



**SEW**  
**EURODRIVE**

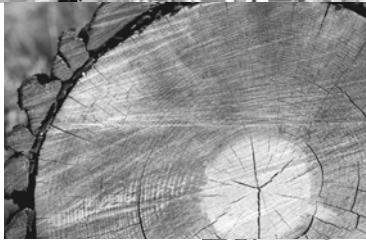


# **MOVIDRIVE® MDX60B / 61B** **"Crane Control" Application**

Edition 12/2007

16610016 / EN

# Manual












<b>1</b>	<b>General Information</b> .....	<b>4</b>
1.1	Structure of the safety notes .....	4
1.2	Right to claim under limited warranty .....	4
1.3	Exclusion of liability .....	4
1.4	Other applicable documentation .....	5
<b>2</b>	<b>Safety Notes</b> .....	<b>6</b>
2.1	General information .....	6
2.2	Target group .....	6
2.3	Designated use .....	6
2.4	Transportation, putting into storage .....	7
2.5	Installation .....	7
2.6	Electrical connection .....	7
2.7	Safe disconnection.....	7
2.8	Operation .....	8
<b>3</b>	<b>Project Planning</b> .....	<b>9</b>
3.1	Application areas .....	9
3.2	Prerequisites .....	9
3.3	Description of the functions.....	10
3.4	Limit switches.....	10
3.5	Load recognition .....	11
<b>4</b>	<b>Installation</b> .....	<b>12</b>
4.1	MOVITOOLS <sup>®</sup> software .....	12
4.2	Terminal assignment.....	12
4.3	Wiring diagram for MOVIDRIVE <sup>®</sup> MDX60B / 61B crane control.....	13
4.4	Connecting the control inputs .....	15
4.5	Connecting limit switches.....	17
<b>5</b>	<b>Startup</b> .....	<b>18</b>
5.1	General notes .....	18
5.2	Preliminary work.....	18
5.3	Starting crane control with a PC and MOVITOOLS <sup>®</sup> .....	19
5.4	Parameters .....	27
<b>6</b>	<b>Operation</b> .....	<b>28</b>
6.1	Starting the drive .....	28
6.2	Flow diagram for the Variable speed operating mode .....	30
6.3	Flow diagram for the Fixed setpoints operating mode .....	32
6.4	Flow diagram for when the drive reaches the limit switches (variable speed operating mode) .....	34
<b>7</b>	<b>Service</b> .....	<b>37</b>
7.1	Error messages.....	37
<b>8</b>	<b>Index</b> .....	<b>39</b>



## 1 General Information

### 1.1 Structure of the safety notes

The safety notes in this manual are designed as follows:

<b>Pictogram</b>  	 <b>SIGNAL WORD!</b>		
Example:   General danger   Specific danger, e.g. electric shock	<b>! DANGER!</b>	<b>Imminent danger</b>	<b>Severe or fatal injuries</b>
	 <b>WARNING!</b>	<b>Possible dangerous situation</b>	<b>Severe or fatal injuries</b>
	 <b>CAUTION!</b>	<b>Possible dangerous situation</b>	<b>Minor injuries</b>
	<b>STOP!</b>	<b>Possible damage to property</b>	<b>Damage to the drive system or its environment</b>
	<b>NOTE</b>	<b>Useful information or a tip Simplifies the handling of the drive system</b>	

### 1.2 Right to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the operating instructions and this manual. Consequently, read the operating instructions and this manual before you start working with the unit!

Make sure that the manual and operating instructions are available to persons responsible for the plant and its operation, as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

### 1.3 Exclusion of liability

You must comply with the information contained in the operating instructions and this manual to ensure safe operation of the crane control and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the operating instructions. In such cases, any liability for defects is excluded.



#### **1.4 Other applicable documentation**

- This information does not replace the detailed operating instructions!
- Only electrical specialists are allowed to perform installation and startup observing relevant accident prevention regulations and the "MOVIDRIVE® MDX60B / 61B" operating instructions, publication number 11483415.
- Read the operating instructions and manual carefully before commencing installation and startup.
- As a prerequisite to fault-free operation and fulfillment of warranty claims, you must adhere to the information in the documentation.



## 2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must make sure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions and manual carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

### 2.1 General information

Never install damaged products or take them into operation. Submit a complaint to the shipping company immediately in the event of damage.

Depending on their level of enclosure, drive inverters can have live, bare, hot surfaces and/or movable or rotating parts during operation.

Removing covers without authorization, improper use or incorrect installation and operation may result in severe injuries to persons or damage to machinery.

Consult the documentation for additional information.

### 2.2 Target group

**Only qualified personnel** are authorized to install, start up, repair or service the units (observe IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 and the national accident prevention guidelines).

Qualified personnel in the context of these basic safety notes are persons familiar with installation, assembly, startup and operation of the product who possess the necessary qualifications.

All persons involved in any other work, such as transportation, storage, operation and disposal, must have suitable training.

### 2.3 Designated use

Drive inverters are components intended for installation in electrical systems or machines.

In case of installation in machines, do not start up the drive inverter (i.e. start of designated operation) until it has been determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine guideline); observe EN 60204.

Startup (i.e. start of designated operation) is only permitted with adherence to the EMC guideline (89/336/EEC).

The drive inverters meet the requirements stipulated in low voltage guideline 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these drive inverters.

Technical data and information on the connection requirements are given on the nameplate and in the documentation; they have to be observed under all circumstances.



**Safety functions** The MOVIDRIVE® MDX60B/61B drive inverters may not perform safety functions without higher-level safety systems. Use higher-level safety systems to ensure protection of equipment and personnel.

For safety applications, refer to the information in the following publications:

- Safe Disconnection for MOVIDRIVE® MDX60B/61B – Conditions
- Safe Disconnection for MOVIDRIVE® MDX60B/61B – Applications

## 2.4 Transportation, putting into storage

Observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the section "General technical data" in the operating instructions.

## 2.5 Installation

Installation and cooling of the devices must take place according to the guidelines listed in the corresponding documentation.

Protect the drive inverters from excessive strain. Especially during transportation and handling, do not allow the components to be deformed or insulation spaces altered. Avoid contact with electronic components and contacts.

Drive inverters contain components that can be damaged by electrostatic energy and improper handling. Prevent mechanical damage or destruction of electric components (may pose health risk!)

The following applications are prohibited unless measures are expressly taken to make them possible:

- Use in potentially explosive atmospheres
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 61800-5-1.

## 2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live drive inverters (e.g. BGV A3).

Perform electrical installation according to the pertinent regulations (e.g. line cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You will find notes on EMC-compliant installation – such as shielding, grounding, arrangement of filters and routing of lines – in the documentation of the drive inverters. Always observe these notes even with drive inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by the EMC legislation.

Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Required preventive measures: Ground the unit.

## 2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.



## 2.8 Operation

Systems with integrated drive inverters must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. The operating software may be used to make changes to the drive inverter.

Do not touch live components or power connections immediately after disconnecting drive inverters from the supply voltage because some of the capacitors may still be charged. Note the respective reference plates on the drive inverter.

Keep all covers and doors closed during operation.

If the status LED and other display elements are no longer illuminated, this does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Removing the cause of the problem or performing a reset can result in the drive re-starting on its own. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the mains before correcting the fault.



## 3 Project Planning

### 3.1 Application areas

The crane control is ideal for use in materials handling technology and logistics industries. For example, it can be used in the following applications:

- Trolleys
- Hoists
- Crane trolley
- Assembly cranes

The drives can be controlled manually or via remote control.

#### **Crane control is characterized by the following features:**

- Wide range of functions
- User-friendly user interface
- Only parameters required for crane control have to be entered (operating mode, speed, fixed setpoints, ramps).
- Guided parameter setting process instead of complicated programming
- Users do not need any programming experience
- Rapid familiarization with the system

### 3.2 Prerequisites

**PC and software** The "Crane control" application module is implemented as an IPOS<sup>plus</sup>® program and forms part of the SEW MOVITOOLS<sup>®</sup> software from version 4.5 - MotionStudio Version 5.40. In order to use MOVITOOLS<sup>®</sup>, you must have a PC with one of the following operating systems: Windows<sup>®</sup> 95, Windows<sup>®</sup> 98, Windows NT<sup>®</sup> 4.0 or Windows<sup>®</sup> 2000.

#### **Inverter**

**Application version** The "Crane control" application module can only be used with MOVIDRIVE<sup>®</sup> units in application version (-0T). The application modules cannot be used on units in the standard version (-00).

**Option cards** The "Crane control" module uses on process data word. Therefore, the MOVIDRIVE<sup>®</sup> "I/O expansion" option card DIO11B is required. Depending on the bus type used, one of the following MOVIDRIVE<sup>®</sup> options is also required:

PROFIBUS	⇒ option DFP
InterBus	⇒ option DFI
CAN bus	⇒ option DFC
DeviceNet	⇒ option DFD
Ethernet	⇒ option DFE
System bus (SBus)	⇒ no option required

**Motor** To operate crane control with the MOVIDRIVE<sup>®</sup> MDX60B / 61B drive inverter, you need an AC motor type DR, DT, DV or D.



### 3.3 Description of the functions

#### Functional characteristics

The "Crane control" application has the following functional characteristics:

- 6 fixed setpoints for multi-level connection in fixed setpoint operating mode
- Variable speed in the Variable speed operating mode
- The prelimit and limit switches are monitored
- The speed is reduced to  $n_{min}$  or  $n11$  (level 1) when the drive comes into contact with a prelimit switch.

#### Operating modes

The functions are implemented with two operating modes:

- **Operating mode: Variable speed (ground level control)**
  - The drive is enabled for clockwise or counterclockwise operation with 2 binary inputs.
  - Infinitely variable speed is set with the two keys variable speed up/down.
  - $n_{min}$  can be used for accurate drive positioning.
  - The max. speed is limited according to the load (load recognition).
- **Operating mode: fixed setpoints (radio control)**
  - The fixed setpoints  $n11$ ,  $n12$ ,  $n13$ ,  $n21$ ,  $n22$  or  $n23$  are activated via binary inputs.
  - The max. speed is limited according to the load (load recognition).

### 3.4 Limit switches

Comprehensive limit switch control monitors the prelimit and limit switches along the travel distance. The limit switches must be low-active (i.e. "0" = Limit switch contacted, "1" = not contacted). The prelimit switches must have long cams.

- If the drive comes into contact with a prelimit switch, the drive inverter reduces the speed to  $n_{min}$  (Variable speed operating mode) or  $n11$  (Fixed setpoints operating mode).
- If the drive comes into contact with a limit switch, the drive inverter stops the drive.
- A monitoring function for the limit switches is active in both operating modes.



### 3.5 Load recognition

The "Crane control" application module has a load recognition function. The load recognition is based on a comparison of the actual output current on the drive inverter with a calculated current limit curve.

The drive's speed range is divided into two working ranges:

- **Basic speed range**

In the basic speed range, the drives' power increases in proportion to the speed.

The motor develops a torque up to a maximum of 150 % of the rated motor torque regardless of its current speed.

- **Field weakening range**

In the field weakening range, the drive's power remains constant irrespective of the speed.

When the speed  $n$  increases, the drive reduces the torque  $M$  in inverse proportion. In other words, torque is proportional to  $1/n$ .

To prevent the motor from stalling, the inverter also reduces its current limit in inverse proportion to the speed.

To ensure a load reserve, the "Crane control " application module calculates a limit curve that lies below the inverter's limit curve.

By lowering the limit curve, the inverter reduces the maximum speed, thus protecting the inverter against overload.

For information on setting the parameters for load recognition, see page 20.



## 4 Installation

### 4.1 MOVITOOLS® software

**MOVITOOLS®** The "Crane control" application module is part of the MOVITOOLS® software from version 4.5. Proceed as follows to install the MOVITOOLS® software on your PC:


1. Insert the MOVITOOLS® CD into the CD-ROM drive of your PC.
2. The MOVITOOLS® setup menu is started. You will be guided through the installation process: Follow the instructions.

After installation, you can use the Program Manager to start MOVITOOLS®.

