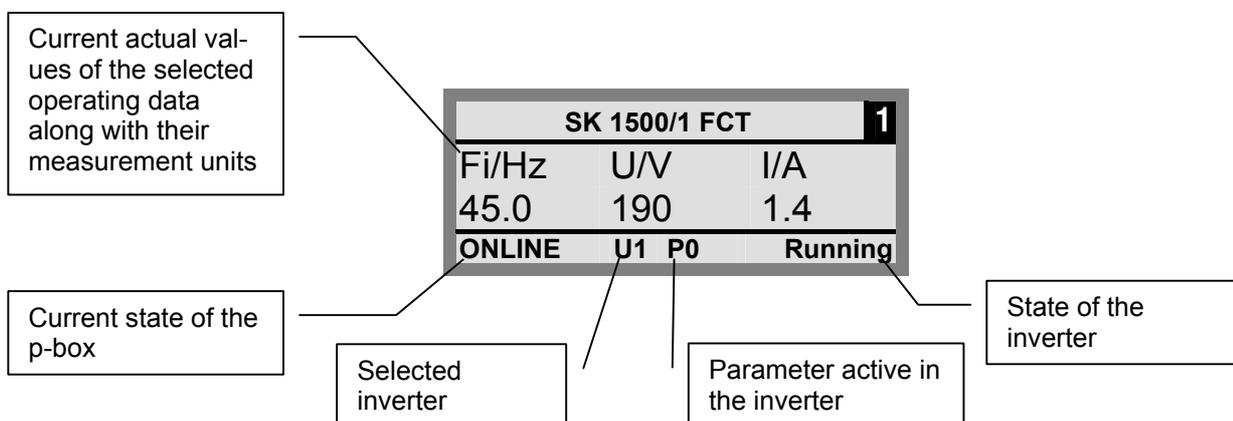
**Please note:** When the inverter is enabled in this mode, the p-box will use the parameter set that has been selected for the inverter in question in the parameter allowing for this option and included in the >Basic parameters< in the >Parameterization< menu. To switch to the alternative parameter set without going off-line, the new parameter set must be selected in the applicable parameter and activated with either the , the , or the  key.

## 4.3 Setpoint display

If you wish to have the operating values displayed by the p-box, the p-box operating mode ( P1302 ) must be set to "online" in the >Options< menu. Only after all of the inverters connected have been recognized in the bus scan is it possible to select one of them via the >FI selection< parameter in the >Display< menu. Apart from the standard operating parameters it will display, the program provides for selection of an operating value which, upon multiplication with a scaling factor, can be used to display an operating variable revealing some characteristic aspect of the way the driven facility works.

### 4.3.1 Standard display mode and list of options/Standard and list display modes

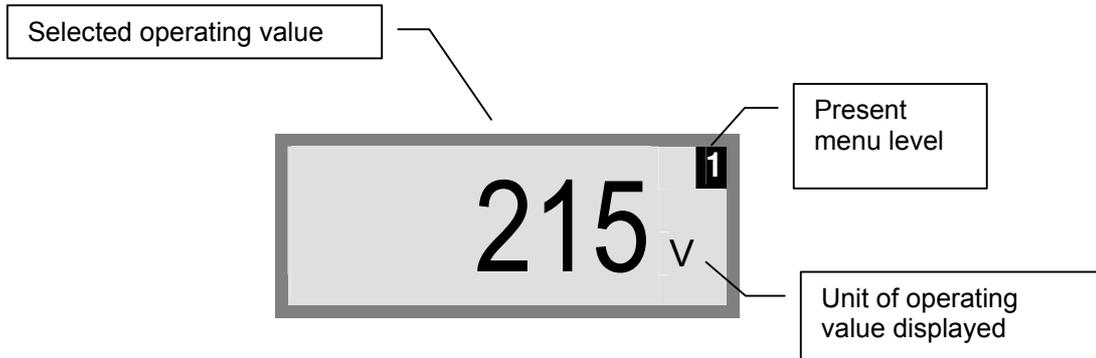
The standard display mode provides for simultaneous display of 3 operating values and the current inverter state. These three operating values can be selected from a list with 8 options in the >Display< >Operating values< menu.



