5 Parameterization

5.1 Parameter menus

Parameters with related functions are compiled in menus for structuring the parameter set stored in the units. A menu thus represents a selection out of the entire supply of parameters of the unit.

It is possible for one parameter to belong to several menus. The parameter list indicates which individual menus a parameter belongs to. Assignment is effected via the menu number allocated to each menu.

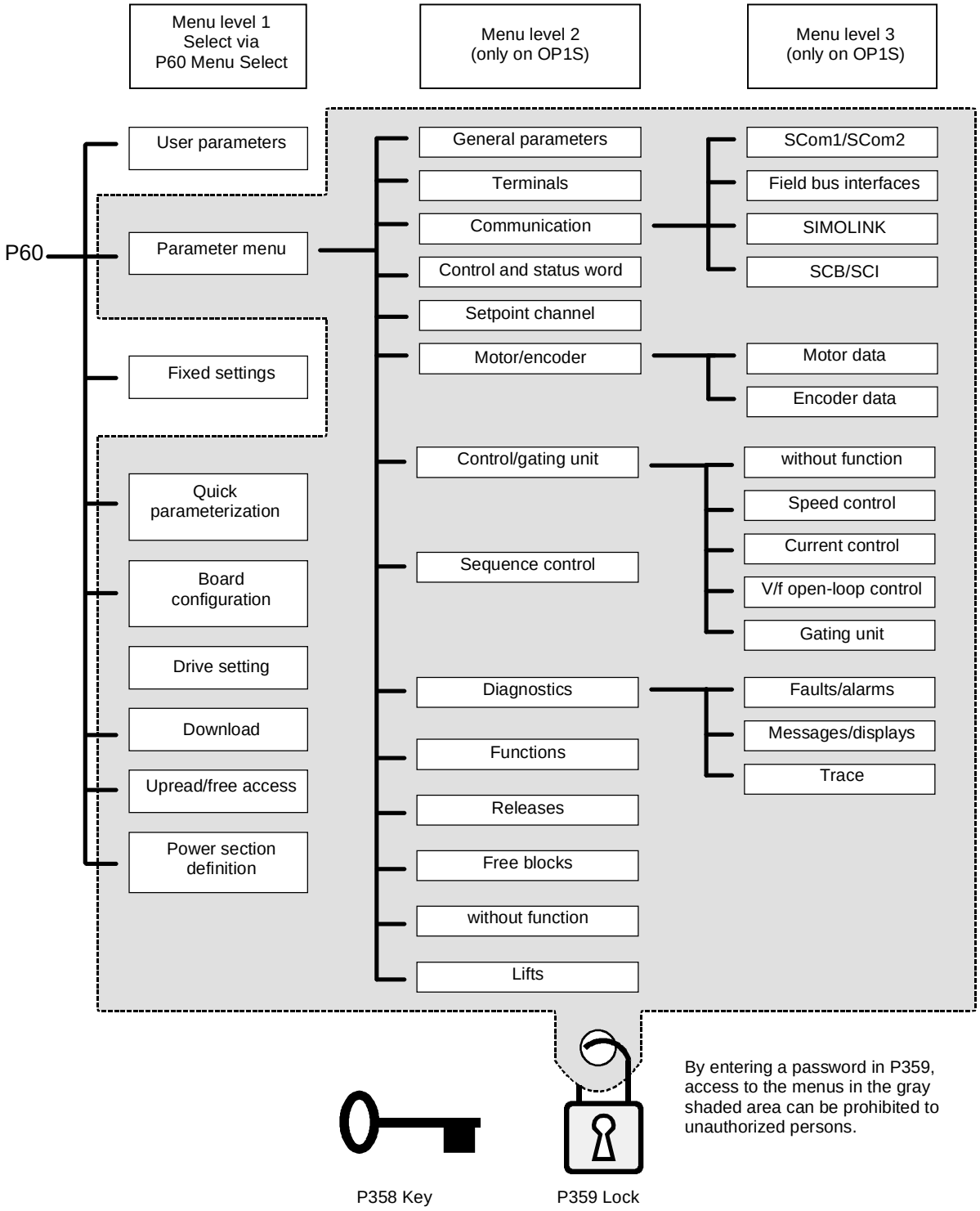


Fig. 5-1 Parameter menus

Menu levels

The parameter menus have several menu levels. The first level contains the main menus. These are effective for all sources of parameter inputs (PMU, OP1S, SIMOVIS, field bus interfaces).

The main menus are selected in parameter P60 Menu Selection.

Examples:
P060 = 0 "User parameters" menu selected
P060 = 1 "Parameter menu" selected
...
P060 = 8 "Power section definition" menu selected

Menu levels 2 and 3 enable the parameter set to be more extensively structured. They are used for parameterizing the units with the OP1S operator control panel.

Main menus

P060	Menu	Description
0	User parameters	• Freely configurable menu
1	Parameter menu	• Contains complete parameter set • More extensive structure of the functions achieved by using an OP1S operator control panel
2	Fixed settings	• Used to perform a parameter reset to a factory or user setting
3	Quick parameterization	• Used for quick parameterization with parameter modules • When selected, the unit switches to status 5 "Drive setting"
4	Board configuration	• Used for configuring the optional boards • When selected, the unit switches to status 4 "Board configuration"
5	Drive setting	• Used for detailed parameterization of important motor, encoder and control data • When selected, the unit switches to status 5 "Drive setting"
6	Download	• Used to download parameters from an OP1S, a PC or an automation unit • When selected, the unit switches to status 21 "Download"
7	Upread/free access	• Contains the complete parameter set and is used for free access to all parameters without being restricted by further menus • Enables all parameters to be upread by an OP1S, PC or automation unit
8	Power section definition	• Used to define the power section (only necessary for units of the Compact and chassis type) • When selected, the unit switches to status 0 "Power section definition"

Table 5-1 Main menus

User parameters

In principle, parameters are firmly assigned to the menus. However, the "User parameters" menu has a special status. Parameters assigned to this menu are not fixed, but can be changed. You are thus able to put together the parameters required for your application in this menu and structure them according to your needs.

The parameters to be included in the "User parameters" menu are selected in parameter P360 (Select UserParam). This parameter is indexed and permits the input of 100 parameter numbers. The sequence in which the parameter numbers are entered also determines the sequence in which they appear in the "User parameters" menu. If parameters with parameter numbers greater than 999 are to be included in the menu, they have to be input in the usual notation for the OP1S (replacing letters by figures).

Example

Parameterization of P360	Contained in "User parameters" menu:
P360.1 = 053	P053 Parameter access (always contained)
P360.2 = 060	P060 Menu select (always contained)
P360.3 = 462	P462 Accel Time
P360.4 = 464	P464 Decel Time
P360.5 = 235	P235 n-Reg Gain1
P360.6 = 240	P240 n-Reg Time
P360.7 = 2306	U306 Timer5 Time_s

Table 5-2 Example: Parameterizing a user menu

Lock and key

In order to prevent undesired parameterization of the units and to protect your know-how stored in the parameterization, it is possible to restrict access to the parameters by defining your own passwords with the parameters:

- P358 key and
- P359 lock.

If P358 and P359 do not have the same parameterization, only the "User parameters" and the "Fixed settings" menus can be selected in parameter P60 (Menu selection). This means that only the enabled parameters in the "User parameters" menu and the parameters of the "Fixed settings" menu are accessible to the operator. These restrictions are canceled again only if P358 and P359 are given the same parameter setting.

You should proceed in the following manner when using the lock and key mechanism:

1. Adopt key parameter P358 in the "User parameters" menu (P360.x = 358).
2. Program the lock parameter P359 in both parameter indices with your specific password.
3. Change over to the "User parameters" menu.

Depending on the parameterization of the key parameter P358 (the same or not the same as P359), you can now leave the "User parameters" menu and carry out or not carry out further parameterization (Exception: "Fixed settings" menu).

Examples:

Lock	Key	Event
P359.1 = 0 P359.2 = 0 (Factory setting)	P358.1 = 0 P358.2 = 0 (Factory setting)	Lock and key have the same parameter setting, all menus are accessible.
P359.1 = 12345 P359.2 = 54321	P358.1 = 0 P358.2 = 0	Lock and key do not have the same parameter setting, only the "User parameters" and "Fixed settings" menus are accessible.
5-3.2 = 54321	P358.1 = 12345 P358.2 = 54321	Lock and key have the same parameter setting, all menus are accessible.

Table 5-3 Examples of using the lock and key mechanism

NOTE

If you should forget or lose your password, access to all the parameters can only be restored by carrying out a parameter reset to factory setting ("Fixed settings") menu.

5.2 Changeability of parameters

The parameters stored in the units can only be changed under certain conditions. The following preconditions must be satisfied before parameters can be changed:

Preconditions	Remarks
• Either a function data set, a motor data set or a BICO parameter must be involved (identified by upper-case letters in the parameter number)	Visualization parameters (identified by lower-case letters in the parameter number) cannot be changed.
• Parameter access must be granted for the source from which the parameters are to be changed.	Release is given in P053 Parameter Access.
• A menu must be selected in which the parameter to be changed is contained.	The menu assignment is indicated in the parameter list for every parameter.
• The unit must be in a status which permits parameters to be changed.	The statuses in which it is possible to change parameters are specified in the parameter list.

Table 5-4 Preconditions for being able to change parameters

NOTE

The current status of the units can be interrogated in parameter r001.

Examples

Status (r001)	P053	Result
"Ready for ON" (09)	2	P222 Src n(act) can only be changed via the PMU
"Ready for ON" (09)	6	P222 Src n(act) can be changed via the PMU and SCom1 (e.g. OP1S)
"Operation" (14)	6	P222 Src n(act) cannot be changed on account of the drive status

Table 5-5 Influence of drive status (r001) and parameter access (P053) on the changeability of a parameter

5.3 Parameter input via the PMU

The PMU parameterizing unit enables parameterization, operator control and visualization of the converters and inverters directly on the unit itself. It is an integral part of the basic units. It has a four-digit seven-segment display and several keys.

The PMU is used with preference for parameterizing simple applications requiring a small number of set parameters, and for quick parameterization.

PMU in units of the Compact PLUS type

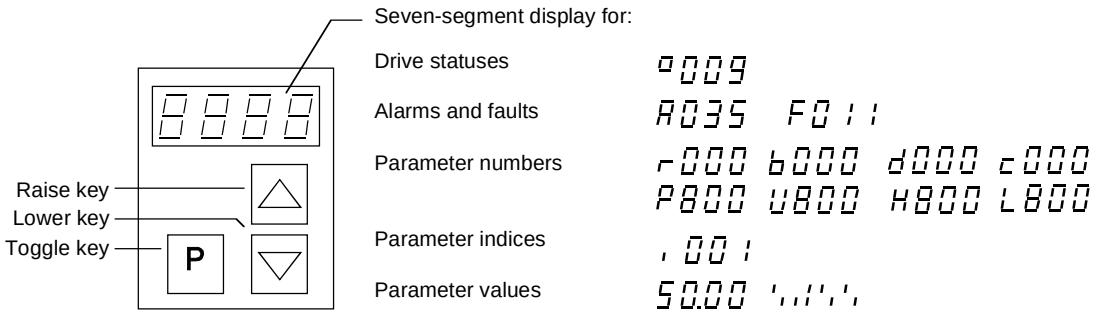


Fig. 5-2 PMU in units of the Compact PLUS type

Key	Significance	Function
P	Toggle key	• For switching between parameter number, parameter index and parameter value in the indicated sequence (command becomes effective when the key is released) • If fault display is active: For acknowledging the fault
△	Raise key	For increasing the displayed value: • Short press = single-step increase • Long press = rapid increase
▽	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease
P + △	Hold toggle key and depress raise key	• If parameter number level is active: For jumping back and forth between the last selected parameter number and the operating display (r000) • If fault display is active: For switching over to parameter number level • If parameter value level is active: For shifting the displayed value one digit to the right if parameter value cannot be displayed with 4 figures (left-hand figure flashes if there are any further invisible figures to the left)
P + ▽	Hold toggle key and depress lower key	• If parameter number level is active: For jumping directly to operating display (r000) • If parameter value level is active: For shifting the displayed value one digit to the left if the parameter value cannot be displayed with 4 figures (right-hand figure flashes if there are any further invisible figures to the right)

Table 5-6 Operator control elements of the PMU (Compact PLUS type)

PMU in units of the Compact and chassis type

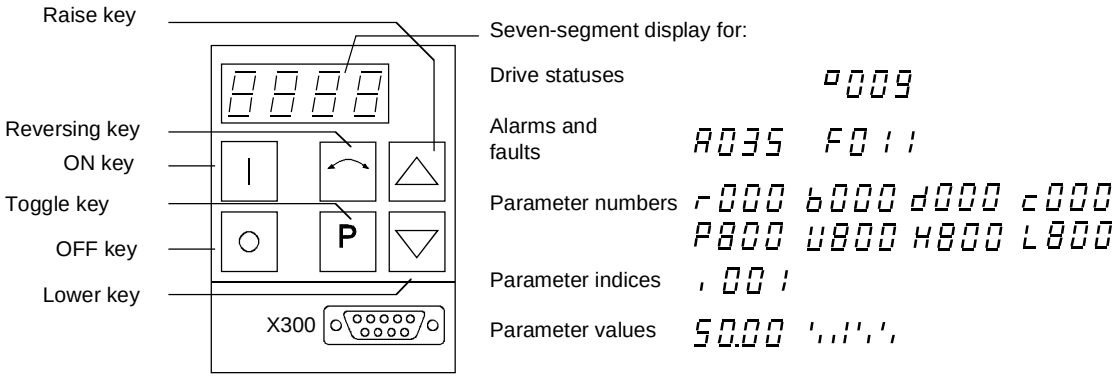


Fig. 5-3 PMU parameterizing unit

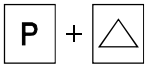
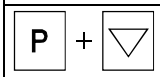
Key	Meaning	Function
	ON key	• For energizing the drive (enabling motor activation). • If there is a fault: For returning to fault display
	OFF key	• For de-energizing the drive by means of OFF1, OFF2 or OFF3 (P554 to 560) depending on parameterization.
	Reversing key	• For reversing the direction of rotation of the drive. The function must be enabled by P571 and P572
	Toggle key	• For switching between parameter number, parameter index and parameter value in the sequence indicated (command becomes effective when the key is released). • If fault display is active: For acknowledging the fault
	Raise key	For increasing the displayed value: • Short press = single-step increase • Long press = rapid increase
	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease
	Hold toggle key and depress raise key	• If parameter number level is active: For jumping back and forth between the last selected parameter number and the operating display (r000) • If fault display is active: For switching over to parameter number level • If parameter value level is active: For shifting the displayed value one digit to the right if parameter value cannot be displayed with 4 figures (left-hand figure flashes if there are any further invisible figures to the left)
	Hold toggle key and depress lower key	• If parameter number level is active: For jumping directly to the operating display (r000) • If parameter value level is active: For shifting the displayed value one digit to the left if parameter value cannot be displayed with 4 figures (right-hand figure flashes if there are any further invisible figures to the right)

Table 5-7 Operator control elements on the PMU

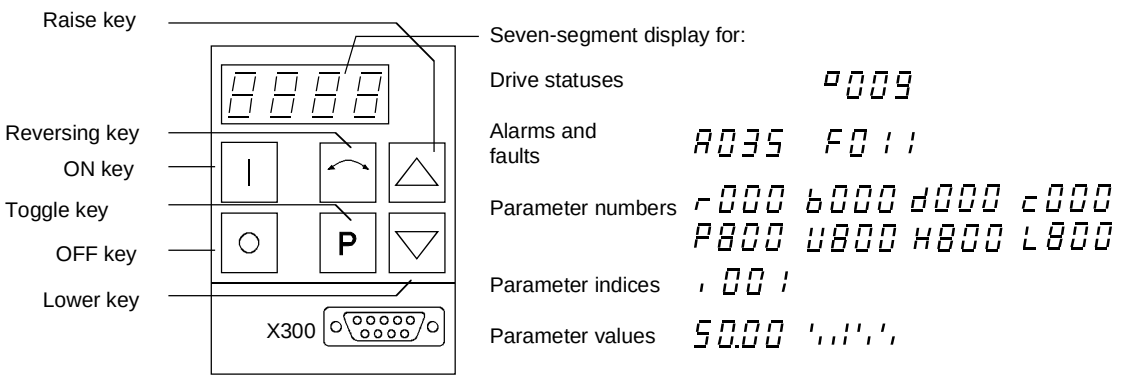


Fig. 5-4 PMU parameterizing unit

Toggle key (P key)

As the PMU only has a four-digit seven-segment display, the 3 descriptive elements of a parameter

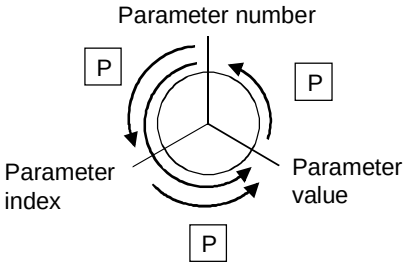
- Parameter number,
- Parameter index (if parameter is indexed) and
- Parameter value

cannot be displayed at the same time. For this reason, you have to switch between the individual descriptive elements by depressing the toggle key. After the desired level has been selected, adjustment can be made using the raise key or the lower key.

With the toggle key, you can change over:

- from the parameter number to the parameter index
- from the parameter index to the parameter value
- from the parameter value to the parameter number

If the parameter is not indexed, you can jump directly to the parameter value.



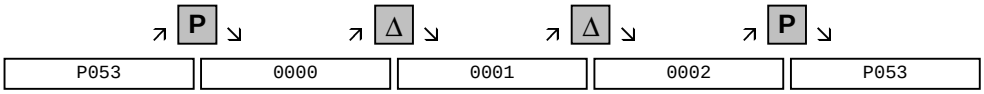
NOTE

If you change the value of a parameter, this change generally becomes effective immediately. It is only in the case of acknowledgement parameters (marked in the parameter list by an asterisk ' * ') that the change does not become effective until you change over from the parameter value to the parameter number.

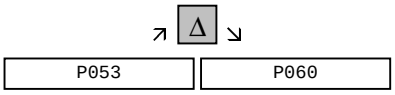
Parameter changes made using the PMU are always safely stored in the EEPROM (protected in case of power failure) once the toggle key has been depressed.

Example The following example shows the individual operator control steps to be carried out on the PMU for a parameter reset to factory setting.

