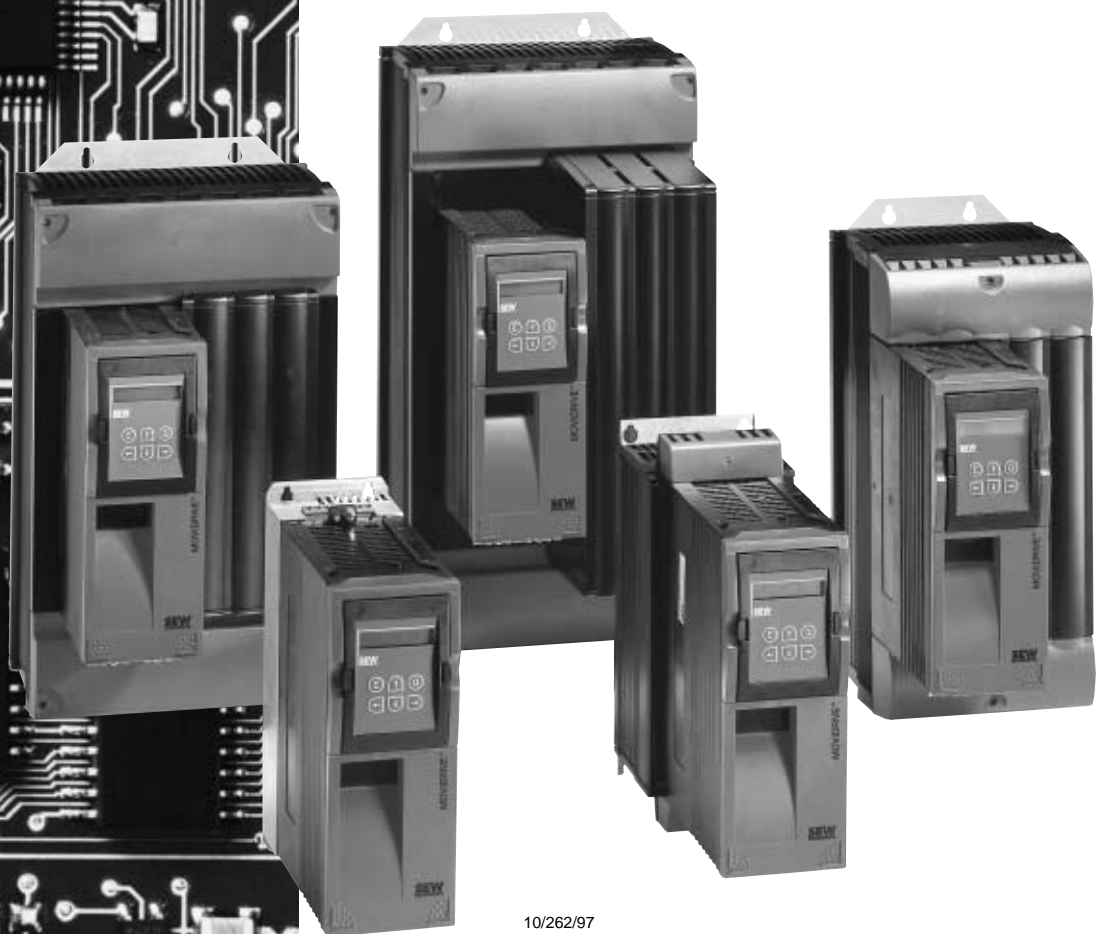


# MOVIDRIVE® Drive Inverter

Manual  
MX\_SHELL

Edition 03/99



10/262/97

0919 1917 / 0399



# SEW EURODRIVE

## Conventions

A key to be pressed is in triangular brackets:  
**<RETURN>**, **<F1>**, **<ESC>** etc.

A control button to be pressed in a window is in brackets:  
**[ESC]**, **[F1]**, **[INS]** etc.

Menu titles/menu items are in italics:  
***“File/Exit”*** or ***“Options/Language”*** etc.

## Mouse operation

Use the left mouse key to select menu titles and menu items.  
 Double-click on parameters which you wish to edit.

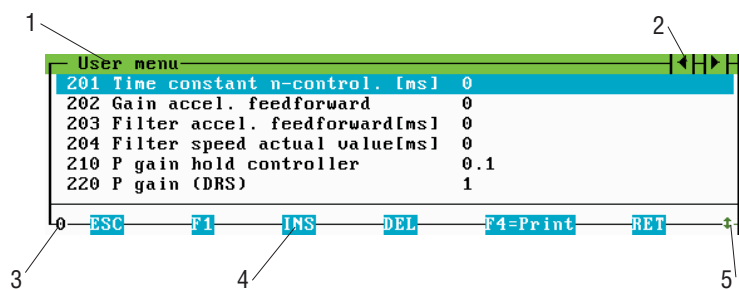
## Keyboard operation

To select a menu title, press **<Alt>** + first letter of the title.

To select a menu item, enter the highlighted letter of the menu item or press **<RETURN>** when the selection bar is on the menu item.

To select parameters, move the selection bar to the parameter, then press **<RETURN>**.