**Note:** In the "List" display mode the three upper lines are used to display the operating data while the fourth line is identical with the standard display.

### 4.3.2 Large-size display mode

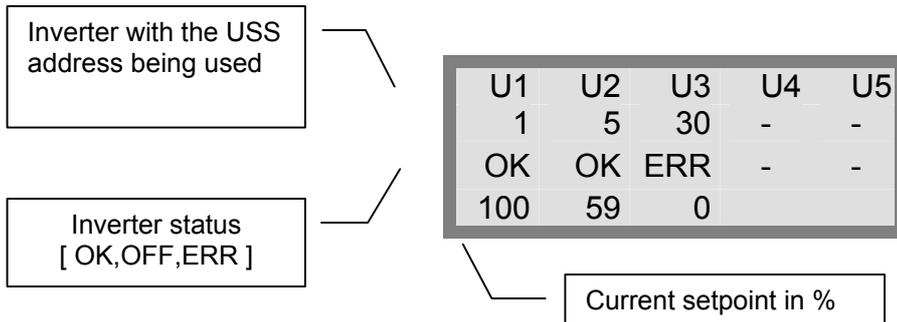
With large-size representation there is room for a single value with its measurement unit only. The desired value can be selected in the menu called >Display< / >Values to be displayed<.



Please note: The maximum value the program is able to put out for display is 32767.

### 4.3.3 Status window

The menu level 1 status window reflects the interface status of all inverters connected to the bus. The display shows the USS address, the interface status, and the current setpoint in percent of each object involved.



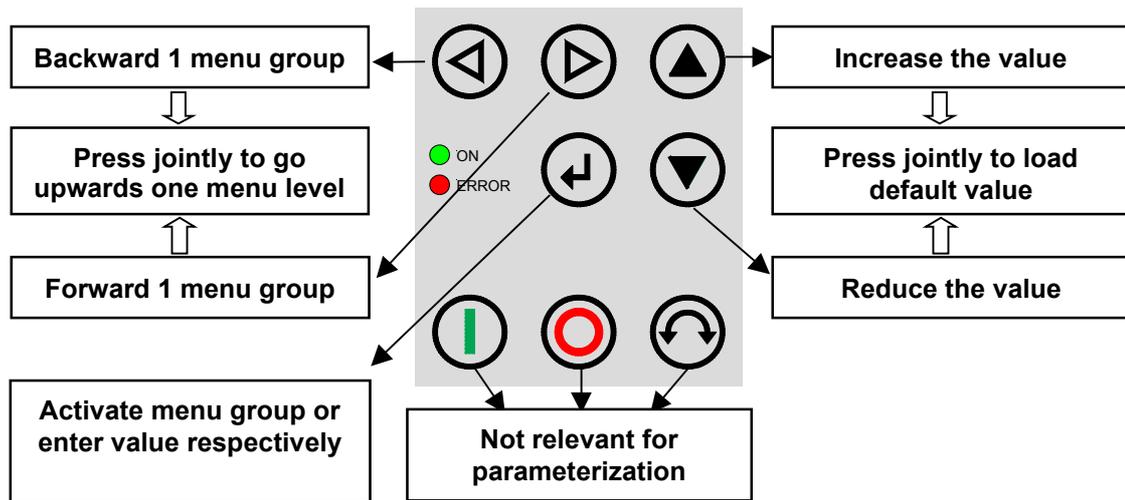
#### 4.4 Parameter setting with the *p-box*

The *p-box* allows for parameterization of up to 5 inverters connected into the same circuit and of 5 storage elements. However only one element can be parameterized at a time.

To access the parameterization mode, select the >Parameterization< menu item in level 1 of the *p-box* menu configuration. Press the ENTER key to progress to the >Object selection< menu item. This is where any of the connected inverters marked U1 to U5, or any of the storage objects S1 to S5 respectively can be selected for parameter setting. Operate the ENTER key again when you have made your choice.