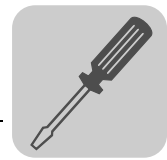
### 4.2 Terminal assignment

The IPOS<sup>plus</sup>® program automatically sets the binary inputs to the following functions:

Basic unit	X13:2	(DIØ1)	⇒ "IPOS input"
	X13:3	(DIØ2)	⇒ "IPOS input"
	X13:4	(DIØ3)	⇒ "IPOS input"
	X13:5	(DIØ4)	⇒ "IPOS input"
	X13:6	(DIØ5)	⇒ "IPOS input"
	X16:2	(DIØ7)	⇒ "Reserved"
	DIO11B option	X22:1	(DI1Ø)
X22:2		(DI11)	⇒ "/LIM. SWITCH CCW"
X22:3		(DI12)	⇒ "IPOS input"
X22:4		(DI13)	⇒ "IPOS input"
X22:5		(DI14)	⇒ "Reset"
X22:6		(DI15)	⇒ "IPOS input"
X22:7		(DI16)	⇒ "No function"
X22:8		(DI17)	⇒ "Reserved"

	<b>STOP!</b>
	<p>Do not change the binary inputs!            Incorrect functions can cause material damage.</p> <ul style="list-style-type: none"> <li>• Do not change the programming of the binary inputs.</li> <li>• Set a fixed connection between binary inputs X22:8 (DI17) and X22:10 (DGND).</li> </ul>

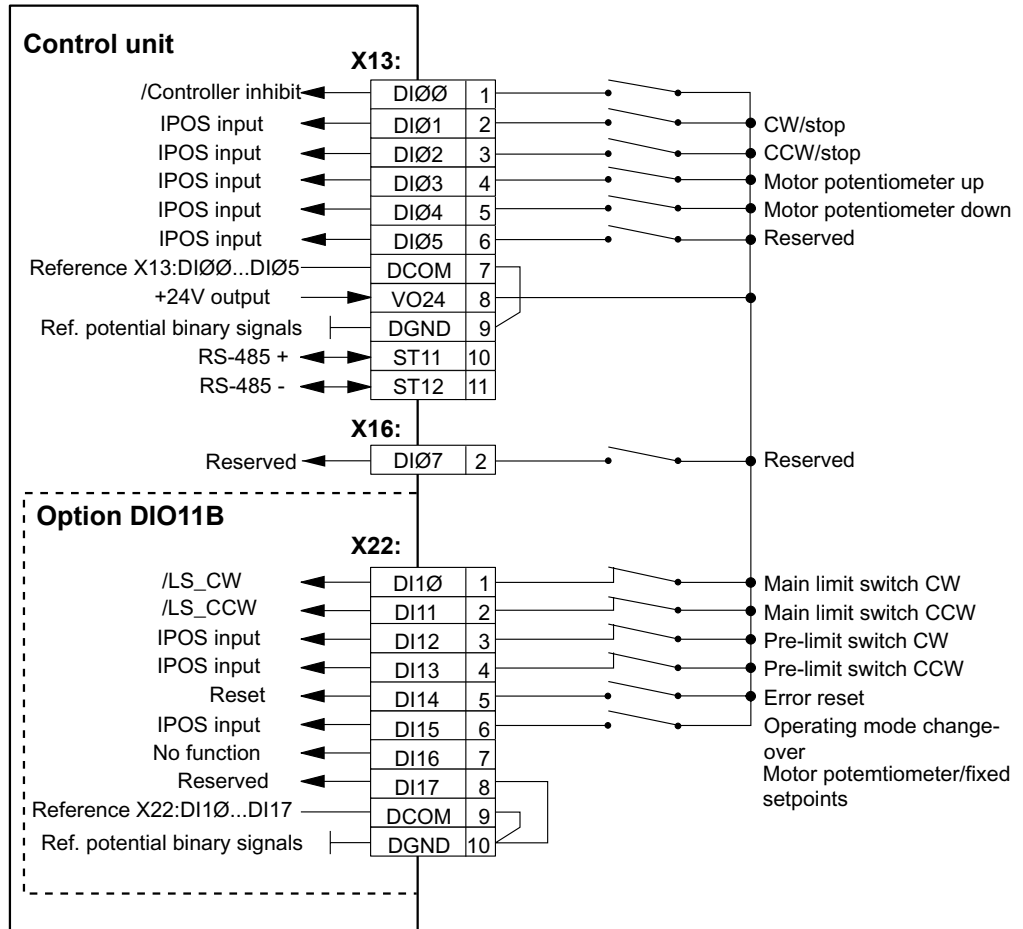
This terminal assignment is the same for both the operating modes 'Variable speed' and 'Fixed setpoints.' The meaning of the binary inputs programmed with "IPOS input" is determined by the IPOS<sup>plus</sup>® program.



4.3 Wiring diagram for MOVIDRIVE® MDX60B / 61B crane control

Variable speed operating mode

The following wiring diagram shows the meaning of the binary inputs for the 'Variable speed' operating mode.



60508AEN

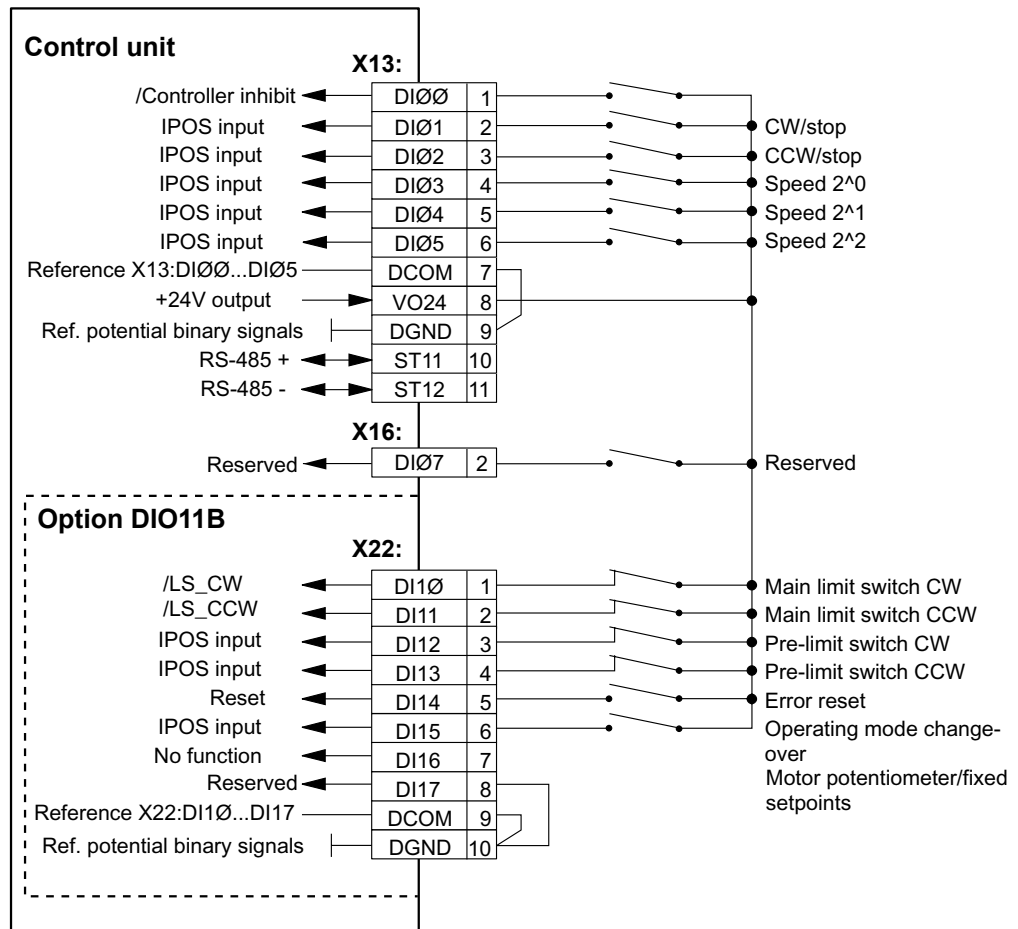


## Installation

### Wiring diagram for MOVIDRIVE® MDX60B / 61B crane control

#### Fixed setpoints operating mode

The following wiring diagram shows the meaning of the binary inputs for the "Fixed setpoints" operating mode.



60509AEN

#### Coding of the fixed setpoints

In the 'Fixed setpoints' operating mode, the fixed setpoints are selected using binary inputs X13:4 (DIØ3) ... X13:6 (DIØ5). The fixed setpoints are in binary coded format in accordance with the following table:

Fixed setpoint	X13:4 (DIØ3) = Speed. 2^0	X13:5 (DIØ4) = Speed. 2^1	X13:6 (DIØ5) = Speed. 2^2
n11 (level 1)	"1"	"0"	"0"
n13 (level 2)	"0"	"1"	"0"
n14 (level 3)	"1"	"1"	"0"
n21 (level 4)	"0"	"0"	"1"
n22 (level 5)	"1"	"0"	"1"
n23 (level 6)	"0"	"1"	"1"

If no setpoint is selected, i.e. X13:4, X13:5 and X13:6 = "0," the setpoint  $n_{min}$  is in effect when the inverter is enabled.



#### 4.4 Connecting the control inputs

##### Switching operating mode

The "Crane control" application module has two operating modes.  
Binary input X22:6 (DI15) is used to switch between the operating modes:

- X22:6 (DI15)= "0" ⇒ 'Variable speed' operating mode (ground level control)
- X22:6 (DI15)= "1" ⇒ 'Fixed setpoints' operating mode (radio control)

The binary inputs X13:4 ... X13:6 (DIØ3 ... DIØ5) are evaluated differently depending on the selected operating mode.

The binary input X22:5 (DI14) set to "Reset" is not required for crane control. In case of fault, this terminal can be used to perform a reset.

The entries in the following tables are based on the use of ramp set 1 (P130...P133) from parameter set 1.

##### Control inputs of the Variable speed operating mode X22:6 (DI15) = "0"

Binary input	Function	"1" signal	"0" signal
<b>X13:1 (DIØØ)</b>	/Controller inhibit	Output stage not blocked	Output stage locked
<b>X13:2 (DIØ1)</b>	CW/Stop	Enable CW, Ramp <i>t11 up CW</i> (P130) to $n_{min}$	Stop at ramp <i>t11 down CW</i> (P131)
<b>X13:3 (DIØ2)</b>	CCW/Stop	Enable CCW, ramp <i>t11 up CCW</i> (P132) to $n_{min}$	Stop at ramp <i>t11 down CCW</i> (P133)
<b>X13:4 (DIØ3)</b>	Variable speed up	Ramp <i>t3 up</i> (P150) in the direction specified by X13:2 and X13:3 to a max. of $n_{max}$	Current setpoint remains unchanged
<b>X13:5 (DIØ4)</b>	Variable speed down	Ramp <i>t3 down</i> (P151) to $n_{min}$	Current setpoint remains unchanged
<b>X22:1 (DI1Ø)</b>	Limit switch CW	State within travel distance	Limit switch CW contacted → emergency stop <sup>1)</sup> at emergency stop ramp <i>t14</i> (P137)
<b>X22:2 (DI11)</b>	Limit switch CCW		Limit switch CCW contacted → emergency stop <sup>1)</sup> at emergency ramp <i>t14</i> (P137)
<b>X22:3 (DI12)</b>	Prelimit switch CW		Prelimit switch CW contacted → deceleration at ramp <i>t13</i> (P136) to $n_{min}$
<b>X22:4 (DI13)</b>	Prelimit switch CCW		Prelimit switch CCW contacted → deceleration at ramp <i>t13</i> (P136) to $n_{min}$

1) Emergency stop: The drive is slowed with the emergency ramp *t14*. The brake is applied once the stop speed is reached (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).



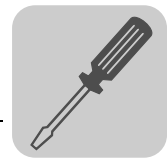
## Installation

### Connecting the control inputs

#### Control inputs of the Fixed setpoints operating mode X22:6 (DI15) = "1"

Binary input	Function	"1" signal	"0" signal
X13:1 (DI00)	/Controller inhibit	Output stage not blocked	Output stage locked
X13:2 (DI01)	CW/Stop	Enable CW, Ramp <i>t11 up CW</i> (P130) to $n_{min}$	Stop at ramp <i>t11 down CW</i> (P131)
X13:3 (DI02)	CCW/Stop	Enable CCW, ramp <i>t11 up CCW</i> (P132) to $n_{min}$	Stop at ramp <i>t11 down CCW</i> (P133)
X13:4 (DI03)	Speed 2 <sup>0</sup>	These binary inputs are used to activate the fixed setpoints $n11$ , $n12$ , $n13$ , $n21$ , $n22$ and $n23$ . (see table on page 14 below for coding)  If X13:4, X13:5 and X13:6 = "0," the setpoint $n_{min}$ is in effect when the inverter is enabled.	
X13:5 (DI04)	Speed 2 <sup>1</sup>		
X13:6 (DI05)	Speed 2 <sup>2</sup>		
X22:1 (DI10)	Limit switch CW	State within travel distance	Limit switch CW contacted → emergency stop <sup>1)</sup> at ramp <i>t14</i> (P137)
X22:2 (DI11)	Limit switch CCW		Limit switch CCW contacted → emergency stop <sup>1)</sup> at ramp <i>t14</i> (P137)
X22:3 (DI12)	Prelimit switch CW		Prelimit switch CW contacted → deceleration at ramp <i>t13</i> (P136) to $n_{min}$
X22:4 (DI13)	Prelimit switch CCW		Prelimit switch CCW contacted → deceleration at ramp <i>t13</i> (P136) to $n_{min}$

- 1) Emergency stop: The drive is slowed with the emergency ramp *t14*. The brake is applied once the stop speed is reached (DB00 "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).





### 4.5 Connecting limit switches

The "Crane control" application module helps process track limit switches for cranes. The following four limit switch inputs are available for monitoring the travel distance and the travel speed:

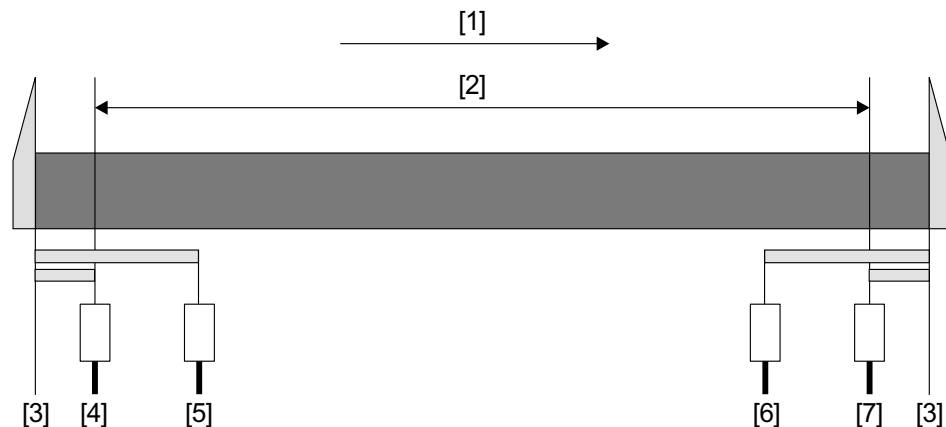
Option DIO11B	X22:1	(DI1Ø)	⇒ Limit switch CW
	X22:2	(DI11)	⇒ Limit switch CCW
	X22:3	(DI12)	⇒ Prelimit switch CW
	X22:4	(DI13)	⇒ Prelimit switch CCW

Connect any limit switch inputs that are not used to +24 V (X13:8 VO24). If you do not connect the free inputs, the limit switch monitor outputs the error message F27 "Limit switches missing."