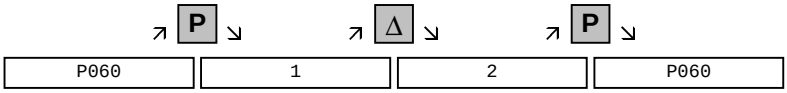
Set P053 to 0002 and grant parameter access for PMU



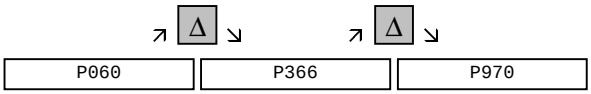
Select P060



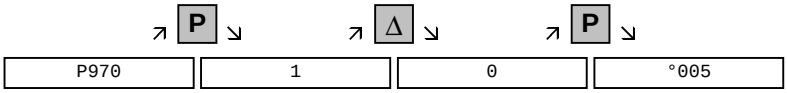
Set P060 to 0002 and select "Fixed settings" menu



Select P970



Set P970 to 0000 and start parameter reset



5.4 Parameter input via the OP1S

5.4.1 General

The operator control panel (OP1S) is an optional input/output device which can be used for parameterizing and starting up the units. Plain-text displays greatly facilitate parameterization.

The OP1S has a non-volatile memory and can permanently store complete sets of parameters. It can therefore be used for archiving sets of parameters, but first the parameter sets must be read out (upread) from the units. Stored parameter sets can also be transferred (downloaded) to other units.

The OP1S and the unit to be operated communicate with each other via a serial interface (RS485) using the USS protocol. During communication, the OP1S assumes the function of the master whereas the connected units function as slaves.

The OP1S can be operated at baud rates of 9.6 kBd and 19.2 kBd, and is capable of communicating with up to 32 slaves (addresses 0 to 31). It can therefore be used in a point-to-point link (e.g. during initial parameterization) or within a bus configuration.

The plain-text displays can be shown in one of five different languages (German, English, Spanish, French, Italian). The language is chosen by selecting the relevant parameter for the slave in question.

Order numbers

Components	**Order Number**
OP1S	6SE7090-0XX84-2FK0
Connecting cable 3 m	6SX7010-0AB03
Connecting cable 5 m	6SX7010-0AB05
Adapter for installation in cabinet door incl. 5 m cable	6SX7010-0AA00

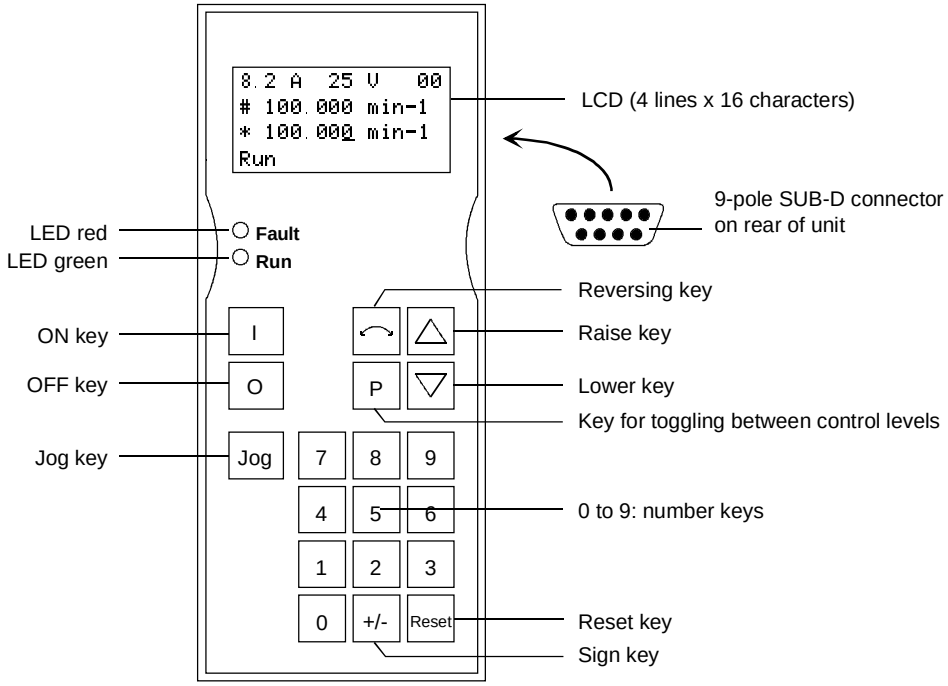
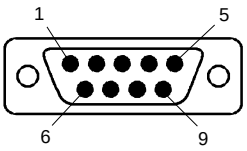


Fig. 5-5 View of the OP1S

OP1S connections



Pin	Designation	Meaning	Range
1			
2			
3	RS485 P	Data via RS485 interface	
4			
5	N5V	Ground	
6	P5V	5 V aux. voltage supply	±5%, 200 mA
7			
8	RS485 N	Data via RS485 interface	
9		Reference potential	

Table 5-8 OP1S connections

5.4.2 Connecting, run-up

5.4.2.1 Connecting

The OP1S can be connected to the units in the following ways:

- Connection via 3 m or 5 m cable (e.g. as a hand-held input device for start-up)
- Connection via cable and adapter for installation in a cabinet door
- Plugging into MASTERDRIVES Compact units (for point-to-point linking or bus configuration)
- Plugging into MASTERDRIVE Compact PLUS units (for bus configuration)

Connection via cable

The cable is plugged into the Sub D socket X103 on units of the Compact PLUS type and into Sub D socket X300 on units of the Compact and chassis type.

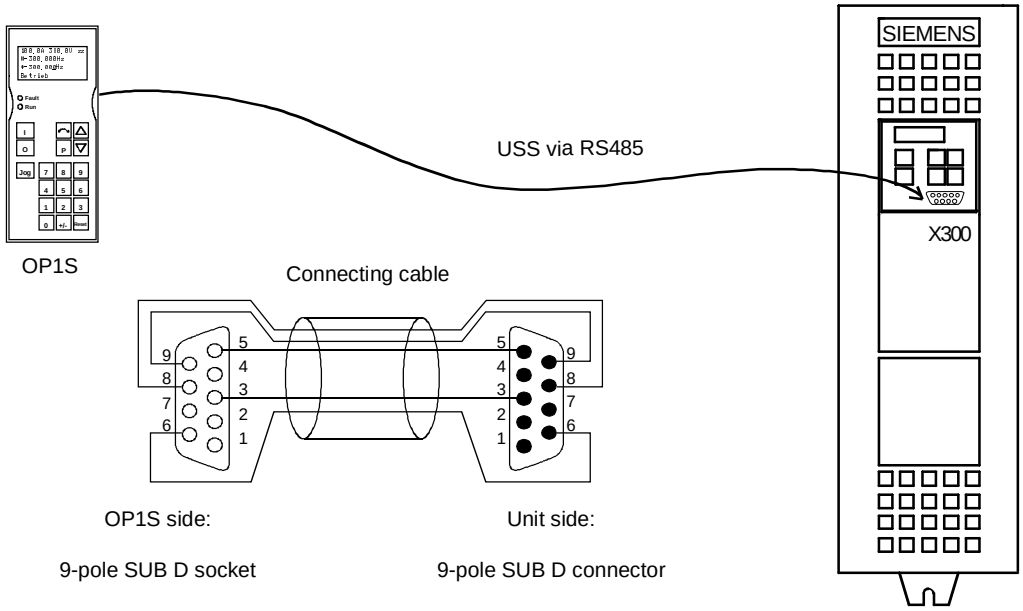


Fig. 5-6 The OP1S directly connected to the unit

Plugging into units of the Compact and chassis type

Carefully penetrate the pre-punched holes for the fixing screws in the front panel of the Compact units. Plug the OP1S onto the Sub D socket X300 and screw it tight using the two screws (M5 x 10, accessory pack) from the inside of the front panel.

5.4.2.2 Run-up

After the power supply for the unit connected to the OP1S has been turned on or after the OP1S has been plugged into a unit which is operating, there is a run-up phase.

NOTICE

The OP1S must not be plugged into the Sub D socket if the SCom1 interface parallel to the socket is already being used elsewhere, e.g. bus operation with SIMATIC as the master.

NOTE

In the as-delivered state or after a reset of the parameters to the factory setting with the unit's own control panel, a point-to-point link can be adopted with the OP1S without any further preparatory measures.

When a bus system is started up with the OP1S, the slaves must first be configured individually. The plugs of the bus cable must be removed for this purpose (see section "Bus operation").

During the run-up phase, the text "Search slave" is shown in the first line of the display, followed by "Slave found" and the found slave number as well as the set baud rate.

```
Slave found
Adress:  [00]
Baudrate: [6]
```

Example of a display after the run-up phase (6 corresponds to 9.6 kBd)

After approximately 4 s, the display changes to

```
    SIEMENS
MASTERDRIVES VC
6SE7016-1EA61
SW:V3.0 OP:V2T20
```

Example of what is displayed after a slave address has been found

After a further 2 s, there is a changeover to the operating display. If it is not possible to start communicating with the slave, an error message "Error: Configuration not ok" appears. About 2 s later, a request is made for new configuration.

```
New config?

#yes
 no
```

Error message displayed when communication is not possible

If the "P" key is pressed, the connected unit is reconfigured, i.e. the interface parameters are set to the standard values.

Number of PKWs (P702): 127

Number of PZDs (P703): 2 or 4

Telegram failure time (P704): 0 ms

If communication with the slave is still impossible, the reasons may be as follows:

- Defective cabling
- Bus operation with two or more slaves with the same bus address (see section "Bus operation")
- The baud rate set in the slave is neither 9.6 nor 19.2 kBd

In the latter case, an error message "Error: No slave found" appears. The unit's own PMU control panel must then be used to set parameter P701 (baud rate) to 6 (9.6 kBd) or 7 (19.2 kBd) or to reset the parameters to the factory setting.

5.4.3 Operator control

5.4.3.1 Operator control elements

Key	Meaning	Function
I	ON key	• For energizing the drive (enabling motor activation). The function must be enabled by P554.
O	OFF key	• For de-energizing the drive by means of OFF1, OFF2 or OFF3. The function must be enabled by P554 to P560.
Jog	Jog key	• For jogging with jog setpoint 1 (only effective when the unit is in the "Ready to start" state). This function must be enabled by P568.
	Reversing key	• For reversing the direction of rotation of the drive. This function must be enabled by P571 and P572.
P	Toggle key	• For selecting menu levels and switching between parameter number, parameter index and parameter value in the sequence indicated. The current level is displayed by the position of the cursor on the LCD display (the command comes into effect when the key is released). • For conducting a numerical input.
Reset	Reset key	• For leaving menu levels • If fault display is active: For acknowledging the fault. This function must be enabled by P565.
△	Raise key	For increasing the displayed value • Short press = single-step increase • Long press = rapid increase • If motorized potentiometer is active, this is for raising the setpoint. This function must be enabled by P573.
▽	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease • If motorized potentiometer is active, this is for lowering the setpoint. This function must be enabled by P574.
+/-	Sign key	• For changing the sign so that negative values can be entered
0 to 9	Number keys	• Numerical input

Table 5-9 Operator control elements

5.4.3.2 Operating display

After run-up of the OP1S, the following operating display appears:

```
    0.0A  0V  00
#     0.00 min-1
*     0.00 min-1
Ready.
```

Example of an operating display in the "Ready" status

The values shown in the operating display (except for slave number, 1st line on the far right) can be specified by means of parameterization:

1st line, left (P0049.001)	in the example "Output current"
1st line, right (P0049.002)	in the example "DC link voltage"
2nd line actual value (P0049.003)	in the example "Actual speed" (only a visualization parameter)
3rd line setpoint (P0049.004)	in the example "Speed setpoint"
4th line (P0049.005)	in the example "Operating state"

In the operating display, the actual value is indicated with "#" and the setpoint with "*".

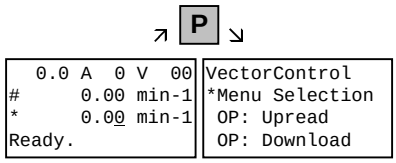
In addition to the operating display on the display unit, the operating state is indicated by the red and green LEDs as follows:

	Flashing	**Continuous**
red LED	Alarm	Fault
green LED	Ready for ON	Operation

Table 5-10 Operating displays

5.4.3.3 Basic menu

When the "P" key is pressed, a changeover is made from the operating display to the basic menu.

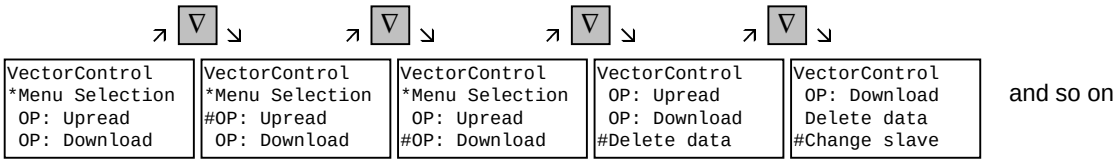


Display of the basic menu

The basic menu is the same for all units. The following selections can be made:

- Menu selection
- OP: Upread
- OP: Download
- Delete data
- Change slave
- Config. slave
- Slave ID

As not all the lines can be shown at the same time, it is possible to scroll the display as required with the "Lower" and "Raise keys.



Example of switching from one line to the next

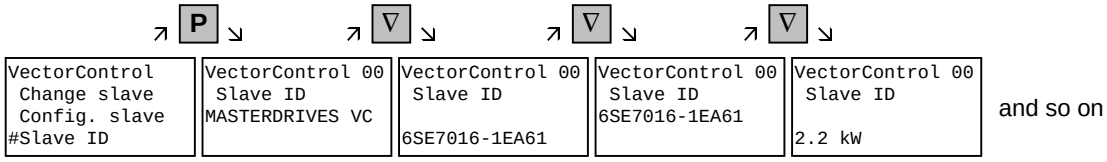
The currently active function is indicated by the "*" symbol and the selected function by the "#" symbol. After the "P" key has been pressed, the relevant symbol jumps to the selected function. The "Reset" key is for returning to the operating display.

5.4.3.4 Slave ID

With the "Slave ID" function, the user can request information about the connected slave. The slave ID consists, for example, of the following lines:

MASTERDRIVES VC
6SE7016-1EA61
2.2 kW
V3.0
15.02.1998

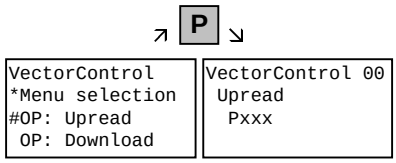
Starting from the basic menu, the "Slave ID" function is selected with "Raise" or "Lower" and activated with "P". As all the lines cannot be shown at the same time, it is possible to scroll the display as required with the "Lower" and "Raise" keys. In addition, the slave number is shown at the top on the right-hand side.



Example of a slave ID

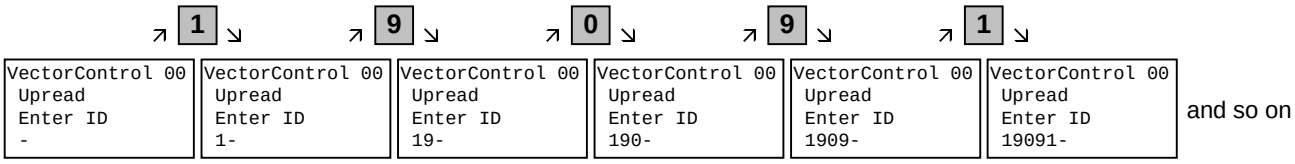
5.4.3.5 OP: Upread

With the "OP: Upread“ function, the parameters of the connected slave can be upread and stored in the flash memory inside the OP1S. Parameters of a possibly inserted technology board are not taken into account (e.g. T100, T300). The SIMOVIS program is required here. Starting from the basic menu, the "OP: Upread" function is selected with "Lower" or "Raise" and started with "P". If the available memory is insufficient, the procedure is interrupted with an appropriate error message. During upread, the OP1S indicates the parameters currently being read. In addition, the slave number is shown at the top on the right-hand side.



Example: Selecting and starting the "Upread" procedure

With "Reset", the procedure can be interrupted at any time. If the upread procedure has been completed in full, the user is requested to enter an ID with a maximum of 12 characters for the stored parameter set. This identification can, for example, consist of the date and two differentiating numbers. It is entered with the numerical keypad. With "Lower" a number which has been entered can be deleted.

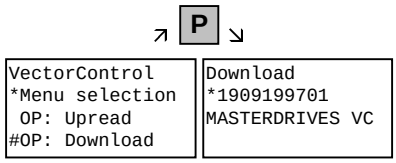


Example of entering an ID

When "P" is pressed, the message "Upread OK" appears and the display changes to the basic menu.

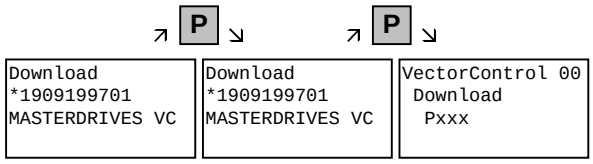
5.4.3.6 OP: Download

With the "OP: Download" function, a parameter set stored in the OP1S can be written into the connected slave. Parameters of a possibly inserted technology board are not taken into account (e.g. T100, T300). The SIMOVIS program is required here. Starting from the basic menu, the "OP: Download" function is selected with "Lower" or "Raise" and activated with "P".



Example: Selecting and activating the "Download" function

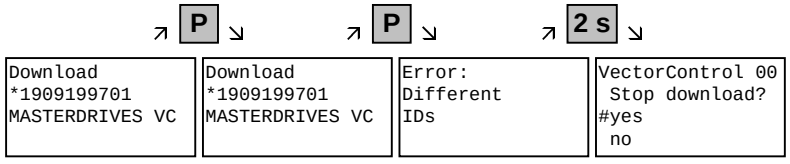
One of the parameter sets stored in the OP1S must now be selected with "Lower" or "Raise" (displayed in the second line). The selected ID is confirmed with "P". The slave ID can now be displayed with "Lower" or "Raise" (see section "Slave ID"). The "Download" procedure is then started with "P". During download, the OP1S displays the currently written parameter.



Example: Confirming the ID and starting the "Download" procedure

With "Reset", the procedure can be stopped at any time. If downloading has been fully completed, the message "Download ok" appears and the display returns to the basic menu.

After the data set to be downloaded has been selected, if the identification of the stored software version does not agree with the software version of the unit, an error message appears for approximately 2 seconds. The operator is then asked whether downloading is to be discontinued.

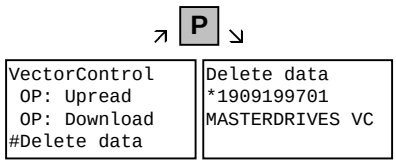


Yes: The "Download" procedure is discontinued.

No: The "Download" procedure is carried out.

5.4.3.7 Delete data

With the "Delete data" function, the user can delete parameter sets stored in the OP1S, thus, for example, creating space for new parameter sets. Starting from the basic menu, the "Delete data" function is selected with "Lower" or "Raise" and activated with "P".