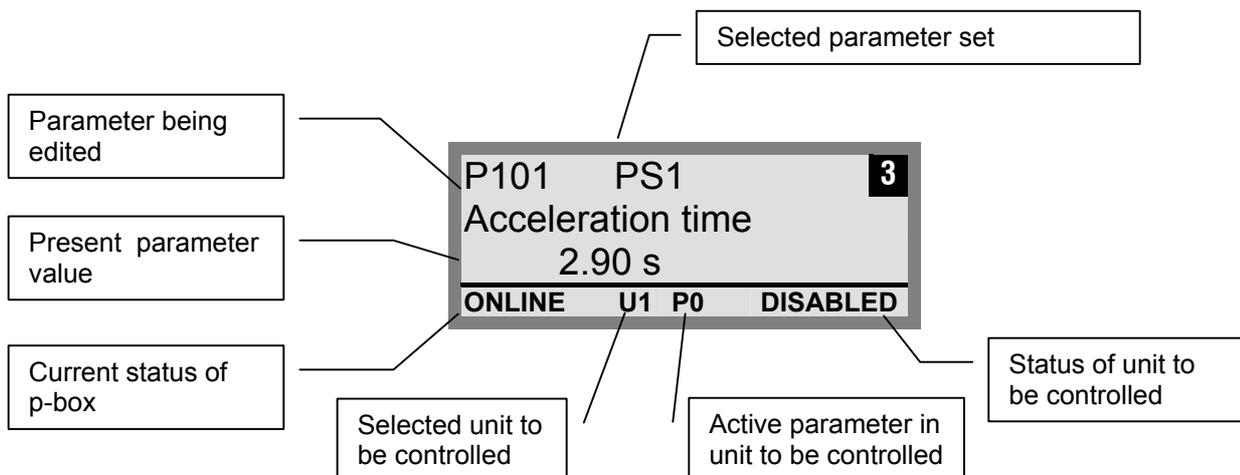
The other menu items are organized in different ways varying with the inverter type. Look up detailed descriptions in the Operating Instructions.

The diagram below illustrates the way the operating elements of the *p-box* are used for parameterization.



When a parameter setting is changed, the new value will keep on flashing until the input is made permanent with ENTER. The default value of the parameter to be edited can be loaded by operating the two VALUE keys simultaneously. Here again the new setting is saved using the ENTER key. If you don't want the change to be sent to memory after all, operate a SELECTION key to call the value which was stored last, and operate a SELECTION key once again to quit the parameter.

Screen layout during parameterization



**Note:** The bottom line in the display is used to read out the current status of the *p-box* and of the inverter to be controlled. This inverter, though also connected to the bus, need not necessarily be identical with the unit selected for parameterization. Selection is made via the *p-box* menu items >Display< and >FI Selection<.

