SEW EURODRIVE

MOVIDRIVE® MDX61B
Flying Saw Application

FA362800

Edition 08/2005

11335416 / EN

Manual

SEW
EURODRIVE

1 Important Notes

Always follow the safety and warning instructions contained in this section!

1.1 Explanation of the icons

Hazard

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

Warning

Indicates an imminently hazardous situation caused by the product which, if not avoided, WILL result in death or serious injury. You will also find this signal to indicate the potential for damage to property.

Caution

Indicates a potentially hazardous situation which, if not avoided, MAY result in minor injury or damage to products.

Note

Indicates a reference to additional information, for example on startup, or other useful data.

Documentation reference

Indicates a reference to a document, such as operating instructions, catalog, data sheet.

1.2 Safety notes and general information

Risk of an electrical shock

Possible consequences: Death or serious injury.

Only electrical specialists are allowed to install and start up MOVIDRIVE® drive inverters observing the applicable accident prevention regulations and the MOVIDRIVE® operating instructions.

Potentially hazardous situation which, if not avoided, may result in damage to products or the surrounding area.

Possible consequences: Damage to the product

Read through this manual carefully before you commence installation and startup of MOVIDRIVE® drive inverters with this application module. This manual does not replace the detailed operating instructions!

A requirement of fault-free operation and the possibility of any rights to claim under guarantee is that you observe the information in the documentation.

Documentation reference

This manual was written assuming that the user is familiar with the MOVIDRIVE® documentation, in particular the MOVIDRIVE® system manual.

In this manual, cross references are marked with "→". For example, (→ Sec. X.X) means: Further information can be found in section X.X of this manual.

2 System Description

2.1 Areas of application

The "flying saw" application module is particularly suited to applications in which moving endless material has to be cut to length. Other applications include synchronous material transportation, filling stations, "flying punches" or "flying knives."

The "flying saw" application module is especially suitable for the following sectors:

- Wood processing
- Paper, cardboard
- Plastic
- Stone
- Clay

Two basic application types are possible:

- Parallel saw: One drive is required for the saw carriage (traveling with the material) and another drive is required for the saw feed.
- Diagonal saw: Only one drive is required; the saw carriage moves diagonally in relation to the material direction

The "flying saw" offers the following advantages in these applications:

- User-friendly user interface.
- Only the parameters required for the "flying saw" (cut length, engagement travel) need to be entered.
- Guided parameter setting process instead of complicated programming.
- Monitor mode for optimum diagnostics.
- Users do not need any programming experience.
- It does not take long to get to know the system.

2.2 Application example

Flying saw

The "flying saw" application module is often used in the wood processing industry. Long pressed particle boards have to be cut to length.

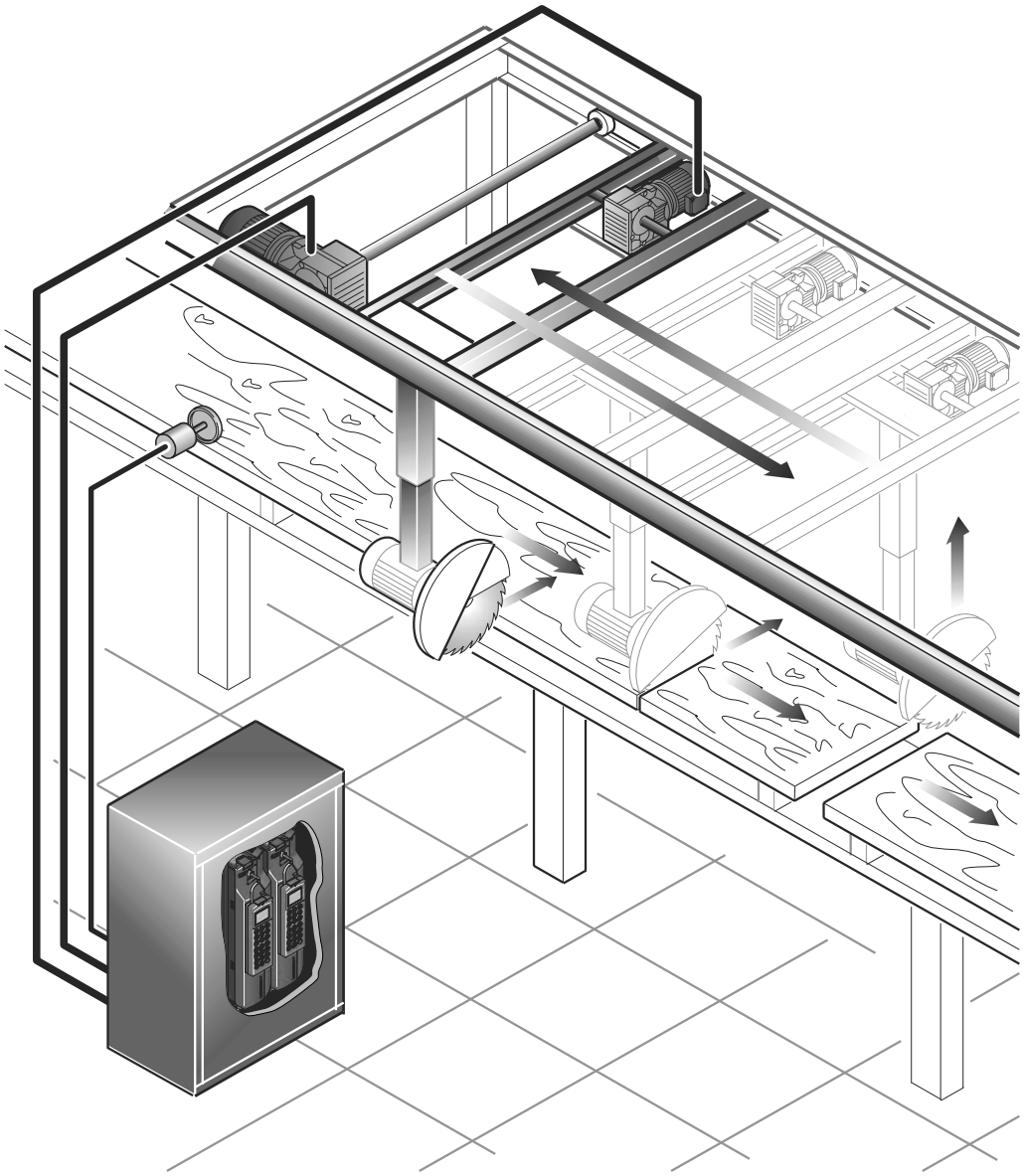

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Figure 1: "Flying saw" in the wood processing industry