Example: Selection and activation of the "Delete data" function

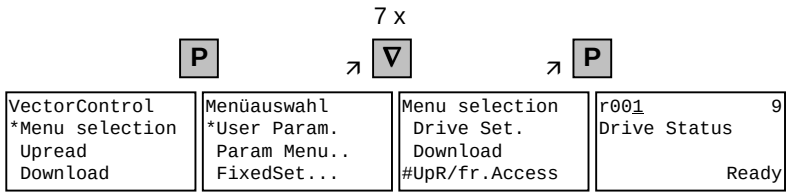
One of the parameter sets stored in the OP1S must now be selected with "Lower" or "Raise" (displayed in the second line). With "P", the selected ID is confirmed. The slave ID can now be displayed with "Lower" or "Raise" (see section "Slave ID"). The "Delete data" procedure can now be started with "P". After completion, the message "Data deleted" appears and the display returns to the basic menu.

5.4.3.8 Menu selection

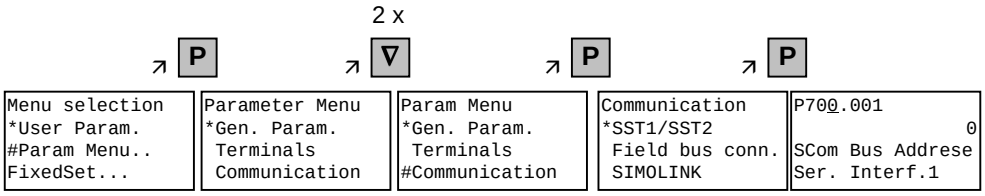
The actual parameterization and start-up of the connected slave is performed by means of the "Menu selection" function. Starting from the basic menu, the "Menu selection" function is selected with "Lower" or "Raise". By pressing "P", the unit-specific sub-menu is displayed with the following choices:

- User Param.
- Param Menu..
- FixedSet...
- Quick Param...
- Board Conf.
- Drive Set
- Download
- UpR/fr.Access
- Power Def.

Two or more dots after these items mean that there is a further sub-menu level. If "Parameter menu.." is selected, access is possible to all parameters via correspondingly structured sub-menus. If "UpR/fr. Access" is selected, direct access is gained to the parameter level.



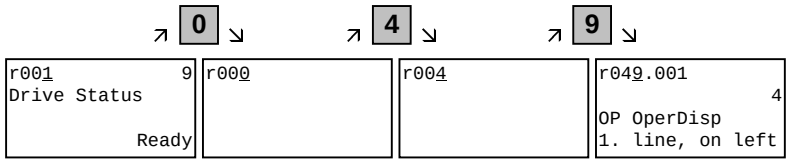
Example: Selecting the parameter level by means of UpR/fr.access



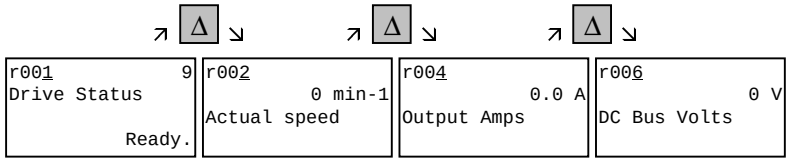
Example: Selecting a parameter via sub-menus

Parameter display and parameter correction

A parameter number can be selected from the parameter level directly with the numerical keys or with "Raise"/"Lower". The parameter number is shown as a three-figure quantity. In the event of four-figure parameter numbers, the first figure (1, 2 or 3) is not displayed. A distinction is made with the letters (P, H, U etc.).



Example: Direct input of the parameter number with the numerical keypad

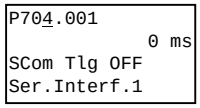


Example: Correcting the parameter number by means of "Raise"

If the parameter is found not to exist when the number is entered, a message "No PNU" appears. A non-existent parameter number can be skipped by selecting "Raise" or "Lower".

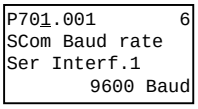
How the parameters are shown on the display depends on the type of parameter. There are, for example, parameters with and without an index, with and without an index text and with and without a selection text.

Example: Parameter with index and index text



1st line: Parameter number, parameter index
2nd line: Parameter value with unit
3rd line: Parameter name
4th line: Index text

Example: Parameter with index, index text and selection text



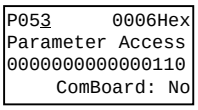
1st line: Parameter number, parameter index, parameter value

2nd line: Parameter name

3rd line: Index text

4th line: Selection text

Example: Parameter without index, with selection text, binary value



1st line: Parameter number, parameter value, hexadecimal parameter value

2nd line: Parameter name

3rd line: Parameter value, binary

4th line: Selection text

Transition between the parameter number, parameter index and parameter value levels is made with "P".

Parameter number → "P" → Parameter index → "P" → Parameter value

If there is no parameter index, this level is skipped. The parameter index and the parameter value can be corrected directly with the "Raise"/"Lower" keys. An exception to this are parameter values shown in binary form. In this case, the individual bits are selected with "Raise"/"Lower" and corrected with the numerical keys (0 or 1).

If the index number is entered by means of the numerical keys, the value is not accepted until "P" is pressed. If the "Raise" or "Lower" keys are used to correct the number, the value comes into effect immediately. The acceptance of an entered parameter value and return to the parameter number does not take place until "P" is pressed. The level selected in each case (parameter number, parameter index, parameter value) is marked with the cursor. If an incorrect parameter value is entered, the old value can be obtained by pressing "Reset". The "Reset" key can also be used to go one level lower.

Parameter value → "Reset" → Parameter index → "Reset" → Para.No.

Parameters which can be changed are shown in upper-case letters and visualization parameters which cannot be changed are shown in lower-case letters. If a parameter can only be changed under special conditions or if an incorrect value has been entered with the numerical keys, an appropriate message follows, e.g.:

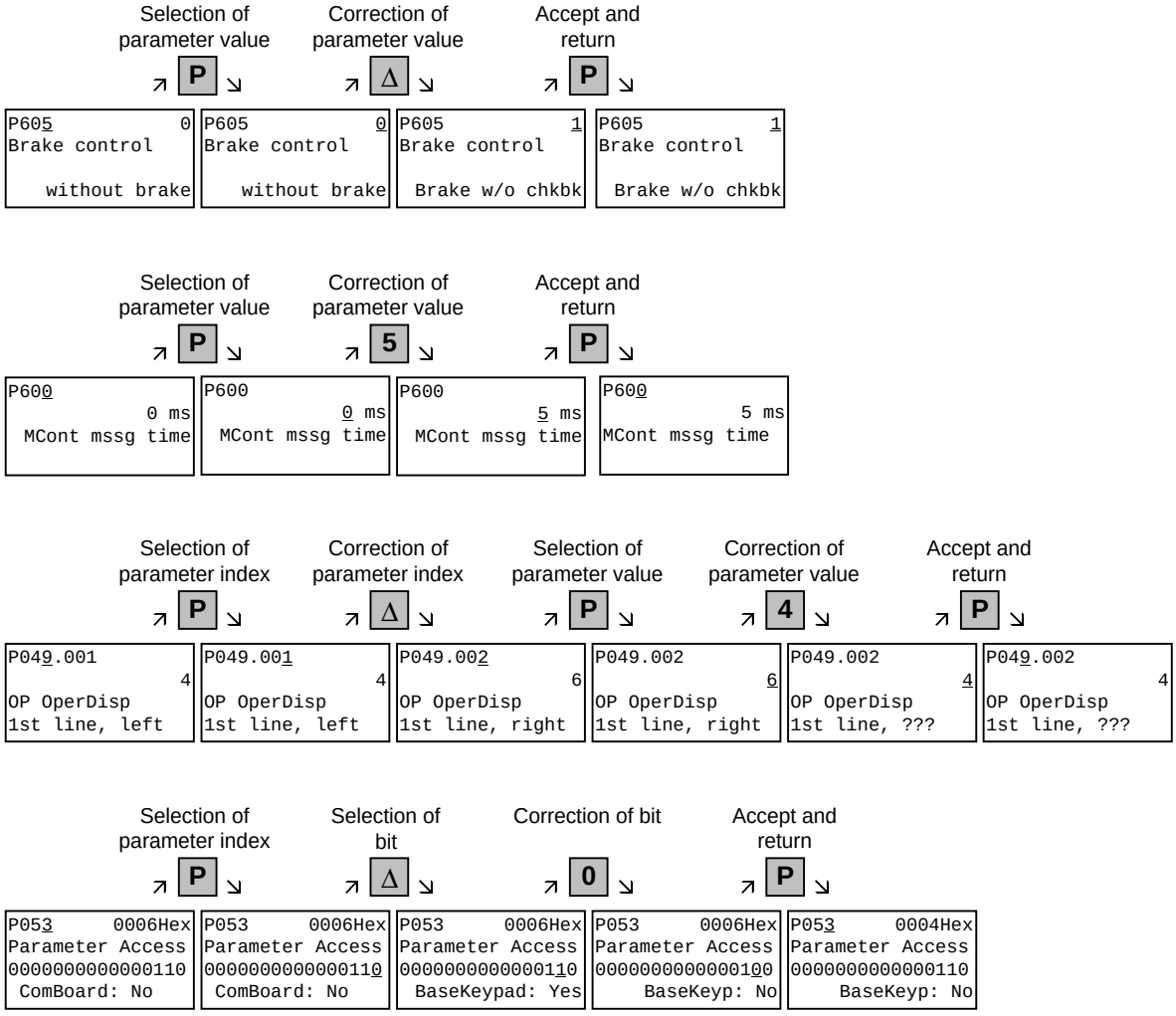
- "Value not perm." Incorrect value entered
- "Value <> min/max" Value too large or too small
- "P53/P927?" No parameter access
- "Operating status?" Value can only be changed in the "Drive setting" status, for example

With "Reset", the message is deleted and the old value is re-instated.

NOTE

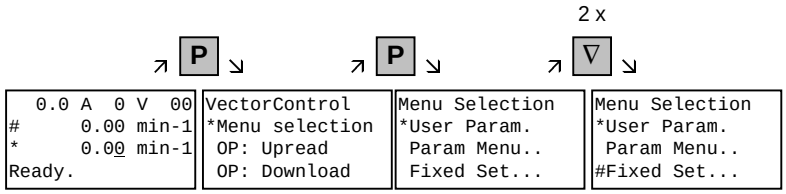
Parameter changes are always stored with power-failure protection in the EEPROM of the unit connected to the OP1S.

Example of parameter correction

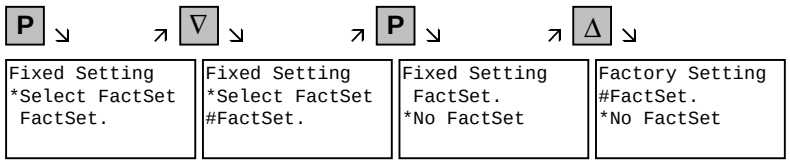


Some parameters may also be displayed without a parameter number, e.g. during quick parameterization or if "Fixed setting" is selected. In this case, parameterization is carried out via various sub-menus.

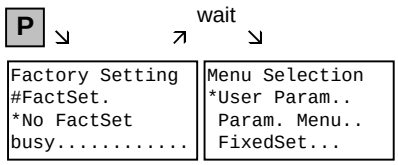
Example of how to proceed for a parameter reset.



Selection of fixed setting



Selection of factory setting



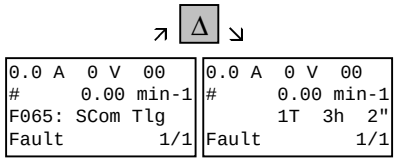
Start of factory setting

NOTE

It is not possible to start the parameter reset in the "Run" status.

Fault and alarm messages

A fault or alarm message is indicated by the red LED. In the event of a fault, the red LED lights up and stays on. A fault message appears in the 3rd and 4th line of the operating display.

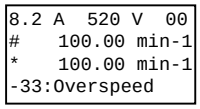


Example of a fault display

The fault number and the respective text are shown in the 3rd line. Up to 8 fault messages can be stored but only the first fault to occur is shown on the display. Several subsequent faults are shown in the 4th line, e.g. with 1/3 (first of three). Information on all faults can be obtained from the fault memory. With "Raise"/"Lower", the associated operating hours are shown when a fault is waiting to be remedied.

After the cause of a fault has been removed, the fault is acknowledged with "Reset" inside the operating display (the "Reset" key must be appropriately parameterized. See section "Issuing commands via the OP1S"). By pressing "P" and "Lower" at the same time, it is possible to skip back directly to the operating display from the parameter level.

When there is an alarm, the red LED flashes. A warning appears in the 4th line of the operating display.



Example of an alarm display

The alarm number and the respective text is shown in the 4th line. There can be several alarms at the same time but only the first alarm to occur is shown on the display. Several alarms are shown in the 4th line before the alarm number with an "+" instead of "-". Information on all alarms can be obtained with the alarm parameters r953 to r969.

An alarm cannot be acknowledged. As soon as the cause no longer exists, the alarm/display disappears automatically.

5.4.3.9 Issuing commands via the OP1S

Control functions and setpoint specifications for the connected unit can be selected with the corresponding keys of the OP1S, for example during start-up. To do so, the sources of the control commands have to be added to the corresponding bits of word 1 of the SCom1 interface 1), or SCom2 interface 2). For setpoint specification, the sources of the setpoints must be appropriately "interconnected". In addition, the setpoint to be changed is to be parameterized as a displayed value in the 3rd line of the operating display.

Key	Function	Parameter number	Parameter value
I O	ON/OFF1	P554 Source ON/OFF1	2100 1) / 6100 2)
△ ▽	Motorized potentiometer: setpoint higher, lower (only effective within the operating display)	P573 Source Raise MOP P574 Source Lower MOP P443 Source Main Setpoint P049.004 Setpoint Operating Disp	2113 1) / 6113 2) 2114 1) / 6114 2) KK0058 (MOP Output) 424 (MOP Out)
0 to 9 or △ ▽	Setpoint specification by means of fixed septoint (only effective within the operating display. If entered with numerical key, confirm with "P")	P443 Source Main Setpoint P573 Source Raise MOP P574 Source Lower MOP P049.004 Setpoint Operating Disp	KK0040 (Fixed setpoints) 0 0 e.g. 401 (selected fixed setpoint)
↶	Reversing	P571 Source clockwise direc. of rotation P572 Source anti-clockwise direc. of. rotation	2111 1) / 6111 2) 2112 1) / 6112 2)
Reset	Acknowledging (only effective within the operating display)	P565 Source Acknowledge	2107 1) / 6107 2)
Jog	Jogging with jog setpoint 1 (only effective in the "Ready" status)	P568 Source Jog Bit 0 P448 Jog Setpoint 1	2108 1) / 6108 2) Setpoint in %

NOTE

The OFF function can also be performed with OFF2 or OFF3 instead of OFF1. For this, the source of OFF2 (P555) or OFF3 (P556) must be "interconnected" to 2101 1) / 6101 2) or 2102 1) / 6102 2) respectively in addition to setting P554.

1) only applicable for Compact/chassis unit

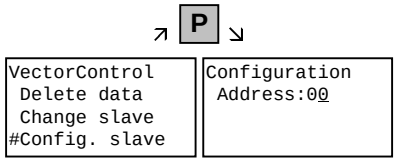
2) only applicable for Compact PLUS

5.4.4 Bus operation

In order to start operating a bus system with the OP1S, the slaves must first be configured individually. To do this, the bus connecting cable between the slaves must be interrupted (pull out the bus-cable plug). For configuration, the OP1S is connected with each slave one after the other. A precondition for carrying out the configuration is a baud rate of 9.6 or 19.2 kBd set in the slave (see section "Run-up").

5.4.4.1 Configuring slaves

Starting from the basic menu, the "Config. slave" function is selected with "Lower"/"Raise" and activated with "P". The user is now requested to enter a slave address.



Example of activating the "Config. slave" function

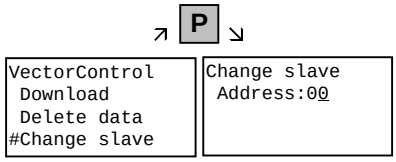
After a different slave address for each slave has been entered by means of the "Raise" key or with the numerical keypad and confirmed with "P", configuration is carried out, i.e. the interface parameters are set to the standard value (see section "Run-up"). In addition, the slave address is entered and a baud rate of 9.6 kBd is set in the slave. After configuration has been completed, the message "Configuration ok" appears, followed by a return to the basic menu. If the configuration of all slaves has been successfully completed, bus operation can be started after the bus connection between the slaves has been restored.

NOTE

During bus operation, each slave must have a different address (P700). Bus operation is also possible at 19.6 kBd (set P701 to 7). The baud rate, however, must be set the same in all slaves.

5.4.4.2 Changing slaves

During bus operation, a specific slave can be selected via the OP1S with the "Change slave" function without any re-plugging. Starting from the basic menu, the "Change slave" function is selected with the "Lower"/"Raise" key and activated with "P". The user is then requested to enter a slave address.



Example of activating the "Change slave" function

After the slave address has been entered with "Raise"/"Lower" and confirmed with "P", a change is made to the required slave and the display returns to the basic menu. If the slave cannot be found, an error message is output.

5.4.5 Technical data

Order number	6SE7090-0XX84-2FK0
Supply voltage	5 V DC ± 5 %, 200 mA
Operating temperature	0 °C to +55 °C
Storage temperature	-25 °C to +70 °C
Transport temperature	-25 °C to +70 °C
Environment class • Humidity • Pollution resistance	Acc. to DIN IEC 721 Part 3-3/04.90 3K3 3C3
Protection class	II acc. DIN VDE 0160 Part 1/05.82 IEC 536/1976
Degree of protection • Front • Rear	Acc. to DIN VDE 0470 Part 1/11.92 IP54 EN60529 IP21
Dimensions W x H x D	74 x 174 x 26 mm
Standards	VDE 0160/E04.91 VDE 0558 Part 1/07.87 UL, CSA

Table 5-11 Technical data

5.5 Parameter input with SIMOVIS / DriveMonitor

Operation of SIMOVIS/ DriveMonitor via the PC and USS interfaces is described below.

5.5.1 Installation and connection

5.5.1.1 Installation

A CD is included with the devices of the MASTERDRIVES Series when they are delivered. The operating tool supplied on the CD (SIMOVIS/DriveMonitor) is automatically installed from this CD. If "automatic notification on change" is activated for the CD drive on the PC, user guidance starts when you insert the CD and takes you through installation of SIMOVIS/DriveMonitor. If this is not the case, start file "Autoplay.exe" in the root directory of the CD.

5.5.1.2 Connection

There are two ways of connecting a PC to a device of the SIMOVERT MASTERDRIVES Series via the USS interface. The devices of the SIMOVERT MASTERDRIVES Series have both an RS232 and an RS485 interface.

