Drive System SD2x

Operating Terminal 0362150 and 0362153

Operating terminal to control a drive of the series SD2S, SD2M, SD2B or SD2B plus

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1 About this Manual

This chapter descirbes symbols, signal words and abbreviations used in this manual.

Note
You can download more documentation from the SIEB & MEYER website under http://www.sieb-meyer.de/downloads.html.

1.1 Illustration of Warnings

In this manual, the warnings listed below are used. Depending on their degree of risk, the risk levels listed below exist:

⚠ DANGER

Imminent risk of injury

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

→   Follow the instructions in this manual to avoid danger.

⚠ WARNING

Risk of injury

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

→   Follow the instructions in this manual to avoid danger.

⚠ CAUTION

Slight risk of injury

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

→   Follow the instructions in this manual to avoid danger.

NOTICE

Notice

Indicates a hazardous situation which, if not avoided, may result in property damage.

→   Follow the instructions in this manual to avoid danger.

1.2 Technical Symbols

Symbol	Description
☀	LED indicator: LED on
○	LED indicator: LED off
☼	LED indicator: LED flashes

2 General Information

This manual describes the operating terminals 0362150 and 0362153 that are used for the control of a drive of the series SD2x (SD2S, SD2M, SD2B or SD2B plus).

The operating terminal 0362150 is directly plugged on the drive while the operating terminal 0362153 is intended for the installation in a switch cabinet.

Note

As an alternative, the operating terminal 0362150 can also be connected via the switch cabinet kit 32299567. For the mounting instructions, refer to the technical information "TIE_MountingPlate_OperatingTerminal_0362150.pdf".

Note

Read the hardware documentation of the connected drive and PC and pay attention to the safety instructions.

This manual provides information on:

 ▸ views, dimensional drawings, connections
 ▸ pin assignments, mounting
 ▸ software configuration
 ▸ functions
 ▸ status messages

3 Operating Terminal Versions

Depending on the PCB version, there are different versions of the operating terminals 0362150 and 0362153:

1. PCB version 036210043:
   - connectors: X58 (USB), X59 (RS232), X62 (COM1)
   - software version: V2.xx.

2. PCB version 036210043.1:
   - connectors: X60 (download socket), X61 (bus, RS232 via the pins 6/7), X62 (COM1)
   - software version: V3.xx
   - used for serial number 1000258902 and higher

3. PCB version 036210043.2:
   - connectors: X60 (download socket), X61 (bus, RS232 via the pins 2/3 and 6/7), X62 (COM1)
   - software version: V3.xx
   - used for serial number 1000286240 and higher

4. PCB version 036210043.3:
   - new processor type (STM32F105R8)
   - connectors: X60 (download socket), X61 (bus, RS232 via the pins 2/3 and 6/7), X62 (COM1), X63 (JTAG download socket) and switch S1 (see chapter 10 "Hardware Configuration", page 19)
   - software version: V4.xx
   - used for serial number 1000305636 and higher

5. PCB version 036210043.4:
   - processor type: STM32F105R8
   - connectors: X60 (download socket), X61 (bus, RS232 via the pins 2/3 and 6/7), X62 (COM1), X63 (JTAG download socket) and switch S1 (see chapter 10 "Hardware Configuration", page 19) and X60-1 (download socket: USB, type B)
   - software version: V4.xx
   - used for serial number 1000387005 and higher

4 Operating Terminal 0362150

Fig. 1: Operating terminal 0362150 (for plug-on mounting to the drive)

4.1 Dimensions 0362150
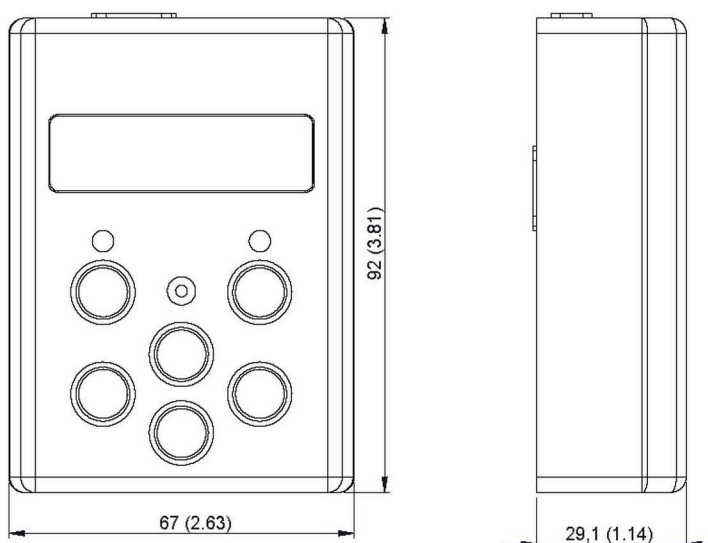
Fig. 2: Dimensions of the operating terminal 0362150 in mm (inch)

5 Operating Terminal 0362153

Fig. 3: Operating terminal 0362153 (for switch cabinet installation)

5.1 Dimensions 0362153
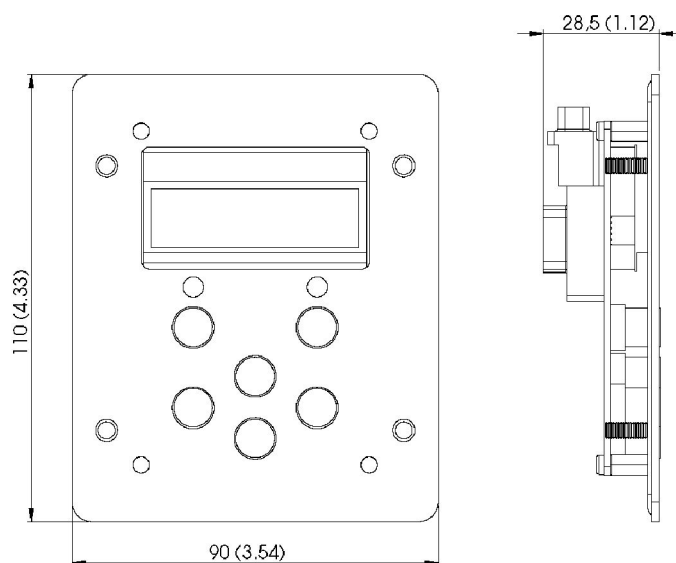
Fig. 4: Dimensions of the operating terminal 0362153 in mm (inch)

6 Connectors

The following chapters show the connectors on the operating terminals 0362150 and 0362153 depending on the built-in PCB..

6.1 Connectors on PCB 036210043
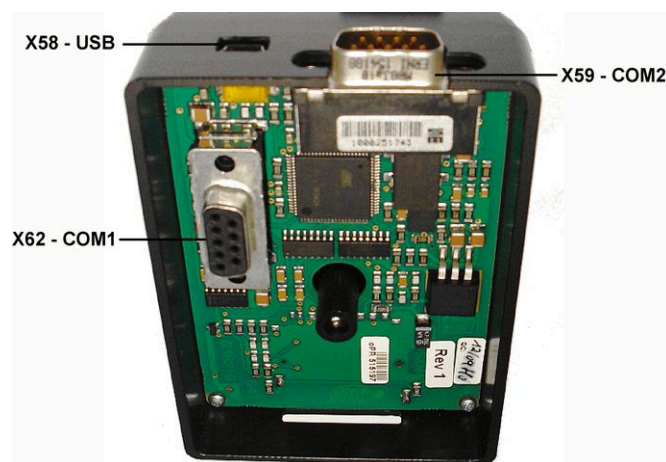
Fig. 5: PCB 036210043 (example illustration of operating terminal 0362150)

Connector	Meaning	Pin assignment
X58	USB port to the PC	page 13
X59	Serial interface COM2 (RS232) to the PC	page 13
X62	Serial interface COM1 (RS232) to the drive	page 15