## General window structure



- |                                       |                                  |
|---------------------------------------|----------------------------------|
| 1 Name of window                      | 4 Control button                 |
| 2 Data can be edited with cursor keys | 5 Height of window is adjustable |
| 3 Window number                       |                                  |

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## Safety notes

Always follow the safety and warning instructions contained in this manual!  
 Safety notes are marked as follows:



**Electrical hazard**, e. g. during live working.



**Mechanical hazard**, e. g. when working on hoists.



**Important instructions** for safe and fault-free operation of the driven machine/system, e. g. pre-setting before commissioning.

MX\_SHELL allows you to change the function settings of MOVIDRIVE® drive inverters in a simple and straightforward manner.

As with all such systems there is the risk of an operating error, which may result in unexpected (not uncontrolled, though!) system behavior. It is advisable to implement EMERGENCY stop functions, especially during startup.

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### Notes on the current software release

Please note the comments in the "README.TXT" file on the corresponding disk.

## 1 Introduction

The MX\_SHELL program is a software tool that allows you to parameterize and commission MOVIDRIVE® drive inverters simply and rapidly. Context-sensitive Help menus offer support for each individual commissioning step right up to the documentation of the settings you have made.

### Program features

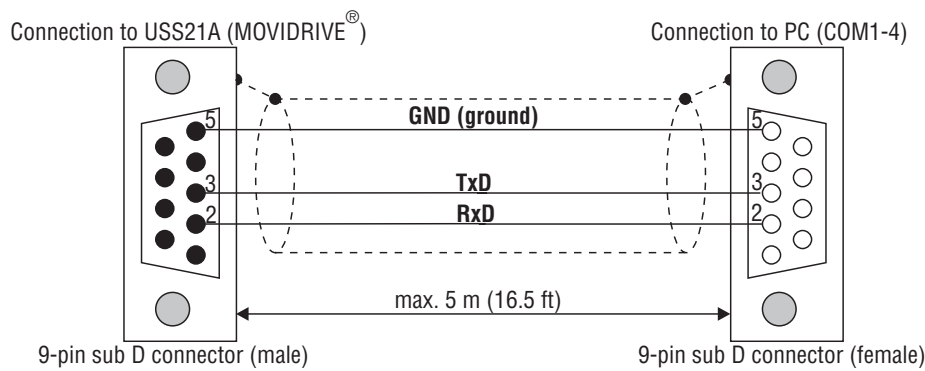
- Commissioning, test and diagnosis of all unit versions and options (for DPI/DPA.. see the MX\_POS software).
- Uploading and downloading of parameter sets from the inverter to the PC and vice versa.
- Setting and editing of parameter sets offline on the PC, i.e. without an inverter connected.
- Integrated function modules for
  - manual control and setpoint input from the PC (“Manual operation”)
  - fieldbus diagnosis (“Fieldbus monitor”)
  - programming and diagnosis of the IPOS<sup>plus</sup> integral positioning and sequence control
- Identification of a parameter set with a user “signature” for unique identification of a parameterized inverter.

## 2 Installation

### 2.1 Hardware requirements

- PC/AT with 80286 CPU or better
- MS-DOS version 3.3 or higher
- Minimum 570K RAM
- 3.5" disk drive (1.44MB)
- VGA compatible video adapter (colour or monochrome, LCD)
- Approx. 2MB free hard disk space
- RS-232 serial interface to connect the MOVIDRIVE<sup>®</sup>
- Serial interface to connect the mouse

Use a standard serial interface cable (shielded) to connect the MOVIDRIVE<sup>®</sup> to the PC.



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### IMPORTANT:

Switch off the mains supply before you connect the inverter to the PC!



### 2.2 Installing and starting the program

Start the `install.bat` installation routine on the floppy disk. Then follow the instructions of the installation routine.

Start the MX\_SHELL program with the `mx_shell.exe` command.

### 2.3 PC/drive inverter connection

If the communications link between the inverter and the PC is down or faulty, the parameter values are substituted by dashes (---). In this case check the following settings:

### Selecting the interface

1. Set the required connection in the “Communication/PC interface” menu item.
2. Make sure that MX\_SHELL is running online. Close “Communication/Offline”.
3. Select “Communication/Connect”. MX\_SHELL will check all addresses from 0 ... 99 for a connected inverter.
4. You may now select:
  - “Point-to-point connection” if exactly one MOVIDRIVE® is connected to your PC port (in this case the address setting in MX\_SHELL and the inverter is not important).
  - “Number”, if you wish to establish a communications link to one of the inverter addresses found.
  - “Other address” if you wish to enter the desired address directly.

### Note:

The MOVIDRIVE® communications address for the RS-485/RS-232 serial interfaces is set with the parameter 810 “RS-485 address”.

### RS-485 connection

When you use the RS-485 interface, check whether the ends of the two RS-485 lines are connected correctly.

### Windows 95

Under Windows 95, the serial interfaces are permanently assigned to an application. This means that the MX\_SHELL and MX\_SCOPE programs cannot be run in parallel (in two DOS boxes). Use the direct program call via [File] / [MX\_SCOPE], [File] / [MX\_POS], [File] / [MX\_SHELL] which is integrated in the programs to switch between these applications quickly.