RS232 interface

The serial interface that PCs are equipped with by default functions as an RS232 interface. This interface is not suitable for bus operation and is therefore only intended for operation of a SIMOVERT MASTERDRIVES device.

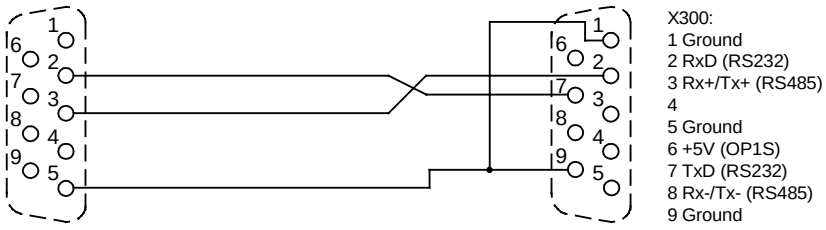


Fig. 5-7 Connecting cable for connecting PC COM(1-4) to SIMOVERT MASTERDRIVES X300

NOTICE

SIMOVIS/DriveMonitor must not be operated via the Sub-D socket X300 if the SST1 interface parallel to it is already being used for another purpose, e.g. bus operation with SIMATIC as the master.

RS485 interface

The RS485 interface is multi-point capable and therefore suitable for bus operation. You can use it to connect 31 SIMOVERT MASTERDRIVES with a PC. On the PC, either an integrated RS485 interface or an RS232 ↔ RS485 interface converter is necessary. On the device, an RS485 interface is integrated into the -X300 (compact PLUS -X103) connection. For the cable: see pin assignment -X300 and device documentation of the interface converter.

5.5.2 Bus configuration (SIMOVIS)

After you have launched SIMOVIS, the "SIMOVIS bus configuration" window appears. Here you must define, how many devices are to be addressed by SIMOVIS, of what type (device series from the SIMOREG or SIMOVERT families) these devices are, and how the connection with the devices is configured.

5.5.2.1 Creating a project

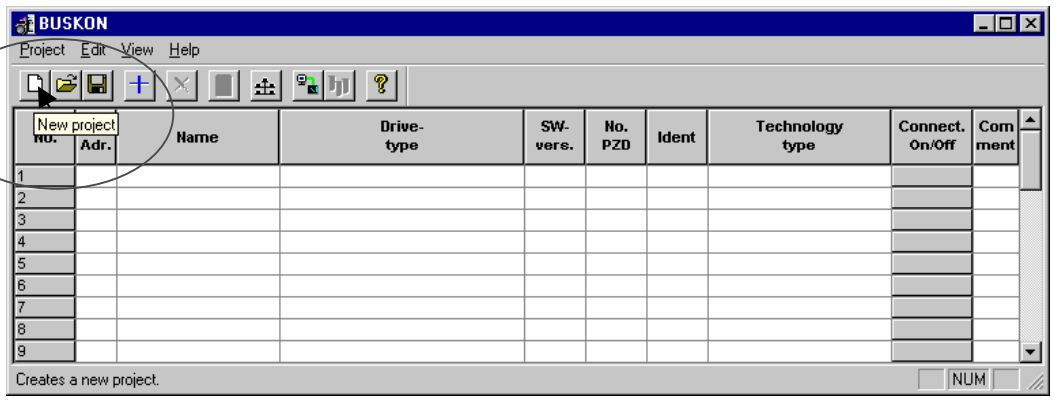


Fig. 5-8 Creating a project

First create a project. That is done as follows:

- If the toolbar is being displayed, you can create a project by clicking on the button *New project* (see Fig. 5-8) or selecting the menu command *Project → New*.
- After that, enter a project name that is not yet being used in field "Filename" in the following dialog box (Fig. 5-9) and save the project with button *Save*.

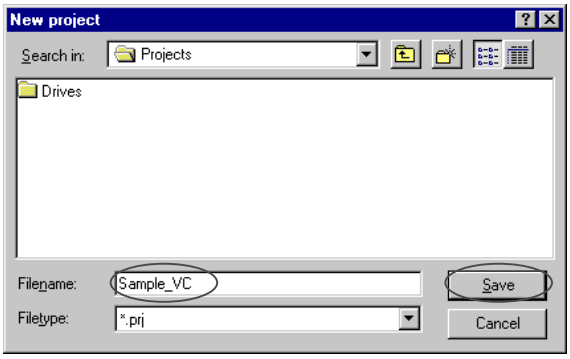


Fig. 5-9 Dialog box for creating a project

5.5.2.2 Setting the interface

For each project, you can configure the USS interface individually. When configuring, you must specify the baudrate and select a PC interface (COM 1-4). To set the interface, please proceed as follows:

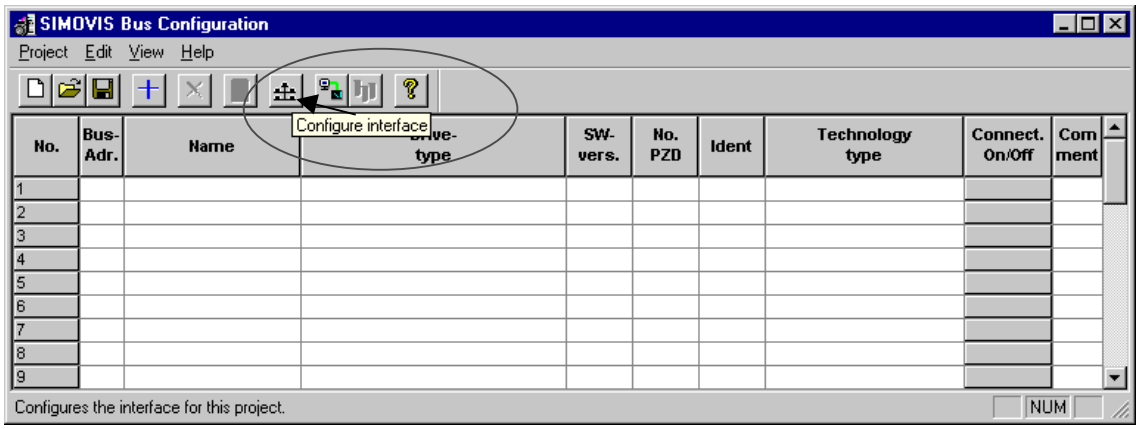


Fig. 5-10 Configuring the interface

If the toolbar is being displayed, click on button *Configure interface* (see Fig. 5-10) or select the menu command *Edit → Interface*. In window "Communication" you can then specify the required COM interface of the PC (COM1 to COM4) and the required baudrate (see Fig. 5-11 [1]).

NOTE

Set the baudrate to the baudrate parameterized in the SIMOVERT MASTERDRIVES (P701) (factory setting 9600 baud).

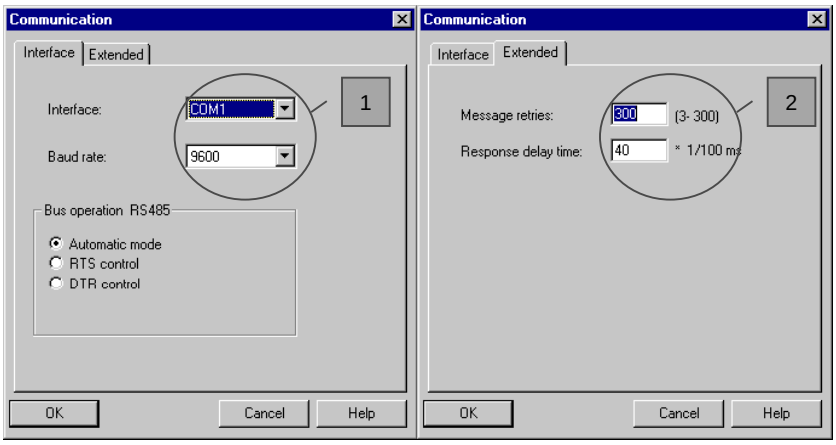


Fig. 5-11 Communication

You can also set:

- Operating mode of bus operation (RS485); for the setting, see the description of the interface converter RS232/RS485
- Request repetitions and response timeout on tab card "Extended", (see Fig. 5-11 [2]). Here, you can increase the values already set if communication errors occur frequently.

5.5.2.3 Selecting a device

After you have set the interface, select the connected device. This can be done in one of two ways:

- Set the device with "Add drive".
  If the toolbar is being displayed, click on button *Add drive* or select the menu command *Edit → Add drive*.

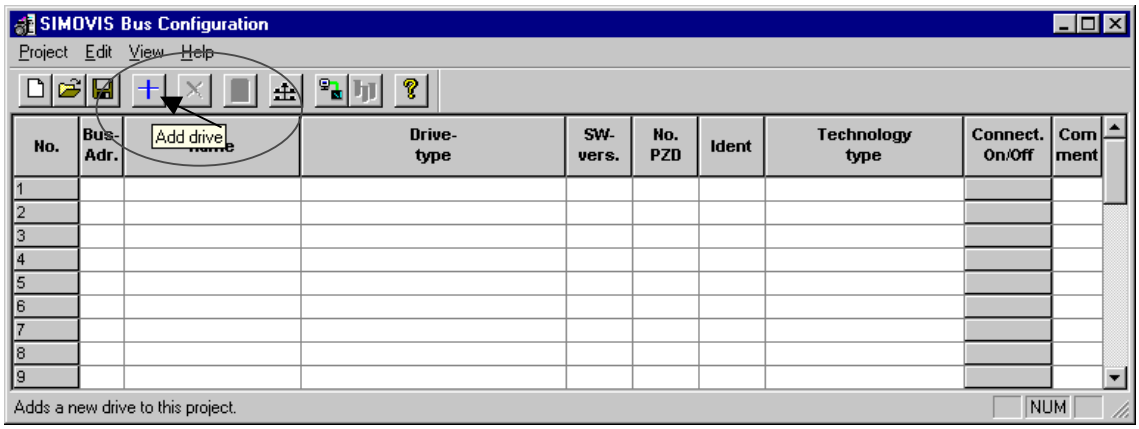


Fig. 5-12 Add drive

In window "Add a drive", the next free bus address is displayed in field "Bus adress" as a recommended value.

Fig. 5-13 Window for adding a device

NOTE

The bus address specified must match the SST bus address (P700) parameterized in the SIMOVERT MASTERDRIVES.

In dropdown list box "Drive" you can select the device type (e.g. MASTERDRIVES VC(CUVC)). You can only select stored devices.

In dropdown list box "SW-version" you can set the software version of the device. (For software versions not listed, see Section 5.5.6.6 "Learning a database".)

You can select the technology type that is to run on a T100, T300, or T400 technology module in dropdown list box "Techn. type".

If you require, you can enter any additional information about the device in field "Comment".

NOTE

Field "No. PZD" has no special significance for the parameterization of MASTERDRIVES. If you require operation using SIMOVIS, set this field to 4.

If the value is changed, it must be/remain ensured that the setting value in the program matches the value in parameter P703 of the drive at all times.

- Set the device with *Connect to all devices/identify devices*
  You can select this function using the toolbar or the menu command *Edit → Connect to drives/ identify drives*. For this function, it is necessary that there is a physical connection with the device and that the baudrate set in SIMOVIS is the same as that set in the device parameterized.

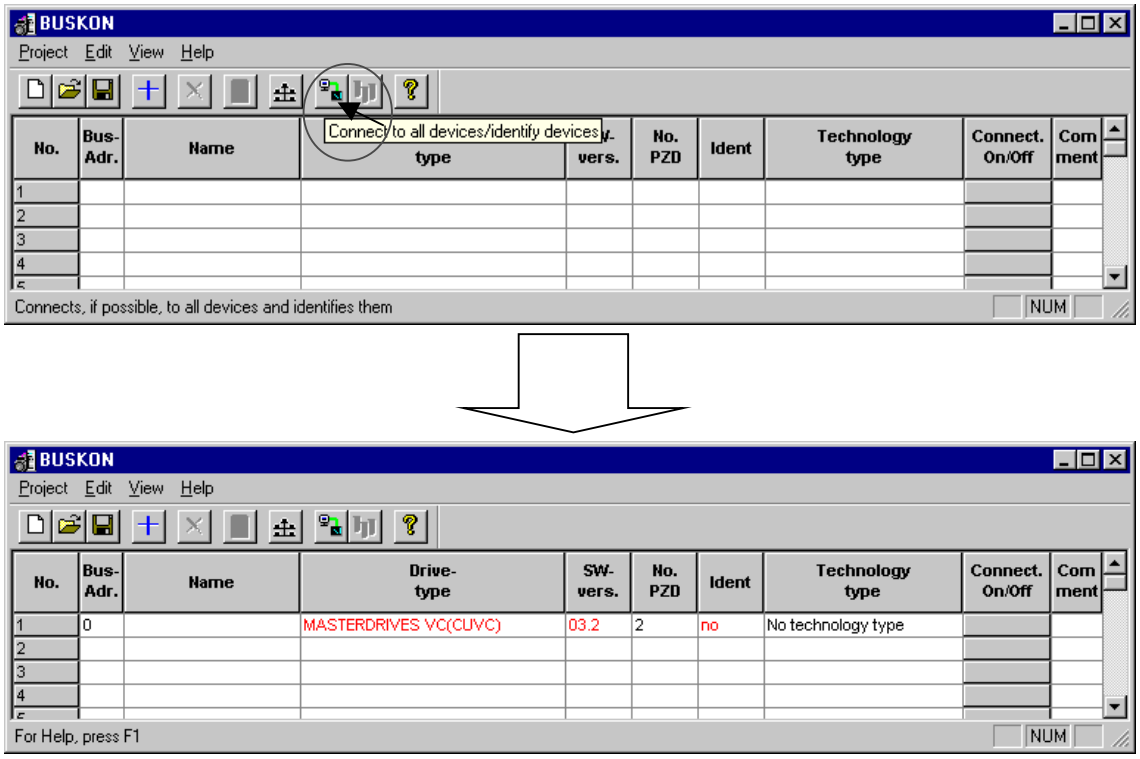


Fig. 5-14 Automatic identification

5.5.2.4 Testing the connection

To establish the connection with the device, click on field "Connect. On/Off" in the row of the device in question in the bus configuration table. With the set interface data, an attempt is then made to establish a connection. The color of the field then indicates the status of the connection (see Fig. 5-15):

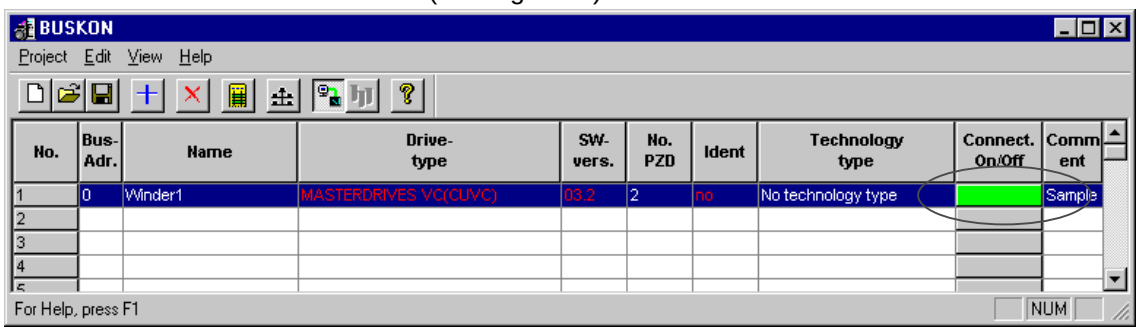


Fig. 5-15 Connection

green	Connection up, everything OK
yellow	Connection up, an alarm is pending on the device
red	Connection up, a fault is pending on the device
black	Connection not possible. Possible reasons for this: Incorrect PC interface, incorrect baudrate, device with this bus address does not exist, connection broken.

5.5.3 Drive configuration DriveMonitor

Unlike SIMOVIS, DriveMonitor starts with an empty drive window. You cannot perform bus and drive configuration here.

5.5.3.1 Setting the interface

You can configure the interface with menu *Tools → ONLINE Settings*.

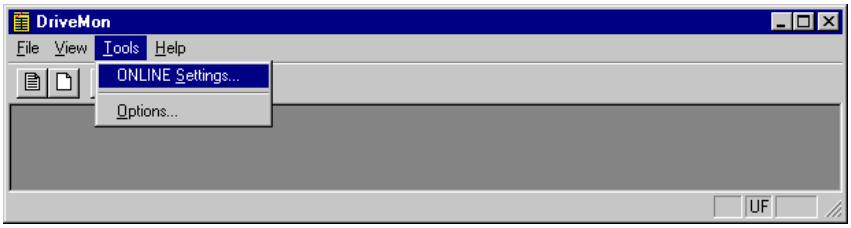


Fig. 5-16 Online settings

The following settings (Fig. 5-17) are possible:

- **Tab card "Bus Type",** options
  USS (operation via serial interface)
  Profibus DP (only if DriveMonitor is operated under Drive ES).
- **Tab card "Interface"**
  You can enter the required COM interface of the PC (COM1 to COM4) and the required baudrate here.

NOTE

Set the baudrate to the baudrate parameterized in SIMOVERT MASTERDRIVES (P701) (factory setting 9600 baud).

Further settings: operating mode of the bus in RS485 operation; setting according to the description of the interface converter RS232/RS485

- **Tab card "Extended"**
  Request retries and Response timeout; here you can increase the values already set if communication errors occur frequently.

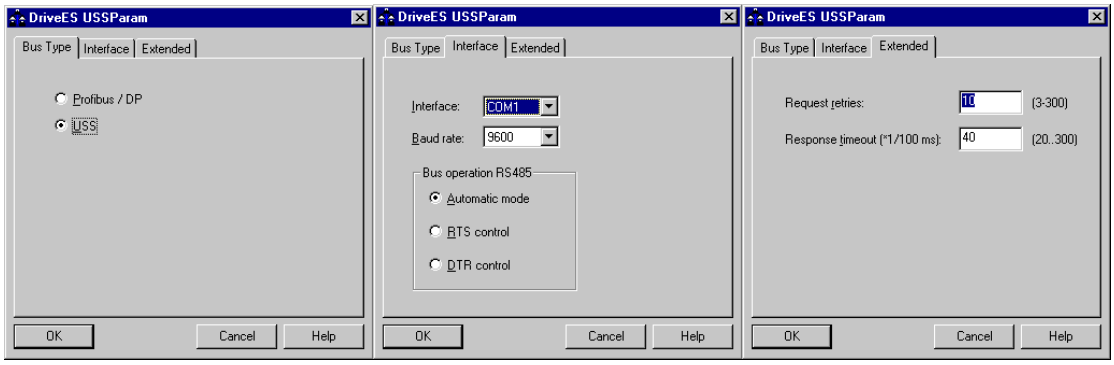


Fig. 5-17 Interface configuration

5.5.3.2 Drive settings

With menu *File → New →...* you can create a new drive for parameterization (see Fig. 5-18). The system creates a download file (*.dnl), in which the drive characteristic data (type, software version) are stored. You can create the download file on the basis of an empty parameter set or the factory setting.