Once the inverter is enabled, the internal limit switch monitoring function checks whether the prelimit and limit switches are connected.

	 <b>WARNING!</b>
	<p>Risk of crushing if the drive malfunctions or exceeds the limit switches. May result in death, severe injuries or damage to property.</p> <ul style="list-style-type: none"> <li>• For reasons of safety, use only low-active limit switches!</li> <li>• The cams of the prelimit and limit switches must overlap (long cams).</li> <li>• The cams of the limit switches must cover the travel range up to the stop.</li> <li>• Set the maximum speed, fixed setpoints and the ramps (see page 22ff.) so that the drive cannot exceed the positions of the limit switches. The drive must come to a halt before it reaches the mechanical stop.</li> </ul>

Position the limit switches on the travel distance as shown in the following figure.



60516AXX

- [1] Clockwise drive inverter
- [2] Travel distance
- [3] Mechanical stop
- [4] Limit switch CCW
- [5] Prelimit switch CCW (with long cam)
- [6] Prelimit switch CW (with long cam)
- [7] Limit switch CW



## 5 Startup

### 5.1 General notes

Correct project planning and installation are the prerequisites for successful startup. Refer to the "MOVIDRIVE<sup>®</sup> MDX60B / 61B" system manual for detailed project planning information.

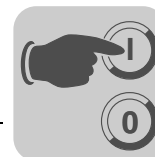
Check the installation using the installation instructions in the "MOVIDRIVE<sup>®</sup> MDX60B / 61B" operating instructions and this manual. For drives with speed feedback, also check the encoder connection and installation of the MOVIDRIVE<sup>®</sup> option card "I/O expansion DIO11B". See section "Installation", from page 12).

### 5.2 Preliminary work

Perform the following steps before starting the "Crane control" module:

- Connect option UWS21B to slot XT in the MOVIDRIVE<sup>®</sup> drive inverter. Connect the UWS21B option to the PC with an interface cable (RS232).  
(See section "Installation" in the "MOVIDRIVE<sup>®</sup> MDX60B / 61B" operating instructions.)
- Install the SEW MOVITOOLS<sup>®</sup> software from version 4.5 - MotionStudio Version 5.40 on your PC (see page 12).
- Check that the parameters for operating mode 1 are set correctly.
  - For motor without encoder feedback: **Operating mode 1 = VFC 1**
  - For motor with encoder feedback: **Operating mode 1: = VFC n-CONTROL**

Refer to the MOVIDRIVE<sup>®</sup> MDX60B / 61B system manual for detailed project planning notes and an explanation of the parameters.

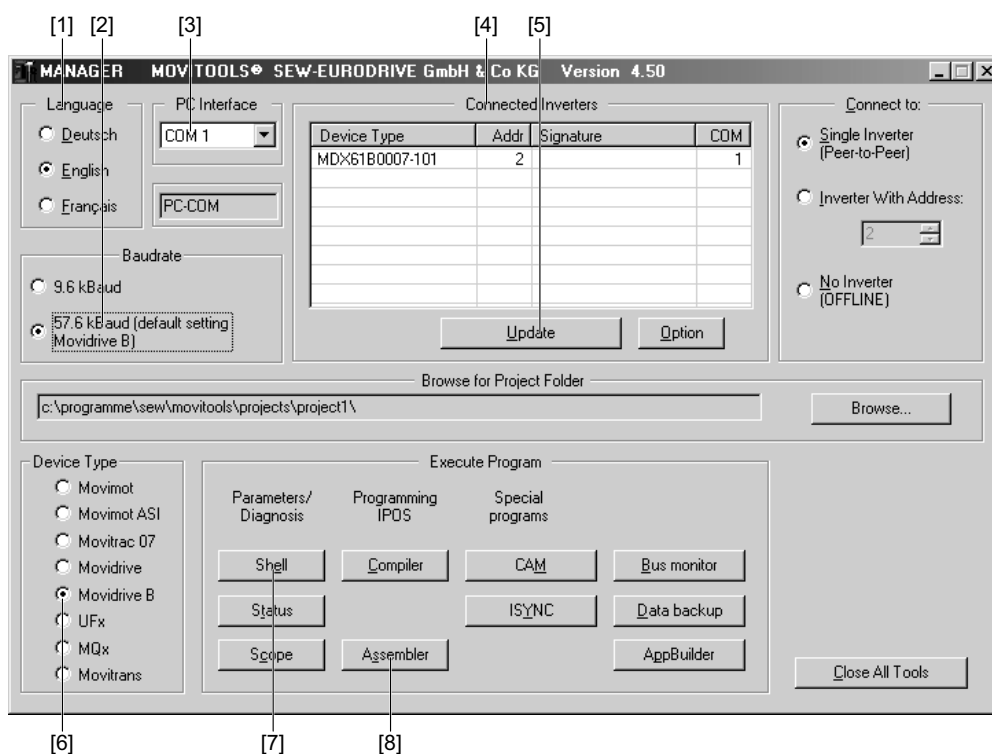


### 5.3 Starting crane control with a PC and MOVITOOLS®

#### General information

MOVITOOLS® software version 4.5 or higher is required for startup with a PC.

- Terminal X13:1 (DIØØ "/CONTROL.INHIBIT") must receive a "0" signal!
- Start MOVITOOLS®.
- Select the language in the "Language" [1] group box.
- From the "PC-COM" drop down menu [3], select the PC port (e.g. COM 1) to which the inverter is connected.
- In the "Device type" group box [6], select the option "Movidrive B".
- In the "Baudrate" group box [2], select the baud rate set on the basic unit with DIP switch S13 (standard setting → "57.6 kBaud").
- Click on the [Update] button [5]. The connected inverter is displayed under "Connected inverters" [4].



59680AXX

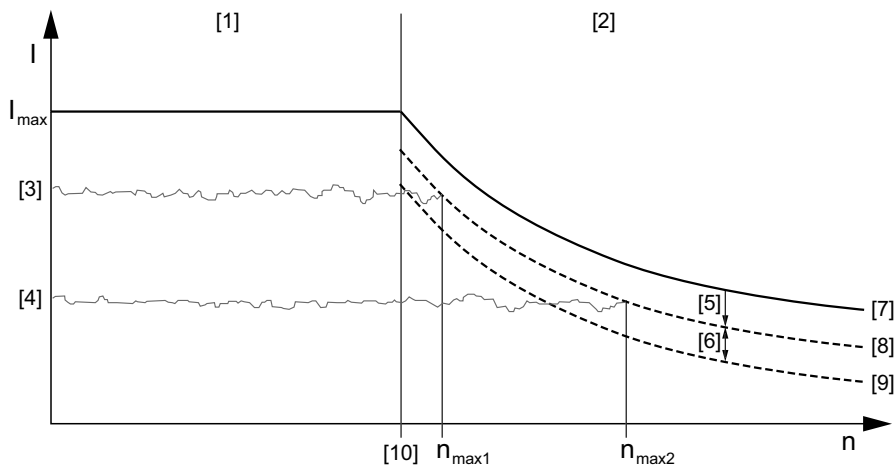


### Setting the parameters for load recognition

The parameters for load recognition are set as defaults and usually do not have to be changed. However, in some cases, it can be beneficial to adjust the load recognition parameters as follows:

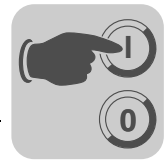
1. In the MOVITOOLS® Manager, click the button [Assembler] [8]. A program editor and a variable editor open.
2. You can change the following parameters for load recognition in the variable editor:
  - **H01 transition speed**  
You can use parameter *H01 Transition speed* to shift the limit curve in a horizontal direction. The program calculates the set transition speed itself. However, if you would like to activate load recognition at a lower speed, set parameter *H01 Transition speed* to the required transition speed.
  - **H02 Load reserve**  
You can use parameter *H02 load reserve* to shift the limit curve in a vertical direction. This parameter is set to 20 as a default. In other words, the load recognition limit curve is 20 % below  $I_{max}$ .
  - **H03 Current distance motor <-> regenerative**  
Less braking power is required for lowering operation (regenerative operation) due to the friction losses and efficiency. This means that the load can be lowered more quickly than it can be lifted.  
If you want to set similar speeds for the lowering and lifting operations, set parameter *H03 Current distance* accordingly. This setting further reduces the limit curve (default value: 15 %).

The following figure shows the inverter's output current  $I$  depending on the drive's speed  $n$ . In addition, the figure also shows the inverter's current limits and, therefore, the theory of operation of load recognition:



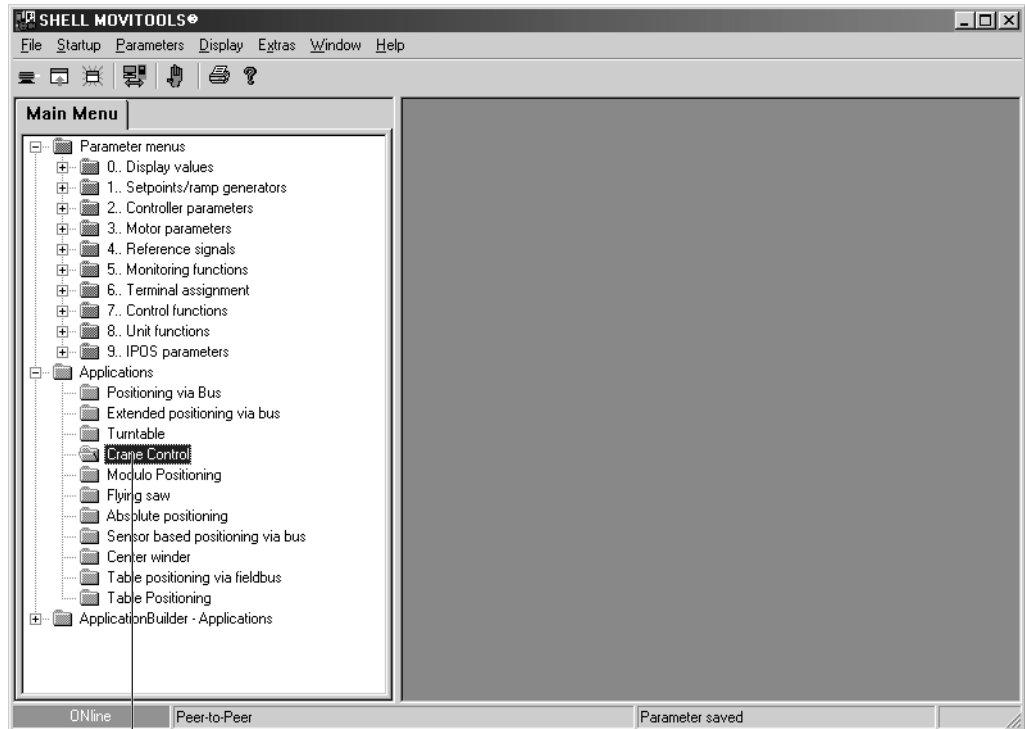
59681AXX

- [1] Basic speed range
- [2] Field weakening range
- [3] Measured output current at maximum load
- [4] Measured output current without load
- [5] Parameter H2 Load reserve [%  $I_n$ ]
- [6] Parameter H3 Current distance [%  $I_n$ ]
- [7]  $I_{max}$  of the inverter, disconnection with error code F08
- [8] Current limit with load reserve for motor operation (lifting)
- [9] Current limit with load reserve for regenerative operation (lowering)
- [10] Parameter H1 Transition speed [1/min]
- $n_{max1}$  Maximum speed at maximum load
- $n_{max2}$  Maximum speed without load



**Commencing  
startup**

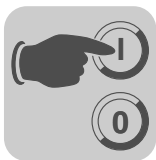
- In the MOVITOOLS® Manager, click the button [Shell] [7]. The Shell program is started.



[1]

59682AXX

- In the "Applications" folder, select the file <Crane Control> [1].



### Setting the speed limitations and operating mode

The window for setting the speed limitation and operating mode is displayed.