1. Drive for the saw carriage feed along the longitudinal axis (material direction)
2. Drive for the saw feed

2.3 Program identification

You can use the MOVITOOLS® software package to identify which application program was last loaded into the MOVIDRIVE® unit. Proceed as follows:

- Connect MOVIDRIVE® to the PC via the serial port.
- Start MOVITOOLS®.
- Start "Shell."
- In Shell, select "Display/IPOS information...".

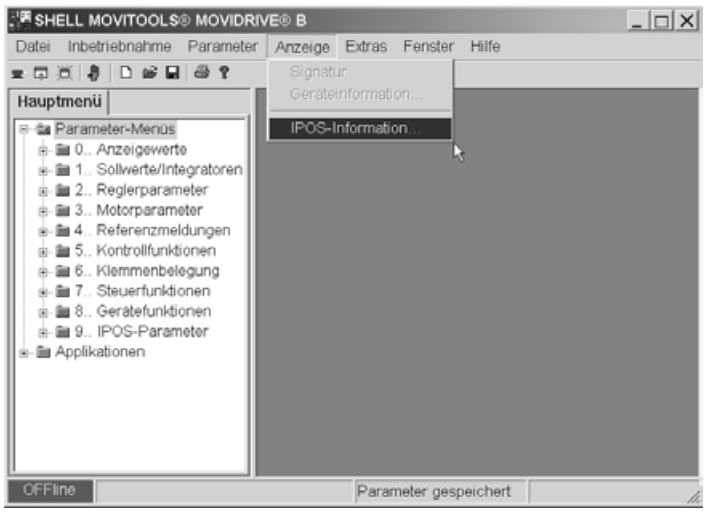

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Figure 2: IPOS information in Shell

- The "IPOS-Status" window appears. The entries in this window tell you which application software is stored in MOVIDRIVE®.

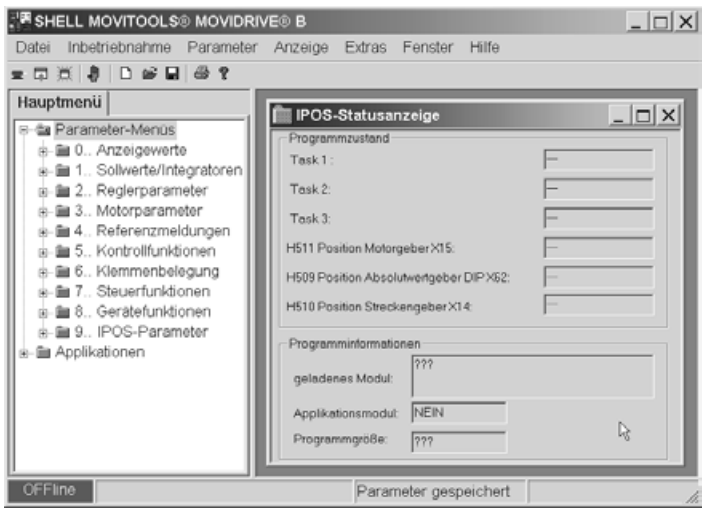

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Figure 3: Current IPOS program version displayed in MOVITOOLS®

3 Project Planning

3.1 Prerequisites

PC and software

The "flying saw" application module is implemented as an IPOS$^{plus®}$ program and forms part of the SEW MOVITOOLS® software package. To use MOVITOOLS®, you must have a PC with one of the following operating systems: Windows® 95, Windows® 98, Windows NT® 4.0, Windows® Me or Windows® 2000.

Inverters, motors and encoders

- **Inverter**

  The "flying saw" can only be implemented on MOVIDRIVE® units in application version (...-0T). In MOVIDRIVE® MDX61B, the inverter can be controlled using either terminals or a bus. Terminal control is not possible with MOVIDRIVE® *compact* MCH4_A. You can use the system bus provided as standard, the PROFIBUS DP interface (MCH41A), the INTERBUS LWL interface (MCH42A) or a fieldbus gateway.

  It is essential for the "flying saw" to have encoder feedback, and consequently it cannot be implemented with MOVIDRIVE® MDX60B.

Control via	Possible with MOVIDRIVE®		
	MDX61B	***compact* MCH41A**	***compact* MCH42A**
Terminals	Yes, with option DIO11B	No	No
System bus	Yes, without option	Yes, without option	Yes, without option
PROFIBUS-DP	Yes, with option DFP21B	Yes, without option	No
INTERBUS-LWL	Yes, with option DFI21B	No	Yes, without option
INTERBUS	Yes, with option DFI11B	Yes, with option UFI11A	Yes, with option UFI11A
CANopen	Yes, with DFC11B option	No	No
DeviceNet	Yes, with option DFD11B	Yes, with UFD11A option	Yes, with UFD11A option

- **MOVIDRIVE® MDX61B**: The DIP11B option is not support by the "Flying saw" application module.
- **MOVIDRIVE® MDX61B with bus control:** The optional "I/O card DIO11B" is not to be connected for operation with bus control. If the DIO11B option is connected, the virtual terminals cannot be addressed via the bus.

- **Motors and encoders**
  - For operation on MOVIDRIVE® MDX61B with DEH11B or MOVIDRIVE® *compact* MCH4_A: CT/CV asynchronous servomotors (encoder installed as standard) or DR/DT/DV/ AC motors with encoder (Hiperface®, sin/cos or TTL).
  - For operation on MOVIDRIVE® MDX61B with option DER11B: CM/DS synchronous servomotors with resolver.
- **Permitted operating modes (P700):**
  - Asynchronous motor (CT/CV/DR/DT/DV): **CFC operating modes**; the "flying saw" cannot be operated in VFC-n-CONTROL operating modes
  - Synchronous motor (CM/DS): **SERVO operating modes**.