6.2   Connectors on PCB 036210043.1/036210043.2
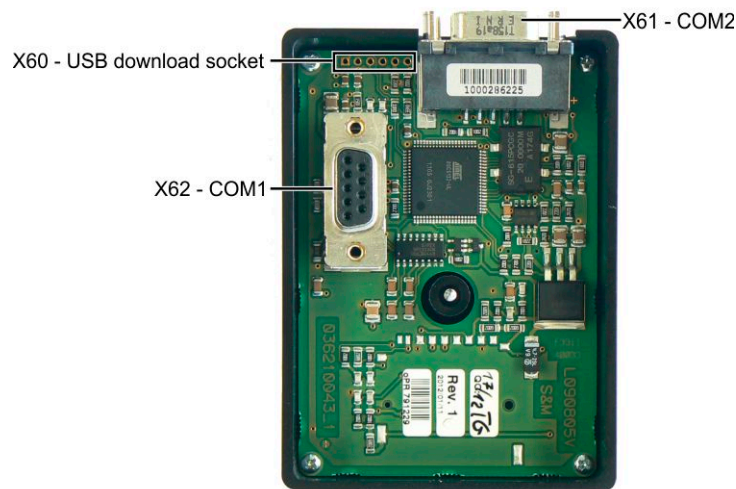
Fig. 6: PCB version 036210043.1/036210043.2 (example illustration of operating terminal 0362150)

Connector	Meaning	Pin assignment
X60	USB download socket to load new software into the operating terminal	page 13
X61	Serial interface COM2 (RS232 and CAN bus) to the PC	page 14
X62	Serial interface COM1 (RS232) to the drive	page 15

6.3   Connectors on PCB 036210043.3
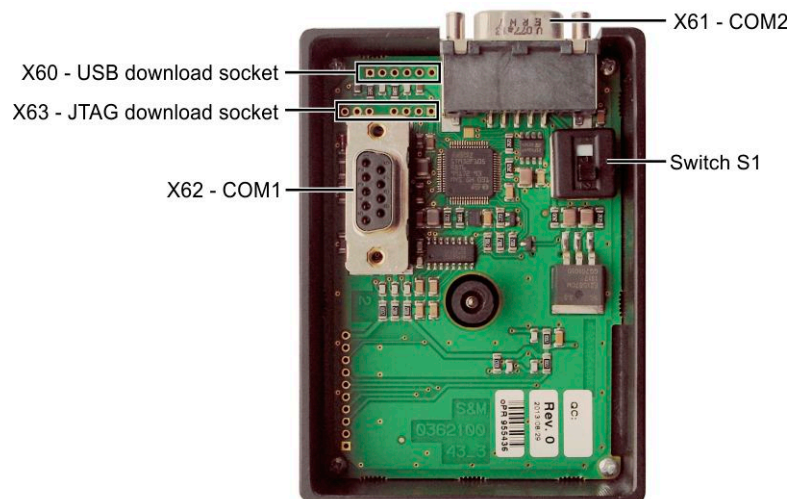
Fig. 7: PCB version 036210043.3 (example illustration of operating terminal 0362150)

Connector	Meaning	Pin assignment
X60	USB download socket to load new software into the operating terminal	page 13
X61	Serial interface COM2 (RS232 and CAN bus) to the PC	page 14
X62	Serial interface COM1 (RS232) to the drive	page 15
X63	JTAG download socket to load new software into the operating terminal	page 15

Connector	Meaning	Pin assignment
S1	Slide switch to set the hardware configuration	page 19

6.4 Connectors on PCB 036210043.4
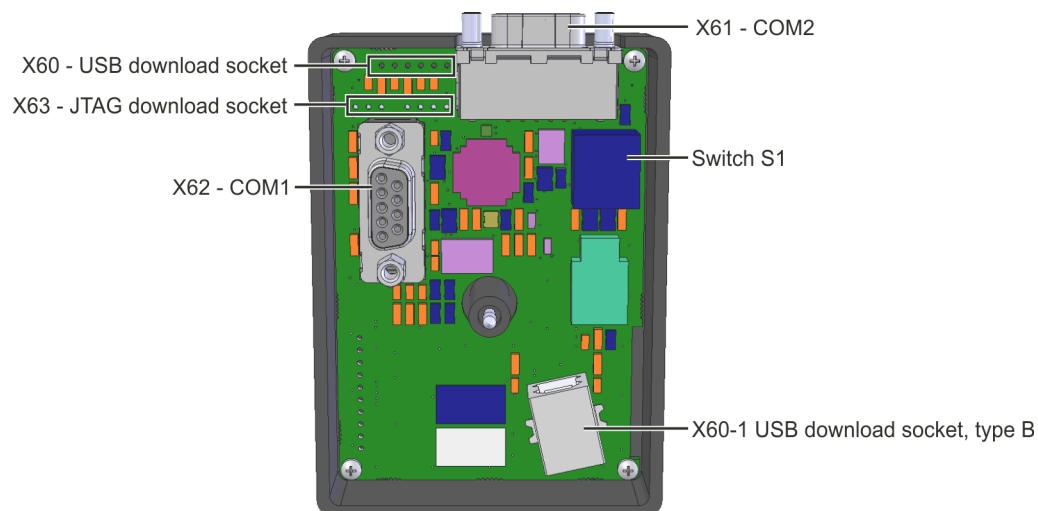
Fig. 8: PCB version 036210043.4 (example illustration of operating terminal 0362150)
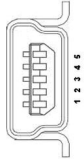
Connector	Meaning	Pin assignment
X60	USB download socket to load new software into the operating terminal	page 13
X60-1	USB download socket (type b) to load new software into the operating terminal	
X61	Serial interface COM2 (RS232 and CAN bus) to the PC	page 14
X62	Serial interface COM1 (RS232) to the drive	page 15
X63	JTAG download socket to load new software into the operating terminal	page 15
S1	Slide switch to set the hardware configuration	page 19

7 Connector Pin Assignment

7.1 X58 – USB Connector

The operating terminal is connected to the PC via the USB connector. When the operating terminal is in the USB TRANSPARENT MODE, you can operate the drive via the *drivemaster2* software.

5-pole female USB connector, type: Mini-B
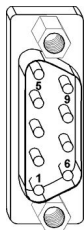
X58	Pin	I/O	Name
	1		n.c.
	2	I/O	D-
	3	I/O	D+
	4		n.c.
	5	I/O	GND

7.2 X59 – COM2 Interface (RS232)

Via the COM2 interface, you can establish an RS232 connection between the operating terminal and the PC. When the operating terminal is in the RS232 TRANSPARENT MODE, you can operate the drive via the *drivemaster2* software.

The connection for the boot loader is used by the SIEB & MEYER service staff for loading new operating terminal software. If you want to load a new software into the operating terminal, please contact the SIEB & MEYER service.

9-pole male D-sub connector

X59	Pin	I/O	Name	Description
	1	E	VCC5	5 V voltage supply
	2	E	PC-RX	Receive data
	3	A	PC-TX	Transmit data
	4		n.c.	
	5	I/O	GND	Ground
	6		n.c.	
	7		n.c.	
	8		n.c.	
	9	I/O	Boot loader	Connection for boot loader

Stud bolt flange: max. tightening torque = 0.7 Nm

7.3 X60 – USB Download Socket

The USB download socket is a 6-pole row of holes and is used by the SIEB & MEYER service staff to load a new operating terminal software. If you want to load a new software into the operating terminal, please contact the SIEB & MEYER service.

7.4 X60-1 – USB-B Download Socket

The download socket is a USB socket of type B and used by the SIEB & MEYER service staff to load a new operating terminal software. If you want to load a new software into the operating terminal, please contact the SIEB & MEYER service.

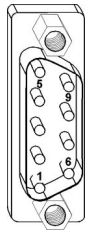4-pole female USB connector, type B

7.5 X61 – COM2 Interface (RS232 and CAN)

The connectors of the COM2 interface are directly connected through the operating terminal. Via this interface an RS232 connection to the PC or the Profibus to serial converter as well as a CAN bus connection can be established. Switching the operating terminal software to the RS232 transparent mode is not necessary anymore. With software version (operating terminal) 3.17 and higher, the menu item "RS232 TrnsMode" is not available anymore.