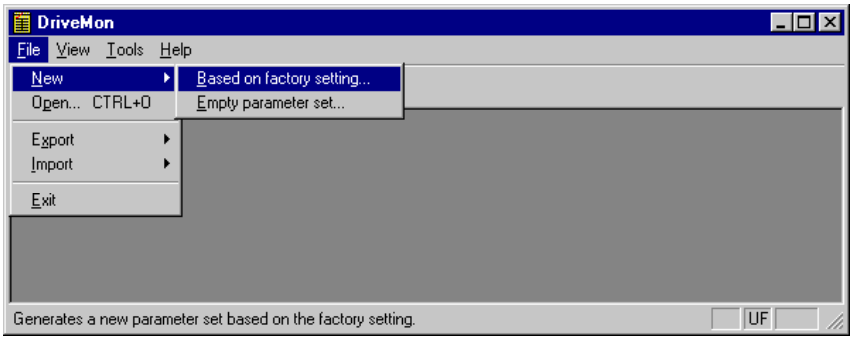


Fig. 5-18 Creating a new drive

Once you have created a drive, you can start it again with the menu function *File → Open* for parameterization by opening the download file.

When you create a new drive, the window "Properties - Drive" (Fig. 5-19) opens. Here you must enter the following data:

- In dropdown list box "Device type", select the type of device (e.g. MASTERDRIVES VC(CUVC)). You can only select the devices stored.
- In dropdown list box "Software version", you can select the software version of the device. You can generate databases for (new) software versions that are not listed when you start online parameterization.

- You can select the technology type that is to run on the technology module T100, T300, or T400, in dropdown list box "Technology type".
- You must only specify the bus address of the drive during online operation (switchover with button Online/Offline)

NOTE

The specified bus address must be the same as that of the parameterized SST bus address in SIMOVERT MASTERDRIVES (P700).

NOTE

Field "Number of PCD" has no special significance for the parameterization of MASTERDRIVES. If you require operation using SIMOVIS, set this field to 4.

If the value is changed, it must be/remain ensured that the setting value in the program matches the value in parameter P703 of the drive at all times.

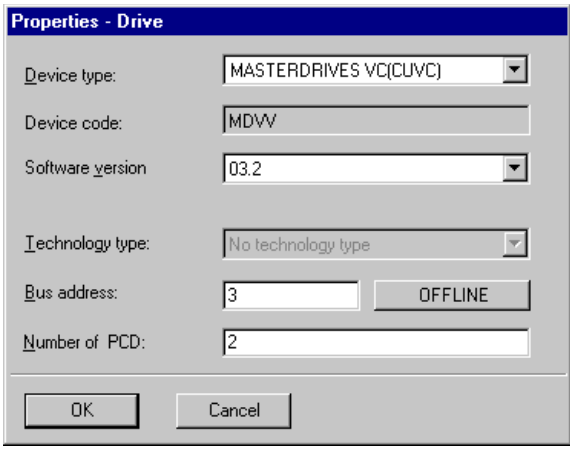


Fig. 5-19 Drive setting

After you have confirmed the drive settings with *ok*, you can still specify the name and the storage location of the download file to be created. After that, the parameter list opens in offline mode (Fig. 5-20).

With buttons *Offline, Online (RAM), Online (EEPROM)* (Fig. 5-20 [1]) you can switch modes. When you switch to online mode, device identification is performed. If the configured device and the real device do not match (device type, software version), an alarm appears. If an unknown software version is recognized, the option of creating the database is offered. (This process takes several minutes.)

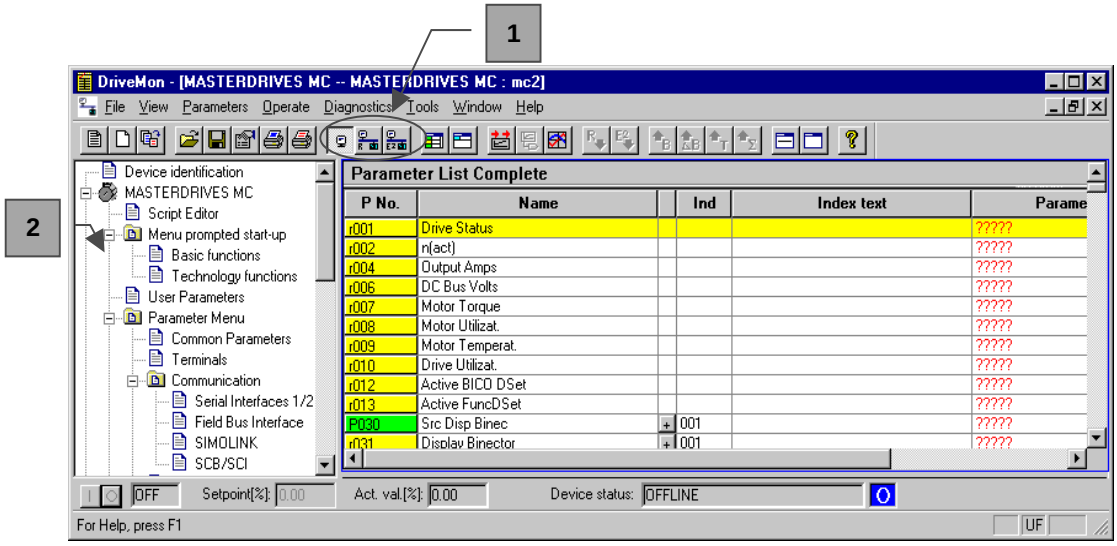


Fig. 5-20 Drive window/parameter list

The DriveMonitor drive window offers one feature that the SIMOVIS drive window does not have, a directory tree for navigation (Fig. 5-20 [2]). You can deselect this additional operating tool in menu *View*.

Otherwise there is no difference between operation and parameterization of DriveMonitor and SIMOVIS.

5.5.4 Parameterization

5.5.4.1 Calling up the drive window (SIMOVIS)

You can open the drive window from the bus configuration window in one of the following ways:

- Double-click on the device to be parameterized (Fig. 5-21 [2])
- Call-up on the toolbar *Parameterize drive* (Fig. 5-21 [1])
- Call-up with the menu command *Edit → Parameterize drive* (Fig. 5-21 [3])

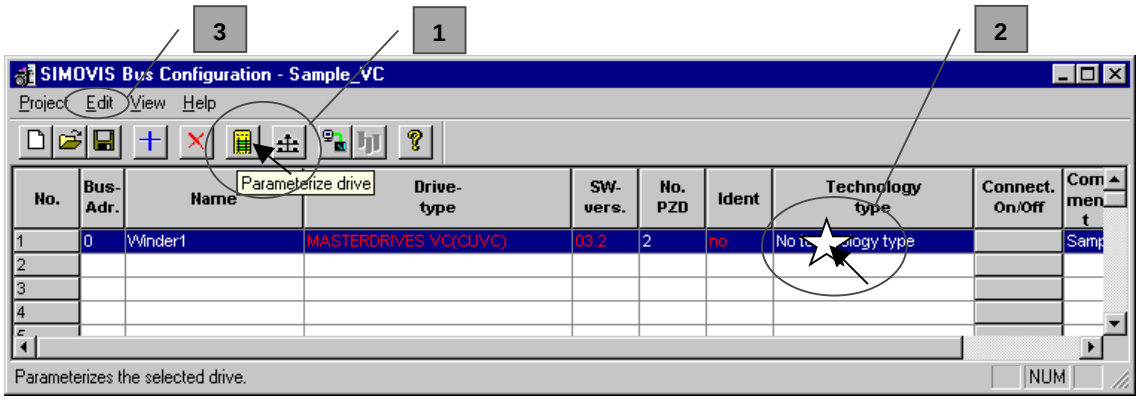


Fig. 5-21 Parameterizing a device

The drive window is then opened with an empty parameter list (*free parameterization*).

5.5.4.2 Drive window

NOTE

DriveMonitor starts immediately with the empty drive window without bus configuration. (See Section 5.5.3 "Drive configuration DriveMonitor".) After you have set the drive or opened a download file, the parameter list is displayed.

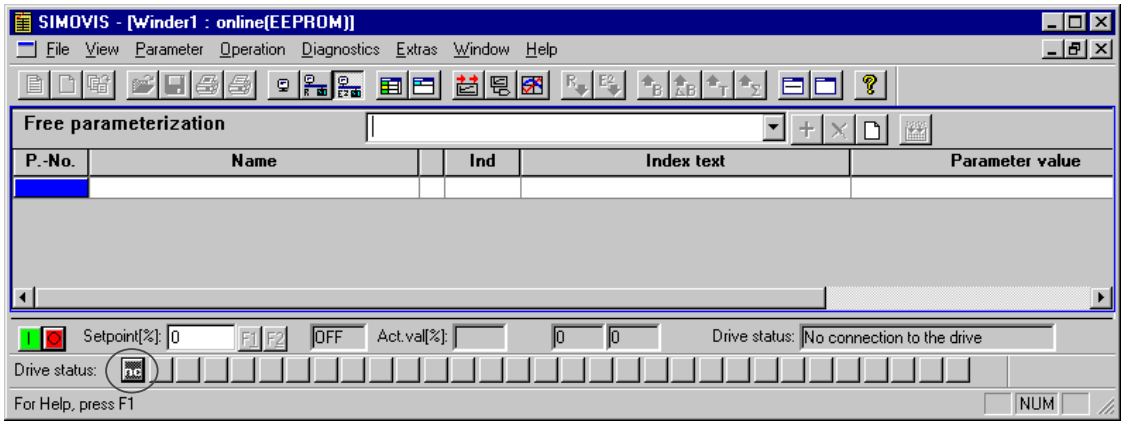


Fig. 5-22 Drive window

The drive window contains all elements required for the parameterization and operation of the connected device. In the lower bar (see Fig. 5-22), the status of the connection with the device is displayed:

Connection and device ok

Connection ok, device in fault state

Connection ok, device in alarm state

Device is parameterized offline

No connection with the device can be established (only offline parameterization possible).

NOTE

If no connection with the device can be established because the device does not physically exist or is not connected, you can perform offline parameterization. First switch to offline mode. In this mode, you can edit the parameter data set on the basis of the factory setting. In that way, you can create an individually adapted download file, which you can load into the device later.

5.5.4.3 Operating modes

You can switch between operating modes using the toolbar (Fig. 5-23 [1]) or menu *View* (Fig. 5-23 [2]).

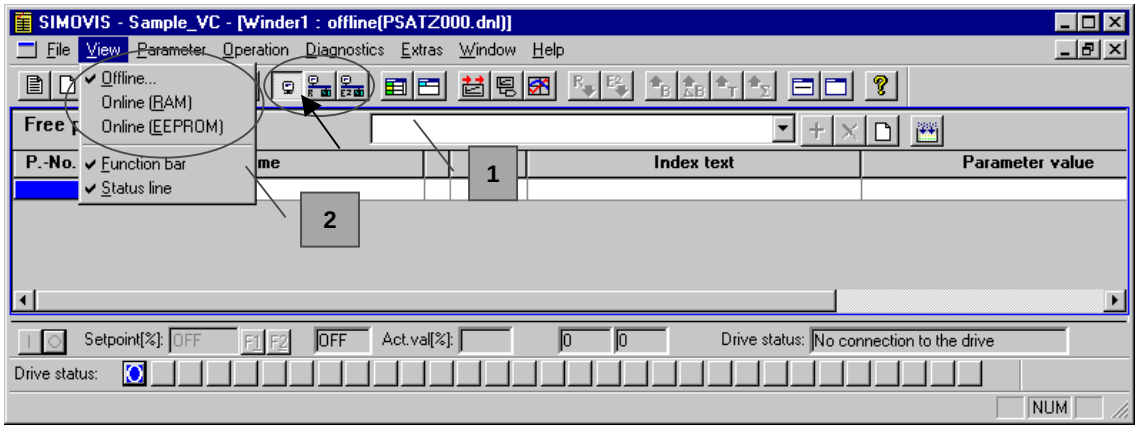


Fig. 5-23 Operating modes

The following modes are available:

- **Offline**
  In this mode, you can edit a parameter set on the basis of the factory setting (default for *View Offline*) or on the basis of a parameter file. You can open or create a parameter data set that is based on a file with menu *File → Open...* bzw. *File → New → Empty parameter set*. You can transfer the parameter data sets created or changed in this way into the device later with the download function.
- **Online RAM**
  In this mode, the edited parameter values are read out of the device online. The parameter changes are only written to the RAM and will therefore be lost when the device is switched off.
- **Online EEPROM**
  In this mode, the edited parameter values are read out of the device online. The parameter changes are written to the EEPROM and are therefore stored in the device nonvolatilely.

5.5.4.4 Parameterization options (Menu Parameter)

Menu *Parameter* contains several selection options for parameterization.

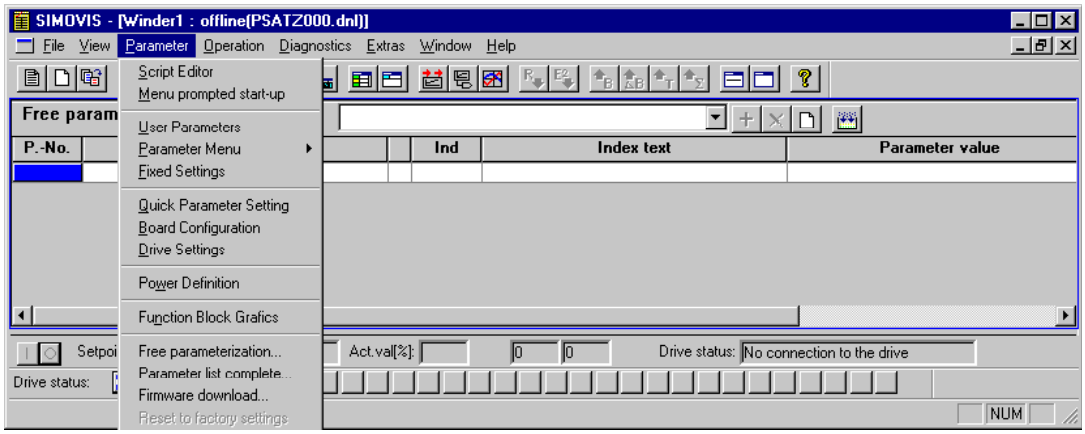


Fig. 5-24 Menu Parameter

Drive menus according to the device

The selection is made in SIMOVIS/ DriveMonitor in accordance with the assignment of parameters to individual menus. (If permissible), the selection in Parameter menu (P60) is automatically set to the correct value. MASTERDRIVES VC/MC contains the following parameter menus:

- **User parameters (P60 = 0)**
  In this menu, only the parameters defined in the device as user parameters (P360) are visible.
- **Parameter menu (P60 = 1)**
  This menu is further subdivided. The parameters are assigned to function groups. In that way, you can perform a particular parameterization task effectively without global knowledge of the parameter set.

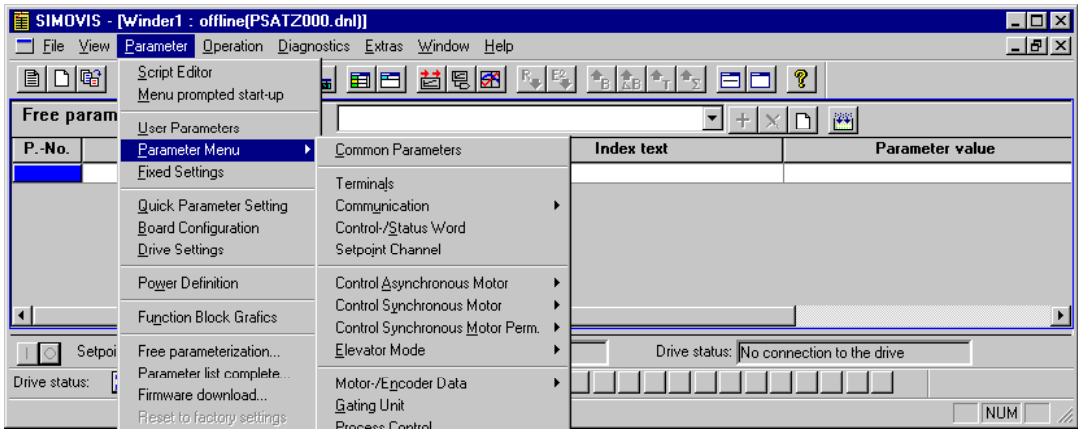


Fig. 5-25 Parameter menu

- **Fixed Settings (P60 = 2)**
  In this menu, the parameters required to make the factory setting are displayed.
- **Quick Parameter Setting (P60 = 3)**
  In this menu, the parameters required to perform quick parameterization are displayed.
- **Board Configuration (P60 = 4)**
  In this menu, the parameters required to perform board definition are displayed.
- **Drive Settings (P60 = 5)**
  In this menu, the parameters required to set the motor are displayed.
- **Power Definition (P60 = 8)**
  In this menu, the parameters required to define the power section are displayed.

SIMOVIS / DriveMonitor parameter menus

- **Free parameterization**
  In menu *Free parameterization*, you can create individual parameter lists. First click on button *New list* on the toolbar of "Free parameterization" (Fig. 5-26 [1]). Then enter a name for the list in the window to the left of that (Fig. 5-26 [2]) and store the list with button *Add list* (Fig. 5-26 [3]). You can make a selection of lists already created with the dropdown text field on the toolbar.

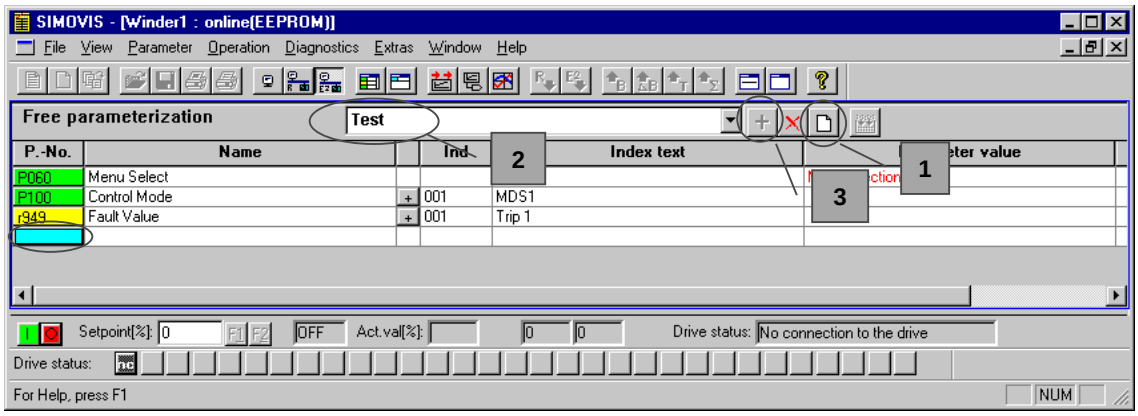


Fig. 5-26 Creating a parameter list

A new parameter list initially appears empty. At the end of the parameter list, the user can then enter the required parameter number by clicking on the last empty field, entering the number, and confirming with *Enter*. You can delete parameters that you do not require by selecting them with a mouse click and pressing *Enter*.