Essential:

Ensure that there is no slip in the slave drive.

3.2 Functional description

Functional-characteristics

The "flying saw" application offers the following functional characteristics:

- **Control via terminals, system bus or fieldbus:** In MOVIDRIVE® MDX61B, the "flying saw" can be controlled either using binary input terminals, the system bus or a fieldbus (with 1 or 3 process data words). In MOVIDRIVE® *compact* MCH4_A, it can only be controlled using a system bus or a fieldbus.
- **Cut length control with/without material sensor or cutting mark control:** You can select either cut length control or cut length control with label sensor. For cut length control, you can additionally use a material sensor that starts length control.

  In **cut length control without material sensor**, a master encoder measures the cut length of the material to be cut. This information is processed by the inverter and used for starting the saw carriage. There is no need to have any marks on the material.

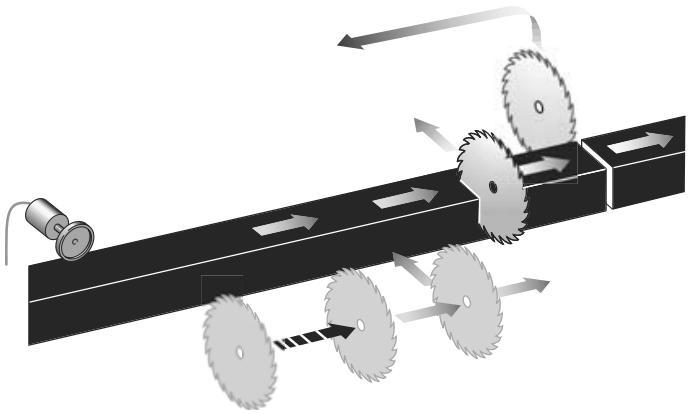

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Figure 4: Cut length control without material sensor

In **cut length control with material sensor**, a master encoder also measures the cut length of the material to be cut, but additionally a material sensor is evaluated. Cutting length control starts when the material to be cut reaches this sensor. There is no need to have any marks on the material. However, the material sensor may have to detect a mark on the front edge of the material.

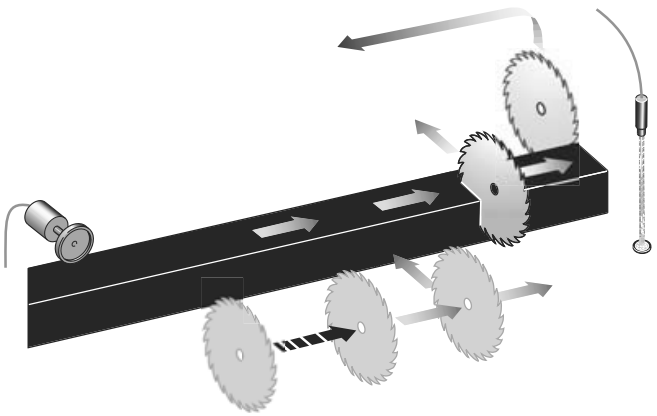

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Figure 5: Cut length control with material sensor

In **cut length control with label sensor**, a sensor detects the cutting marks on the material. This sensor signal is processed as an interrupt in the inverter and is used

for starting the saw carriage.

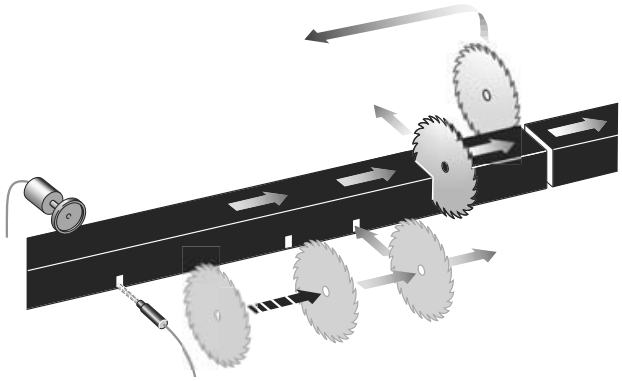

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Figure 6: Cut length control with label sensor

- **Protecting the cut edge and "pulling a gap":** The "pulling a gap" function causes the saw carriage to move ahead of synchronism with the material before the saw blade is pulled out. The result is a gap in between the cut edge and the saw blade, thereby preventing the saw blade from leaving any traces on the cut edge. This function is suitable for use in protecting the cut edge of sensitive material. This function can also be used for separating material that has already been cut.
- **Immediate manual cut function:** The saw carriage is started when a "1" signal is detected at the binary input.
- **Extensive diagnostics:** During operation, the monitor displays all important data, such as current cut length, material speed and speed of the saw drive.
- **Simple connection to the master controller (PLC).**

Operating modes

The functions are implemented with four operating modes:

- **Jog mode (DI1Ø = "0" and DI11 = "0")**
  - A "1" signal at binary input DI13 "Jog +" causes the saw carriage motor to turn "clockwise." A "1" signal at binary input DI14 "Jog -" causes the saw carriage motor to turn "counterclockwise." Check whether you are using a 2 or 3-stage gear unit.
  - A "0" signal at binary input DI15 "Rapid speed" results in jog mode at slow speed. A "1" signal at binary input DI15 "Rapid speed" results in jog mode at rapid speed.

- **Reference travel (DI1Ø = "1" and DI11 = "0")**

  The reference position is defined by reference travel to one of the two limit switches. Reference travel is started with a "1" signal at binary input DI12 "Start." The "1" signal must be present at DI12 for the entire duration of the reference travel; a "0" signal stops reference travel. You can enter a reference offset during startup. The reference offset can be used to change the machine zero point without having to adjust the limit switches. The following formula applies:

  Machine zero = reference position + reference offset

- **Positioning (DI1Ø = "0" and DI11 = "1")**

  The "Positioning" mode is used for position-controlled movement of the saw drive between the home position and the parking position. A "0" signal at binary input DI13 selects the home position. A "1" signal at binary input DI13 selects the parking position. Positioning is started with a "1" signal at binary input DI12 "Start"; a "0" signal stops positioning. The "1" signal must be present at DI12 for the entire duration of the positioning process.