9-pole male D-sub connector

X61	Pin	I/O	Name	Meaning
	1	I	VCC5	5 V voltage supply
	2	O	SD-TX2	Transmit data; internal bridge to pin 7[1][2]
	3	I	SD-RX2	Receive data; internal bridge to pin 6[1][2]
	4	I/O	CAN_L	CAN_L
	5	I/O	GND	Ground
	6	I	SD-RX2	Receive data; internal bridge to pin 3[1]
	7	O	SD-TX2	Transmit data; internal bridge to pin 2[1]
	8	I/O	CAN_H	CAN_H
	9	I/O	GND	Ground

[1] Up to PCB version 036210043.1: Only the pins 6 and 7 are available for the communication with the PC. Connecting cables must be built individually for this purpose.
PCB version 036210043.2 and higher: The pins 2 and 3 are wired internally parallel to the pins 6 and 7. For this reason, you can use the cable K362105xxxR01 for the connection between PC and operating terminal (you can order the cable at SIEB & MEYER, xxx = cable length in dm).

[2] PCB version 036210043.3 and higher: The pins 2 and 3 allow connecting straight-through (1:1) as well as cross-over cables. The switch S1 defines the internal forwarding of the data (see chapter 10 "Hardware Configuration", page 19).
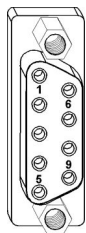
Stud bolt flange: max. tightening torque = 0.7 Nm

7.6 X62 – COM1 Interface

The COM1 connector X62 is plugged on the COM1 connector of the drive, see <u>chapter 8 "Connection to the Drive", page 16</u>.

Via the COM1 interface the serial RS232 connections 1 and 2 and the CAN bus are established. The supply voltage for the terminal is also supplied via this connection.

9-pole female D-sub connector

X62	Pin	I/O	Name	Meaning
	1	I	VCC5	5 V voltage supply
	2	O	SD-TX1	Transmit data
	3	I	SD-RX1	Receive data
	4	I/O	CAN_L	CAN_L
	5	I/O	GND	Ground
	6	I	SD-RX2	Receive data
	7	O	SD-TX2	Transmit data
	8	I/O	CAN_H	CAN_H
	9	I/O	GND	Ground

Stud bolt flange: max. tightening torque = 0.7 Nm

7.7 X63 – JTAG Download Socket

The JTAG download socket is an 8-pole row of holes and is used by the SIEB & MEYER service staff to load a new operating terminal software. If you want to load a new software into the operating terminal, please contact the SIEB & MEYER service.

8   Connection to the Drive

The female connector X62 of the operating terminal 0362150 or 0362153 is connected to the COM1 interface of the drive. The designation of the COM1 interface varies depending on the device:

Drive	Device designation	COM1 interface
SD2S	036212xxx / 0362x4xxx	X19
SD2M	036228xxF	X19
SD2M	0369x7xxF	X74
SD2B	0362170xx	X10
SD2B plus	0362171xx / 0362171xx1	X10

Operating terminal 0362150

The female connector X62 (COM1) of the operating terminal is directly plugged on the male COM1 connector of the drive. Then, the operating terminal is fixed by a screw. After fixing, the connection to the drive is established. The supply voltage for the terminal is also supplied via this connection.

Note

When using the operating terminal with a drive of the series SD2B / SD2B plus or SD2M (0369x7xxF only), the terminal cannot be direclty plugged on the drive for mechanical reasons. With these devices, you can connect the operating terminal via a cable to the COM1 interface of the drive.

Note

As an alternative, the operating terminal 0362150 can also be connected via the switch cabinet kit 32299567. For the mounting instructions, refer to the technical information "TIE_MountingPlate_OperatingTerminal_0362150.pdf".

Operating terminal 0362153

The female connector X62 (COM1) of the operating terminal 0362153 is connected to the male COM1 connector of the drive by means of an extension cable. For the mounting instructions and a mounting template, refer to the technical information "TIE_OperatingTerminal_0362153_Mounting.pdf".

9 Switch Cabinet Installation

The operating terminal 0362153 is designed to be mounted to a switch cabinet. The mounting instructions and a mounting template can be found in the technical information "TIE_OperatingTerminal_0362153_Mounting.pdf".

By means of the switch cabinet kit 32299567, the operating terminal 0362150 can also be mounted to a switch cabinet. The mounting instructions can be found in the technical information "TIE_MountingPlate_OperatingUnit_0362150.pdf".

Instead of the supplied extension cable, you can also use your own cable suitable in length.
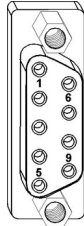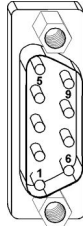
Extension Cable

▶ shielded round cable
▶ 9-pole male D-sub connector ↔ 9-pole female D-sub connector
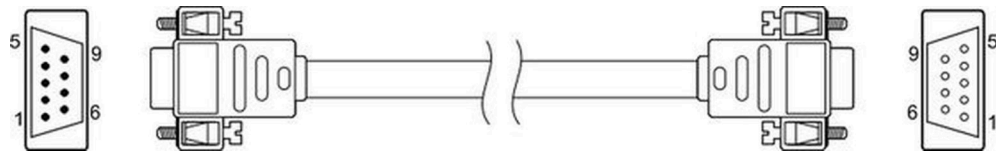
Pin assignment on the device

▶ 9-pole female D-sub connector ↔ 9-pole male D-sub connector
▶ 1:1 pin assignment

Operating terminal: X62			Name	Drive: COM1 connector		
	Pin	I/O		I/O	Pin	
	1	E	VCC5 (5 V voltage supply)	A	1	
	2	A	SD-TX1 (transmit data to drive)	E	2	
	3	E	SD-RX1 (receive date from drive)	A	3	
	4	I/O	CAN_L	I/O	4	
	5	I/O	GND (ground)	I/O	5	
	6	E	SD-RX2 (receive date from drive)	A	6	
	7	A	SD-TX2 (transmit data to drive)	E	7	
	8	I/O	CAN_H	I/O	8	
	9	I/O	GND (ground)	I/O	9	
	Connector shell		Cable shield		Connector shell	

Stud bolt flange: max. tightening torque = 0.7 Nm

Trouble-free operation is provided up to at least 3 m cable length, when the conductor cross-section is 0.14 mm².

It is possible to operate the terminal with a cable length of >3 m to 15 m. But external interferences may cause malfunction of the operating terminal/drive. Trouble-free function of the devices must be assured by the machine manufacturer.

SIEB & MEYER recommends a separate voltage supply for this purpose. If a larger distance must be covered, you can connect a separate voltage source to the operating terminal.

A separate power supply unit must meet the following specification:
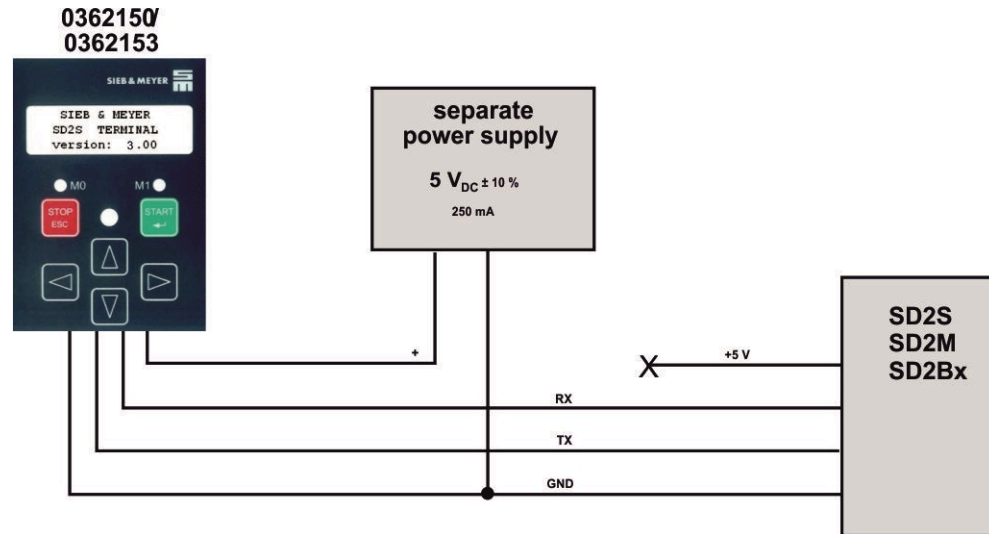

Fig. 9: Operating terminal supplied by a separate power supply unit

NOTICE

Property damage when using a separate voltage supply

→   When using a separate voltage source the voltage supply from the drive must be disconnected. Otherwise overvoltages can cause damage at the operating terminal.