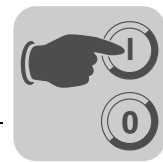
[8]

59683AXX

Make the following settings in this window:

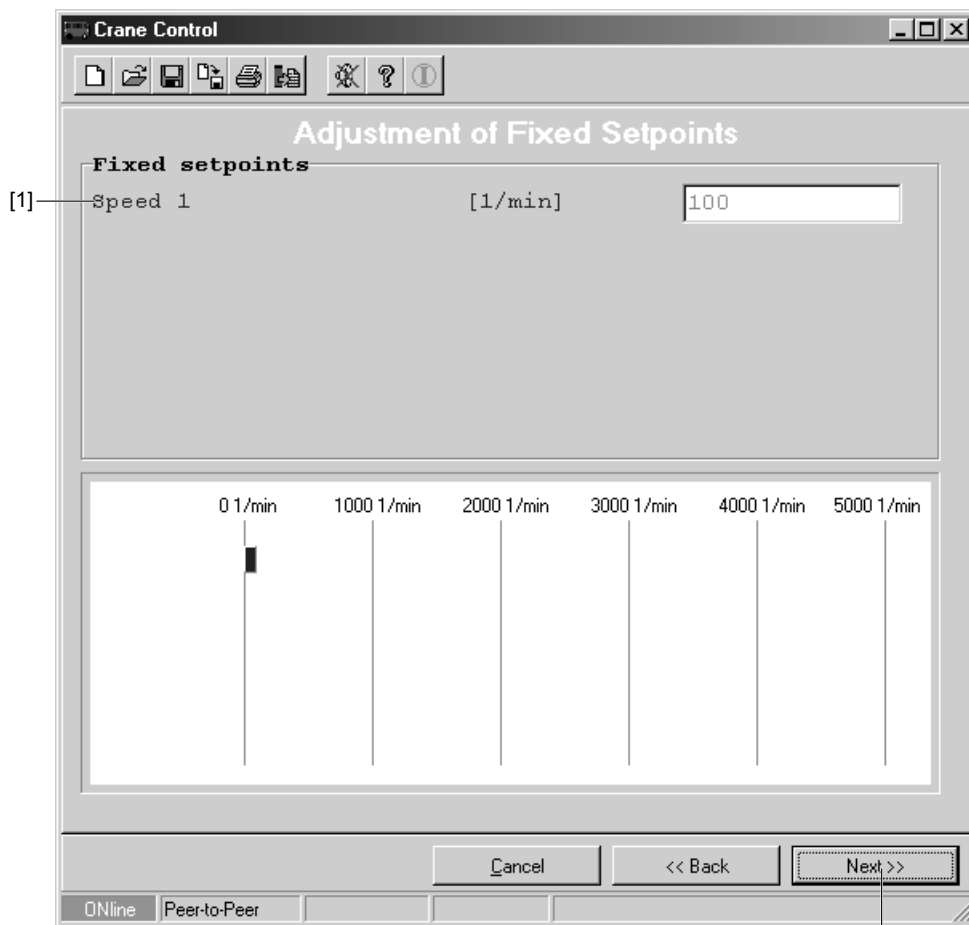
	<b>! WARNING!</b>
	<p>Risk of crushing if the drive malfunctions or exceeds the limit switches. May result in death, severe injuries or damage to property.</p> <ul style="list-style-type: none"> <li>Set the maximum speed [2] + [3], fixed setpoints and ramp parameters so that the drive does not exceed the positions of the limit switches. The drive must come to a halt before it reaches the mechanical stop.</li> </ul>

- **Speed limitations** [1] + [2]
  - **Speed at which drive comes into contact with prelimit switch** [3] + [4]  
The low speed [3] is identical to P301 *Minimum speed 1* ( $n_{min}$ ) [3] and cannot be set here.
  - **Operating mode** [5] + [7]  
Select the required operating mode.  
If you activate the "Use fixed setpoints" [5] operating mode, you must also make a selection for the "Number of fixed setpoints" [6].  
You can also select both operating modes and switch them during operation using input X22:6 (DI15) "Switch operating mode"
- Click [Next>>] [8] to continue.



**Setting the fixed setpoints**

If you have chosen the 'Fixed setpoints' operating mode, the following window appears to set the fixed setpoints.



[2]

59684AXX



**WARNING!**

Risk of crushing if the drive malfunctions or exceeds the limit switches.  
May result in death, severe injuries or damage to property.

- Set the maximum speed, fixed setpoints and ramp parameters so that the drive does not exceed the positions of the limit switches. The drive must come to a halt before it reaches the mechanical stop.

Set the fixed setpoints as required.

(Level 1 [1] =  $n11$ , level 2 =  $n12$ , level 3 =  $n13$ ,  
Level 4 =  $n21$ , level 5 =  $n22$ , level 6 =  $n23$ )

You cannot set the value for level 1 ( $n11$ ). It is determined by the setting entered for the speed at which the drive comes into contact with the prelimit switch.

Click [Next>>] [2] to continue.



## Startup

Starting crane control with a PC and MOVITOOLS®

### Setting the ramps for the "Fixed setpoint" operating mode

If you have chosen the 'Fixed setpoints' operating mode, the following window appears to set the ramp parameters for the Fixed setpoints operating mode.

Ramps			
[1]	130 Ramp t11 UP CW	[s]	10
[2]	131 Ramp t11 DOWN CW	[s]	10
[3]	132 Ramp t11 up CCW	[s]	10
[4]	132 Ramp t11 up CCW	[s]	10
[5]	136 Stop ramp t13	[s]	4

The graph shows speed (N 1/min) on the vertical axis and time (t) on the horizontal axis. It illustrates four ramp profiles: t11 up CW (positive slope), t11 down CW (negative slope), t11 up CCW (positive slope), and t11 down CCW (negative slope). The maximum speed is 3000 1/min and the minimum is -3000 1/min.

Buttons: Cancel, << Back, Next >>

Status: Online, Peer-to-Peer, Changed

[6]

59685AXX



### ⚠ WARNING!

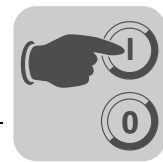
Risk of crushing if the drive malfunctions or exceeds the limit switches.  
May result in death, severe injuries or damage to property.

- Set the maximum speed, fixed setpoints and ramp parameters so that the drive does not exceed the positions of the limit switches. The drive must come to a halt before it reaches the mechanical stop.

Set the ramp parameters for the Fixed setpoints operating mode [1] - [5].

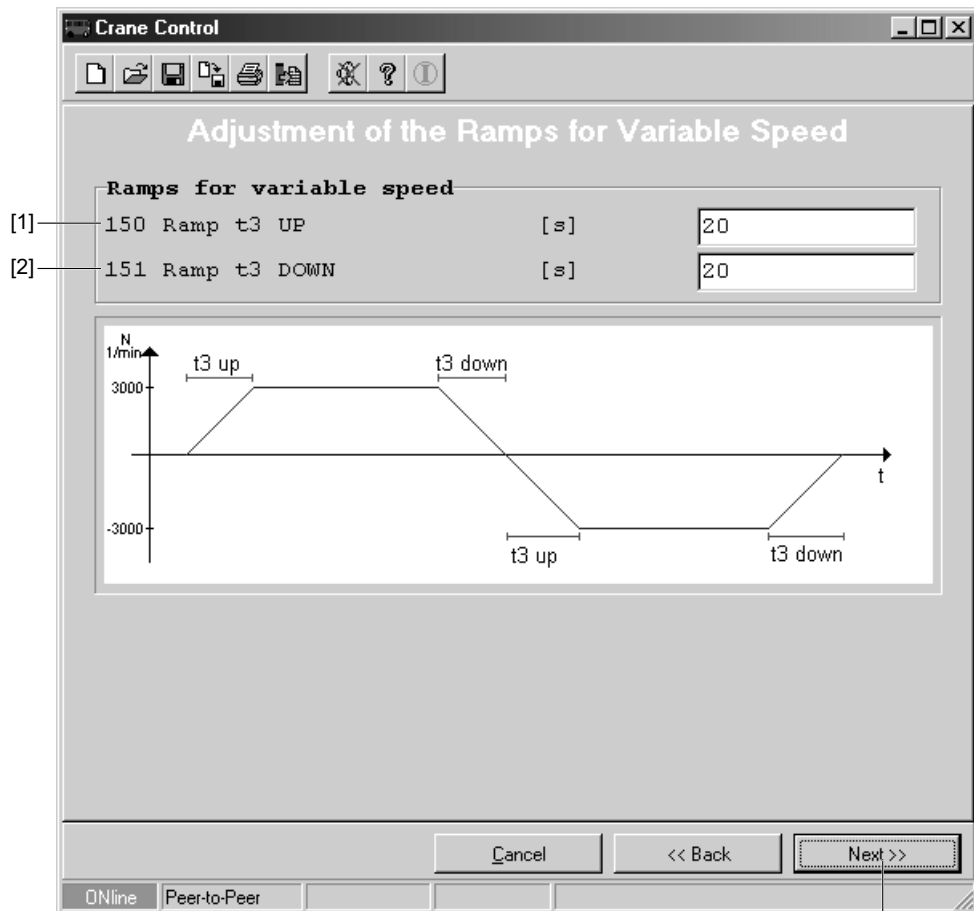
A ramp parameter specifies the time within which the drive increase or decreases the speed by 3000 1/min.

Click [Next>>] [6] to continue.



**Setting the ramps for the "Variable speed" operating mode**

If you have chosen the 'Variable speed' operating mode, the following window appears to set the ramp parameters for the Variable speed operating mode.



[3]

60894AXX

	<p><b>! WARNING!</b></p>
	<p>Risk of crushing if the drive malfunctions or exceeds the limit switches. May result in death, severe injuries or damage to property.</p> <ul style="list-style-type: none"> <li>Set the maximum speed, fixed setpoints and ramp parameters so that the drive does not exceed the positions of the limit switches. The drive must come to a halt before it reaches the mechanical stop.</li> </ul>

Set the ramp parameters for the Variable speed operating mode [1] - [2].

A ramp parameter specifies the time within which the drive increase or decreases the speed by 3000 1/min.

Click [Next>>] [3] to continue.

The program prompts you to save parameters.

Save the set values by pressing the [Yes] button.

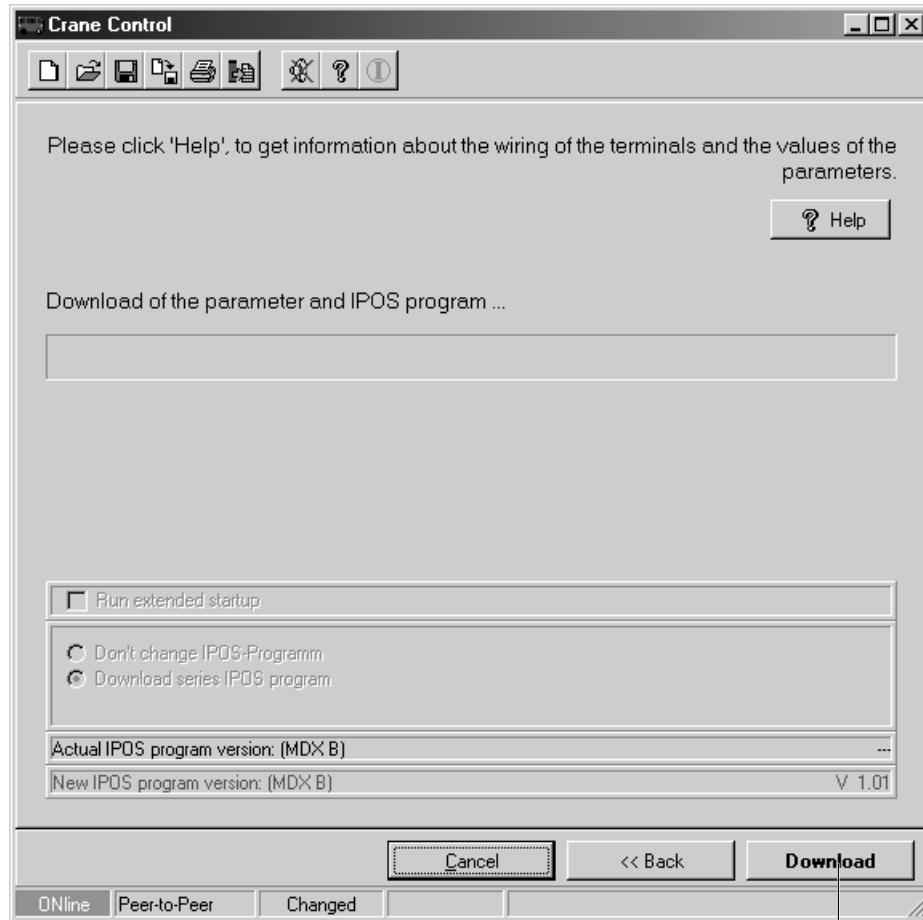


## Startup

### Starting crane control with a PC and MOVITOOLS®

#### Download

The following download window opens up after you have saved your entries.



[1]

59687AXX

Click the [Download] button [1].

All the required settings are made in the drive inverter.

The IPOS® "Crane control" program is started.



## 5.4 Parameters

When the "Crane control" application module is started, the following parameters are set and loaded to the inverter during download:

Parameter number P...	Parameters	Setting
100	Setpoint source	VARIABLE SPEED
101	Control signal source	TERMINALS
130	t11 up CW	0...2000 s
131	t11 down CW	0...2000 s
132	t11 up CCW	0...2000 s
133	t11 down CCW	0...2000 s
136	t13 (STOP ramp)	0...20 s
150	t3 up	0.2...50 s
151	t3 down	0.2...50 s
160	n11	-5000...5000 1/min
161	n12	-5000...5000 1/min
162	n13	-5000...5000 1/min
170	n21	-5000...5000 1/min
171	n22	-5000...5000 1/min
172	n23	-5000...5000 1/min
301	Minimum speed 1 ( $n_{min}$ )	0...6100 1/min
302	Maximum speed 1 ( $n_{max}$ )	0...6100 1/min
600	Binary input DIØ1	IPOS input
601	Binary input DIØ2	IPOS input
602	Binary input DIØ3	IPOS input
603	Binary input DIØ4	IPOS input
604	Binary input DIØ5	IPOS input
610	Binary input DI1Ø	/Right limit switch
611	Binary input DI11	/CCW limit switch
612	Binary input DI12	IPOS input
613	Binary input DI13	IPOS input
614	Binary input DI14	Reset
615	Binary input DI15	IPOS input
616	Binary input DI16	No function
617	Binary input DI17	Reserved

**Do not change these parameters after startup.**



## 6 Operation

### 6.1 Starting the drive

Binary input X13:1 (DIØØ) "/CONTROLLER INHIBIT" must be set to "1" to start the drive.

#### Operating modes

If both operating modes are selected at startup, you can switch the operating modes at input X22:6 as follows:

X22:6 (DI15)= "0" ⇒ 'Variable speed' operating mode (ground level control)

X22:6 (DI15)= "1" ⇒ 'Fixed setpoints' operating mode (radio control)

The operating modes can be switched during live operation.

- **"Variable speed" operating mode**

- Control the drive's speed by setting/resetting binary inputs X13:2 (DIØ2) to X13:5 (DIØ4).
- When a drive comes into contact with a prelimit switch, its speed is reduced to  $n_{min}$  using ramp  $t13$ .
- When a drive comes into contact with a limit switch, it is brought to a halt using the emergency ramp  $t14$ .

For more information on the meaning of the control signals, see page 15.