  The drive immediately moves to its new position if DI12 remains at "1" and a new position is specified using DI13.

- **Automatic mode (DI1Ø = "1" and DI11 = "1")**

  For terminal control and fieldbus control with 1 PD, specify during startup whether cut length control with material sensor, cut length control without material sensor or cut length control with label sensor is active.

  – Cut length control without material sensor: A "0"-"1" edge at binary input DI12 "Start" (process output data PO1:10) starts automatic mode. The "1" signal must be present at DI12 (PO1:10) for the entire duration of automatic mode. The material length is recorded starting from the "0"-"1" edge at DI12 "Start."
    – Terminal control: From the cut length table (→ Startup), select the required cut length in binary coded form via binary inputs DI15 ... DI17. The operating mode (cut length control with/without material sensor, or cut length control with label sensor) is set at startup and cannot be changed during live operation. To set another operating mode, you have to perform startup again.
    – Bus control with one process data word (1 PD): From the cut length table (→ Startup), select the required cut length in binary coded form via process output data PO1:13 ... PO1:15. The operating mode (cut length control with/without material sensor, or cut length control with label sensor) is set at startup and cannot be changed during live operation. To set another operating mode, you have to perform startup again.
    – Bus control with three process data words (3 PD): You can set any cut length via fieldbus. You can also switch to another operating mode via fieldbus (cut length control with/without material sensor, cut length control with label sensor) during running operation.
  – Cut length control with material sensor: A "0"-"1" edge at binary input DI12 "Start" (process output data PO1:10) starts automatic mode. The "1" signal must be present at DI12 (PO1:10) for the entire duration of automatic mode. The material length is counted starting from the "0"-"1" edge on DIØ2 "Sensor" (= material sensor).
    – Terminal control: From the cut length table (→ Startup), select the required cut length in binary coded form via binary inputs DI15 ... DI17. The operating mode (cut length control with/without material sensor or cut length control with label sensor) is set at startup and cannot be changed during live operation. To set another operating mode, you have to perform startup again.

  - Bus control with one process data word (1 PD): From the cut length table (→ Startup), select the required cut length in binary coded form via process output data PO1:13 ... PO1:15. The operating mode (cut length control with/without material sensor or cut length control with label sensor) is set at startup and cannot be changed during live operation. To set another operating mode, you have to perform startup again.
  - Bus control with three process data words (3 PD): You can set any cut length via fieldbus. You can also switch to another operating mode via fieldbus (cut length control with/without material sensor, cut length control with label sensor) during running operation.
- Cut length control with label sensor: A "1" signal at binary input DI12 "Start" (process output data PO1:10) starts automatic mode. The "1" signal must be present at DI12 (PO1:10) for the entire duration of automatic mode.

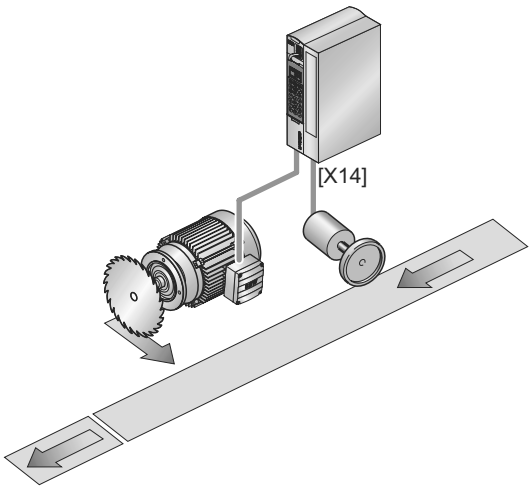
When the drive reaches the reversing position, the "pulling a gap" function can be used to move the saw blade away from the cut edge. A "1" signal at binary input DI13 (process output data PO1:11) starts the "pulling a gap" function. You set the size of the gap during startup.

Repositioning can be initiated once the drive reaches the reversing position. A "1" signal at binary input DI14 "Repositioning" (process output data PO1:12) moves the drive back to the home position. This "1" signal can remain permanently set. The saw carriage is started again once the cut length is reached or with the next signal edge at binary input DIØ2 "Sensor."

3.3 Determining the material travel and web speed

The web speed must be known to set the cut length for the sawing process. The web speed can be determined in two ways:

- A slip-free encoder is mounted on the material web as closely as possible to the "flying saw." This encoder is connected as external encoder (= master encoder) to X14: of the saw carriage drive. The incremental distance information from the external encoder is used for measuring the speed and the material travel (→ Following Figure).



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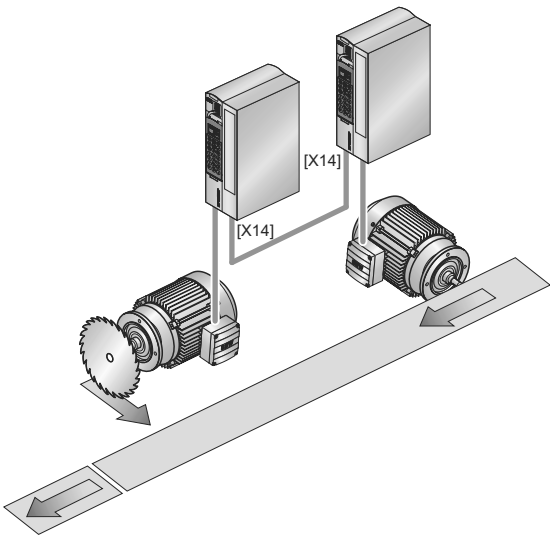
The ratio between the travel resolution of the motor encoder and the external encoder must be less than 20:1 to determine the web speed and the material travel with sufficient accuracy.