10   Hardware Configuration

Switch S1

PCB version 036210043.3 and higher

For the serial connection to the drive, see , you can use different cables in which the pins 2 and 3 are connected either straight-through (1:1) or crossed. This makes compatible internal forwarding of the data in the operating terminal necessary. The internal forwarding must be set by means of the slide switch S1 on the PCB according to the used cable:

Cable	S1 switch position	Internal forwarding
cross-over	1	Pin 2 and pin 7 Pin 3 and pin 6
straight-through (1:1)	2	Pin 2 and pin 6 Pin 3 and pin 7

11 Software Configuration

In a first step, install the *drivemaster2* software as described in the corresponding software documentation.

To be able to control the drives via the operating terminal, you must set the following parameters in accordance with the used drive via the *drivemaster2* software:

Control channel / Setpoint channel
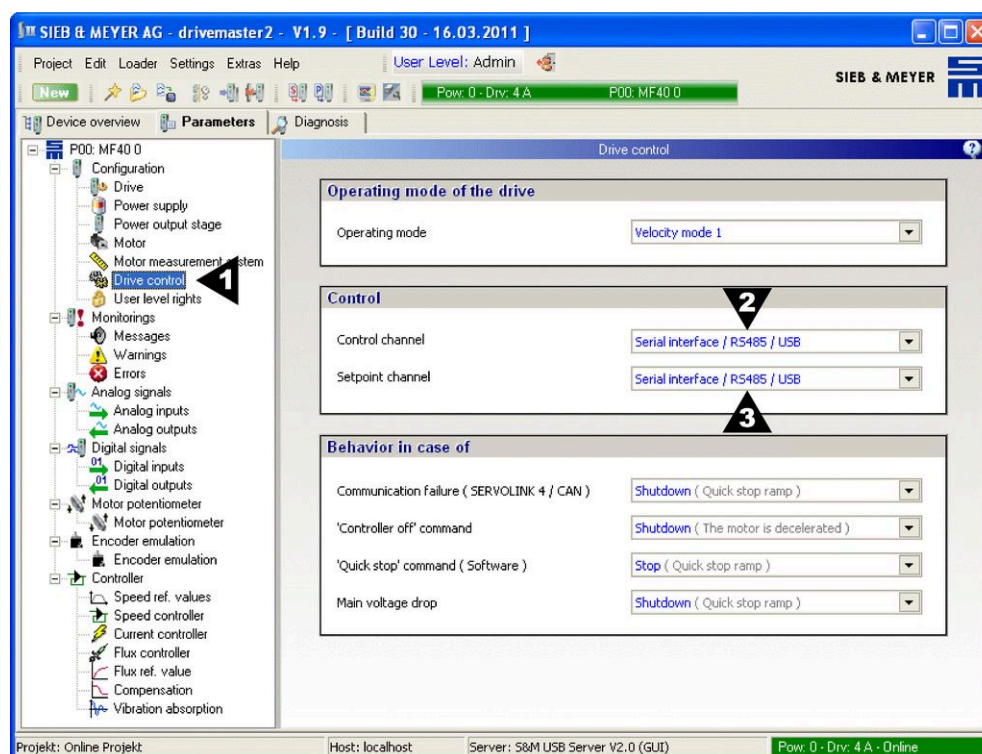
[1] On the "Parameter" tab, open the "Drive control" page.

[2] Select the control channel "Serial Interface / RS485 / USB".

[3] Up to software version (operating terminal) 3.08: select the setpoint channel "Serial interface / RS485 / USB".
Software version (operating terminal) 3.09 and higher: Select the setpoint channel in accordance with the preset parameters.

Note

The operating terminal cannot control the drive if another control channel (and setpoint channel up to version 3.08) have been selected or if the *drive-setup-tool* is active.

Digital input D-IN0: *No function*
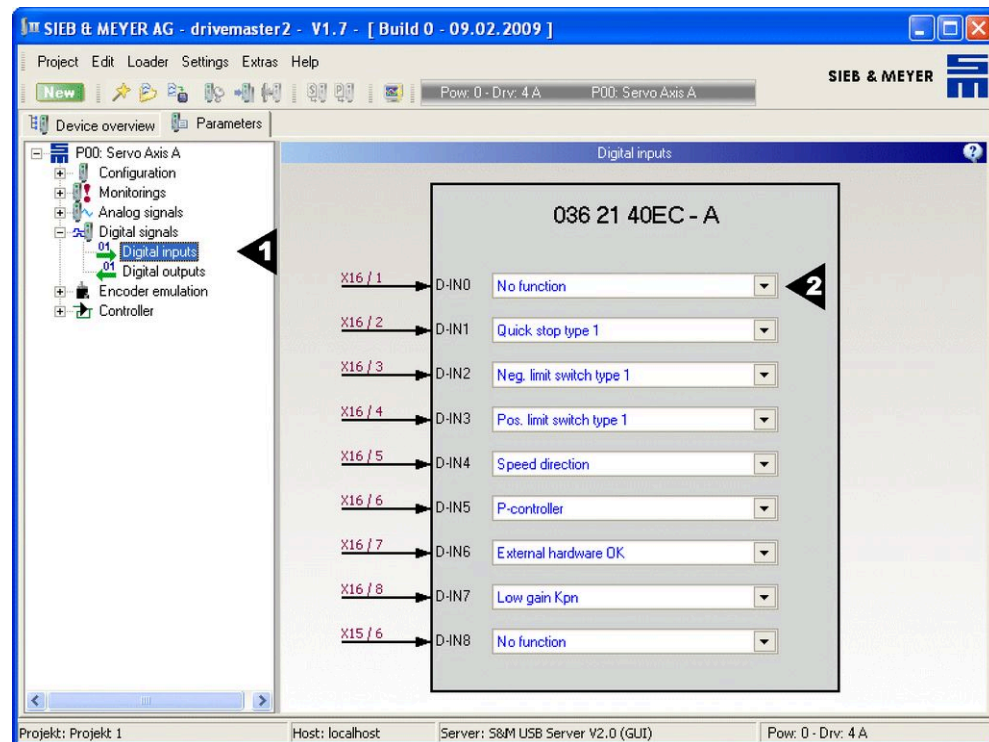
[1]   On the "Parameter" tab, open the "Digital inputs" page.

[2]   For the D-IN0 input, select "No function" from the drop-down list.

12   Switching on the Operating Terminal

When the is switched on, the operating terminal is also supplied with voltage. The version of the operating software appears.

There are two versions of the operating software:

▸ Version 2.xx for terminals with USB and RS232 support. These terminals are connected to drives that do not feature an own USB port.
▸ Version 3.xx for terminals without USB and RS232 support. These terminals are connected to drives that feature an own USB port.

Then the terminal software tries to establish a connection to the drive. During the search for the drive the following text appears on the display:

```
Scan for drive
No ParameterSet
```
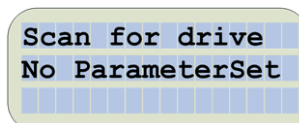
As soon as a drive is found, the module address is kept and drive specific objects are read. These are for example the conversion factors of the speed.

Operating terminals with USB/RS232 support:

During initialization the terminal recognizes whether a PC is connected to the USB port or not. If so the terminal switches to the TRANSPARENT MODE. If not the terminal switches to the AUTOMATIC MODE. The terminal also recognizes when you connect the PC to its USB port during operation. The terminal memorizes the current mode and switches back into that mode as soon as the PC is disconnected.