- **Fixed setpoints operating mode**

- Choose the drive's direction by setting/resetting binary inputs X13:2 (DIØ1) to X13:3 (DIØ2).
- Choose the drive's predefined speed setpoints by setting/resetting binary inputs X13:4 (DIØ3) to X13:6 (DIØ5).
- When a drive comes into contact with a prelimit switch, its speed is reduced to  $n_{min}$  using ramp  $t13$ .
- When a drive comes into contact with a limit switch, it is brought to a halt using emergency ramp  $t14$ .

For more information on the meaning of the control signals, see page 16.



#### NOTE

The results of the operating modes are described in the flow diagrams in the following sections.



**Used speed ramps and fixed setpoints**

Speed ramp	Parameter set 1
CW/Stop	<i>t11 up CW (P130)</i> <i>t11 down CW (P131)</i>
CCW/Stop	<i>t11 up CCW (P132)</i> <i>t11 down CCW (P133)</i>
Variable speed up	<i>t3 up (P150)</i>
Variable speed down	<i>t3 down (P151)</i>
Stop (prelimit switch)	<i>t13 (P136)</i>
Emergency stop (limit switch)	<i>t14 (P137)</i>

Fixed setpoint	Parameter set 1	Parameter set 2
1. Fixed setpoint	<i>n11 (P160)</i>	<i>n21 (P170)</i>
2. Fixed setpoint	<i>n12 (P161)</i>	<i>n22 (P171)</i>
3. Fixed setpoint	<i>n13 (P162)</i>	<i>n23 (P172)</i>

**Select fixed setpoints**

In the 'Fixed setpoints' operating mode, you can choose from six predefined fixed setpoints. Parameter switchover is not required.

For the coding of the fixed setpoints, refer to page 14.



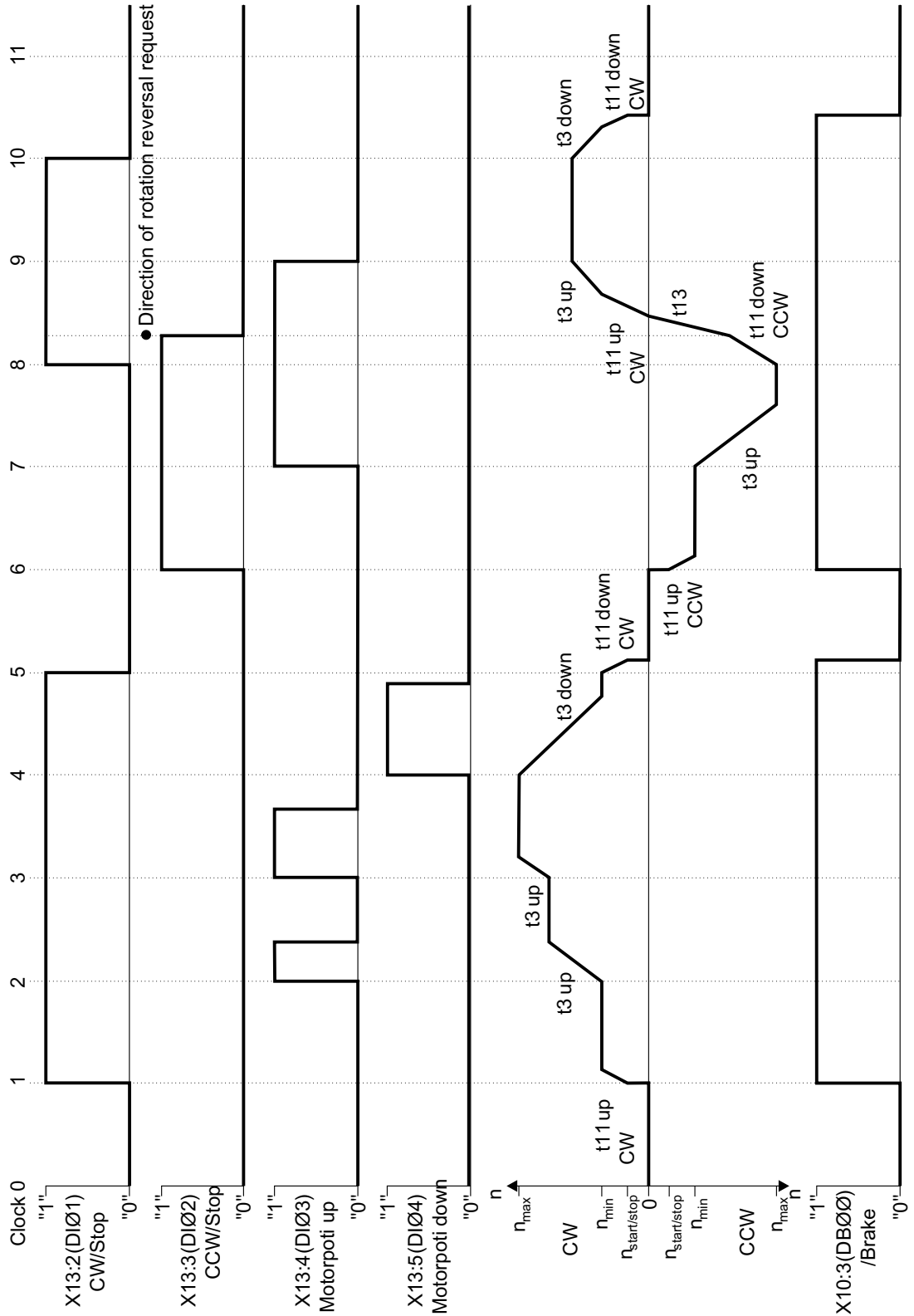
**NOTE**

The following flow diagrams use the speed ramps and fixed setpoints of parameter set 1.



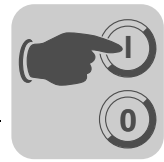
6.2 Flow diagram for the Variable speed operating mode

The drive must be enabled with X13:1 (DIØØ) "/CONTROLLER INHIBIT" = "1".



60538AEN

The flow diagram for reaching the limit switches can be found on page 34.



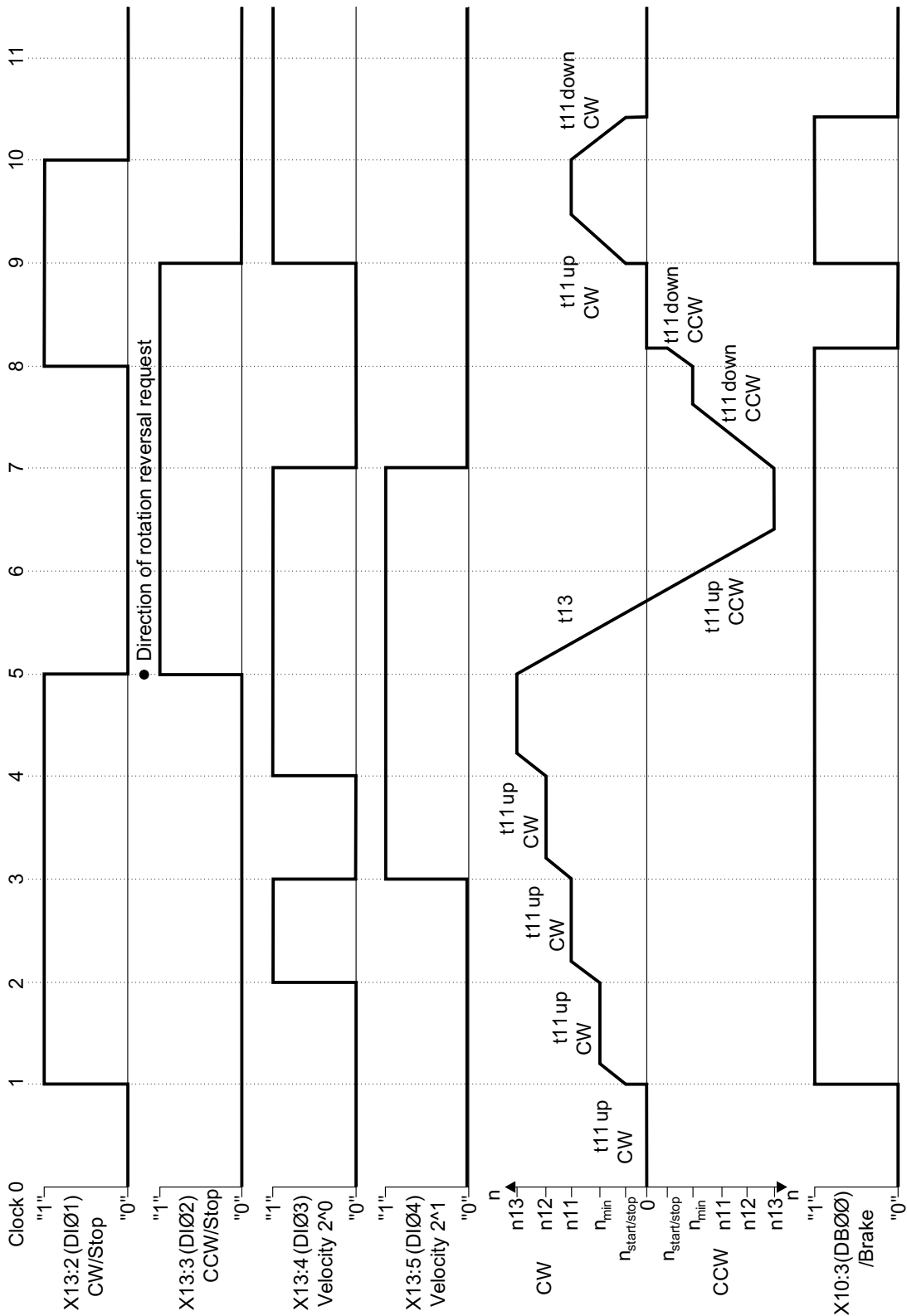
**Explanation of the flow diagram for the Variable speed operating mode**

- **Phase 1:** X13:2 (DIØ1) CW/Stop changes from "0" to "1".  
CW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp *t11 up CW* to  $n_{min}$ ,  $n_{min}$  is maintained.
  
- **Phase 2:** X13:4 (DIØ3) Variable speed up changes from "0" to "1".  
Acceleration with ramp *t3 up*, as long as X13:4 = "1".  
The setpoint remains in force when X13:4 and X13:5 = "0" and X13:2 ≠ X13:3.
  
- **Phase 3:** X13:4 (DIØ3) Variable speed up changes from "0" to "1" again.  
Acceleration with variable speed ramp *t3 up* until  $n = n_{max}$ .  
 $n_{max}$  remains in force when X13:5 = "0" and X13:2 ≠ X13:3.
  
- **Phase 4:** X13:5 (DIØ4) Variable speed down changes from "0" to "1".  
Deceleration with ramp *t3 down* as long as X13:5 = "1" or until the drive reaches the speed  $n_{min}$ .
  
- **Phase 5:** X13:2 (DIØ1) CW/Stop changes from "1" to "0".  
Deceleration with ramp *t11 down CW* from  $n_{min}$  to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.
  
- **Phase 6:** X13:3 (DIØ2) CCW/Stop changes from "0" to "1".  
CCW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp *t11 up CCW* to  $n_{min}$ ,  $n_{min}$  is maintained.
  
- **Phase 7:** X13:4 (DIØ3) Variable speed up changes from "0" to "1".  
Acceleration with variable speed ramp *t3 up* until  $n = n_{max}$ .  
 $n_{max}$  remains in force when X13:5 = "0" and X13:2 ≠ X13:3.
  
- **Phase 8:** X13:2 (DIØ1) CW/Stop changes from "0" to "1".  
Deceleration with variable speed ramp *t11 down CCW* as long as X13:2 = X13:3.  
When X13:3 changes from "1" to "0", i.e. X13:2 ≠ X13:3, deceleration with ramp *t13* until the drive comes to a standstill. This is followed by a change in the direction of rotation and acceleration with ramp *t11 up CW* until  $n_{min}$ .  
When X13:4 = "0",  $n_{min}$  remains in force; when X13:4 = "1", the drive accelerates using the variable speed ramp *t3 up*.
  
- **Phase 9:** X13:4 (DIØ3) Variable speed up changes from "1" to "0".  
The setpoint remains in force when X13:4 and X13:5 = "0" and X13:2 ≠ X13:3.
  
- **Phase 10:** X13:2 (DIØ1) CW/Stop changes from "1" to "0".  
Deceleration with ramp *t3 down* until  $n_{min}$  and ramp *t11 down RECHTS* from  $n_{min}$  to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.



6.3 Flow diagram for the Fixed setpoints operating mode

The drive must be enabled with X13:1 (DIØØ) "/CONTROLLER INHIBIT" = "1".



60549AEN

The flow diagram for reaching the limit switches can be found on page 34.