### Status line

The last but one line of the screen is the status line. It provides important information about the status of MX\_SHELL and the connected inverter. The status line has the following structure:

#### Online mode

| Online                  | Point-to-point                   | No enable   | MDV60A0055-503 | Customer XYZ            |
|-------------------------|----------------------------------|---|----------------|-------------------------|
| MX_SHELL operating mode | Address of the assigned inverter | Operating condition or fault status of the inverter | Inverter type  | Parameter set signature |


#### Offline mode

| Offline                 | FILE.MDX                       | SAVED              |          | Customer XYZ            |
|-------------------------|--------------------------------|--------------------|----------|-------------------------|
| MX_SHELL operating mode | Name of file last opened/saved | File update status | Not used | Parameter set signature |

### 3 Menu Functions

#### General description of the window properties

You can open a maximum of 15 windows (10 application windows + 5 system windows) in MX\_SHELL. Application windows are identified by a window number in the bottom left corner.

Windows whose height you can adjust have a zoom symbol  in the bottom right corner.

You can activate non-active windows:

- by clicking on them with the mouse
- with the <F6> key.

To change numerical values, texts, parameter settings, press the <RETURN> key, then change the values with the cursor keys (active keys see bottom of window and bottom line of user interface).

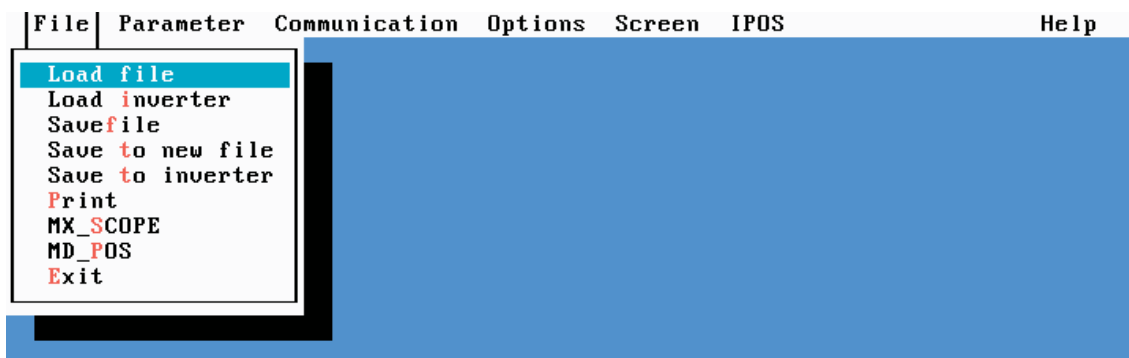
Displayed process values are updated in regular intervals. These onscreen values are the values of the inverter the program is communicating with. The address of the assigned drive inverter is shown in the status line at the bottom of the screen. To change the address, select “Communication/Change address” or “Communication/Connect”.

The following diagram gives an overview of the MX\_SHELL menus: :

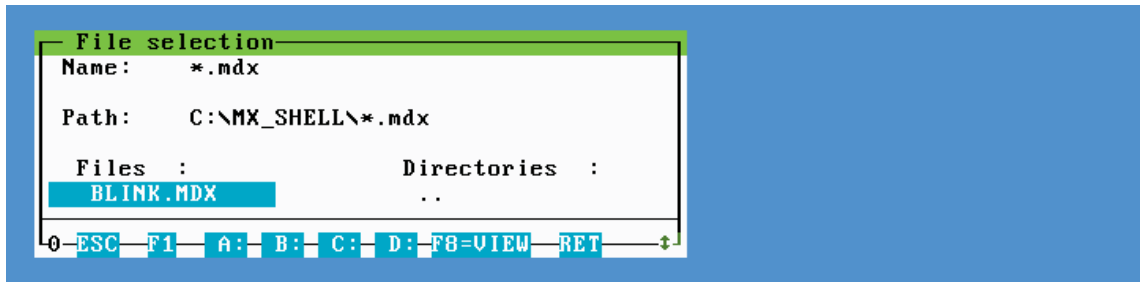
| File             | Parameter        | Communication  | Options           | Screen             | IPOS      | Help                |
|------------------|------------------|----------------|-------------------|--------------------|-----------|---------------------|
| Load File        | Commissioning    | PC interface   | Language          | Configuration load | Program   | Key assignment      |
| Load Inverter    | Main Menu        | Connect        | Select colour set | Configuration save | Variables | Use program windows |
| Save file        | User Menu        | Offline        | 25 Lines          | Auto configuration |           | Information         |
| Save to new file | Signature        | Change Address |                   |                    |           |                     |
| Save to inverter | Manual operation | Modem          |                   |                    |           |                     |
| Print            | Fieldbus monitor |                |                   |                    |           |                     |
| MX_SCOPE         | Manual reset     |                |                   |                    |           |                     |
| MX_POS           |                  |                |                   |                    |           |                     |
| Exit             |                  |                |                   |                    |           |                     |

#### 3.1 File

The “File” menu title comprises the following menu items:



The **file selection window** comes up when you select  
– “Load file”, “Save file” or “Save to new file”.



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The File selection window has the following fields:

**Name:** Enter the name of the desired file.

To change the file name press the <←→> key or click on it with the mouse.