Functions

The terminal supports the following functions:

▸ AUTOMATIC MODE
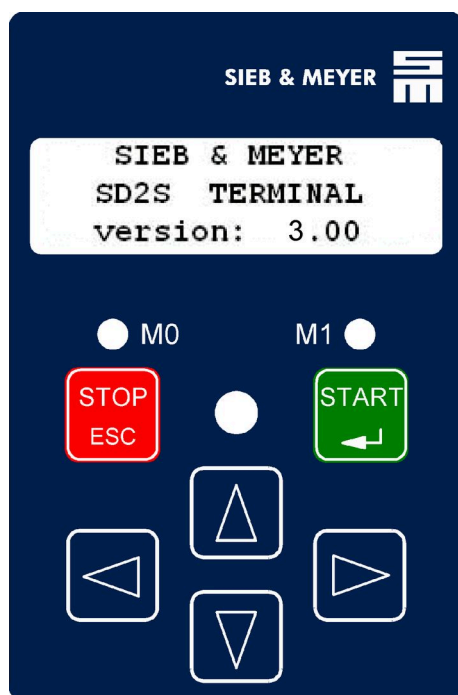▸ PROGRAM MENU
▸ INFO MODE
▸ AXIS RESET
▸ USB TRANSPARENT MODE
▸ RS232 TRANSPARENT MODE
▸ TERMINAL RESET
▸ BRIGHTNESS

The MAIN MENU is superordinated.

Note

The two transparent modes are only used by terminals with USB and RS232 support.

13 Operating Elements

13.1 Keys

The operating terminal offers the following keys:

Key	Function	Description
START	START / ENTER	Start drive Confirm input Select highlighted menu item
STOP ESC	STOP / ESC	Stop drive Cancel input Return to previous menu level
△	Cursor up	Select next higher menu level Increase the selected digital value in parameterization mode
▽	Cursor down	Select next lower menu level Decrease the selected digital value in parameterization mode
▷	Cursor right	Rightward selection of a display parameter in AUTOMATIC MODE Rightward selection of a display parameter in INFO MODE Rightward selection of a digit in the parameterization mode
◁	Cursor left	Leftward selection of a display parameter in AUTOMATIC MODE Leftward selection of a display parameter in INFO MODE Leftward selection of a digit in the parameterization mode

13.2 LED Description

The two yellow illuminated LEDs indicate the states of the operating terminal and drive. In addition, they indicate in some of the menu items, which of the both keys ESC (M0) and ENTER (M1) can be pressed.

LED State				Description
M0 ☀		M1 ☀		During the initialization phase, both LEDs flash **simultaneously**.
M0 ●				In AUTOMATIC MODE, the LED indicates the following state: "speed zero".
				In case that a question is displayed, you can deny it by pressing ESC.
M1 ●				In AUTOMATIC MODE, the LED indicates the following state: "speed reached" an.
				In case that a question is displayed, you can confirm it by pressing ENTER.
M0 ☀		M1 ○		If an error is displayed, both LEDs flash**alternately**.
M0 ○		M1 ☀		

13.3   Display

The display is made up of 3 × 16 characters. It shows information, actual values and menu items. The language of the display is by default English.

```
  SIEB & MEYER
 SD2S  TERMINAL
 version: 3.00
```
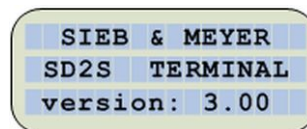
Upon request, SIEB & MEYER can also provide text modules in other languages.

Note

All displayed values are read from the drive as objects. Each value has an object number assigned. Via these object numbers, you can access the related object in the Object browser of the *drivemaster2* user interface.

---

14   Functions of the Terminal

14.1   MAIN MENU

`STOP ESC`   Press the ESC key to switch to the MAIN MENU and to display the top menu level.

```
MAIN MENU
> Automatic
  Programming
```
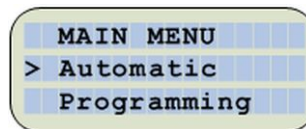
`△` `▽`   Via the "Cursor up" und "Cursor down" keys, you can display the different menu items of one menu level.

`START ↵`   Via the ENTER key you confirm the selected menu item and can change to the next menu level.

`STOP ESC`   Via the ESC key, you can switch back to the previous menu level. When the lowest menu level has been reached, the corresponding mode or the parameter input is displayed. By default, automatic operation is displayed.

14.2   AUTOMATIC MODE

14.2.1   Actual Value Display

The actual value displays are different between operating terminals with and without USB support.

14.2.1.1   Actual Value Display of Devices with USB Support

In automatic operation, current drive values are displayed. They include the actual parameter set number, the actual device status and the error, warning or quick stop code number. Usually, the display additionally shows the actual speed (object 168) and the actual current (object 102).

The displayed unit of the current depends on the DeviceDriveFunctionMode: For "Servo" and "HSBLOCK", the current is displayed as sine wave peak amplitude (A), for "HSPWM", "HSPAM" und "U/f" as RMS value (Arms). (The DeviceDriveFunctionMode "HSPWM" is supported for software version (operating terminal) 3.11 and higher and "U/f" for version 3.12 and higher.)

Examples

```
p01 reg on              p01 reg on
vel:    560 rpm         vel:    560 rpm
cur:   0.24 A           cur:   0.17 Arms
```

Via the "Cursor Left" and "Cursor Right" keys, you can show additional actual parameters, e.g. the power (object 324), the digital inputs and outputs (objects 106 and 107), the analog inputs (objects 310 and 315), the analog outputs (objects 329 and 331) and the warning register (object 87):

```
p01 reg on          p01 reg on                p01 reg on
vel:    560 rpm     D-IN:   011000001         A-IN0:    -5 mV
pwr:   0.23 W       D-OUT:      10011         A-IN1:     4 mV
```

```
p01 reg off         p01 reg on
A-OUT0:    0 inc    warning register
A-OUT1:    0 inc        00000000
```

In case of an error, the actual error (object 69) is displayed as error text with the corresponding error number. A latched error (object 70) is displayed with the error number. In case of a warning in the warning register (object 87), the warning code will be displayed.

```
p01 reg off  E40    p01 reg off  E11     p01 reg on   W05
                    vel:       0 rpm     vel:     560 rpm
feedback system     cur:    0.00 A      cur:    0.24 A
```

14.2.1.2 Actual Value Display of Devices without USB Support

In automatic operation, the actual values of the drive are displayed on the terminal.

1st display line

Output stage off: The name of the current spindle (object 22) is displayed.

Output stage on: The actual speed (object 168 up to Odict version 7, object 398 with Odict version 8 and higher) is displayed.

2nd display line

Output stage off: The set reference speed (object 168 up to Odict version 7, object 395 with Odict version 8 and higher) is displayed.

Output stage on: The set reference speed value is displayed. This value depends on the Odict version and the software version of the operating terminal:
- ▸ Up to software version (operating terminal) 3.09: object 168 up to Odict version 7, object 395 from Odict version 8.
- ▸ Software version (operating terminal) 3.10 and higher: object 168 up to Odict version 7, object 396 from Odict version 8.
- ▸ Software version (operating terminal) 3.17 and Odict version 8 or higher:
  - – For device status "Switched on", object 395 is displayed
  - – For device status "Operation enabled", object 396 is displayed

3rd display line

The status of the finite state automaton is displayed.

If the drive status is "Operation enabled", a progress bar for the load (object 324 for Odict version 8 and higher) on the parameterized rated motor current is displayed in %.