**Explanation of the flow diagram for the Fixed setpoints operating mode**

- **Phase 1:** X13:2 (DIØ1) CW/Stop changes from "0" to "1".  
CW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp  $t_{11}$  up CW to  $n_{min}$ ,  $n_{min}$  is maintained.
- **Phase 2:** X13:4 (DIØ3) Speed 2<sup>0</sup> changes from "0" to "1".  
Acceleration with ramp  $t_{11}$  up CW to fixed setpoint  $n_{11}$ .
- **Phase 3:** X13:4 (DIØ3) Speed 2<sup>0</sup> changes from "1" to "0"  
and X13:5 (DIØ4) Speed 2<sup>1</sup> changes from "0" to "1".  
Acceleration with ramp  $t_{11}$  up CW to fixed setpoint  $n_{12}$ .
- **Phase 4:** X13:5 (DIØ4) Speed 2<sup>1</sup> = "1"  
and X13:4 (DIØ3) Speed 2<sup>0</sup> changes from "0" to "1".  
Acceleration with ramp  $t_{11}$  up CW to fixed setpoint  $n_{13}$ .
- **Phase 5:** X13:2 (DIØ1) CW/Stop changes from "1" to "0"  
and X13:3 (DIØ2) CCW/Stop changes from "0" to "1".  
Deceleration with ramp  $t_{13}$  to standstill. This is followed by a change in the direction of rotation and acceleration with ramp  $t_{11}$  up CCW to fixed setpoint  $n_{13}$ .
- **Phase 6:** X13:3 (DIØ2) CCW/Stop = "1"  
and X13:4 (DIØ3) Speed 2<sup>0</sup> = "1"  
and X13:5 (DIØ4) Speed 2<sup>1</sup> = "1".  
Acceleration with ramp  $t_{11}$  up CCW to fixed setpoint  $n_{13}$ .
- **Phase 7:** X13:4 (DIØ3) Speed 2<sup>0</sup> = changes from "1" to "0"  
and X13:5 (DIØ4) Speed 2<sup>1</sup> = changes from "1" to "0".  
Deceleration with ramp  $t_{11}$  down CCW to  $n_{min}$ .
- **Phase 8:** X13:2 (DIØ1) CW/Stop changes from "0" to "1"  
and X13:3 (DIØ2) CCW/Stop = "1".  
Deceleration with ramp  $t_{11}$  down CCW from  $n_{min}$  to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.
- **Phase 9:** X13:3 (DIØ2) CCW/Stop changes from "1" to "0"  
and X13:4 (DIØ3) Speed 2<sup>0</sup> changes = from "0" to "1".  
CW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp  $t_{11}$  up CW to fixed setpoint  $n_{11}$ .
- **Phase 10:** X13:2 (DIØ1) CW/Stop changes from "1" to "0".  
Deceleration with ramp  $t_{11}$  down CW to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.

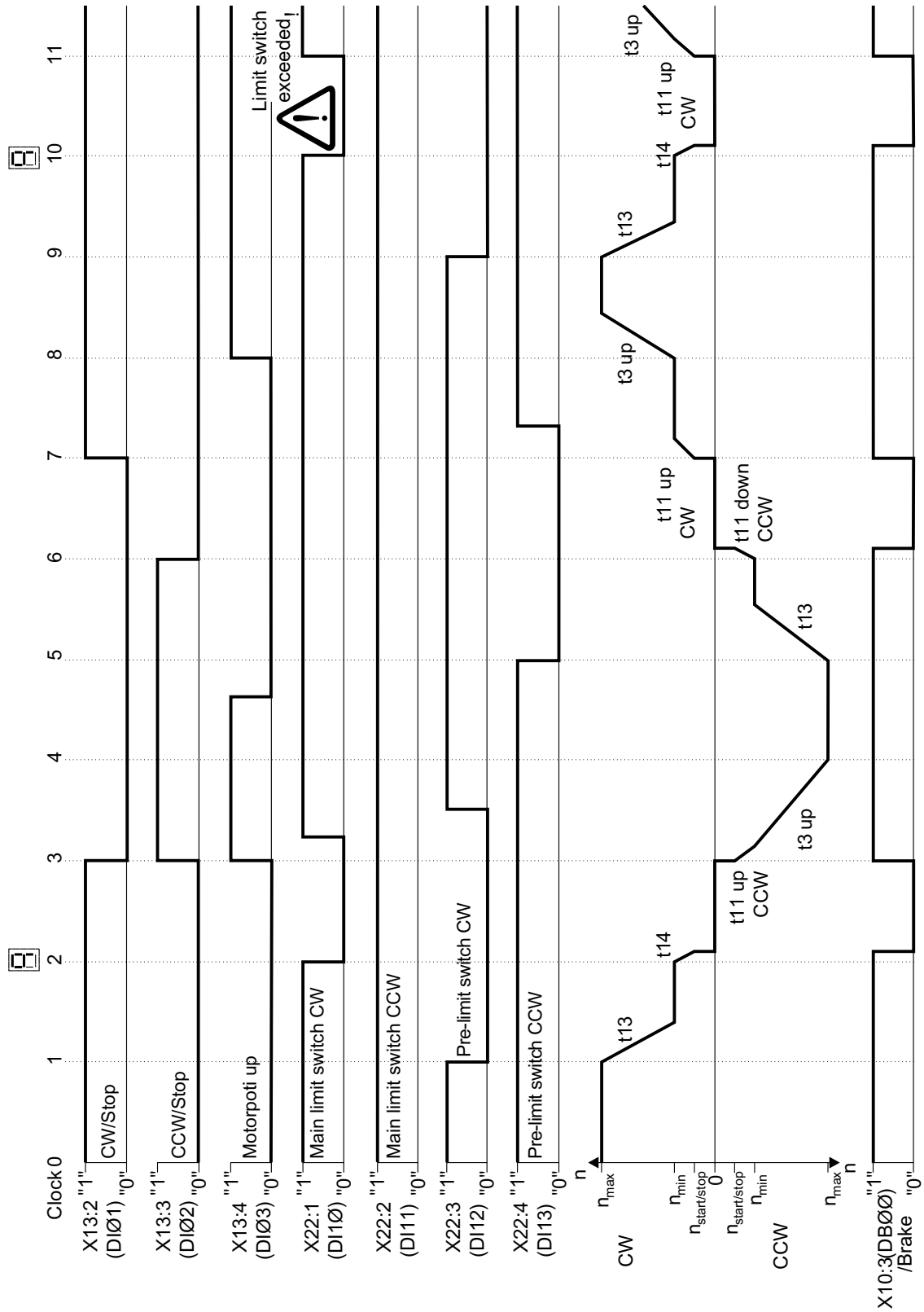


**Operation**

Flow diagram for when the drive reaches the limit switches (Variable speed

**6.4 Flow diagram for when the drive reaches the limit switches (Variable speed operating mode)**

The drive must be enabled with X13:1 (DI00) "/CONTROLLER INHIBIT" = "1".



60554AEN



**Explanation of the flow diagram for when the drive reaches the limit switch**

(Variable speed operating mode, also applies to Fixed setpoints operating mode)

- **Phase 1:** X13:2 (DIØ1) CW/Stop = "1"  
and X13:3 (DIØ2) CCW/Stop = "0"  
and X22:3 (DI12) changes from "1" to "0", drive reaches CW prelimit switch.  
Deceleration with ramp  $t_{13}$  to  $n_{min}$ .
- **Phase 2:** X22:1 (DI12) changes from "1" to "0", drive reaches CW limit switch.  
Deceleration with emergency ramp  $t_{14}$  until  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.  
The inverter's 7-segment display shows "9" (Limit switch contacted).
- **Phase 3:** X13:2 (DIØ1) CW/Stop changes from "1" to "0"  
and X13:3 (DIØ2) CCW/Stop changes from "0" to "1"  
and X13:4 (DIØ3) Variable speed up changes from "0" to "1".  
CCW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp  $t_{11}$  up CCW to  $n_{min}$  and continue with ramp  $t_3$  up as long as X13:4 (DIØ3) Variable speed = "1."
- **Phase 4:** X13:3 (DIØ2) CCW/Stop = "1"  
and X13:4 (DIØ3) Variable speed = "1".  
 $n_{max}$  is achieved, CCW with  $n_{max}$ .
- **Phase 5:** X13:3 (DIØ2) CCW/Stop = changes from "1" to "0"  
and X13:3 (DIØ2) CCW/Stop = "1"  
and X22:4 (DI13) changes from "1" to "0", drive reaches CCW prelimit switch.  
Deceleration with ramp  $t_{13}$  to  $n_{min}$ .
- **Phase 6:** X13:3 (DIØ2) CCW/Stop changes from "1" to "0".  
Deceleration with ramp  $t_{11}$  down CCW from  $n_{min}$  to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.
- **Phase 7:** X13:2 (DIØ1) CW/Stop changes from "0" to "1".  
CW and X10:3 (DBØØ) /Brake changes from "0" to "1", i.e. brake releases  
Acceleration with ramp  $t_{13}$  up CW to  $n_{min}$ .
- **Phase 8:** X13:2 (DIØ1) CW/Stop = "1"  
and X13:4 (DIØ3) Variable speed up changes from "0" to "1".  
Acceleration with ramp  $t_3$  up, as long as X13:4 (DIØ3) Variable speed up = "1".
- **Phase 9:** X22:3 (DI12) changes from "1" to "0", drive reaches CW prelimit switch.  
Deceleration with ramp  $t_{13}$  to  $n_{min}$ .



## Operation

Flow diagram for when the drive reaches the limit switches (Variable speed)

- **Phase 10:** X22:1 (DI1Ø) changes from "1" to "0",  
drive reaches CW limit switch.

Deceleration with emergency ramp  $t14$  from  $n_{min}$  to  $n_{start/stop}$ . This is followed by a standstill and X10:3 (DBØØ) /Brake changes from "1" to "0", i.e. brake is applied.

The inverter's 7-segment display shows "9" (Limit switch contacted).

- **Phase 11:** X22:1 (DI1Ø) limit switch changes from "0" to "1".

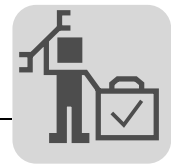


### NOTE

No operational condition.

The drive exceeds the CW limit switch and accelerates with ramp  $t11$  up CW to  $n_{min}$  and continues with ramp  $t3$  up as long as X13:4 (DIØ3) Variable speed = "1".

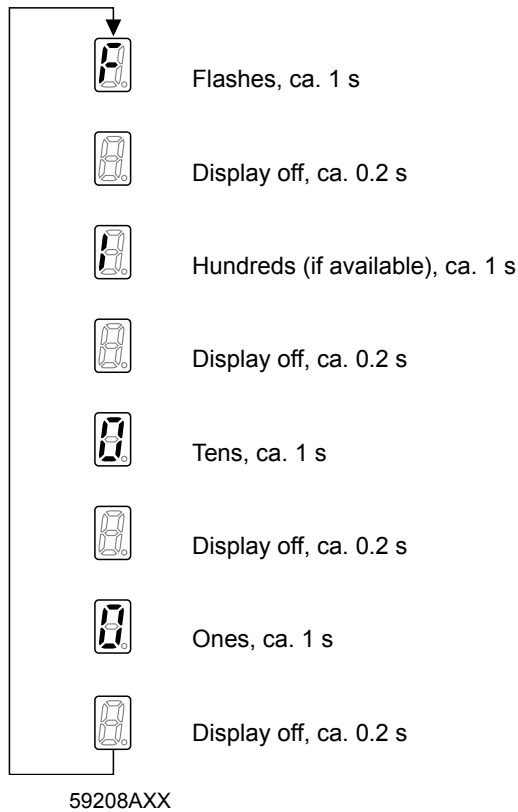
If the limit switch is installed correctly and the parameters have been set correctly (see warning on page 17), this phase does not occur.



## 7 Service

### 7.1 Error messages

**Fault message in 7-segment display** The fault code is shown in a 7-segment display. The following display sequence is shown (e.g. fault code 100):



Following a reset or if the fault code resumes the value "0", the display switches to the operating display.

#### Fault list

The following table shows a selection from the complete fault list (see "MOVIDRIVE® MDX60B / 61B" operating instructions). Only those faults that can occur in this application are listed.

Fault code	Designation	Response	P	Possible cause	Measure
27	No limit switches	Emergency stop		Open circuit/both limit switches missing	Check / correct wiring
				The limit switches have been mixed up with regards to the motor's direction of rotation	Swap limit switch connections

Fault messages are stored in fault memory P08\_.



#### **Fault "Missing limit switches"**

When the inverter is enabled, i.e. when X13:1 (DI00) /Controller inhibit = "1" the internal limit switch monitoring function checks whether the prelimit and limit switches are connected in accordance with the wiring diagram (see page 13 or page 14).

Any limit switch inputs that are not used must be connected to +24 V (X13:8 VO24). If you do not connect the free inputs, the limit switch monitor outputs the error message F27 "Limit switches missing."

If a limit switch is not connected, or if there is a break in a wire:

- The drive is slowed with the emergency ramp  $t14$ .
- When the stop speed  $n_{start/stop}$  is reached, the brake is applied (DB00 /Brake changes from "1" to "0").
- The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).
- The fault is indicated by F27 in the 7-segment display.
- The plain text messages "F27 missing limit switch" is displayed in the DBG60B keypad and in MOVITOOLS® Shell.

#### **Reset**

An error message can be acknowledged by:

- Switching the power supply off and on again.  
Recommendation: Observe a minimum switch-off time of 10 s for the input contactor K11.
- Performing a reset via binary input X22:5 (DI14). Startup of the "Crane control" module causes this binary input to be assigned with the "Reset" function.
- Performing a manual reset in MOVITOOLS® Shell (P840 = "YES" or use the menu item [Parameter] / [Manual reset]).
- Performing a manual reset using the DBG60B keypad.