- **Parameter list complete**
  In menu *Parameter list complete*, all parameters stored in the device are displayed. The visibility and changeability of the parameter value depends on the device status. (See Chapter Parameter list column "Read/Write".)

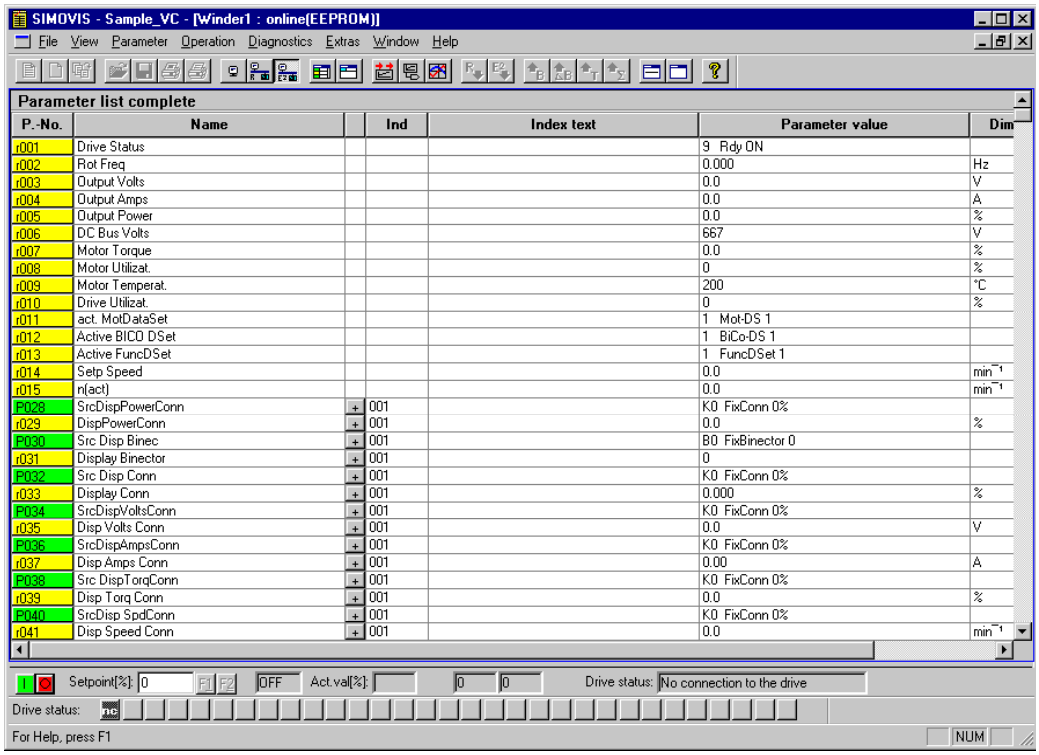


Fig. 5-27 Parameter list of all parameters

5.5.4.5 Structure of the parameter lists, parameterization with SIMOVIS/DriveMonitor

Parameterization using the parameter list is basically the same as parameterization using PMU (See Chapter "Parameterizating steps"). The parameter list provides the following advantages:

- Simultaneous visibility of a larger number of parameters
- Text display for parameter names, parameter value, binectors, and connectors
- On a change of parameters: Display of parameter limits or possible parameter values

The parameter list has the following structure:

Field No.	Field Name	Function
1	P. Nr	Here the parameter number is displayed. You can only change the field in menu *Free parameterization*.
2	Name	Display of the parameter name, in accordance with the parameter list
3	Ind	Display of the parameter index for indexed parameters. To see more than index 1, click on the [+] sign. The display is then expanded and all indices of the parameter are displayed
4	Index text	Meaning of the index of the parameter
5	Parameter value	Display of the current parameter value. You can change this by double-clicking on it or selecting and pressing *Enter*.
6	Dim	Physical dimension of the parameter, if there is one

5.5.5 Operation with USS

Using SIMOVIS/DriveMonitor, you can not only parameterize but also perform simple operation of the device. You can define a setpoint and display an actual value. For control purposes, you can define a control word and display a status word.

5.5.5.1 Requirements

For operation via the USS interface, you must implement minimum connector/binector wiring at the MASTERDRIVE VC/MC end:

Minimum settings

Wire the first word received via the serial interface SST1 Word1 to the control word of the drive:

Basic device parameters	SST1 binector	Comment
P554	B2100	required (acc. to fast parameterization)
P555	B2101	required (acc. to fast parameterization)
P558	B2102	not required for the basic functionality
P561	B2103	not required for the basic functionality
P562	B2104	not required for the basic functionality
P563	B2105	not required for the basic functionality
P564	B2106	not required for the basic functionality
P565	B2107	required (acc. to fast parameterization)
P568	B2108	required (acc. to fast parameterization)
P569	B2109	not required for the basic functionality
P571	B2111	required (acc. to fast parameterization)
P572	B2112	required (acc. to fast parameterization)
P573	B2113	not required for the basic functionality
P574	B2114	not required for the basic functionality
P575	B2115	not required for the basic functionality

Then wire the second word received via the serial interface word, SST1 Word2, to the setpoint of the drive (e.g. for speed setpoint P443 = K2002).

The drive must transmit the following values for monitoring purposes:

- Status_word1 in the first word transmitted (P707.1 = K032)
- The actual value in the second word transmitted (e.g. for speed actual value P707.2 = KK148).

You can also make this setting, which is the minimum required, with function *Quick Parameter Setting → Select Setpoint Source* (P368) = USS. In that case, however, only the control word wiring marked *necessary* is established.

Complete setting

Drive control and monitoring is performed in four process data words. For that purpose, set PZD = 4 during device selection. (See Section 5.5.2.3 "Selecting a device".)

In addition to the minimum setting, also establish the following wiring:

- To ensure that the double connectors are available with full resolution, also transmit the setpoint and actual value in Word3. Example of speed setpoint and speed actual value: Wire P443 = KK2032, P707.3 = KK148.
- Control_word2 and Status_word2 are also made available for operation. This is done by wiring the fourth word received via the serial interface (B2400...B2415) to Control_word2 of the drive.
- Transmit Status_word2 with the fourth word of the serial interface (P707.4 = K033).

With this parameterization, the full scope of operation and monitoring available under SIMOVIS/DriveMonitor is functional.

5.5.5.2 Operating functions

In the drive window, you can operate the device SIMOVERT MASTERDRIVES VC/MC by the following means:

Operating bar

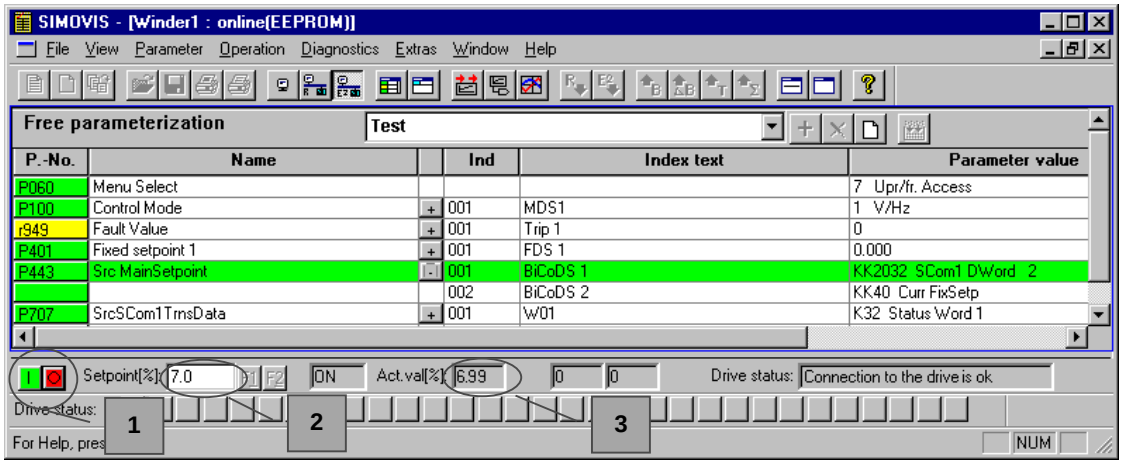


Fig. 5-28 Operating bar

- ON/OFF (Fig. 5-28 [1])
  You can activate or deactive the drive using the ON/OFF buttons  or  buttons on the status bar.
- Setpoint setting and actual value display (Fig. 5-28 [2] [3])
  On the status bar, you can specify a setpoint by clicking on the field Setpoint and entering a setpoint. You can then apply the setpoint by pressing *Enter*.

By **menu selection** you can explicitly operate the control word or monitor the status word.

- **Control word**
  You can call up the display of control word 1 or 2 with menu *Operation* → *Control word 1* or *Control word 2*.

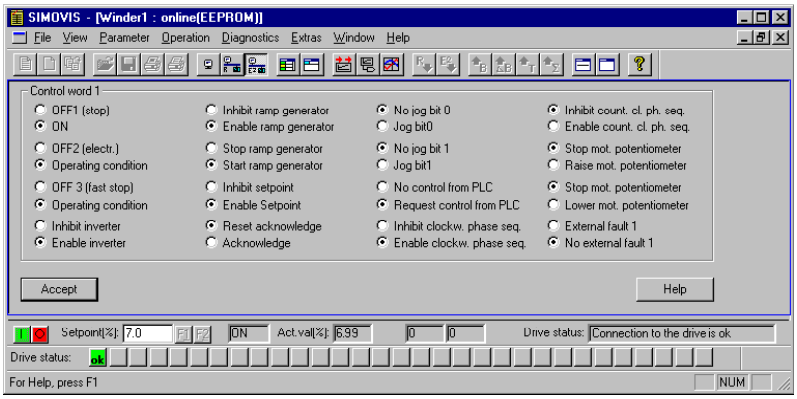


Fig. 5-29 Control word 1

In this display, you can set each control word bit individually. Apply the setting by clicking on button *Accept*.

- **Status word**
  You can call up the display of status word 1 or 2 with menu *Operation* → *Status word 1* or *Status word 2*.
  In this display, you can display the status word bits individually and in plain text.

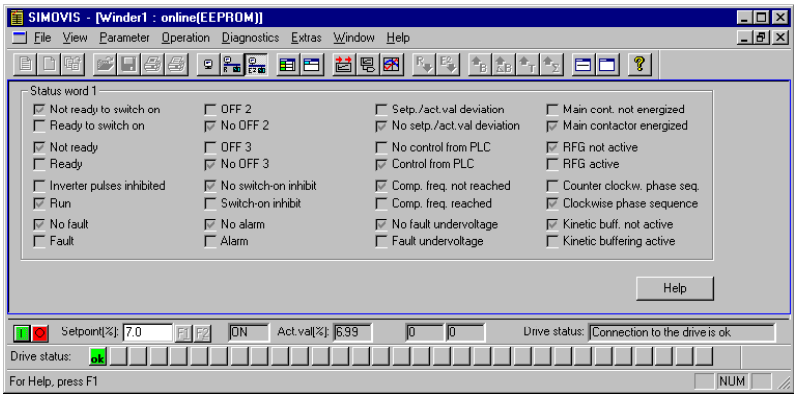


Fig. 5-30 Status word 1

5.5.6 Service functions

5.5.6.1 Upread/download

You can read out and store the parameterization of the connected device with function *Upread*. You can call up the function with menu *Datei → Upread → Grundgerät...* (Fig. 5-31 [1]) or on the toolbar (Fig. 5-31 [2]). You can select either a complete upread of all parameters or readout of those values that are different from the factory setting.

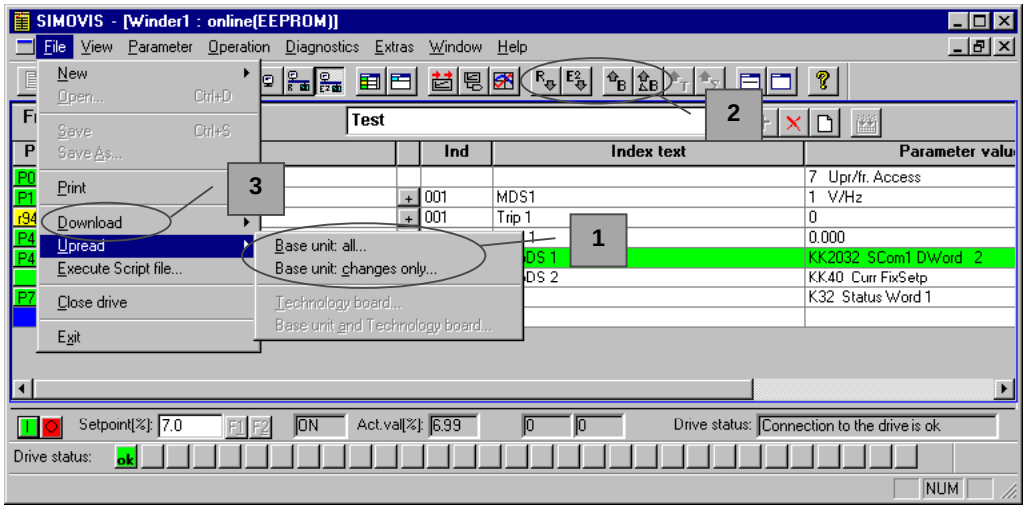


Fig. 5-31 Upread/Download

The values read out are stored under the name specified in a file with extension .dnl. After the function has finished, the message *UpRead for file XXX successful/terminated with errors* is displayed and you must acknowledge it.

You can transmit the files created in this way into a device with function *Download*. You can call up the function with menu *File → Download...* (Fig. 5-31 [3]) or on the toolbar (Fig. 5-31 [2]). You can transmit the parameter values both nonvolatilely (*Save [EEPROM]*) and volatilely (*Write [RAM]*).

NOTE

When you download with SIMOVIS/DriveMonitor, certain parameters (such as the power section definition P070) are not written. You will find the list of parameters that will not be written in the *.ini file assigned to the device type under the heading "[DontWrite]".
Example of a path of the *.ini file in MASTERDRIVE VC in SIMOVIS:
c:\Siemens\SIMOVIS\System\Drives\MASTERDRIVES VC(CUVC)\MDVV.ini
in DriveMonitor:
c:\Siemens\STEP7\p7vrvisx\system\device\MDVV\MDVV.ini

5.5.6.2 Script files

Description

Script files are used to parameterize devices of the MASTERDRIVES series as an alternative to downloading a parameter set. A script file is a pure text file that must have the filename extension ***.ssc**. The script file executes individual commands using a simple command syntax for the purpose of device parameterization. (You can write the script files using a simple text editor, such as WordPad.)

You can launch execution of a script file with menu command *File → Execute Script file*.

Advantages:

- Structured format according to functions/function modules possible, because
  - You can arrange the parameters in any order and insert any comments.
  - With jump functions (CALL commands) you can call up function modules (minimization of data to be managed, parameterization, of possible sources of error and of the configuration effort)
- Interactive communication e.g. by MSG / LOCALMSG commands (guiding the customer, final customer)
- It is possible to force, monitor, and wait for converter states and to start "background calculations" in the converter.

Commands

Commands are interpreted line by line. You can mark off comments with "REM" or a semicolon ";".

Tabs and blanks are permissible both as a separator between the command and the arguments and at the beginning of a line.

A line to be interpreted consists of a command and arguments, and can have the following appearance:

<tab><command><tab><1.argument><tab><2.argument>etc.

Example of a command sequence:

WRITE	60	0	5	(Meaning: Set par. 60 to value 5)
WAIT	1	0	5	(Meaning: Wait until the converter is in status drive setting)
WRITE	96	0	1	(Meaning: Set par. 96 to value 1)

- **READ**

  Command: READ

  Description: For reading parameter values. The value read is written to the logfile.

  Max. arguments: 2

  Syntax: READ PNU IND

  The parameter number is absolutely necessary.

  If index 255 is specified, all indices of the parameter are read out and written to the logfile.

  The index is optional.

  If you forget the index in an indexed parameter, or if the index is 0, index 1 is interpreted automatically. If the index is specified for an unindexed parameter, it is ignored.

- **WRITE**

  Command: WRITE

  Description: For writing parameter values.

  Max. arguments: 3

  Syntax: WRITE PNU IND PWE

  The parameter number is absolutely necessary.

  For an indexed parameter, 3 arguments must be present. If there are fewer than 3 arguments, the line is ignored.

  For an unindexed parameter, 2 or 3 arguments must be present. If there are 3 arguments, the 2nd argument is the index and is ignored. If there are fewer than 2 arguments, the line is ignored.

- **WAIT**

  Command: WAIT

  Description: A defined length of time is allowed to elapse before a certain parameter is assigned a defined value.

  Max. arguments: 4

  Syntax: WAIT PNU IND PWE1/PWE2/PWE3 ZEIT

  The parameter number is absolutely necessary.

  Specifying the time is optional. If you do not specify a time, the function waits until the expected parameter value comes about. If you specify a time in seconds (positive integer), the same condition applies but for no longer than the time specified. The WAIT command is ignored if SIMOVIS / DriveMonitor is in the offline state. For the parameter number, you can specify up to three values, which are ORed. The separator between the values is the character "/" and must be without gaps (no spaces or tabs). The parameter values are considered to be an argument.

  Specify the values (PWE) as they appear in the download file because they are not converted to numeric values.

  Example: 0000000001010111 and not 87
  0x21E and not 542

  For indexed parameters, 3 arguments must be present. If there are fewer than 3 arguments, the line is ignored.

  For unindexed parameters, 2 or 3 arguments must be present. If there are 3 arguments, the 2nd argument is the index and is ignored. If there are fewer than 2 arguments, the line is ignored.

- **TIME**

  Command: TIME

  Description: Allows the specified time to elapse before the following scripts are further processed.

  Max. arguments: 1

  Syntax: TIME ZEIT

  The TIME command is ignored if SIMOVIS / DriveMonitor is in the offline state. You must specify the time as a positive integer number of seconds. If there is more than one argument, the following arguments are ignored. If there is no argument after the command, the line is ignored.