- The incremental travel information of the motor encoder on the material feed drive is used for determining the web speed and the material travel. For this purpose, an X14-X14 connection is required from the MOVIDRIVE® drive inverter on the web drive to the MOVIDRIVE® drive inverter on the saw carriage drive (→ Following Figure).



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3.4 Process data assignment

You can also control the "flying saw" application module via a bus. All MOVIDRIVE® fieldbus options as well as the system bus (SBus) provided as standard are supported. The virtual terminals in control word 2 are used for bus control (→ MOVIDRIVE® Fieldbus Unit Profile).

Note the following:

- The "input/output card type DIO11B" option is not to be installed for bus control.
- For bus control with 3 process data worlds (3 PD): The values of PO2 "Setpoint cut length" and PO3 "Minimum reversing position" are transferred to the inverter with the scaling "0.1 " user travel unit."

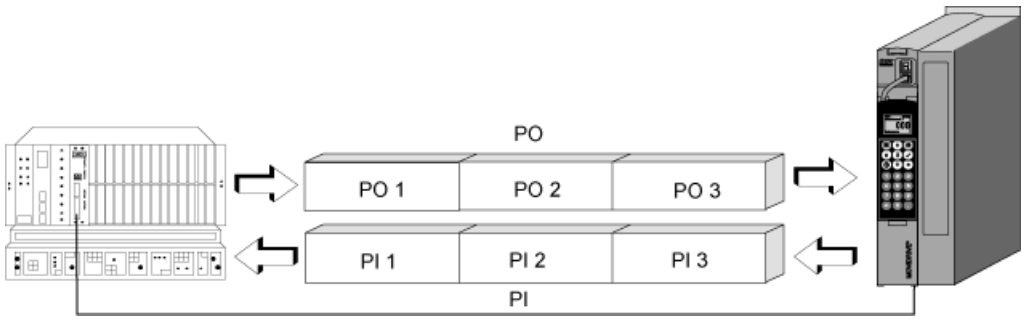

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Figure 7: Data exchange via process input and output data

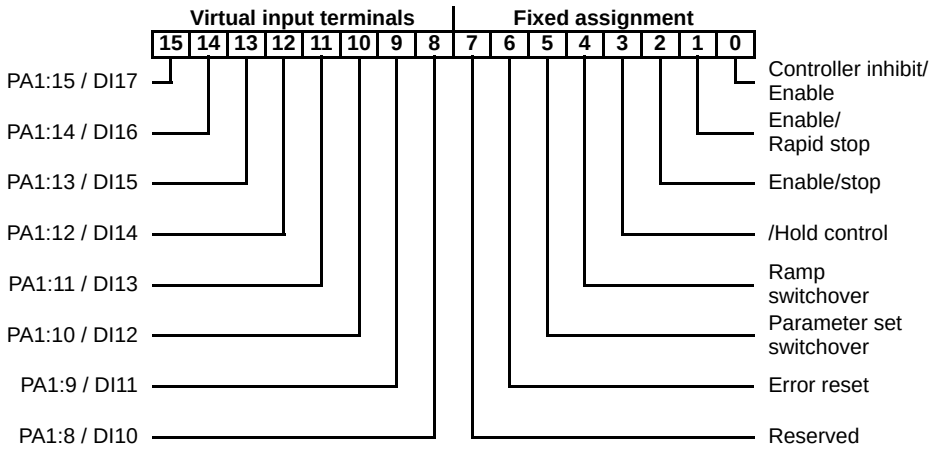
PO = Process output data
PO1 = Control word 2
PO2 = Setpoint cut length (IPOS PO DATA)
PO3 = Minimum reversing position (IPOS PO DATA)
PE = Process input data
PI1 = Status word 2
PI2 = Actual cut length (IPOS PI DATA)
PE3 = Actual position of the saw drive (IPOS PI DATA)

Minimum reversing position: Earliest possible position of the saw carriage at which the drive can be decoupled and it is possible to move back to the home position.

Process output data

Assignment of the process output data words:

- PO1: Control word 2



Assignment of the binary inputs DI10 ... DI17:

Binary-inputs	Jog-mode	Reference travel	Positioning	Automatic mode	
				(Terminal or bus with 1 PD)	(Bus with 3 PD)
DI1Ø	"0"	"1"	"0"	"1"	
DI11	"0"	"0"	"1"	"1"	
DI12	-	Start reference travel	Start Positioning	Start automatic mode	
DI13	Jog+	-	Home or parked position	Pulling a gap	
DI14	Jog -	-	-	Repositioning	
DI15	Rapid speed	-	-	Cut length 2^0	Cut length control operating mode
DI16	-	-	-	Cut length 2^1	Material sensor operating mode
DI17	-	-	-	Cut length 2^2	Mark sensor operating mode

- PO2: Setpoint cut length

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[0.1 × user unit]

- PO3: Minimum reversing position

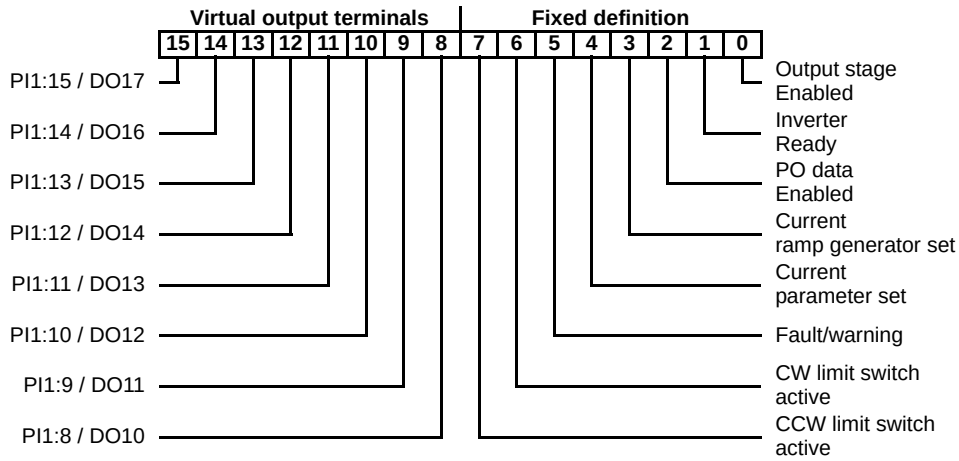
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[0.1 × user unit]