## 8 Index

### Numerics

7-segment display (fault message) .....37

### A

Application areas .....9

Application version .....9

### C

Coding of the fixed setpoints .....14

Connection

*Control inputs* .....15

*Limit switches* .....17

Control inputs

*Fixed setpoints operating mode* .....16

*Variable speed operating mode* .....15

### D

Description of the functions .....10

Download parameters .....26

Drive

*Starting* .....28

### E

Error messages .....37

### F

Fault list .....37

Fault message in 7-segment display .....37

Fixed setpoints, Used .....29

### I

Installation .....12

*MOVITOOLS® software* .....12

Installing MOVITOOLS® .....12

### L

Limit switches .....10

### O

Operating modes

*Description* .....10

*Functions* .....28

*Setting* .....22

*Switchover* .....15

Operation .....28

*Fixed setpoints operating mode* .....32

*Reaching the limit switches* .....34

*Variable speed operating mode* .....30

### P

Parameters .....27

PC, Prerequisites .....9

Prerequisites

*PC* .....9

Project planning

*Prerequisites* .....9

### R

Ramps, Used .....29

Reset .....38

### S

Safety notes .....6

Setting

*Fixed setpoints* .....23

*Operating mode* .....22

*Ramps, Fixed setpoints operating mode* .....24

*Ramps, Variable speed operating mode* .....25

*Speed limitation* .....22

Setting speed limitations .....22

Setting the fixed setpoints .....23

Setting the ramps

*Fixed setpoints operating mode* .....24

*Variable speed operating mode* .....25

Software, required .....9

Starting the drive .....28

Startup .....18

*General notes* .....18

*Preliminary work* .....18

*Setting the fixed setpoints* .....23

*Setting the operating mode* .....22

*Setting the ramps*

*Fixed setpoints operating mode* .....24

*Variable speed operating mode* .....25

*Setting the speed limitation* .....22

### T

Terminal assignment .....12

### W

Wiring diagram

*Fixed setpoints operating mode* .....14

*Variable speed operating mode* .....13



## Address List

### Address List

Germany			
<b>Headquarters</b>	<b>Bruchsal</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-0
<b>Production</b>		Ernst-Blickle-Straße 42	Fax +49 7251 75-1970
<b>Sales</b>		D-76646 Bruchsal	<a href="http://www.sew-eurodrive.de">http://www.sew-eurodrive.de</a>
		P.O. Box	<a href="mailto:sew@sew-eurodrive.de">sew@sew-eurodrive.de</a>
		Postfach 3023 • D-76642 Bruchsal	
<b>Service Competence Center</b>	<b>Central</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-1710
		Ernst-Blickle-Straße 1	Fax +49 7251 75-1711
		D-76676 Graben-Neudorf	<a href="mailto:sc-mitte@sew-eurodrive.de">sc-mitte@sew-eurodrive.de</a>
	<b>North</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 5137 8798-30
		Alte Ricklinger Straße 40-42	Fax +49 5137 8798-55
		D-30823 Garbsen (near Hannover)	<a href="mailto:sc-nord@sew-eurodrive.de">sc-nord@sew-eurodrive.de</a>
	<b>East</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 3764 7606-0
	Dänkritzter Weg 1	Fax +49 3764 7606-30	
	D-08393 Meerane (near Zwickau)	<a href="mailto:sc-ost@sew-eurodrive.de">sc-ost@sew-eurodrive.de</a>	
<b>South</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 89 909552-10	
	Domagkstraße 5	Fax +49 89 909552-50	
	D-85551 Kirchheim (near München)	<a href="mailto:sc-sued@sew-eurodrive.de">sc-sued@sew-eurodrive.de</a>	
<b>West</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 2173 8507-30	
	Siemensstraße 1	Fax +49 2173 8507-55	
	D-40764 Langenfeld (near Düsseldorf)	<a href="mailto:sc-west@sew-eurodrive.de">sc-west@sew-eurodrive.de</a>	
<b>Electronics</b>	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-1780	
	Ernst-Blickle-Straße 42	Fax +49 7251 75-1769	
	D-76646 Bruchsal	<a href="mailto:sc-elektronik@sew-eurodrive.de">sc-elektronik@sew-eurodrive.de</a>	
	<b>Drive Service Hotline / 24 Hour Service</b>		+49 180 5 SEWHELP +49 180 5 7394357
Additional addresses for service in Germany provided on request!			

France			
<b>Production</b>	<b>Hagenau</b>	SEW-USOCOME	Tel. +33 3 88 73 67 00
<b>Sales</b>		48-54, route de Soufflenheim	Fax +33 3 88 73 66 00
<b>Service</b>		B. P. 20185	<a href="http://www.usocome.com">http://www.usocome.com</a>
		F-67506 Hagenau Cedex	<a href="mailto:sew@usocome.com">sew@usocome.com</a>
<b>Production</b>	<b>Forbach</b>	SEW-EUROCOME	Tel. +33 3 87 29 38 00
		Zone Industrielle	
		Technopôle Forbach Sud	
		B. P. 30269	
		F-57604 Forbach Cedex	
<b>Assembly Sales Service</b>	<b>Bordeaux</b>	SEW-USOCOME	Tel. +33 5 57 26 39 00
		Parc d'activités de Magellan	Fax +33 5 57 26 39 09
		62, avenue de Magellan - B. P. 182	
		F-33607 Pessac Cedex	
	<b>Lyon</b>	SEW-USOCOME	Tel. +33 4 72 15 37 00
		Parc d'Affaires Roosevelt	Fax +33 4 72 15 37 15
		Rue Jacques Tati	
		F-69120 Vaulx en Velin	
	<b>Paris</b>	SEW-USOCOME	Tel. +33 1 64 42 40 80
		Zone industrielle	Fax +33 1 64 42 40 88
		2, rue Denis Papin	
		F-77390 Verneuil l'Étang	
Additional addresses for service in France provided on request!			



Algeria			
<b>Sales</b>	<b>Alger</b>	Réducom 16, rue des Frères Zagnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr
Argentina			
<b>Assembly Sales Service</b>	<b>Buenos Aires</b>	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar
Australia			
<b>Assembly Sales Service</b>	<b>Melbourne</b>	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 <a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a> enquires@sew-eurodrive.com.au
	<b>Sydney</b>	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
	<b>Townsville</b>	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
Austria			
<b>Assembly Sales Service</b>	<b>Wien</b>	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 <a href="http://sew-eurodrive.at">http://sew-eurodrive.at</a> sew@sew-eurodrive.at
Belarus			
<b>Sales</b>	<b>Minsk</b>	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by
Belgium			
<b>Assembly Sales Service</b>	<b>Brüssel</b>	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> info@caron-vector.be
<b>Service Competence Center</b>	<b>Industrial Gears</b>	SEW Caron-Vector S.A. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> service-wallonie@sew-eurodrive.be
Brazil			
<b>Production Sales Service</b>	<b>Sao Paulo</b>	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 <a href="http://www.sew.com.br">http://www.sew.com.br</a> sew@sew.com.br
Additional addresses for service in Brazil provided on request!			
Bulgaria			
<b>Sales</b>	<b>Sofia</b>	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net



## Address List

Cameroon			
<b>Sales</b>	<b>Douala</b>	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137
Canada			
<b>Assembly Sales Service</b>	<b>Toronto</b>	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 <a href="http://www.sew-eurodrive.ca">http://www.sew-eurodrive.ca</a> <a href="mailto:marketing@sew-eurodrive.ca">marketing@sew-eurodrive.ca</a>
	<b>Vancouver</b>	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 <a href="mailto:marketing@sew-eurodrive.ca">marketing@sew-eurodrive.ca</a>
	<b>Montreal</b>	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 <a href="mailto:marketing@sew-eurodrive.ca">marketing@sew-eurodrive.ca</a>
Additional addresses for service in Canada provided on request!			
Chile			
<b>Assembly Sales Service</b>	<b>Santiago de Chile</b>	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 <a href="http://www.sew-eurodrive.cl">http://www.sew-eurodrive.cl</a> <a href="mailto:ventas@sew-eurodrive.cl">ventas@sew-eurodrive.cl</a>
China			
<b>Production Assembly Sales Service</b>	<b>Tianjin</b>	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 <a href="mailto:info@sew-eurodrive.cn">info@sew-eurodrive.cn</a> <a href="http://www.sew-eurodrive.cn">http://www.sew-eurodrive.cn</a>
	<b>Suzhou</b>	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 <a href="mailto:suzhou@sew-eurodrive.cn">suzhou@sew-eurodrive.cn</a>
	<b>Guangzhou</b>	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 <a href="mailto:guangzhou@sew-eurodrive.cn">guangzhou@sew-eurodrive.cn</a>
	<b>Shenyang</b>	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 <a href="mailto:shenyang@sew-eurodrive.cn">shenyang@sew-eurodrive.cn</a>
Additional addresses for service in China provided on request!			
Colombia			
<b>Assembly Sales Service</b>	<b>Bogotá</b>	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 <a href="http://www.sew-eurodrive.com.co">http://www.sew-eurodrive.com.co</a> <a href="mailto:sewcol@sew-eurodrive.com.co">sewcol@sew-eurodrive.com.co</a>
Croatia			
<b>Sales Service</b>	<b>Zagreb</b>	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 <a href="mailto:kompeks@net.hr">kompeks@net.hr</a>



Czech Republic			
<b>Sales</b>	<b>Praha</b>	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 <a href="http://www.sew-eurodrive.cz">http://www.sew-eurodrive.cz</a> <a href="mailto:sew@sew-eurodrive.cz">sew@sew-eurodrive.cz</a>
Denmark			
<b>Assembly Sales Service</b>	<b>Kopenhagen</b>	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 <a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a> <a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>
Egypt			
<b>Sales Service</b>	<b>Cairo</b>	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 <a href="http://www.copam-egypt.com/">http://www.copam-egypt.com/</a> <a href="mailto:copam@datum.com.eg">copam@datum.com.eg</a>
Estonia			
<b>Sales</b>	<b>Tallin</b>	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 <a href="mailto:veiko.soots@alas-kuul.ee">veiko.soots@alas-kuul.ee</a>
Finland			
<b>Assembly Sales Service</b>	<b>Lahti</b>	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="mailto:sew@sew.fi">sew@sew.fi</a> <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a>
<b>Production Assembly Service</b>	<b>Karkkila</b>	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 <a href="mailto:sew@sew.fi">sew@sew.fi</a> <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a>
Gabon			
<b>Sales</b>	<b>Libreville</b>	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12
Great Britain			
<b>Assembly Sales Service</b>	<b>Normanton</b>	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 <a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a> <a href="mailto:info@sew-eurodrive.co.uk">info@sew-eurodrive.co.uk</a>
Greece			
<b>Sales Service</b>	<b>Athen</b>	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 <a href="http://www.boznos.gr">http://www.boznos.gr</a> <a href="mailto:info@boznos.gr">info@boznos.gr</a>
Hong Kong			
<b>Assembly Sales Service</b>	<b>Hong Kong</b>	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 <a href="mailto:contact@sew-eurodrive.hk">contact@sew-eurodrive.hk</a>



## Address List

Hungary			
<b>Sales</b>	<b>Budapest</b>	SEW-EURODRIVE Kft.	Tel. +36 1 437 06-58
<b>Service</b>		H-1037 Budapest Kunigunda u. 18	Fax +36 1 437 06-50 office@sew-eurodrive.hu
India			
<b>Assembly</b>	<b>Vadodara</b>	SEW-EURODRIVE India Pvt. Ltd.	Tel. +91 265 2831086
<b>Sales</b>		Plot No. 4, GIDC	Fax +91 265 2831087
<b>Service</b>		POR Ramangamdi • Vadodara - 391 243 Gujarat	http://www.seweurodriveindia.com sales@seweurodriveindia.com
Ireland			
<b>Sales</b>	<b>Dublin</b>	Alperon Engineering Ltd.	Tel. +353 1 830-6277
<b>Service</b>		48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Fax +353 1 830-6458 info@alperon.ie
Israel			
<b>Sales</b>	<b>Tel-Aviv</b>	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
<b>Assembly</b>	<b>Milano</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s.	Tel. +39 02 96 9801
<b>Sales</b>		Via Bernini,14	Fax +39 02 96 799781
<b>Service</b>		I-20020 Solaro (Milano)	http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Ivory Coast			
<b>Sales</b>	<b>Abidjan</b>	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36
Japan			
<b>Assembly</b>	<b>Iwata</b>	SEW-EURODRIVE JAPAN CO., LTD	Tel. +81 538 373811
<b>Sales</b>		250-1, Shimoman-no,	Fax +81 538 373814
<b>Service</b>		Iwata Shizuoka 438-0818	http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Korea			
<b>Assembly</b>	<b>Ansan-City</b>	SEW-EURODRIVE KOREA CO., LTD.	Tel. +82 31 492-8051
<b>Sales</b>		B 601-4, Banweol Industrial Estate	Fax +82 31 492-8056
<b>Service</b>	1048-4, Shingil-Dong Ansan 425-120	http://www.sew-korea.co.kr master@sew-korea.co.kr	
	<b>Busan</b>	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Latvia			
<b>Sales</b>	<b>Riga</b>	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com



Lebanon			
<b>Sales</b>	<b>Beirut</b>	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com
Lithuania			
<b>Sales</b>	<b>Alytus</b>	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Brüssel</b>	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be
Malaysia			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Johore</b>	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexico			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Queretaro</b>	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@sew-eurodrive.com.mx
Morocco			
<b>Sales</b>	<b>Casablanca</b>	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma
Netherlands			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Rotterdam</b>	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
New Zealand			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Auckland</b>	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	<b>Christchurch</b>	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Norway			
<b>Assembly</b> <b>Sales</b> <b>Service</b>	<b>Moss</b>	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no