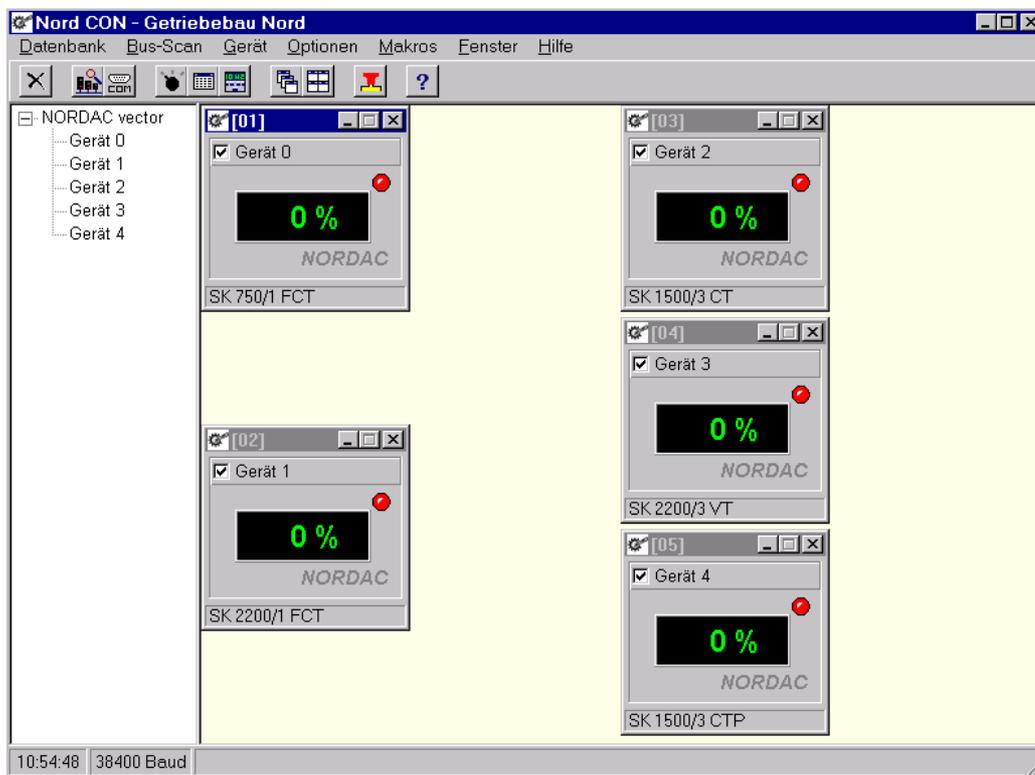
## 4.5 NordCON for data exchange

Management of the NORDAC *vector p-box* storage elements S1 to S5 can be ensured by the **NordCON** control and parameterization software.

For data transmission to proceed as required the PC's serial interface must be connected to the interface of the *p-box* (see also item 2.2.2). In addition the *p-box* must be connected to a power supply unit. Use a connector power supply unit for this purpose with an output voltage of 5V / 300mA or 15V / 120mA, and plug it into the 3mm socket on the *p-box* front panel.

In this configuration communication will be controlled by the PC. It is necessary also that a setting is made in the >Options< menu item comprised in the >Operating mode (P1302)< parameter defining the *p-box* as a slave to the PC. Now when the NordCON program runs a bus scan, it will be able to recognize the storage objects S1 to S5 as separate inverters with the bus addresses S1 to S5 and display them on the screen.

**Note:** Only those inverters which have previously been saved in the storage objects can be recognized and dealt with by the **NordCON** parameterization software. Before a data record of another inverter can be edited, the inverter type must be properly set in the (P1204) >Load default values< parameter. Scanning the bus once again the software will recognize the new storage object and accept any subsequent editing performed with the tools described above.



All of the Nord CON parameterization functions are available now.



### 5.1.2 Parameterization

Parameter	Setting value / Description / Note
<b>P1101</b> Object selection	<p>Selection of the object to be parameterized.</p> <p>Any parameterization which is performed now will apply to refer relate to the object which is selected here. Only the devices and the storage objects recognized in the bus scan will be mentioned in the list of available options.</p> <p>Range of values: U1-U5 and S1-S5</p>

### 5.1.3 Parameter management

Parameter	Setting value / Description / Note
<b>P1201</b> Copy - Source	<p>Selection of the source object to be activated for copying.</p> <p>Only the inverters and the storage objects recognized in the bus scan will be mentioned in the list of available options.</p> <p>Range of values: U1-U5 and S1-S5</p>
<b>P1202</b> Copy - Destination	<p>Selection of the destination object the information is to be copied to.</p> <p>Only the inverters and storage objects recognized in the bus scan will be mentioned in the list of available options.</p> <p>Range of values: U1-U5 and S1-S5</p>
<b>P1203</b> Copy - Start	<p>This parameter will start a transmission process by which all of the parameters stored in an object which has been selected in the &gt;Copy – Source&lt; parameter are transferred to an object which has been determined in the &gt;Copy – Destination&lt; parameter.</p> <p>In case that data would be overwritten, a window appears calling attention to this fact and prompting acknowledgement. Transmission starts after an acknowledge-ment has been made.</p>
<b>P1204</b> Load default values	<p>This parameter ensures that the parameters of the selected object are filled with default values.</p> <p>This function is particularly important with regard to the editing of storage objects. Activation of this parameter is the only way to load a dummy inverter with the <i>p-box</i> and perform the settings ( see also 4.5 Data exchange with Nordcon ).</p> <p>Range of values: U1-U5 and S1-S5</p>
<b>P1205</b> Clear memory	<p>With this parameter, the data of the selected storage object are deleted.</p> <p>Range of values: S1-S5</p>