Examples

```
Spindle 1
REF:   25000 rpm
            Ready
```
```
ACT:         0 rpm
REF:   25000 rpm
         SwitchedOn
```
```
ACT:   25000 rpm
REF:   25000 rpm
■■■■■■■
```

Via the "cursor left" and "cursor right" keys, you can display other actual parameters, e.g. reference current (object 99), digital inputs and outputs (objects 106 and 107), analog inputs (objects 310 and 315), analog outputs (objects 329 and 331) and the warning register (object 87):

Displayed unit of the current:
▸ Up to software version (operating terminal) 3.18: The displayed unit of the current depends on the DeviceDriveFunctionMode: In the modes "Servo" and "HSBLOCK", the current is displayed as sine wave peak amplitude (A), in the modes "HSPWM" and "HSPAM / V/f", it is displayed as RMS value (Arms).
▸ Software version (operating terminal) 3.19 and higher: The displayed unit of the current depends on the DeviceDriveFunctionMode: In the mode "HSBLOCK", the current is displayed as sine wave peak amplitude (A), in the modes "Servo", "HSPWM" and "HSPAM / V/f", it is displayed as RMS value (Arms).

```
ACT:   25000 rpm
REF:   25000 rpm
CUR:    4.30 A
```
```
ACT:   25000 rpm
REF:   25000 rpm
D-IN:  000110011
```
```
ACT:   25000 rpm
REF:   25000 rpm
D-OUT:     01011
```

```
ACT:   25000 rpm
REF:   25000 rpm
A-IN0:     0 mV
```
```
ACT:   25000 rpm
REF:   25000 rpm
A-IN1:     0 mV
```
```
ACT:   25000 rpm
REF:   25000 rpm
A-OUT0:    0 mV
```

```
ACT:   25000 rpm
REF:   25000 rpm
A-OUT1:    0 mV
```

In "HSPAM / U/f" operation, the active output stage power (object 390) in kW is displayed:

```
ACT:   25000 rpm
REF:   25000 rpm
Pact: 10.00 kW
```

With software version (operating terminal) 3.12 and Odict version 19 and higher, for the V/f control, the active current (object 430) is displayed instead of the reference current. In addition, the actual apparent current (object 431) and the actual motor voltage (object 434) are displayed for this drive function.

```
ACT:   25000 rpm
REF:   25000 rpm
Iw :    0.30 Arms
```
```
ACT:   25000 rpm
REF:   25000 rpm
Is :    0.70 Arms
```
```
ACT:   25000 rpm
REF:   25000 rpm
Umot: 300.4 Vrms
```

With software version (operating terminal) 4.02 and higher, the motor temperature (object 63) is displayed if you have parametrized a KTY sensor or a PT1000 sensor for the temperature monitoring. Otherwise, a corresponding note will be displayed.

```
Spindle 1
REF:        0  rpm
MTemp:  25.0  °C
```

```
Spindle 1
REF:        0  rpm
no  KTY  sensor
```

Errors, warnings and event messages

In the event of an error, the current error (object 69) or the latched error (object 70) with the corresponding error code will be displayed. With software version (operating terminal) 3.20 and higher plus Odict version 17 and higher, the terminal will display an additional sub error code (object 425), if available.

If there is a warning in the warning register (object 87), the corresponding warning code will be displayed.

If there is information on the cause of the quick stop (object 71) available, the quick stop code will be displayed. Top priority is given to the error display.

```
Spindle 1
REF:   25000  rpm
       Error:  E.40
```

```
Spindle 1
REF:   25000  rpm
       Error:    E40
```

```
Spindle 1
REF:   25000  rpm
       Error:E.11-4
```

```
Spindle 1
REF:   25000  rpm
       Error:E11-4
```

```
Spindle 1
REF:   25000  rpm
                 W01
```

```
Spindle 1
REF:   25000  rpm
       QStop:    H03
```

14.2.2   LED Display

The LED displays have the following meaning in AUTOMATIC MODE:
▶   The LED M0 illuminates when the drive signals "speed zero" in the status word (object 67).
▶   The LED M1 illuminates when the drive signals "speed reached " in the status word (object 67). meldet.
▶   If an error is returned, both LEDs flash alternately.

14.2.3   Controlling the Drive

In order to control the drive via the operating terminal, you must set the parameters of the drive as follows:
▶   Control channel: Serial interface / RS485 / USB
▶   Setpoint channel:
  –   Up to software version (operating terminal) 3.08: Serial interface / RS485 / USB
  –   Software version (operating terminal) 3.09 and higher: The selected setpoint channel must support the used parameters.

▸ Digital inputs: D-IN0 = no function

If the control channel (and setpoint channel up to version 3.08) is not set to "Serial interface / RS485 / USB", an error message will be triggered when you select the desired function. The settings in the *drivemaster2* software are described in .

In addition, the remote bit in the status word must be set by the firmware.

Note

All functions of the terminal are only available if you have set the parameters as described above. Otherwise, you will not be able to start the motor via the operating terminal.

The display of the actual values is always active.

Via the START key, you can switch on the output stage. The spindle will then rotate at the preset speed.
With software version (operating terminal) 3.17 or higher, switch-on is a multi-stage process. According to the terminal status, you must press the START key repeatedly: Ready for operation (output stage off) → Switched on (output stage on, holding current) → Operation enabled (spindle rotates)

Via the STOP key, you can stop the spindle and the output stage will be switched off. With software version (operating terminal) 3.17 and higher, switch-off is a multi-stage process. According to the terminal status, you must press the STOP key repeatedly: Operation enabled (spindle rotates) → Switched on (output stage on, holding current) → Ready for operation (output stage off)
Once the output stage has been switched off, you can change to the MAIN MENU via the ESC key.

Via the "Cursor up" and "Cursor down" keys, you can access the speed settings. Here, you can modifiy the actual reference speed. For more information, refer to . You can modify the speed in the parameter menu regardless of the user privileges.

14.3   PROGRAM MENU

In the PROGRAM MENU, you can access the parameter menu, read and write parameters, delete the terminal memory and access the password administration.

```
   PROGRAM MENU
 > Parameter Menu
   Save Parameter
```
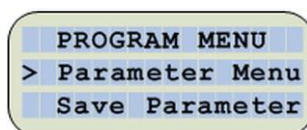
Via the "Cursor up" and "Cursor down" keys, you can select the different menu items.

When you press the ENTER key, the display will switch to the selected menu.

When you press the ESC key, the display will return to the MAIN MENU.

14.3.1 Enter password

Some menu items can only be accessed if you enter a 4-digit password. The password that you enter here will be matched with the stored password.

```
       PASSWORD
enter password:
0000
```
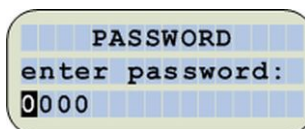
If the password is correct, you can access the selected menu item. If the entered password is incorrect, a corresponding error message will be displayed for one second and you will be returned to the PROGRAM MENU.

```
       PASSWORD
wrong password
```
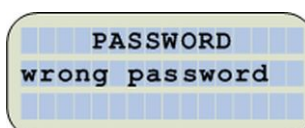
Note

You can set the password via the menu item CHANGE PASSWORD.

14.3.2 PARAMETER MENU

In the PARAMETER MENU, you can select different parameters and edit them.

Up to software version (operating terminal) 3.08:

If the drive control is not set to "Serial interface / RS485 / USB", an error message will be triggered and the display will switch back to the main menu.

Software version (operating terminal) 3.09 or higher:

The modified parameters will only become active in the drive if the selected setpoint channel supports these parameters.

Software version (operating terminal) 3.17 or higher:

The operating terminal checks the user rights that are stored in the drive. To edit the parameters, the user right "Parameter input via terminal" for the OEM level and also for the user level must be activated in the *drivemaster2* user interface. This user right must be activated individually for all parameter sets of the drive.

If the parameter input via terminal is activated (default setting), the parameters are displayed and you can edit them. If the parameter input via terminal is deactivated, the error message "function not allowed" will be displayed for one second and the display will switch back to PROGRAM MENU.

```
    PARAMETER MENU
>  TargetVelocity
   Vel Acc Time
```
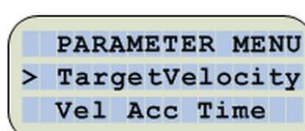
Via the "Cursor up" and "Cursor down" keys, you can select the individual parameters.