## Address List

Peru			
<b>Assembly</b>	<b>Lima</b>	SEW DEL PERU MOTORES REDUCTORES S.A.C.	Tel. +51 1 3495280
<b>Sales</b>		Los Calderos, 120-124	Fax +51 1 3493002
<b>Service</b>		Urbanizacion Industrial Vulcano, ATE, Lima	<a href="http://www.sew-eurodrive.com.pe">http://www.sew-eurodrive.com.pe</a> <a href="mailto:sewperu@sew-eurodrive.com.pe">sewperu@sew-eurodrive.com.pe</a>
Poland			
<b>Assembly</b>	<b>Lodz</b>	SEW-EURODRIVE Polska Sp.z.o.o.	Tel. +48 42 67710-90
<b>Sales</b>		ul. Techniczna 5	Fax +48 42 67710-99
<b>Service</b>		PL-92-518 Łódź	<a href="http://www.sew-eurodrive.pl">http://www.sew-eurodrive.pl</a> <a href="mailto:sew@sew-eurodrive.pl">sew@sew-eurodrive.pl</a>
		<b>24 Hour Service</b>	Tel. +48 602 739 739 (+48 602 SEW SEW) <a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>
Portugal			
<b>Assembly</b>	<b>Coimbra</b>	SEW-EURODRIVE, LDA.	Tel. +351 231 20 9670
<b>Sales</b>		Apartado 15	Fax +351 231 20 3685
<b>Service</b>		P-3050-901 Mealhada	<a href="http://www.sew-eurodrive.pt">http://www.sew-eurodrive.pt</a> <a href="mailto:infosew@sew-eurodrive.pt">infosew@sew-eurodrive.pt</a>
Romania			
<b>Sales</b>	<b>București</b>	Sialco Trading SRL	Tel. +40 21 230-1328
<b>Service</b>		str. Madrid nr.4 011785 Bucuresti	Fax +40 21 230-7170 <a href="mailto:sialco@sialco.ro">sialco@sialco.ro</a>
Russia			
<b>Assembly</b>	<b>St. Petersburg</b>	ZAO SEW-EURODRIVE	Tel. +7 812 3332522 +7 812 5357142
<b>Sales</b>		P.O. Box 36	Fax +7 812 3332523
<b>Service</b>		195220 St. Petersburg Russia	<a href="http://www.sew-eurodrive.ru">http://www.sew-eurodrive.ru</a> <a href="mailto:sew@sew-eurodrive.ru">sew@sew-eurodrive.ru</a>
Senegal			
<b>Sales</b>	<b>Dakar</b>	SENEMECA	Tel. +221 338 494 770
		Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Fax +221 338 494 771 <a href="mailto:senemeca@sentoo.sn">senemeca@sentoo.sn</a>
Serbia			
<b>Sales</b>	<b>Beograd</b>	DIPAR d.o.o.	Tel. +381 11 347 3244 / +381 11 288 0393
		Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Fax +381 11 347 1337 <a href="mailto:dipar@yubc.net">dipar@yubc.net</a>
Singapore			
<b>Assembly</b>	<b>Singapore</b>	SEW-EURODRIVE PTE. LTD.	Tel. +65 68621701
<b>Sales</b>		No 9, Tuas Drive 2	Fax +65 68612827
<b>Service</b>		Jurong Industrial Estate Singapore 638644	<a href="http://www.sew-eurodrive.com.sg">http://www.sew-eurodrive.com.sg</a> <a href="mailto:sewsingapore@sew-eurodrive.com">sewsingapore@sew-eurodrive.com</a>
Slovakia			
<b>Sales</b>	<b>Bratislava</b>	SEW-Eurodrive SK s.r.o.	Tel. +421 2 49595201
		Rybničná 40 SK-83554 Bratislava	Fax +421 2 49595200 <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a> <a href="http://www.sew-eurodrive.sk">http://www.sew-eurodrive.sk</a>
	<b>Žilina</b>	SEW-Eurodrive SK s.r.o.	Tel. +421 41 700 2513
		ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Fax +421 41 700 2514 <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>

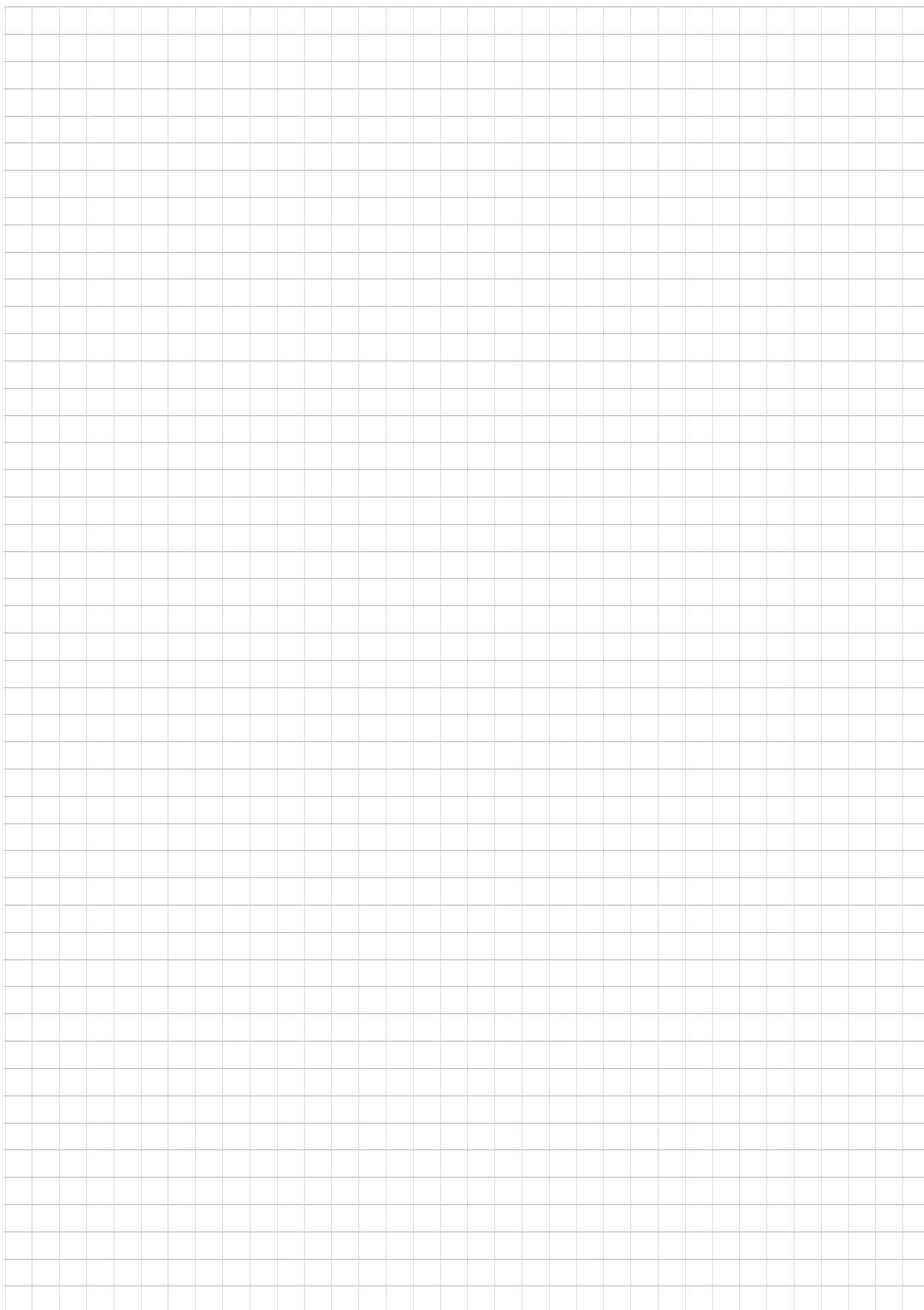


Slovakia			
	<b>Banská Bystrica</b>	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
Slovenia			
<b>Sales Service</b>	<b>Celje</b>	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
<b>Assembly Sales Service</b>	<b>Johannesburg</b>	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 <a href="http://www.sew.co.za">http://www.sew.co.za</a> dross@sew.co.za
	<b>Capetown</b>	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	<b>Durban</b>	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
Spain			
<b>Assembly Sales Service</b>	<b>Bilbao</b>	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 <a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a> sew.spain@sew-eurodrive.es
Sweden			
<b>Assembly Sales Service</b>	<b>Jönköping</b>	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 <a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a> info@sew-eurodrive.se
Switzerland			
<b>Assembly Sales Service</b>	<b>Basel</b>	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 <a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a> info@imhof-sew.ch
Thailand			
<b>Assembly Sales Service</b>	<b>Chonburi</b>	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
<b>Sales</b>	<b>Tunis</b>	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

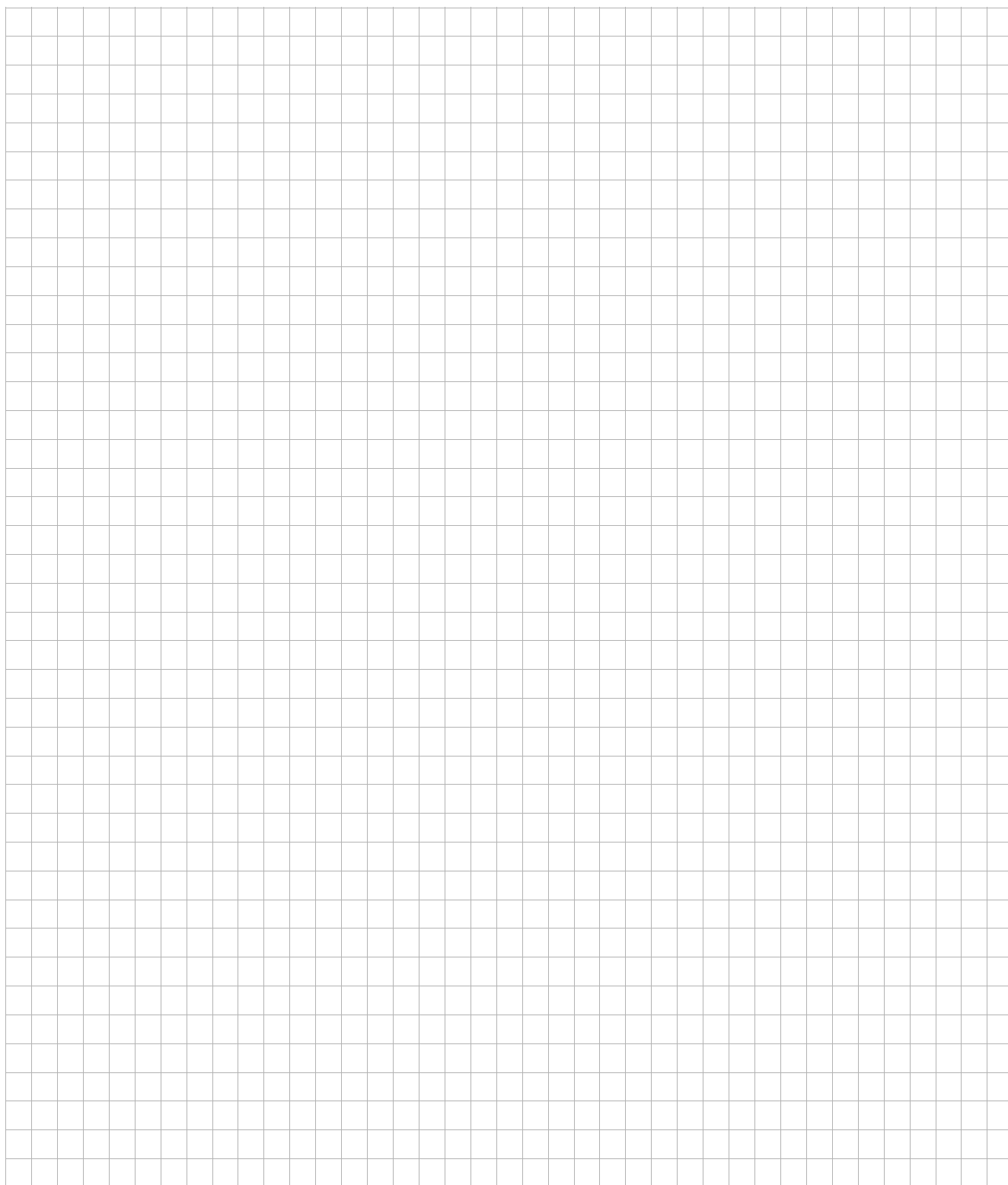


## Address List

Turkey			
<b>Assembly Sales Service</b>	<b>Istanbul</b>	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419164, 3838014, 3738015 Fax +90 216 3055867 <a href="http://www.sew-eurodrive.com.tr">http://www.sew-eurodrive.com.tr</a> <a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a>
Ukraine			
<b>Sales Service</b>	<b>Dnepropetrovsk</b>	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 <a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a> <a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a>
USA			
<b>Production Assembly Sales Service</b>	<b>Greenville</b>	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 <a href="http://www.seweurodrive.com">http://www.seweurodrive.com</a> <a href="mailto:cslyman@seweurodrive.com">cslyman@seweurodrive.com</a>
<b>Assembly Sales Service</b>	<b>San Francisco</b>	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6433 <a href="mailto:cshayward@seweurodrive.com">cshayward@seweurodrive.com</a>
	<b>Philadelphia/PA</b>	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 <a href="mailto:csbridgeport@seweurodrive.com">csbridgeport@seweurodrive.com</a>
	<b>Dayton</b>	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 <a href="mailto:cstroy@seweurodrive.com">cstroy@seweurodrive.com</a>
	<b>Dallas</b>	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 <a href="mailto:csdallas@seweurodrive.com">csdallas@seweurodrive.com</a>
Additional addresses for service in the USA provided on request!			
Venezuela			
<b>Assembly Sales Service</b>	<b>Valencia</b>	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 <a href="http://www.sew-eurodrive.com.ve">http://www.sew-eurodrive.com.ve</a> <a href="mailto:ventas@sew-eurodrive.com.ve">ventas@sew-eurodrive.com.ve</a> <a href="mailto:sewfinanzas@cantv.net">sewfinanzas@cantv.net</a>







## How we're driving the world

With people who think fast and develop the future with you.

With a worldwide service network that is always close at hand.

With drives and controls that automatically improve your productivity.

With comprehensive knowledge in virtually every branch of industry today.

With uncompromising quality that reduces the cost and complexity of daily operations.



**SEW-EURODRIVE**  
Driving the world

With a global presence that offers responsive and reliable solutions. Anywhere.

With innovative technology that solves tomorrow's problems today.

With online information and software updates, via the Internet, available around the clock.

**SEW**  
**EURODRIVE**

SEW-EURODRIVE GmbH & Co KG  
P.O. Box 3023 · D-76642 Bruchsal / Germany  
Phone +49 7251 75-0 · Fax +49 7251 75-1970  
sew@sew-eurodrive.com

→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)