### 5.1.4 Options

Parameter	Setting value / Description / Note
<b>P1301</b> Language	<p>Selection of the language in which the control and parameterization box (CPB) is operated.</p> <p>Languages available:    German                      English             Dutch                              French             Spanish                          Swedish</p>

Parameter	Setting value / Description / Note
<b>P1302</b> Operating mode	Selection of the NORDAC vector <i>p</i> -box operating mode <ul style="list-style-type: none"> <li>• Offline: In this mode the <i>p</i>-box is operated on a non-interaction basis. Neither a PC nor an inverter is connected to it. The storage objects can be parameterized and administrated.</li> <li>• Online: One or more inverters are connected to the <i>p</i>-box interface. The inverters can be parameterized and controlled. As soon as the ONLINE operating mode is activated, a bus scan will start automatically.</li> <li>• PC-Slave: A PC is connected to the <i>p</i>-box interface. The 'NordCon' programme provides for the CPB to communicate with the PC as a slave. The storage objects will respond as separate inverters. S1 ⇒ USS address 1 S2 ⇒ USS address 2 S3 ⇒ USS address 3 S4 ⇒ USS address 4 S5 ⇒ USS address 5</li> </ul>
<b>P1303</b> Autom. bus scan	Setting the action of the <i>p</i> -box at being switched on <ul style="list-style-type: none"> <li>• Off The <i>p</i>-box does not run a bus scan. A search of the inverters connected before it was switched off is made when the <i>p</i>-box is switched on again.</li> <li>• On A bus scan is performed automatically when the <i>p</i>-box is switched on.</li> </ul>
<b>P1304</b> Contrast	Setting the contrast of the NORDAC vector <i>p</i> -box display Range of values: 10% - 100%; resolution 2%
<b>P1305</b> Setting the password	In this parameter the user may define a password. Any value other than 0 entered in this parameter will protect the settings of the <i>p</i> -box or the parameters of the inverters connected to it from being changed.
<b>P1306</b> Box password	To reset the password function, the password selected in the above >password setting< parameter should be set here. If the correct password is used, all of the functions of the <i>p</i> -box are released again.
<b>P1307</b> Reset box parameters	With this parameter the factory settings of the NORDAC vector <i>p</i> -box can be restored. Any settings of the <i>p</i> -box made by the user as well as the data saved to the storage objects are deleted in the process.