When you press ENTER, the selected parameter is released for editing.

Via the ESC key, you can return to the MAIN MENU.

Currently, the following parameters can be edited:
▸ Reference speed (object 210)
▸ Acceleration ramp time (object 186)
▸ Deceleration ramp time (object 187)
▸ Quick stop ramp time (object 188)
▸ W24 load warning threshold (object 95)
▸ W26 overload current (object 400)
▸ Internal setpoints (object 406)
▸ Motor potentiometer step size (object 410)

Speed setting

▸ Up to software version (operating terminal) 3.10: Speed can only be preset with positive values.
▸ Software version (operating terminal) 3.11 and higher: The parameter "Direction lock" (object 429 with Odict version 18 or higher) is requested.
   Depending on the setting of this parameter, you can have the following reference values for the speed: only positive values, only negative values or positive and negative values.

14.3.2.1 Change parameters

While you are modifying a parameter, its name and actual value are displayed.

```
 Vel Acc Time
act:   1000 ms
spt:   1000 ms
```

You can change the values. Use the arrow keys for this purpose.

Via the "Cursor up" and "Cursor down" keys, you can modify the current digit of the value as well as set the minus sign and the decimal point.

Via the "Cursor left" and "Cursor right" arrow keys, you can switch to the next or previous digit. The current digit is displayed flashing.

Press ENTER to confirm your modification and to apply the new value.

Via the ESC key you can cancel the input and can reject the modification. Once you have finished your input, the display will return to the parameter menu.

If you use internal setpoints (object 406), you can enter all 16 reference values one after the other. You must confirm each value by pressing ENTER. The next value will then be automatically displayed. Via the ESC key, you can abort the input. All already confirmed values will be applied.

The displayed unit of the current depends on the DeviceDriveFunctionMode: For "Servo" and "HSBLOCK", the current is displayed as sine wave peak amplitude (A), for "HSPWM", "HSPAM" und "U/f" as RMS value (Arms).

The input value will be checked with regard to its limits. In case of an error, a corresponding error message will be displayed during one second and then you can enter the value again.

```
   Vel Dec Time
act:    1000 ms
parameter nok
```
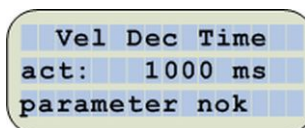
14.3.3   SAVE PARAMETER

Note

You must enter the correct password to open this menu item.

Once you entered your password, the object data will be transferred into the initialization paremeters and the check sum will be recalculated.

The following object data are transferred:
- ▸ Acceleration ramp time (object 186)
- ▸ Deceleration ramp time (object 187)
- ▸ Quick stop ramp time (object 188)
- ▸ W24 load warning threshold (object 95)
- ▸ W26 overload current (object 400)
- ▸ Internal setpoints (object 406)
- ▸ Motor potentiometer step size (object 410)

In a next step, the drive is switched to the loader. Then, the initialization parameters are written to the Flash Eeprom and the drive is set back to the firmware mode. The following display is shown:

```
SAVE PARAMETER
wait for drive
```
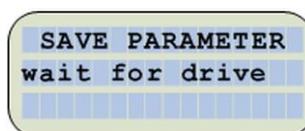
Finally, the operating terminal switches to the actual value display of the automatic operation.

14.3.4   SELECT PARAMSET

Note

You must enter the correct password to open this menu item. Futhermore, the method for parameter set selection in the drive data must be set to "Fixed selection (EEPROM)".

If the selection method is "Digital inputs" or "Field bus", you cannot change the parameter set via the operating terminal. In this case, the error message "Function not allowed" will be displayed for one second and the terminal will switch to the actual value display.

If changing the parameter set is allowed, you must enter the correct password before you can select the desired parameter set.

In the menu item SELECT PARAMSET, the parameter set that is currently stored in the RAM is displayed.

```
SELECT PARAMSET
parameter set   4
TEST M256
```

Via the "Cursor up" and "Cursor down" keys, you can select a new parameter set.

Press ENTER to confirm your selection and to apply the new parameter set. Then, there is a change-over in the drive, which can take some seconds.

Via the ESC key, you can cancel your selection that will then be rejected. Once you finished your selection, the display will switch to the AUTOMATIC MODE.

14.3.5   READ PARAMETER

Note

You must enter the correct password to open this menu item.

When the parameters are read, all parameter sets saved in the Flash EPROM of the drive are loaded into the Flash EPROM of the operating terminal. The terminal displays the currently loaded parameter page, so you can follow the download progress.

```
READ  PARAMETER
read page 0600
```

After successful reading, the following message appears:

```
READ  PARAMETER
reading
successful
```

If there is an error during reading, the process will be canceled and the following error message will be displayed:

```
READ  PARAMETER
reading
aborted
```

If there are no parameters stored in the drive, the following error message will appear:

```
READ  PARAMETER
reading
not possible
```

14.3.6 WRITE PARAMETER

Note

You must enter the correct password to open this menu item.

Before writing the parameters, you are asked whether the parameters should be over-written by the parameters stored in the operating terminal.

```
overwrite params
with term param?
no            yes
```

STOP ESC

Press the ESC key if you want to deny the inquiry ("no"). In this case, the parameters will not be written to the drive and the display will switch back to the AUTOMATIC MODE.

START

Press ENTER if you want to confirm the inquiry ("yes"). In this case, the parameters will be written to the drive. In a next step, there is a change-over in the drive, which can take some seconds.

When the parameters are written, all parameter sets saved in the Flash EPROM of the operating terminal are loaded into the Flash EPROM of the drive. The terminal displays the currently loaded parameter page, so you can follow the download progress:

```
WRITE PARAMETER
write page 0600
```

Upon successful writing, the following message will be displayed:

```
WRITE PARAMETER
writing
successful
```

If there is an error during writing, the process will be canceled and the following error message will appear:

```
WRITE PARAMETER
writing
aborted
```

If thera are no parameters stored in the operating terminal or the drive is in BIOS mode, the parameters cannot be written to the drive. The following message will appear:

```
WRITE PARAMETER
writing
not possible
```

For software version (operating terminal) 3.18 and higher, check sum errors are displayed. If a check sum error is detected in the header of the parameter set while reading it from the operating terminal, the following error message will appear:

```
WRITE PARAMETER
checksum
faulty
```

Software version (operating terminal) 3.19 and higher compares the features of the saved parameters with the features of the drive. The parameters will be loaded into the drive only if the drive supports all features of the related parameters. Otherwise, one of the following error messages will be displayed.

The hardware does not support all features of the parameter sets:

```
WRITE PARAMETER
wrong hardware
ident code
```

The logic software does not support all features of the parameter sets:

```
WRITE PARAMETER
wrong logic
features
```

The firmware does not support all features of the parameter sets:

```
WRITE PARAMETER
wrong firmware
features
```

Note

The messages are displayed for 2 seconds. Afterwards, the display switches back to the AUTOMATIC MODE.

14.3.7   CLEAR TERMINAL DATA

Note

You must enter the correct password to open this menu item.

If you select the menu item CLEAR TERM DATA, the internal memory of the terminal will be cleared, i.e. all parameter sets are deleted, the password and the brightness of the display are reset to the default values.
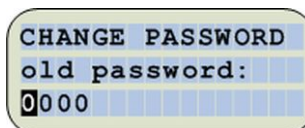
```
CLEAR TERM DATA
```

Afterwards, the display switches back to the PROGRAM MENU.

14.3.8   CHANGE PASSWORD

When you select the CHANGE PASSWORD menu item, you can change the current password. You must always enter a 4-digit password.
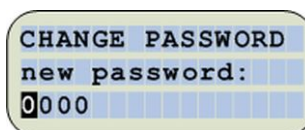
In a first step, enter the old password:

```
CHANGE PASSWORD
old password:
0000
```
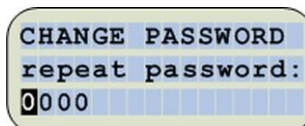
If the password you entered is incorrect, the error message "wrong password" will appear for one second and the terminal will exit the menu item.