**Path:** Shows the active path.

**Remarks:** Comment on the selected file.

To change the comment, press the <←→> key or click on it with the mouse.

**Files:** List of all files with the extension \*.mdx, which are located in the current directory.

Move the selection bar up or down to select a file, then press the <RETURN> key to confirm.

**Directories:** List of all the subdirectories of the current directory.

Move the selection bar up or down to select a subdirectory, then press the <RETURN> key to confirm.

To select the higher-level directory, select parent directory, then press the <RETURN> key to confirm.

Use the <TAB> key to move between **Files** and **Directories**.

To change to a different drive you can either:

- Enter the desired drive in the **Name** field
- Enter the letter for the drive (A to D) directly.
- Click on the desired drive in the bottom line of the window.

When you save a file you can attach a “comment field” to this file where you can enter additional information for printout. This comment field can be defined user-specifically, saved to floppy disk and loaded from there, and can be reused any time.

**Functions in the “Comment field”:**

- F3=OK Confirms and saves the entry in the comment field.
- F4=Open Reads and inserts a comment field from hard disk/floppy disk. A selection window will open when pressed.
- F5=Save Saves and inserts a comment field to hard disk/floppy disk. A selection window will open when pressed.

Comment field files have the extension \*.hdr.

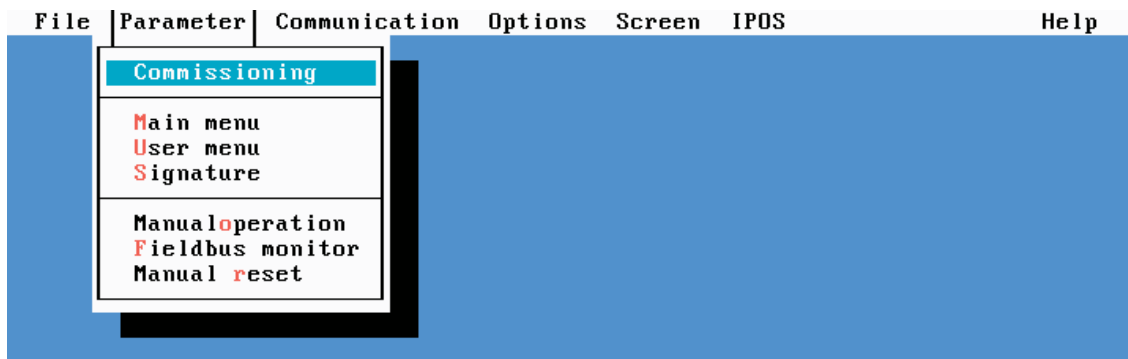
### The “MX\_SCOPE”, “MX\_POS” and “Exit” menu items

You can exit MX\_SHELL with these menu items and open the associated programs. MX\_SHELL uses the search path set in the MX\_SHELL.INI file to call the programs. If MX\_SHELL cannot find the search path or if the search path is invalid, a file window will open where you can search the associated program file and set the call path in the MX\_SHELL.INI file.



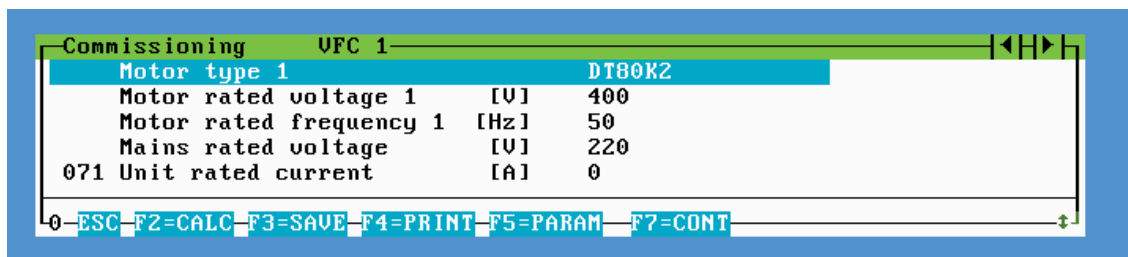
### 3.2 Parameter

The “Parameter” menu title comprises the following menu items:



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#### 3.2.1 Parameter / Commissioning



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Please refer to the MOVIDRIVE® Manual for detailed commissioning instructions and follow these closely.

Automatic setting of the most important parameters:

Set the parameters for your system, for instance:

- Motor type
- Motor rated voltage
- Brake with/without
- Damping of speed control loop
- Stiffness of speed control loop
- Time grid of positioning control
- Drive backlash-free/not backlash-free
- Load inertia reduced to motor shaft
- Shortest required ramp time
- Rated current (is automatically set when a drive inverter is connected)

### Operation

Press the <F2> key to calculate the parameters.

Press the <F5> key to display the parameters.