## 5.2 Table of error messages the *p*-box may generate

Display Error	Cause > What to do about it
<b>Communication errors</b>	
CHECKSUM ERROR OF USS INTERFACE	<p>Communication between inverter and <i>p</i>-box is affected by interference signals ( EMC inadequate ). Operation is becoming unreliable.</p> <ul style="list-style-type: none"> <li>&gt; Check connection with the inverter. Use a screened cable between the devices. See to it that the bus line does not run anywhere near the motor cables.</li> </ul>
USS INTERFACE REPLY CODE IS WRONG	<p>The inverter was unable to execute a parameterization command.</p> <p>This error occurs whenever an attempt is made at changing a parameter setting in an enabled inverter although this cannot be done on-line, or when the value of the parameter is limited by the inverter because of another parameter interfering with it.</p> <ul style="list-style-type: none"> <li>&gt; Switch the inverter off-line and read the desired parameter in again.</li> </ul>
RANGE OF PARAMETER VALUES EXCEEDED	<p>The inverter was unable to execute the parameterization command because the selected value exceeded the limits allowed.</p>
USS INTERFACE STATUS CODE IS WRONG	<p>Communication between the inverter and the <i>p</i>-box is affected by interference signals (EMC inadequate). Operation is becoming unreliable.</p> <ul style="list-style-type: none"> <li>&gt; Check connection with the inverter. Use a screened line to connect the devices to each other. Bus line and motor cables should not be too close to each other.</li> </ul>
INVERTER U... DOES NOT REPLY	<p>The <i>p</i>-box is expecting a reply from the connected inverter. The waiting time has elapsed without a reply having been received.</p> <ul style="list-style-type: none"> <li>&gt; Check the connection with the inverter. The settings of the USS parameters of the inverter were changed in the course of operation.</li> </ul>
UNIDENTIFIED DEVICE	<p><i>P</i>-box failed to establish identity of device. As the connected inverter is not registered in the <i>p</i>-box database, no communication can be established.</p> <ul style="list-style-type: none"> <li>&gt; Please contact your local NORD distribution agency.</li> </ul>
SOFTWARE VERSION IS NOT KNOWN	<p><i>P</i>-box failed to identify the software version. The software of the inverter connected to the <i>p</i>-box is not mentioned in the <i>p</i>-box database. No communication can be established.</p> <ul style="list-style-type: none"> <li>&gt; Please contact your local NORD distribution agency.</li> </ul>
INVALID ID CODE	<p>On restoration of the last bus configuration a reply is sent from a device other than the one that was stored. This error will not occur unless the &gt;Autom. bus scan&gt; parameter was set to OFF and another device has been connected to the <i>p</i>-box.</p> <ul style="list-style-type: none"> <li>&gt; Activate the Autom. bus scan function.</li> </ul>
NO CONNECTION CAN BE ESTABLISHED WITH THE INVERTER	<p>Attempt to access a device which is not on-line (preceded by a timeout error)</p> <ul style="list-style-type: none"> <li>&gt; Run a bus scan via the (P1001) &gt;Bus Scan&lt; parameter.</li> </ul>

Display	Cause
Error	➤ What to do about it

### Parameter management errors

SOURCE AND DESTINATION DEVICES ARE INCOMPATIBLE	An attempt was made at copying between devices of different types
SOURCE IS EMPTY	Attempt to copy data from a storage object that has been deleted
THIS COMBINATION IS ILLEGAL	The same device has been used both as source and destination for the copying operation. The command cannot be executed.
THE SELECTED OBJECT IS EMPTY	Attempt to send parameter values to a storage object that was deleted
DIFFERENT SOFTWARE VERSIONS	Warning Copying objects controlled by different software versions may result in parameters not being transmitted correctly.
INVALID PASSWORD	Attempt to change a parameter without a valid box password having been entered in the P 1306 >Box password< parameter.

### Inverter control errors

THIS USS FUNCTION IS NOT AVAILABLE	The requested function is not available in the inverter interface parameter. ➤ Change the setting of the parameter defining the >Interface< of the connected inverter so that the desired function will be ensured. The Operating Instructions for the inverter will provide you with more detailed information.
USS INSTRUCTION FAILED TO BE EXECUTED	The inverter is unable to fulfill the control instruction, because a higher priority function such as Quick Stop or an OFF signal has been applied to the inverter's control terminals.
NO CONTROL POSSIBLE IN THE OFF-LINE MODE	Attempt to call a control function with the <i>p</i> -box off-line. ➤ Change the <i>p</i> -box operating mode to "On-line" in the P1302 >Operating mode< parameter and repeat the action.