Process input data

Assignment of the process input data words:

- PI1: Status word 2



Assignment of the binary outputs DO10 ... DO17:

Binary outputs	Jogmode	Reference travel	Positioning	Automatic mode	
				(Terminal or bus with 1 PD)	(Bus with 3 PD)
DO1Ø	"0"	"1"	"0"	"1"	
DO11	"0"	"0"	"1"	"1"	
DO12	Reserved	Reserved	Home or parked position	Synchronous	
DO13	Reserved	Reserved	Reserved	Gap has been pulled	
DO14	Reserved	Reserved	Reserved	Cut length bit 0	Cut length control with label sensor operating mode
DO15	Reserved	Reserved	Reserved	Cut length bit 1	Material sensor operating mode
DO16	Reserved	Reserved	Reserved	Cut length bit 2	Mark sensor operating mode
DO17	Reserved	Reserved	Position reached	Start position	

- PI2: Cut length set

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[0.1 × user unit]

- PI3: Actual position of the saw drive

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[0.1 × user unit]

3.5 Safe stop

A "Safe stop" can only be achieved by safe disconnection of the jumpers at terminal X17 (with safety switch or safety PLC).

The "Safe stop active" state is indicated by a "U" in the 7-segment display. In the application module, this state is treated in the same way as the "CONTROLLER INHIBIT" state.

For more information on the "Safe stop" function, refer to the following publications:

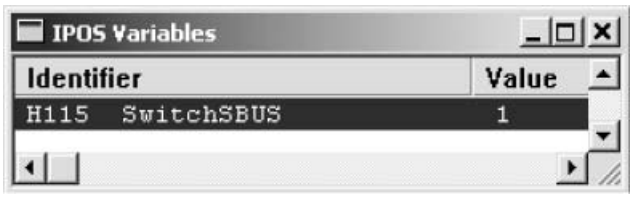
- MOVIDRIVE® MDX60B / 61B Safe Disconnection - Conditions
- MOVIDRIVE® MDX60B/61B Safe Disconnection - Applications

3.6 SBus send object

You have the option of setting up an SBus send object for transferring the cyclical actual position of the drive. In this way, the "flying saw" can be used as a master for the "DriveSync" application module or any IPOS$^{plus®}$ program.

Activating the SBus send object

To set up the SBus send object, set the IPOS$^{plus®}$ variable *H115 SwitchSBUS* to "1" and restart the IPOS$^{plus®}$ program (→following screenshot).



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Settings for the SBus objects

The send and synchronization objects are initialized automatically once the IPOS$^{plus®}$ program has been restarted. The content of the send object is set to IPOS$^{plus®}$ encoder.

	Send object	Synchronization object
ObjectNo	2	1
CycleTime	1	5
Offset	0	0
Format	4	0
DPointer	IPOS encoder	-

4 Installation

4.1 Software

MOVITOOLS®

The "Flying saw" application module is part of the MOVITOOLS® software (version 4.20 and higher). Proceed as follows to install MOVITOOLS® on your computer:

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

You can now use the Program Manager to start MOVITOOLS®. Proceed as follows to perform startup for the inverter using the MOVITOOLS® Manager:

- Select the language you want in the "Language" selection field.
- In the "PC Interface" selection field, select the PC port (e.g. COM 1) to which the inverter is connected.
- In the "Device Type" field, select "Movidrive B".
- In the "Baudrate" field, select the baud rate set on the basic unit with the DIP switch S13 (standard setting → "57.6 kBaud").
- Press the <Update> button to display the connected inverter.

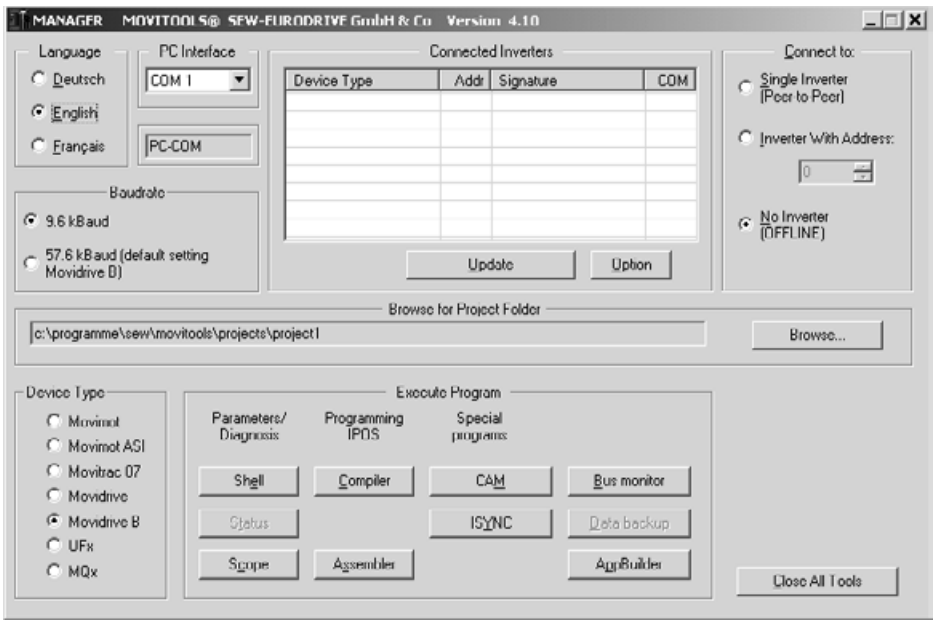

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Figure 8: MOVITOOLS® window

Application version

The "flying saw" application module can only be used on MOVIDRIVE® units in application version (...-0T). The application modules cannot be used on units in the standard version (-00).