- **CALL**

  Command: CALL

  Description: Another script file is executed and then execution of the calling script file is resumed at the next instruction.

  Max. arguments: 1

  Syntax: CALL PFAD

  Under PFAD, you must specify the script file to be called by its full pathname. If there is more than one argument, the following arguments are ignored. If there is no argument after the command, the line is ignored.

- **MSG**

  Command: MSG

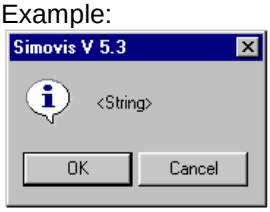
  Description: The string following the command up to the end of line is displayed as information on the screen in a message box.

  Max. arguments: 1

  Syntax: MSG STRING

  The message box includes an *OK* and a *Cancel* button. The information symbol also appears next to the string. Execution of the script file is halted until you click on the *OK* button. If you click on the *Cancel* button, execution of the script file is terminated.

  Example:



- **LOCALMSG**

  Command: LOCALMSG

  Description: This command works like MSG except that when you click on the "Cancel" button, only execution of the current script file is terminated and not script execution as a whole.

  Max. arguments: 1

  Syntax: LOCALMSG STRING

  In that way, you can terminate scripts that have been called up with the CALL command from a script file without terminating execution of the higher-level script(s).

♦ **PRINT**

Command: PRINT

Description: This command places the string specified as the argument up to the end of line in the LOG file.

Max. arguments: 1

Syntax: PRINT STRING

♦ **EXECDIALOG STRING**

Command: EXECDIALOG STRING

Description:
- This command starts a dialog box from which you can launch individual script commands. You can enter the parameters in the dialog box. You can have this logged into the current logfile. (You can activate logging in the dialog box.) The following commands can be implemented at present: READ, WRITE, PRINT, TIME, CALL, WAIT, MSG, LOCALMSG

The string following the command up to the end of line is displayed as information.

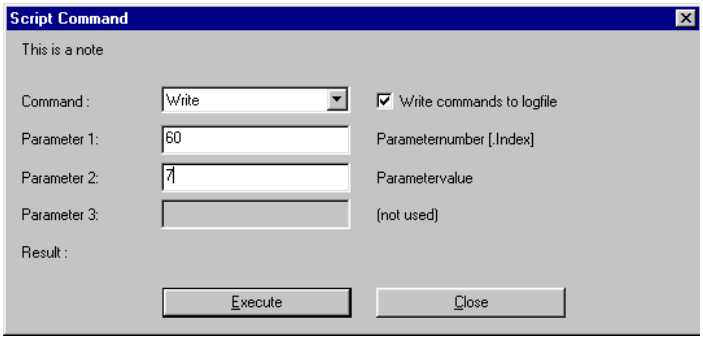
Max. arguments: 1

Syntax: EXECDIALOG STRING

The following window is displayed, in which you can enter the commands interactively. If you click on button *Execute* the command set is executed. If you click on *Close*, the dialog box will be closed and script execution resumed.

Example:

EXECDIALOG This is a note



- **PARAMDIALOG**

  Command: PARAMDIALOG

  Description: This command starts the standard dialog box of SIMOVIS / DriveMonitor, in which you can change a parameter. It is the same dialog box that appears when you double-click on a parameter in the parameter list.

  Max. arguments: 2

  Syntax: PARAMDIALOG PNU IND

  Example: PARAMDIALOG 61 0

- **BEGINDESCRIPTION.....ENDDESCRIPTION**

  Command: BEGINDESCRIPTION
  .....
  ENDDESCRIPTION

  Description: This command brackets off any text, which is displayed to the user as information. This description is only evaluated with Drive ES.

  Max. arguments:

  Syntax: BEGINDESCRIPTION
  The description to be displayed
  ENDDESCRIPTION

- **BEGINLINKS.....ENDLINKS**

  Command: BEGINLINKS
  .....
  ENDLINKS

  Description: This command brackets off a list of information combinations. The information combinations are files, with which the content of the script file can be described in greater detail. This description is only evaluated with Drive ES.

  Max. arguments:

  Syntax: BEGINLINKS
  C:\SIMOVIS\Doc\querschneider.pdf
  C:\SIMOVIS\Doc\querschneider.jpg ENDLINKS

- **Logging script files**

  Script execution is logged by default. You can deactivate logging with the command Set Log Off or reactivate it with Set Log On. If logging is active, SIMOVIS / DriveMonitor creates a file with the same name as the script file being executed but with the extension "LOG". All commands of a transmission are logged in this file with their results. The "LOG" file is stored in the file containing the script file.

5.5.6.3 Trace

Trace is an add-on for SIMOVIS/DriveMonitor that permits visualization of recorded data. You can also store the data read out of the device and open it again later. It is also possible to import such data into text processing programs, such as Microsoft Word, or into spreadsheet programs, such as Microsoft Excel.

You can perform simple measurements of amplitudes and instants using two movable cursors.

WARNING

MASTERDRIVES MC:
If you are operating SIMOVIS-TRACE via the basic device interface X103, the technology option F01 will be affected. This causes sudden setpoint changes in the curve writing function (cracking) and, in automatic mode, it causes incorrect processing of the traversing data sets.

You can start the trace (device-internal cyclic store function) with menu command *Diagnostics* → *Trace* or on the toolbar  .

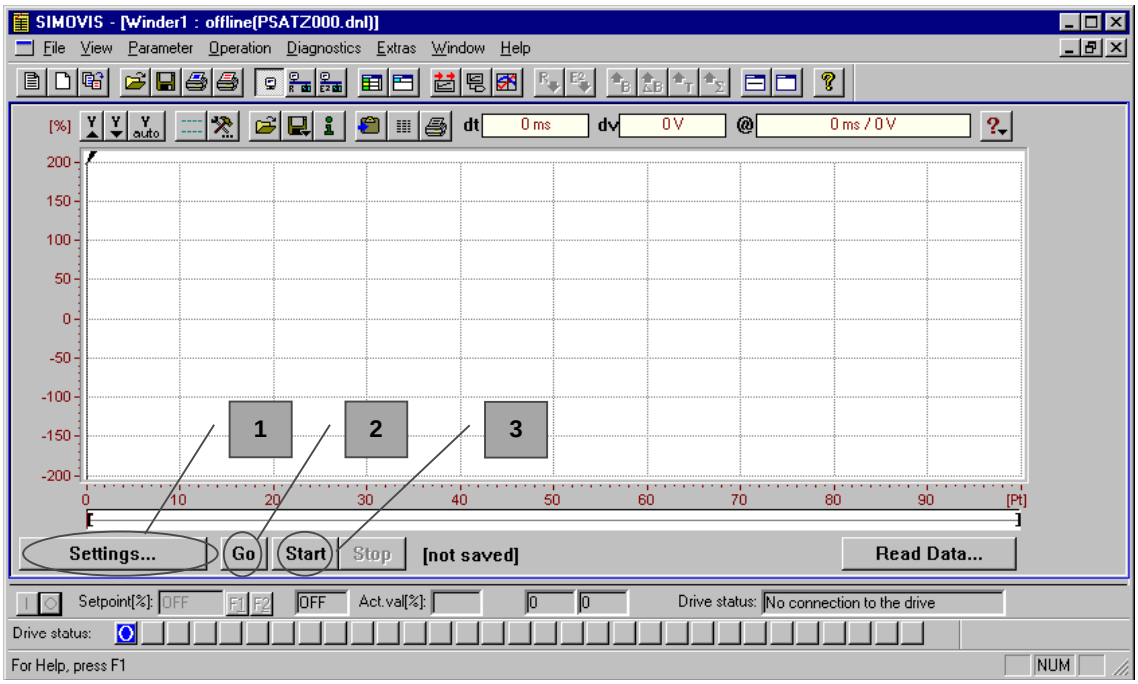


Fig. 5-32 Trace initial window

After an initialization phase, the initial window appears (Fig. 5-32) from which further operation starts.

Setting the recording data

With button *Record Settings* (Fig. 5-32 [1]) you can open the window for defining the recording data and the trigger condition.

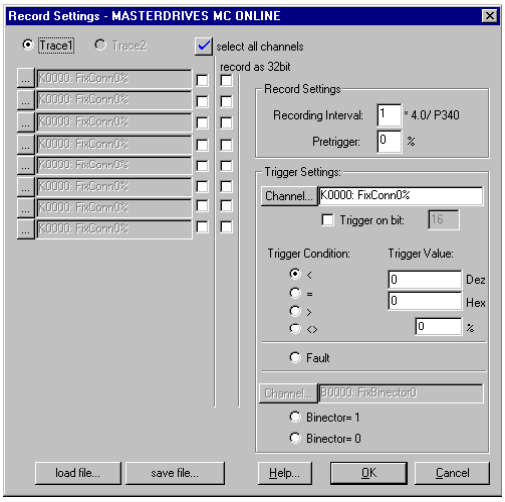


Fig. 5-33 Recording settings

In this window, you can specify the connectors you want to have recorded in the eight available channels. If you click on the associated button, the connectors available in the MASTERDRIVES VC/MC are displayed. You can deactivate unnecessary channels (checkbox). For double connectors, you can activate 32-bit recording.

In addition to the recording settings, you must also specify the sampling rate in field "Recording Interval", the trigger derivation action in field "Pretrigger", and the trigger setting. For the trigger setting, you can select the connector or binector via which triggering is performed (button *Channel*) and the trigger condition is specified. As trigger conditions for the connectors, you can use comparison operators less than (<), equal to (=), greater than (>), and not equal to (<>) and triggering on a certain bit of the connector (e.g. for status words) and the triggering on a fault. For connectors, specify the state (0 or 1) at which you want to trigger as the trigger source.

After you have exited the recording settings, recording is activated with the *Start* (Fig. 5-32 [3]) button. Recording starts as soon as the trigger condition is fulfilled. When recording is completed, the data are read out of the device and displayed in the trace window (see Fig. 5-34).

With button *Go* (Fig. 5-32 [2]), you can activate recording immediately without taking the trigger condition into account.

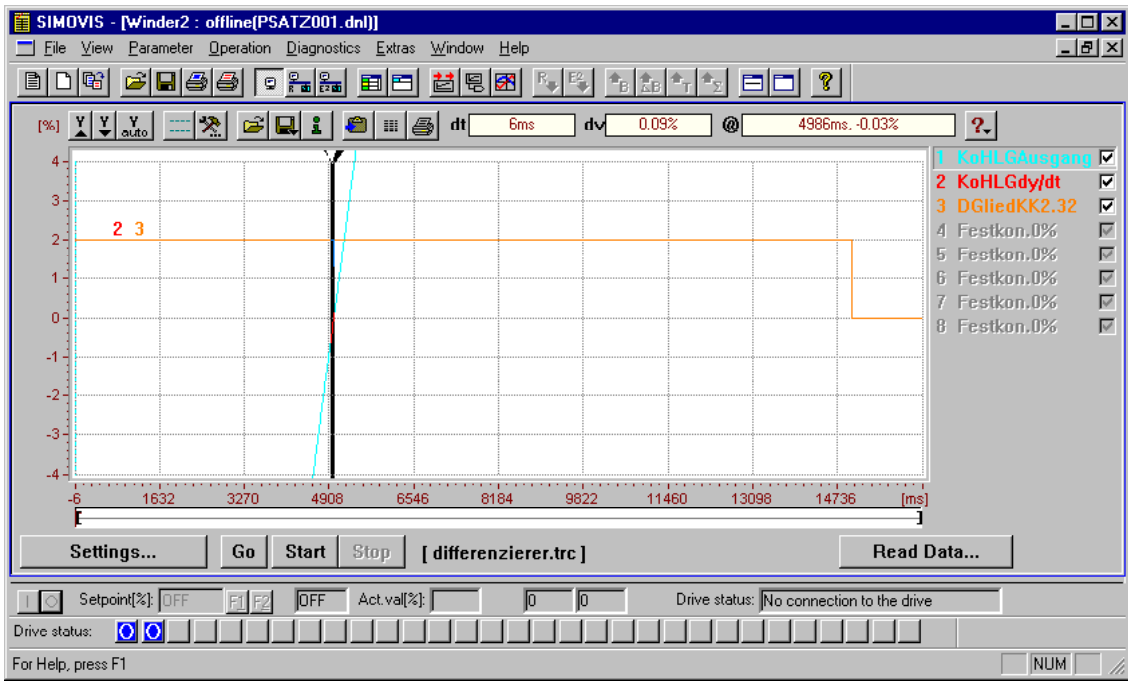


Fig. 5-34 Example trace

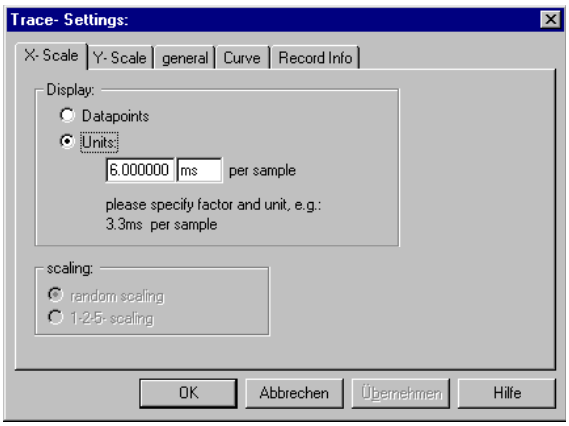
Display of the data

You can adapt the graphic display to your individual needs. Some displays only apply for the active curve (curve name highlighted). You can change the active curve by clicking on the curve description (to the right of the graphic window).

Trace settings

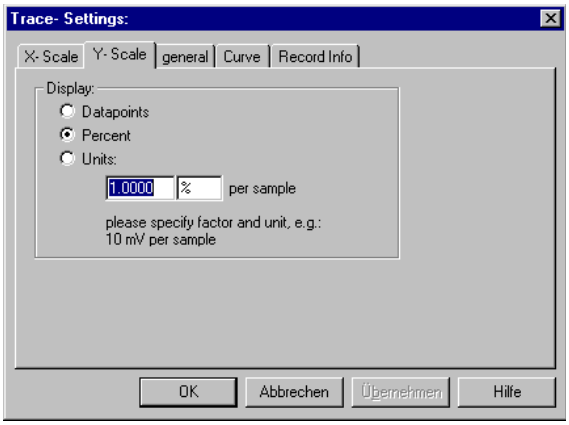
On the trace toolbar, you can call up the graphic trace settings with the function button  . The trace settings contain the following tab cards:

- X- Scale



Display in data points:	Scaling is performed in data points. The triggering time is interpreted as the data point zero so that data points are scaled negatively to the left of the trigger time (pretrigger).
Display in units:	Scaling of the X-axis is performed taking the freely defined factor and unit text into account, e.g.: 3.2 ms per sampled value. This type of display is by default automatically correct in [ms] for trace recordings, which results in correct time scaling.

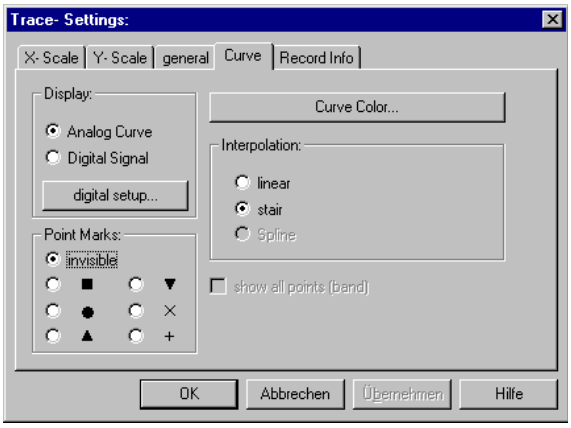
- Y-Scale (only valid for the active curve)



Display in data points:	Scaling is performed in data points.
Display as a percentage:	Scaling is performed as a percentage. 16384 (4000Hex) = 100 % for 16-bit curves and 1073741824 (40000000Hex) = 100 % for 32-bit curves.
Display in units:	Scaling of the Y-axis is performed taking the freely defined factor and unit text into account, e.g. 10 mV per sampled value.

- general
  Generally valid settings of the trace display.
  Visibility of the grid, cursor, and curve numbers.
  Background color
  Settings for the clipboard and WMF export

- Curve (only valid for the active curve)



Settings for displaying the trace curve.

Analog Curve: Display as a linear value

Digital Signal: Bitwise display of the 16-bit value recorded. You can define which bits are displayed in *digital setting*.

Point Marks: Way the individual data points are identified.

Note:
Data point identifiers are not displayed graphically until the zoom factor is large enough to allow you to distinguish between them.

Interpolation:
linear: Linear connection between the data points.
stair: Curve display as a step function.

Amplification setting

You can change the amplification of a trace (active curve). To do that, click on the appropriate button above the Y-scale. 

The *auto* button scales the Y-axis in such a way that the smallest and largest value recorded fit into the display.

Offset

To obtain a better overview, you can shift individual traces (active curve) and thus superimpose traces. Drag the Y-scale using the mouse (by drag and drop).

Defining the visible area

Using the *Zoombar*  below the curve display, you can set the visible portion of the time axis using the movable boundaries [ ]. You can also set the zoom to *All* or to *last View* in the context menu (mouse click on the zoombar with the right mouse button).

Measurement of time and amplitude

Using the two freely movable cursor bars, you can ascertain both the absolute signal amplitude and the instant, and the difference between two signal amplitudes and instants.