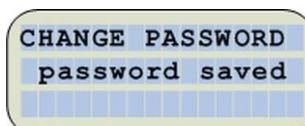If you enter the correct password, you can enter a new password:

```
CHANGE PASSWORD
new password:
0000
```

For safety reasons, you must re-enter the new password:

```
CHANGE PASSWORD
repeat password:
0000
```

If you entered the correct passwords, the new password will be stored. An approriate message will be displayed for one second and the display will then switch back to the PROGRAM MENU.

```
CHANGE PASSWORD
password saved
```

If the two new passwords are not identical, the error message "wrong password" will be displayed for one second and you must enter the new passwords again.

STOP ESC Via the ESC key, you can quit the CHANGE PASSWORd menu without storing the new password.

Note
When changing the password, you can also use the following master password: "0112".

14.4   INFO MODE

In the INFO MODE menu, different information parameters can be load from the drive and be displayed. In addition, the identified module address and the software version of the operating terminal can be displayed.

▸ drive type (object 117)
▸ Name of parameter set (object 22)
▸ motor name (object 44)
▸ serial number (object 7)
▸ Operation time meter since last booting (object 9)

```
   INFO MODE
drive type
0362140EC
```

Via the "Cursor left" und "Cursor right" keys, you can sequentially display the information parameters.

```
   INFO MODE
parameter set  1
TEST M256
```
```
   INFO MODE
motor name
M256
```
```
   INFO MODE
serial number
1000243877
```

```
   INFO MODE
address number
0
```
```
   INFO MODE
terminal version
3.00
```
```
   INFO MODE
operation time
02:35:56
```

STOP ESC Via the ESC key, you can quit the menu and switch back to the MAIN MENU.

14.5 AXIS RESET

Note

You must enter the correct password to open this menu item.

When you select the AXIS RESET menu item, the axis is restarted. It switches to the loader and then back to the firmware.

The following note is displayed:

```
   AXIS RESET
wait for drive
```

Finally, the display switches to the AUTOMATIC MODE.

14.6 TRANSPARENT MODE

Note

The two transparent modes are only used by terminals with USB and RS232 support.

In the TRANSPARENT MODE, there are two modes:
▸ TRANSPARENT MODE for USB
▸ TRANSPARENT MODE for RS232

14.6.1 TRANSPARENT MODE for USB

The USB TRANSPARENT MODE is automatically recognised as soon as a connection to the PC via the USB interface has been established.

The related note appears on the display:
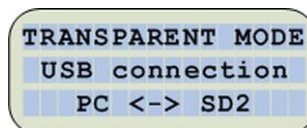
```
TRANSPARENT MODE
 USB connection
    PC <-> SD2
```

In this mode, the operating terminal reads the data and commands of the PC user interface via the USB interface and forwards them to the drive via the first RS232 port. The answer of the drive is read by the first RS232 port and forwarded to the PC user interface via the USB interface. During this time, the operating terminal is inactive.

If the connection to the PC is interrupted, the operating terminal will switch back to the previous mode.
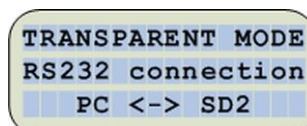
14.6.2 TRANSPARENT MODE for RS232

Note

With software version (operating terminal) 3.17 and higher, the menu item "RS232 Trns-Mode" is not available anymore.

You can select the RS232 TRANSPARENT MODE via the menu item "RS232 Trns-Mode".

The related note appears on the display:

```
TRANSPARENT MODE
RS232 connection
    PC <-> SD2
```

In this mode, the operating terminal reads the data and commands of the PC user interface by the second RS232 port and forwards them to the drive via the first RS232 port. The answer of the drive is read by the first RS232 port and forwarded to the PC user interface via the second RS232 port. During this time, the operating terminal is inactive.

STOP ESC Via the ESC key, you can exit this mode.

14.7 RESET

Depending on the PCB version and the software version of the terminal, you can restart the terminal application either by means of the cursor keys or via the menu item TERMINAL RESET.

Cursor keys

Up to PCB version 036210043.2, up to software version (operating terminal) 3.xx

A reset (warm boot) allows to restart the operating terminal application in the AUTOMATIC MODE and in the TRANSPARENT MODE. A possible bridge at COM2 is left unconsidered.

Press and release the "Cursor left" and "Cursor right" keys simultaneously in order to trigger the reset.

The starting behavior is different between a cold boot via "power on" and a warm boot via a reset using keys. The following starting behaviors are possible:

RESET	Bridge 5/9 at COM2	Starting address	Notes
Power on (cold boot)	yes	Boot loader	After starting the application, another connection via USB is not possible.
Power on (cold boot)	No	Application	A connection via USB is possible.
Reset via keys (warm boot)	Irrelevant	Application	If there was a bridge when the terminal was started via "power on", a USB connection is not possible. If there was no bridge when the terminal was started via "power on", a USB connection is possible.

TERMINAL RESET

PCB version 036210043.3 and higher, software version (operating terminal) 4.00 and higher
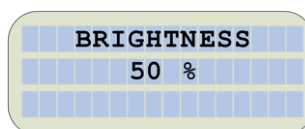
Note

You must enter the correct password to open this menu item.

When you select the menu item TERMINAL RESET, the operating terminal application is restarted.

14.8 BRIGHTNESS

Software version (operating terminal) 4.00 and higher

Via this menu item, you can change the brightness of the display backlight.

```
        BRIGHTNESS
           50 %
```

The brightness is indicated in percent (0…100 %). The default value is 50 %. You can change the current value by means of the cursor keys.

Via the "Cursor up" and "Cursor down" keys, you can change the current digit of the value. The current digit is displayed flashing.

Via the "Cursor left" and "Cursor right" keys, you can switch to the next or the previous digit.

Press ENTER to confirm your modification. The screen will now be displayed with the new brightness value. The display switches back to the main menu.

Press the ESC key if you want to cancel the input and to quit the menu item.

When quitting the menu item, the value for the brightness is saved in the Flash EPROM. During initialization and when the operating terminal data are cleared, the saved value is read from the Flash EPROM.

15 Status Messages

The error messages (Exx), warning messages (Wxx) and quick stop codes (Hxx) displayed in the automatic mode are the drive messages. They are described in the hardware documentation of the drive.

Object nt rd xxx, Object nt wr xxx *(up to software version (operating terminal) 3.18)***; Obj not read xxx, Obj not writexxx** *(software version (operating terminal) 3.19 and higher)***; rd obj failedxxx, wr obj failedxxx** *(software version (operating terminal) 3.21 and higher)*

If one of these displays appears, the operating terminal was not able to access the parameter object of the drive. There are several causes for this error:

▶ The operating terminal is not connected to the drive.
▶ The drive was not detected by the device search (scan for drive) of the operating terminal.
▶ A parameter (object) cannot be used in the current operating mode of the drive.

Function not available, Wrong device fct, Wrong odictclass

If one of these displays appears, the operating terminal can access the drive, but the desired function is not supported by the drive.

Ctrl channel fail, Spt channel fail

The displays "Ctrl channel fail " and "Spt channel fail" indicate that the operating terminal cannot access the control channel and/or the setpoint channel of the drive. In this case, the settings of the drive must be changed via the PC user interface (see chapter 11 "Software Configuration", page 20).

reading/writing aborted, reading/writing not possible

The displays "reading aborted" and "writing aborted" indicate that an error has occurred while reading or writing parameters. The displays "reading not possible" and "writing not possible" indicate that there are no parameters (see chapter 14.3.5 "READ PARAMETER", page 33 and chapter 14.3.6 "WRITE PARAMETER", page 34).

wrong hardware ident code, wrong logic features, wrong firmware features

If one of these displays appears, the comparison of the parameters with the features of the drive failed. There are several causes for this error:

▶ The drive hardware does not support features that are required by the parameter set, e.g. there is no resolver.
▶ The logic software or the firmware does not support features that are required by the parameter set, e.g. the parameterized bus system is not supported.

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