4.2 Wiring diagram for MOVIDRIVE® MDX61B

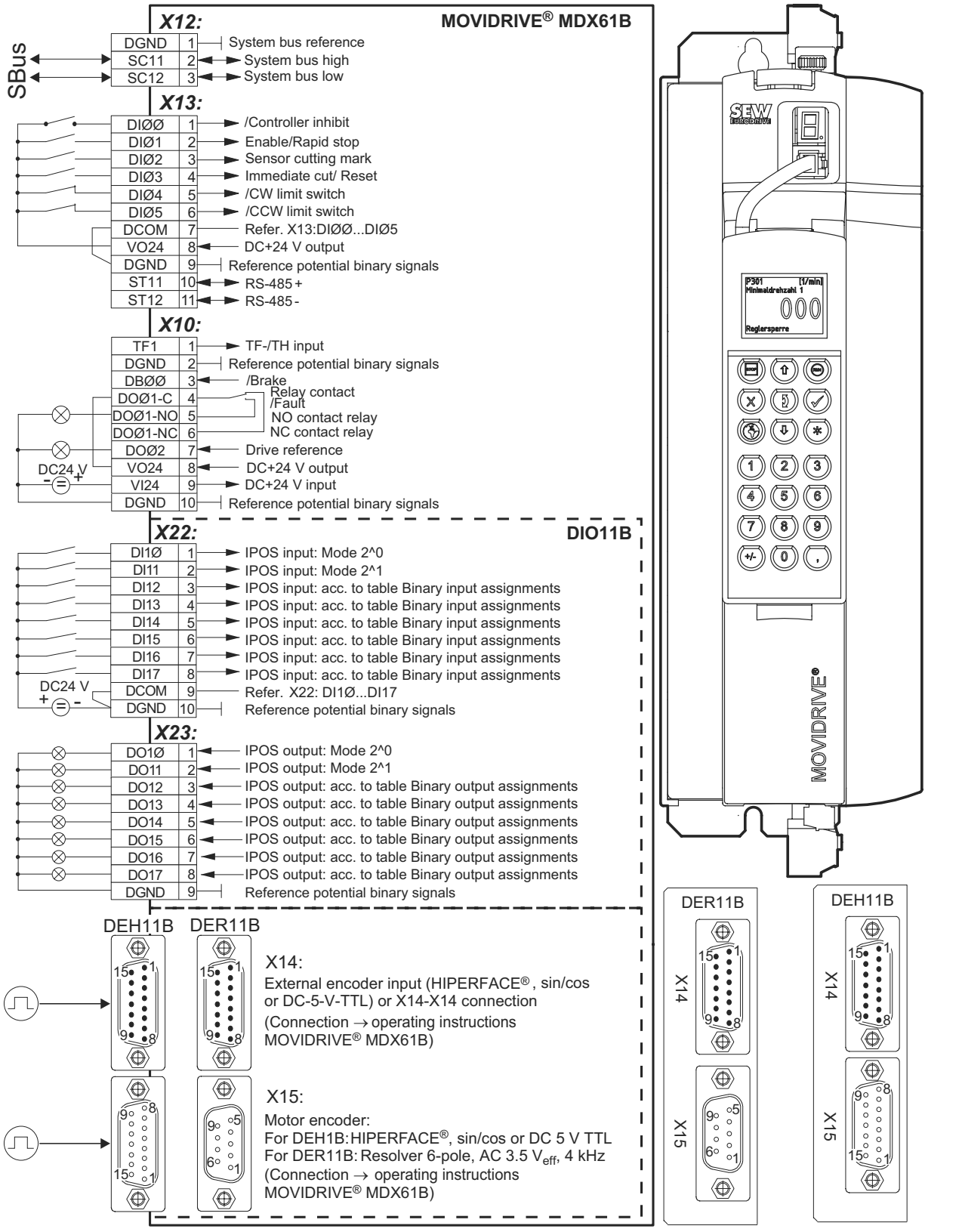

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Figure 9: Wiring diagram: MOVIDRIVE® MDX61B with option DIO11B and DEH11B or DE11B.

Assignment of the binary inputs DI10 ... DI17:

Inputs	Jog mode	Reference travel	Positioning	Automatic mode (terminal)
DI1Ø	"0"	"1"	"0"	"1"
DI11	"0"	"0"	"1"	"1"
DI12	-	Start reference travel	Start positioning	Start automatic mode
DI13	Jog+	-	Home or parked position	Pulling a gap
DI14	Jog -	-	-	Repositioning
DI15	Rapid speed	-	-	Cut length 2^0
DI16	-	-	-	Cut length 2^1
DI17	-	-	-	Cut length 2^2

Assignment of the binary outputs DO10 ... DO17:

Outputs	Jog mode	Reference travel	Positioning	Automatic mode (terminal)
DO1Ø	"0"	"1"	"0"	"1"
DO11	"0"	"0"	"1"	"1"
DO12	Reserved	Reserved	Home or parked position	Synchronous
DO13	Reserved	Reserved	Reserved	Gap has been pulled
DO14	Reserved	Reserved	Reserved	Cut length bit 0
DO15	Reserved	Reserved	Reserved	Cut length bit 1
DO16	Reserved	Reserved	Reserved	Cut length bit 2
DO17	Reserved	Reserved	Position reached	Start position

4.3 Bus installation for MOVIDRIVE® MDX61B

Overview

For bus installation, comply with the information in the relevant fieldbus manuals supplied with the fieldbus interfaces. Refer to the MOVIDRIVE® MDX60B/61B operating instructions for information on installing the system bus (SBus).