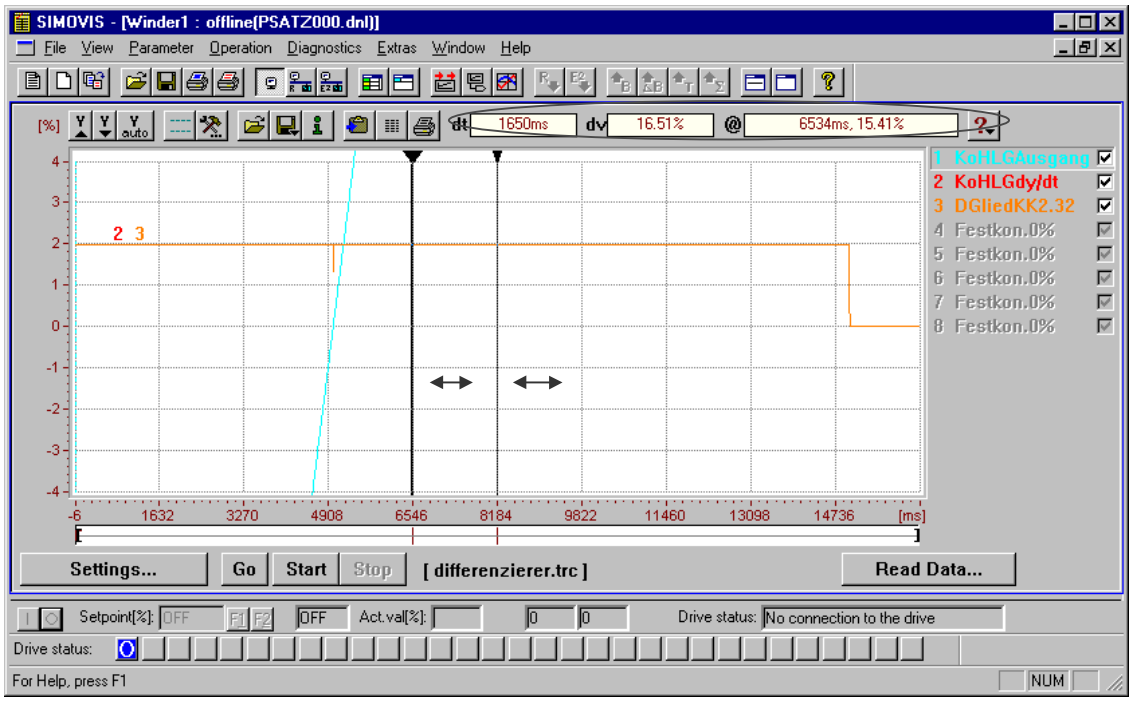


Fig. 5-35 Cursor

When you start the function the cursor bars are at the right-hand edge of the display. Then you can position them anywhere in the display by drag and drop. In field @, the absolute values of the position of the cursor you are clicking on are displayed, in field "dt" the time difference, and in field "dv" the signal amplitude difference between the positions of the two cursors (see Fig. 5-35).

Data management

You can save the trace curves recorded in SIMOVIS/DriveMonitor, export them, or reload them to view them again.

- Saving and exporting trace data:
  You can save trace data in the form of trace files (.trc), as a WMF file (e.g. for exporting or linking in text files) or as an ASCII file (display in columns, e.g. for export into spreadsheet programs).
  Select button *Save Trace file* on the toolbar.
- Loading trace data from the file:
  With button *Open trace file* you can load and view data stored as a trace file.
- Copying trace data into the clipboard:
  To copy the trace display directly into a graphics or text processsing program, you can use the button *Copy traces to clipboard* to copy it into the clipboard in WMF format and then paste it into the target program with *Insert*.
- Printing the curve display:
  With button *Print all visible traces* you can print out the curve display.

5.5.6.4 Diagnostic menu

In menu *Diagnostics* on the menu bar, you can display the parameters as predefined parameter lists for diagnostic purposes.

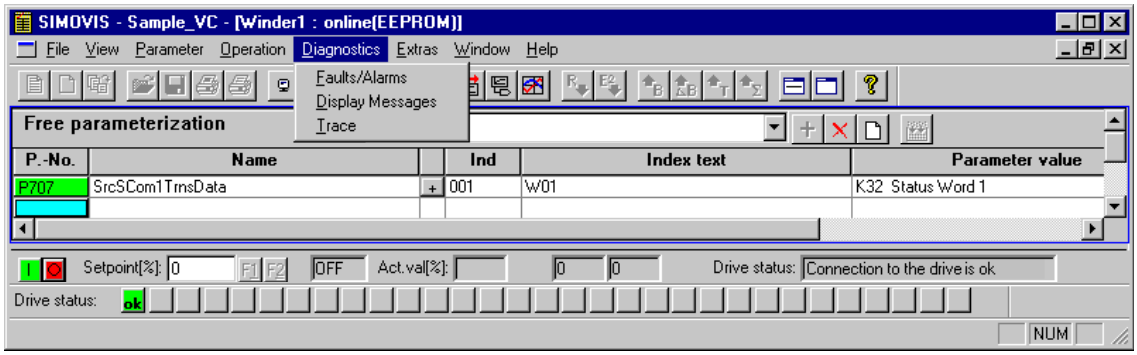


Fig. 5-36 Menu diagnostics

The parameter lists faults/alarms and messages/displays are available. In each of these, only those parameters are displayed that are relevant for the faults and alarms and for messages and displays. You can change or monitor the parameters just like in any other parameter list.

5.5.6.5 Menu prompted start-up

The function *Menu prompted start-up* is available under SIMOVIS/DriveMonitor for MASTERDRIVE VC/MC for simple parameterization with user guidance. In *Menu prompted start-up*, the user is guided through parameterization of the drive by forms. Here, not parameter numbers but texts and selection fields are shown, which makes operation easier to understand. This means that freedom of parameterization is restricted to some extent but is sufficient for standard applications.

Restrictions

The following restrictions apply to menu prompted start-up:

- Parameterization is only performed for the 1st data set (motor data set, function data set, BICO data set).
- A limited selection of setpoint sources is available, for MASTERDRIVE VC they are:
  - PMU and motor potentiometer
  - Analog setpoint and terminal block
  - Fixed setpoints via terminal block
  - Motor potentiometer via terminal block
  - Fixed setpoint via OP1S
  - OP1S and motor potentiometer
  - Serial interface (USS) SIMOVIS
  - Profibus DP and terminal block

NOTE

The selection option of the setpoint sources is restricted by the type of closed-loop control selected.

- No parameterization of special solutions (externally excited synchronous machine, factory setting for elevators and hoisting gear) is possible.
- No parameterization of additional IO boards (EB1, EB2, SCI)

Procedure

You can call up prompted start-up from the drive window either with the button on the toolbar or with menu *Parameter → Menu prompted start-up* (see Fig. 5-37 [1]).

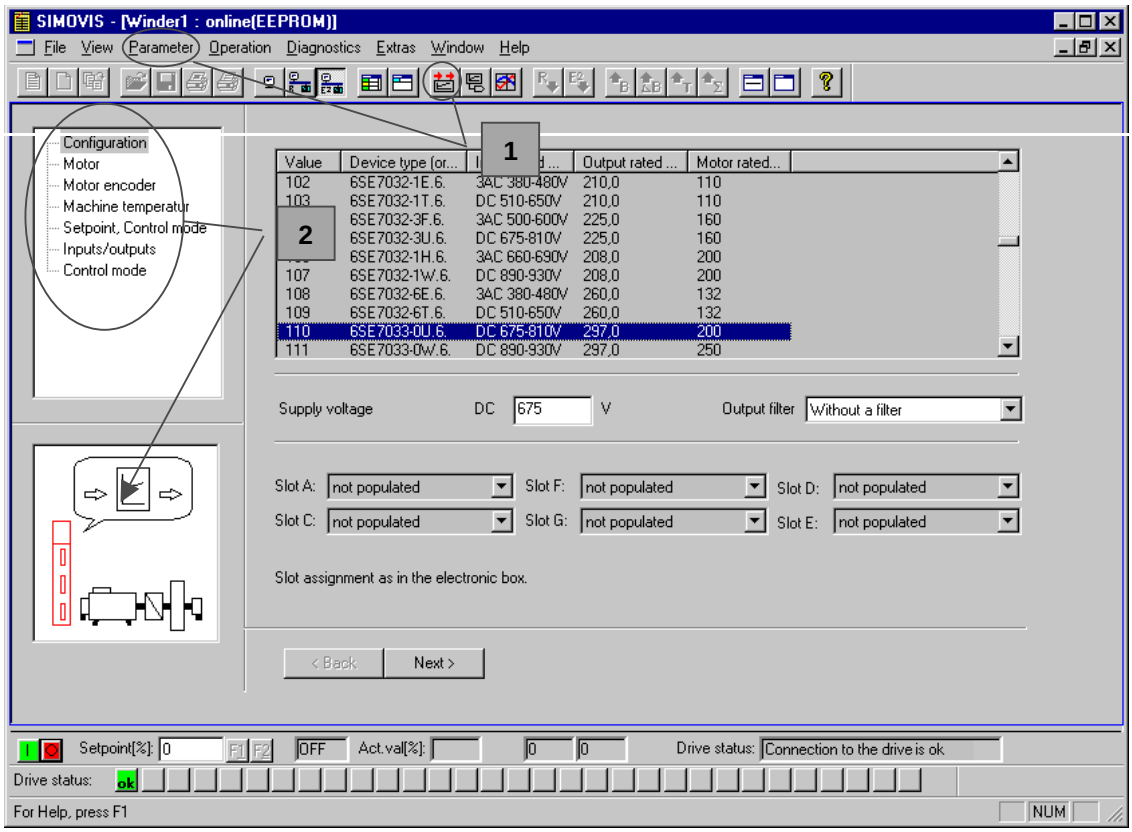


Fig. 5-37 Initial window for prompted start-up

In online mode, the field values displayed are initialized to the existing device parameterization, in offline mode to the existing offline data set. (If no special data set has been loaded, this is the factory setting)

After initialization, the form for parameterization of the device data (Fig. 5-37) appears as the initial window of Menu prompted start-up. All input forms have the following layout:
On the left-hand side, you will find the context display (Fig. 5-37 [2]) with an indication in words and graphics of the part of guided parameterization to which the form belongs. Below the form, you will find function buttons for switching between forms (*Next, Back*). In the form, fields for parameterization are displayed. The fields contain recommended values. You can change the values by typing them in directly or by selection from the dropdown list boxes.

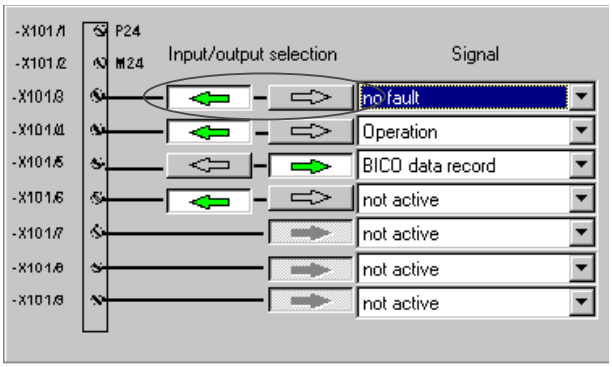


Fig. 5-38 Terminal wiring

When you specify the terminal wiring (Fig. 5-38), you can switch between the input and output for bidirectional inputs/outputs using the function buttons. For parameterization of the inputs and outputs (both the digital and the analog I/Os), only a limited selection of wiring options are offered in the dropdown list boxes.

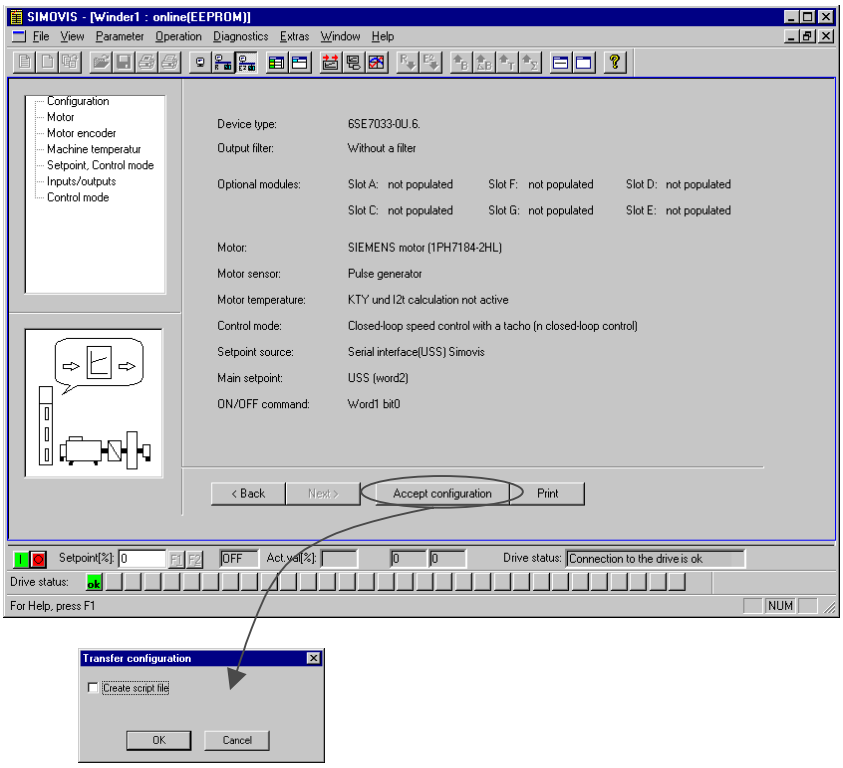


Fig. 5-39 Menu prompted start-up: Summary

To complete guided parameterization, a form with the most important basic data of the parameterization you have just performed is displayed by way of a summary. You can then transfer the values to the device with button *Accept configuration* (Fig. 5-38).

It is also possible to have a script file generated for the parameterization you have just performed (e.g. to parameterize other devices in exactly the same way, or to provide a record of the parameterization in offline mode).

NOTE

With menu prompted start-up, first the factory setting is made with *Accept configuration*, all previous parameterization in the device is reset. (The factory setting type is retained.)

For MASTERDRIVE MC, menu prompted start-up also exists for starting up the technology functions. The appearance and operation are analogous to that of menu prompted start-up for the basic device.

5.5.6.6 Learning a database

If a known device type has an unknown firmware version, it is possible to learn the parameter sets (names, factory setting values, min and max limits) under SIMOVIS/DriveMonitor.

NOTE

In order to establish a connection, it is necessary to specify a firmware version. It is advisable to select the predecessor version of the firmware version to be learned if possible.

Procedure for SIMOVIS

In the window "Bus Configuration" establish a connection with the device (see Section 5.5.2.4 "Testing the connection"). After that, you can learn the parameter set with button *Generate database* or with menu *Edit → Create ("lern")*. This process can take several minutes. After that, this firmware version is also available to you for parameterization.

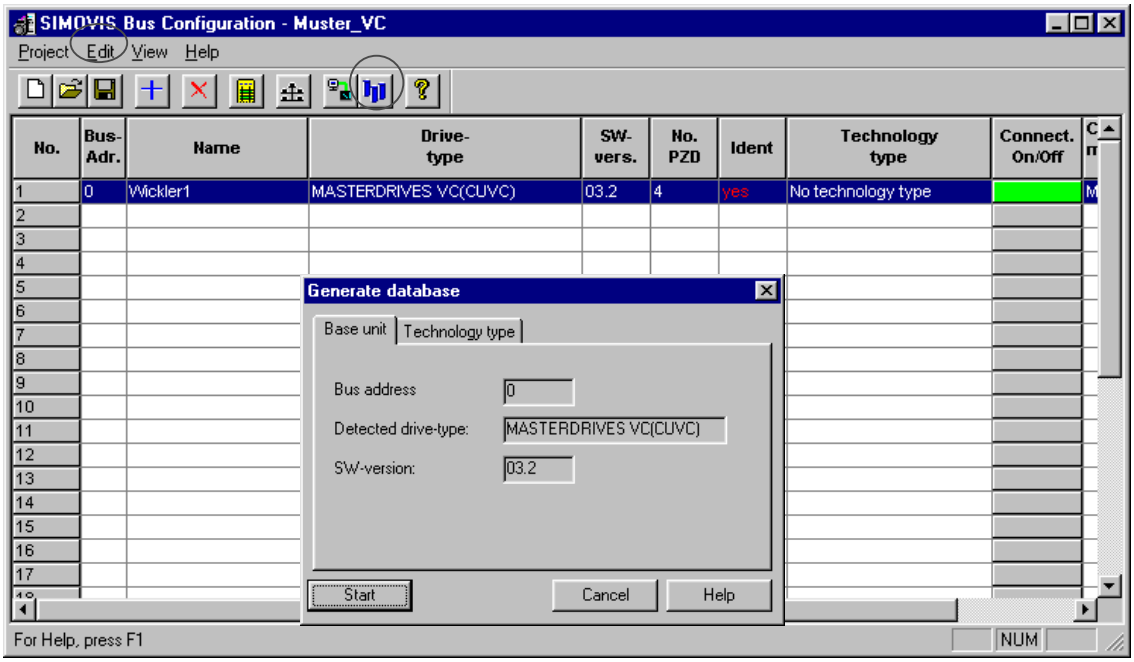


Fig. 5-40 Function "Learning"

Procedure for DriveMonitor

When you switch to online mode, device identification is performed. You can also trigger device identification with menu *Parameters → Device identification*. If an unknown software version is detected, you are offered the option (Fig. 5-41 button *Generate database*), of generating the database. (This process takes several minutes.)

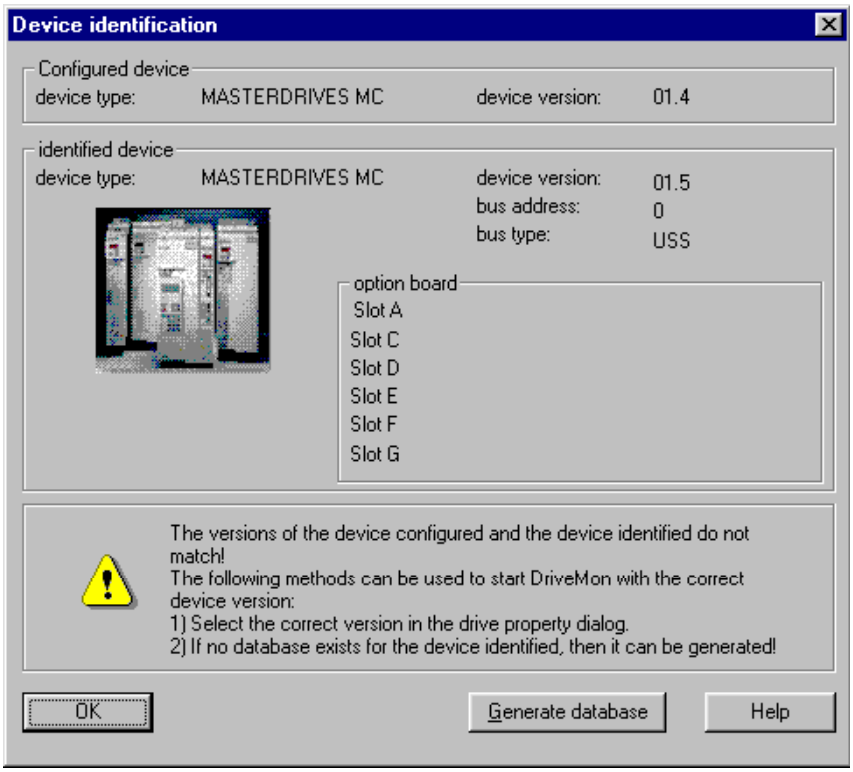


Fig. 5-41 Creating a database

NOTE

Because the device function scope is unknown for the unknown firmware versions, the functionality is restricted to a minimum in the parameterization window. The functions "Trace", "Menu prompted start-up", and the drive menus are therefore not available.

It is not possible to learn a known firmware version, the message *The database for VC/MC with software-version XXX already exists!* appears.