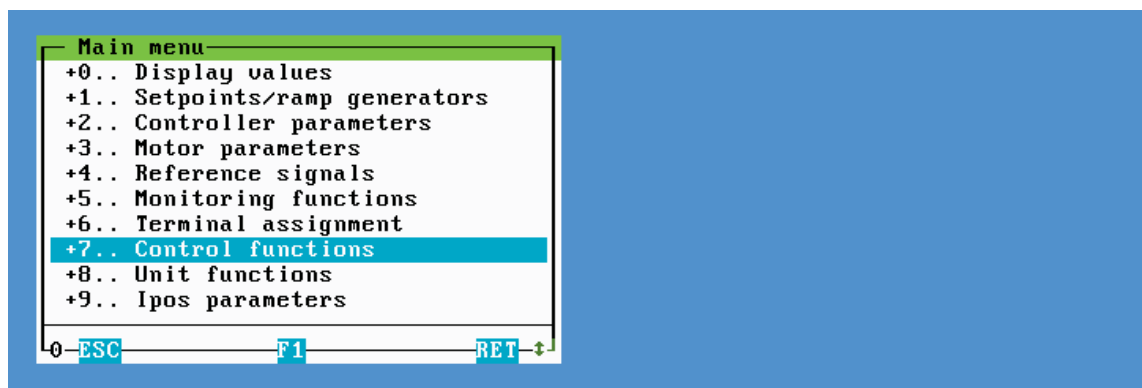
Press the <F7> key to set the speed controller.

Press the <F3> key to download the calculated values to the drive inverter.

The calculated values are shown in the column “Suggestion”. The actual values are displayed in the column “Actual values”. When you download the calculated values to the inverter with the <F3> key, the actual values are set to the calculated ones.

Individual values can be edited in the “Actual values” column any time and are downloaded to the inverter immediately.

### 3.2.2 Parameter / Main menu



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The main menu allows you to display and edit any parameters / process values.

To select a parameter or process value

- move the selection bar in the main menu to the desired entry, then press the <RETURN> key.
- move the selection bar in the submenu to the desired entry, then press the <RETURN> key.

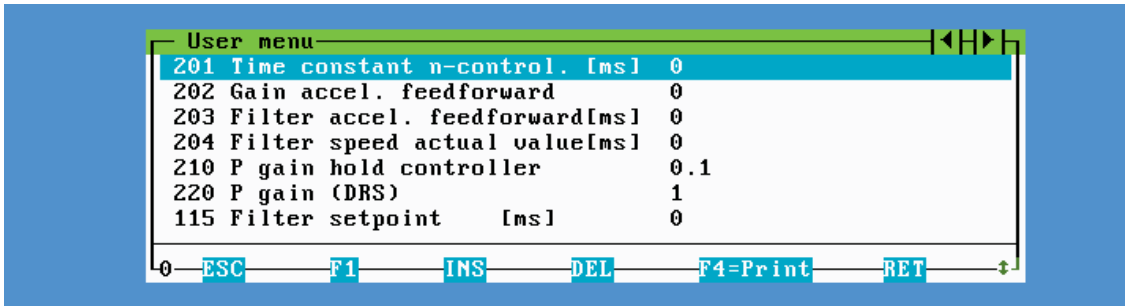
To display the desired parameters / process values in an individual menu

To change values / entries:

- move the selection bar to the desired parameter, then press the <RETURN> key.

For general window functions see Sec. 2.

### 3.2.3 Parameter / User menu



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The user menu is a customized menu where you can put together an individual selection of parameters.

#### Inserting a parameter

Press the <Ins> key. Enter the desired parameter number in the editing window. Press the <RETURN> key. The new parameter will be inserted.

If the new parameter is not inserted, this may be because

- the parameter number you have entered does not exist
- the parameter number you have entered is already included in the user menu
- the maximum number of entries (max. 100 entries) has been reached.

#### Deleting a parameter

Press the <Del> key. If the user menu contains only one parameter, then it is not possible to delete this parameter.

#### Printing the parameters included in the user menu:

Press <F4>.

#### IMPORTANT:

When you set the default user menu:  
The existing user menu configuration will be overwritten.



### 3.2.4 Parameter / Signature

You can store any 16 characters in the unit. This ensures unique identification of the parameter set or the unit. This character string is shown in the MX\_SHELL status line and printed in the header of the hardcopy printout.

### 3.2.5 Parameter / Manual reset

This menu has the same effect as P840 “Manual reset”= YES.

You may also reset the inverter with the <r> key.

## 3.2.6 Parameter / Manual operation

| Manual operation   |             |                          |
|--|-------------|--------------------------|
| Status   | INHIBITED   | Actual pos. [Incl] 61440 |
| Actual speed [rpm]                                       | 0           | Output current [%] 0     |
| Binary inputs standard                                   | 0 1 0 0 1 1 | DI10..17 0 0 0 0 0 0 0 0 |
| Binary outputs standard                                  | 0 1 1       | DO10..17 0 0 0 0 0 0 1 0 |
| Variable speed F7  | 0.00 rpm    | Ref.trav. f              |
|  | +           | Reset r                  |
|  | -           | Left F2                  |
|  |             | Right F3                 |
| Creep feed F8  | 0 rpm       | STOP F4                  |
|  |             | STOP F5                  |
| Rapid feed F9  | 0 rpm       | Controller inhibit F6    |
| 0-ESC  |             |                          |
| ONLINE   POINT-TO-POINT   CTRL. INHIBIT   MDU60A0075-503 |             |                          |