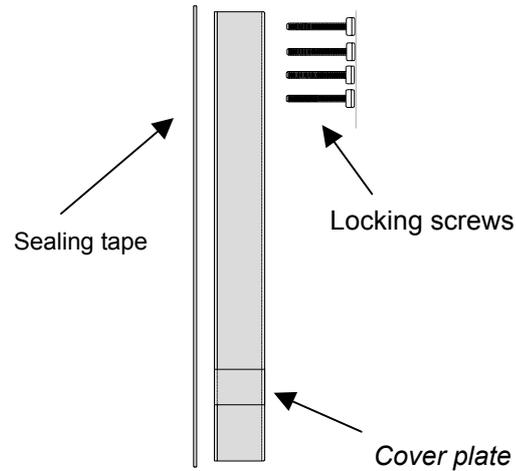
### Error message from the inverter

AN ERROR HAS OCCURRED IN THE Ux INVERTER	An error has occurred in the inverter with the number the display is signalling.
UNSUCCESSFUL FAULT ACKNOWLEDGEMENT	Attempt to acknowledge a fault in the inverter failed. The system continues to put out the error message.

## 6 NORDAC *vector p-box* optional features

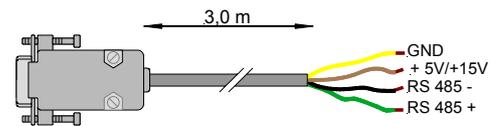
### 6.1 Panel-mounting set

For the NORDAC *vector p-box* to be built into the door of a switch cabinet or into a control panel, a cut-out 76mm x 145mm large must be provided in the front panel. Detach the rear part of the *p-box* before you insert its top shell which contains the electronic components into the cut-out. To ensure a higher degree of protection, insert the sealing tape from the set between the control panel and the top shell of the *p-box*. The unit is secured by fixing the cover plate which is also part of the set to the top shell of the *p-box* with locking screws from inside the switch cabinet.



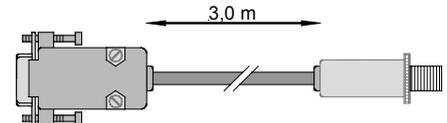
### 6.2 *vector* connecting cable

This optional component is used to connect the NORDAC *vector p-box* to the terminals of the NORDAC *vector* and NORDAC *vector mc* inverter series. On the *p-box* front end, a SUB-D connector is provided. The functions of the individual wires are written on the loose ends to be connected to the inverter. Cable length is 3.0 m.



### 6.3 Verbindungskabel SK 300E

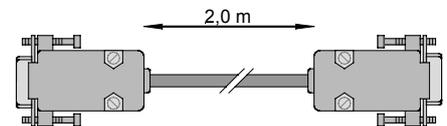
Verbindungskabel für den Anschluss der *p-box* an den Stecker (M12) des NORDAC SK 300E (RS 485).



### 6.4 RS 232 connecting cable

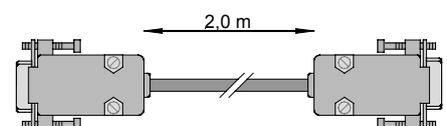
If the NORDAC *vector p-box* is to be connected to only one inverter of the NORDAC *vector mc* or SK 700E series, communication can proceed directly via the optional RS 232 interface of the device.

**Please note:** There will be no background lighting in this operating mode.



### 6.5 PC connecting cable

The *p-box* is connected to the PC with a connecting cable plugged into SUB-D sockets. Only the RS232 Tx/D and RS232 Rx/D data line connections and the ground connection will be required ( zero modem cable ).



### 6.6 Plug-in power supply unit

The plug-in power supply unit can be used to feed power to the *p-box* in a direct fashion. While this optional component is indispensable whenever a PC is involved, it can be used at discretion for any other configuration as well. It would be a good idea to use a plug-in power supply unit for instance when the cable length between inverter and *p-box* is more than 10 m, or when they are connected via the RS 232.

## **7 Maintenance and service instructions**

If operated according to instructions, the NORDAC *vector p-box* frequency inverter is maintenance-free.

Should the device be in need of repair, kindly send it to your local NORD distributing agency.

Any information required should be obtained from:

Your local subsidiary

When sending in a NORDAC *vector p-box* for repair please bear in mind that our guarantee does not extend to any components still attached to it, such as power pack, connecting cables etc.!

## We are always close at hand - world wide - Getriebebau NORD

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