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**ATTENTION:**

The documentation for manual operation refers to MOVIDRIVE® software version .15 and later. It has become easier to activate and exit manual operation.

| Functions   | Older versions   | Version .15 or later  |
|---|--|---|
| Activate manual operation                         | Terminal/Controller inhibit (DI00) = 0   | The inverter only has to be in inhibit status, i.e. no power supply to standstill and output stage. |
| Processing terminals or control functions         | All programmed terminals will be evaluated, i.e. the inverter requires the corresponding enable data to respond to the manual operation setpoint.  | No terminal functions are evaluated, except limit switch functions (LS CW/CCW).                     |
| Terminal function / Controller inhibit (DI00)     | Always set this input to 1 (= 24 V) to move drive.   |   |
| Exiting manual operation                          | The inverter is stopped at ramps $t_{11}/t_{12}/t_{21}/t_{22}$ and remains in status „controller inhibit“. A return to „normal“ operation is accomplished by toggling terminal DI00 = 0, DI00 = 1. | Exit manual operation only in inhibit status.   |
| Inverter behaviour after exiting manual operation | The inverter responds to setpoints and terminal signals as programmed and might start operating immediately.   |   |

Any present IPOS programs will continue running in manual operation, and the IPOS program will respond to changes made in manual operation.

**Recommendation:**

Stop running IPOS programs to avoid undesirable reactions in manual operation.

You may enter a speed value in the “Creep speed” and “Rapid speed” boxes and then operate the drive with “CW” and “CCW”. The actual speed is also displayed in the “Variable speed” box, where you can change it with the “+” and “-” keys. This allows you to change the speed setting of a drive, which accelerates to rapid speed with a slow ramp, to a slower speed. You may also enter any value you require in the “Variable speed” box, the drive will then accelerate to these values. The entry in the “Variable speed” box is not stored.

The drive accelerates to rapid or creep speed using the  $t_{11}/t_{12}/t_{21}/t_{22}$  ramps. “HALT” will decelerate the drive to  $n=0$  using these ramps. “Stop” will decelerate the drive to  $n=0$  using the rapid stop ramp  $t_{13}/t_{23}$ .

“Ref. travel” will carry out a reference travel. “Reset” is used to reset any faults that may have occurred. The “Controller inhibit F6” activates a function which has the same effect as the “Controller inhibit” terminal and is independent of the level on the “Controller inhibit” terminal.

If you operate a key that has no function, it will activate the function „controller inhibit“.

#### ATTENTION:

You can exit manual mode only in inhibit status by using the key combination <Alt-F3>. The terminal conditions apply after exiting manual operation, i.e. inverter may start operating immediately, if setpoints and corresponding enable are present.



### 3.2.7 Parameter / Fieldbus monitor

Fieldbus monitor (Monitor mode)

| P01          | P02         | P03         | P11          | P12         | P13         |
|--------------|-------------|-------------|--------------|-------------|-------------|
| CTRL. WORD 2 | NO FUNCTION | NO FUNCTION | STATUS WORD2 | POSITION HI | POSITION LO |
| 0000 Hex     | 0000 Hex    | 0000 Hex    | 0000 Hex     | 0000 Hex    | 0000 Hex    |
| 0001 Hex     | 0000 Hex    | 0000 Hex    |              |             |             |

| P01            | CTRL. WORD 2 | P11                  | STATUS WORD2 |
|----------------|--------------|----------------------|--------------|
| Control comma  | CTRL INHIBIT | Output stage enabled | 0            |
| Hold control   | 0            | Ready to operate     | 0            |
| Ramp generator | 0            | PO enabled           | 0            |
| Parameter set  | 0            | Act. ramp set        | 0            |
| Reset          | 0            | Act. parameter set   | 0            |
|                |              | Fault/Warning        | 0            |
|                |              | Limit switch CW      | 0            |
|                |              | Limit switch CCW     | 0            |
| Virtual term.  | 00000000     | Virtual output term. | 00000000     |

—0001—0000000000000001— OK — PD enabled —

ESC F1 F7=PD\_enabled F8=Monitor F9=Control RET

ONLINE POINT-TO-POINT CTRL. INHIBIT MDU60A0075-503

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For the operation of the fieldbus monitor, the connected inverter must be fitted with a fieldbus pcb.

**Two operating modes are available:**

**Monitor mode (press <F8> to activate)**

The monitor mode allows you to monitor data received from (①) and returned to (②) an external PLC when the inverter is communicating with the higher-level control over a fieldbus system. The individual function bits of the control and status words 1 are shown in detail.

**Control mode (press <F9> to activate)**

This mode allows you to simulate an existing fieldbus system. When the external fieldbus master (e.g. PLC) is not present yet, the bus monitor can send process output data (PO1...3) to the inverter and display the process input data (PI1...3) returned from the inverter.

If you wish to influence a running fieldbus system, the PO data input of the control system is ignored after you have selected <F9> and instead the PO1...3 values (see ③) of the monitor window will be used. Press <F7> to accept the PO data from the higher-level control system again.

<F7=PD\_enable> corresponds to parameter 876 of the basic unit.

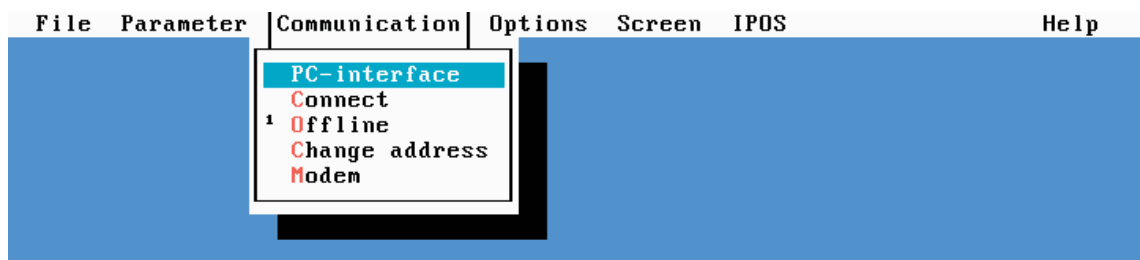
For a detailed description of the fieldbus functions please refer to our fieldbus documentation:

- Fieldbus unit profile
- Manuals for the fieldbus interfaces: CAN bus, INTERBUS, PROFIBUS



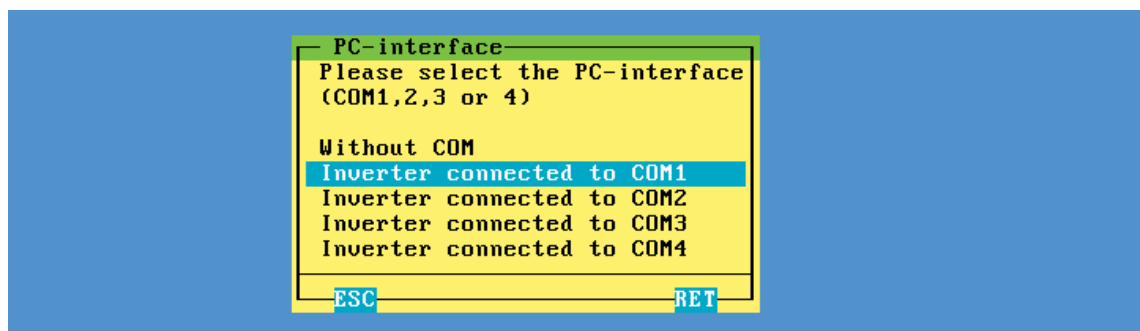
### 3.3 Communication

The menu title “*Communication*” comprises the following menu items:



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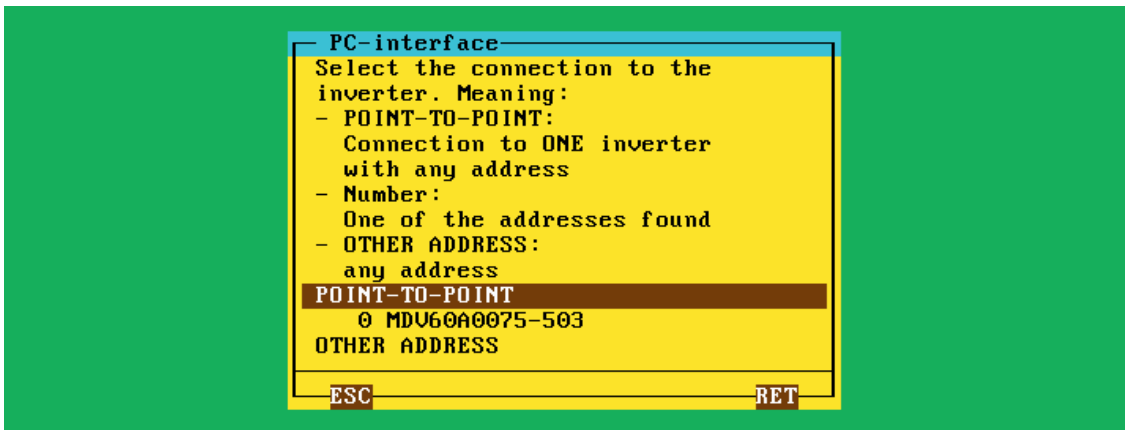
#### 3.3.1 Communication / PC interface



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Select the interface to which the inverter is connected. If the window stays open after you have selected the correct interface and confirmed your selection with the <RETURN> key, then the selected interface does not exist or is already assigned.

### 3.3.2 Communication / Connect



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The communications link between the PC and the drive inverter can be established via one of the COM ports of the PC (→ Sec. 2.3).

### 3.4 Options

The menu title "Options" comprises the following menu items:



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#### **Options / Language**

The program comes standard with German, English and French language files.

#### **Options / Select colour set**

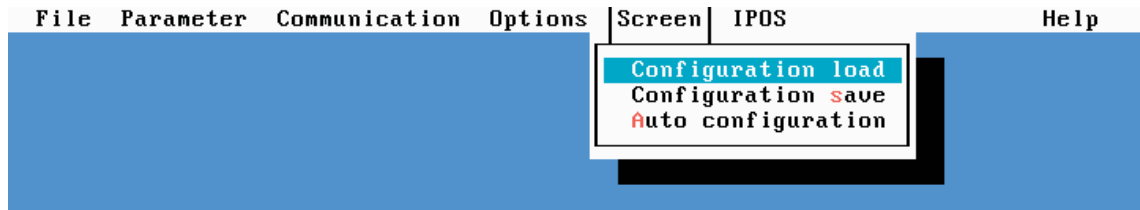
You have a choice of 4 sets of colours.

#### **Options / 25 lines**

This item allows you to change the screen display from 25 to a 50 lines. (25 lines on = check-mark in front of the menu item).

### 3.5 Screen

The menu title “Screen” comprises the following menu items:



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#### ***Screen / Configuration load***

Loads the screen configuration last saved (screen configuration = position of opened windows).

#### ***Screen / Configuration save***

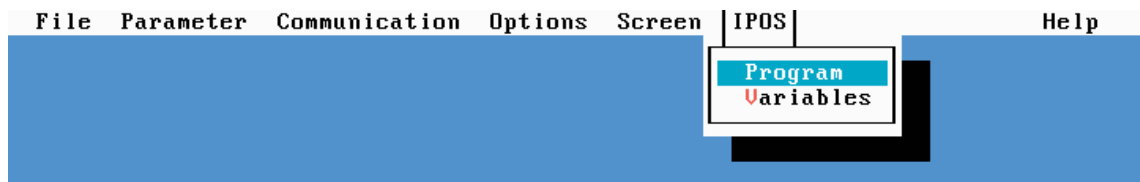
Saves the current screen configuration.

#### ***Screen / Auto configuration***

“Auto configuration” switched on. Saves the position of the opened windows when you exit MX\_SHELL. When you start MX\_SHELL the next time, these windows will be displayed straight away (auto-configuration on = check-mark in front of menu item).

### 3.6 IPOS

The “IPOS” menu title comprises the following menu items:



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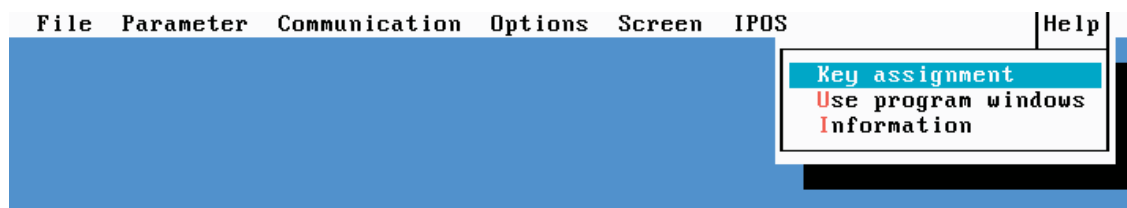


The operation of IPOS<sup>plus</sup> in conjunction with MX\_SHELL is discussed in detail in the IPOS<sup>plus</sup> Manual.



### 3.7 Help

The “*Help*” menu title comprises the following menu items:



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#### ***Help / Key assignment***

Explains all the keys and controls in all the windows. Select the desired window with the <TAB> key and press the <RETURN> key to call up context-sensitive Help.

#### ***Help / Use program windows***

Informs about the most important ways of operating MX\_SHELL windows.

#### ***Help / Information***

Gives the program’s version number and a telephone number which you can call if you need help with the program.

## 4 Extended Program Start Settings

To operate correctly, MX\_SHELL requires several additional files, where, for example, important program settings are stored. When the program is started, these files are read in, processed and some of the information saved again.

**NOTE:**

MX\_SHELL will create the following files automatically. Normally there should be no need to change them. You should only modify these files as an exception (e.g. abnormal termination of MX\_SHELL) or if the application requires you to.

### 4.1 MX\_SHELL.INI file

This file contains all settings you made while the program was running. The file is saved as an ASCII file and can be edited with most text editors. The data are loaded when the program is started and saved back again when you exit.

The following parameters can be set:

**MX\_SCOPE='Path'**

The parameter 'Path' specifies in which directory on your hard disk the MX\_SCOPE program is located. When you select the "Environment/MX\_SCOPE" menu item, MX\_SHELL is closed and MX\_SCOPE called from the 'Path' directory. If 'Path' and/or MX\_SCOPE do not exist, a data selection window opens up to initiate the search for MX\_SCOPE.

**MX\_POS='Path'**

The parameter 'Path' specifies in which directory on your hard disk the MX\_POS program (user interface for the API/APA positioning control) is located. When you select the "Environment/MX\_POS" menu item, MX\_SHELL is closed and MX\_POS called from the 'Path' directory. If 'Path' and/or MX\_POS do not exist, a data selection window opens up to initiate the search for MX\_POS.

### 4.2 MX\_WIN.DAT file

This file contains all the program colour settings. If, for instance, you choose to change the program's blue background, this change will be saved in the MX\_WIN.DAT file.

### 4.3 MX\_USER.MNU file

The user menu configuration is saved in the MX\_USER.MNU file and is available again when you restart MX\_SHELL.

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Tel. +49-7251-75-0 · Fax +49-7251-75-19 70 · Telex 7 822 391  
<http://www.SEW-EURODRIVE.com> · [sew@sew-eurodrive.com](mailto:sew@sew-eurodrive.com)