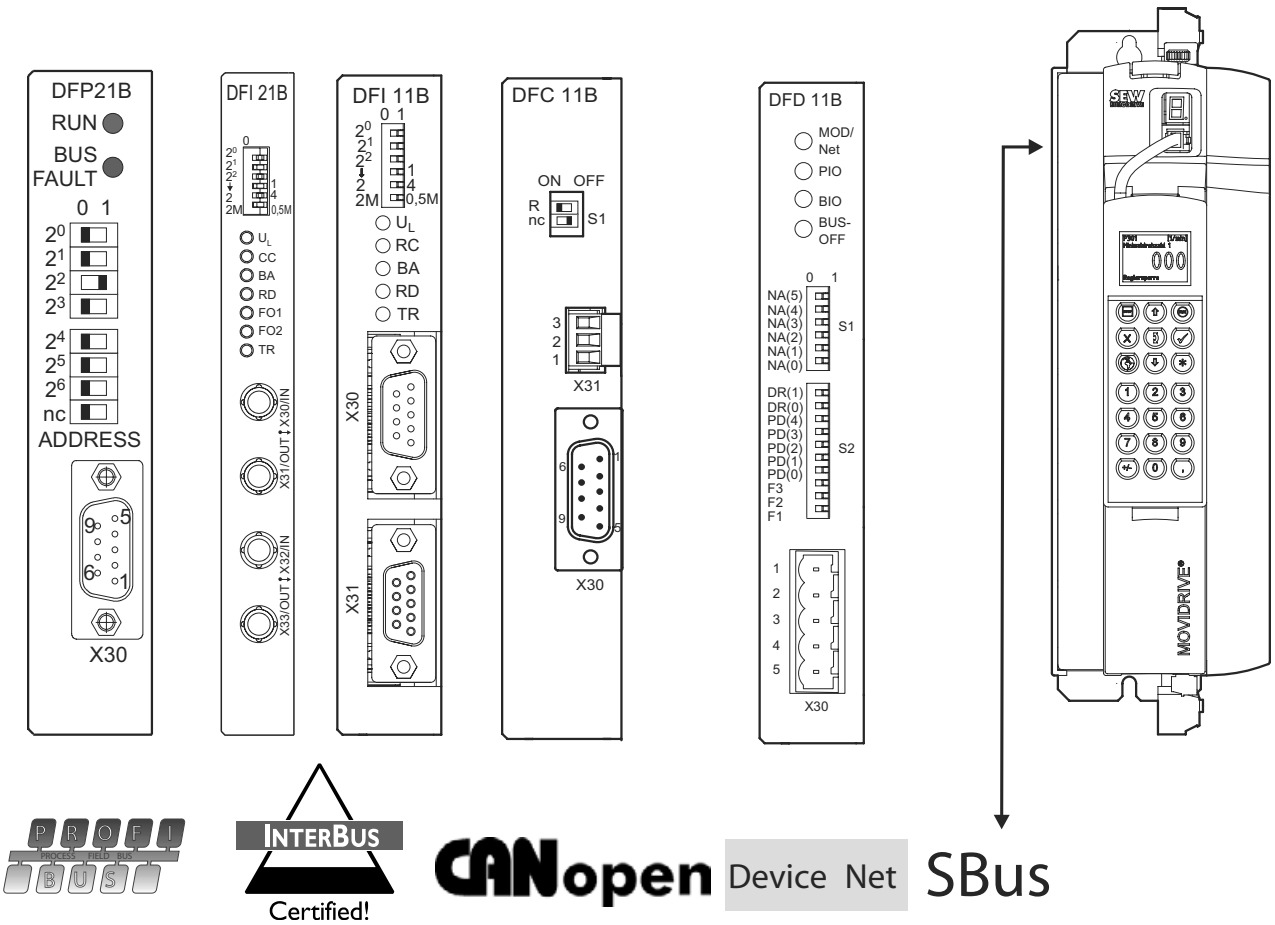

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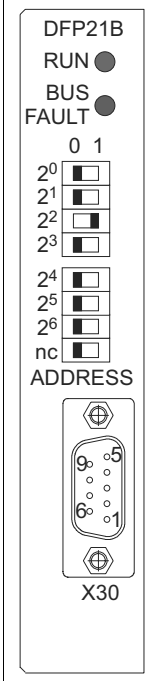
Figure 10: Bus types

PROFIBUS (DFP21B)

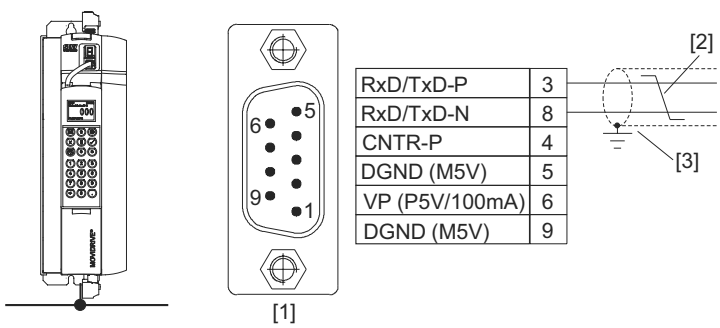
For more detailed information, refer to the "MOVIDRIVE® MDX61B Fieldbus interface DFP21B PROFIBUS DP" manual. This manual can be ordered from SEW-EURODRIVE. You can download the unit master data files (GSD) and type files for MOVIDRIVE® MDX61B from the SEW homepage (under the heading "Software") to facilitate startup.

Technical data

	Option	PROFIBUS type DFP21B fieldbus interface
	Part number	824 240 2
	Resources for startup and diagnostics	MOVITOOLS® software and DBG60B keypad
	Protocol option	PROFIBUS DP and DP-V1 to IEC 61158
	Supported baud rates	Automatic baud rate detection from 9.6 kBaud ... 12 MBaud
	Connection	9-pin Sub-D socket Assignment to IEC 61158
	Bus termination	Not integrated, must be implemented in the PROFIBUS connector.
	Station address	0 ... 125, can be set using DIP switch
	GSD file	SEWA6003.GSD
	DP identity number	6003 hex = 24579 dec
	Max. number of process data	10 process data
	Weight	0.2 kg (0.44 lb)

1. Green LED: RUN
2. Red LED: BUS FAULT
3. DIP switch for setting the station address
4. 9-pin Sub-D socket: bus connection

Pin assignment



55276AXX

Figure 11: Assignment of 9-pin sub D plug to IEC 61158

(1) 9-pin sub-D connector

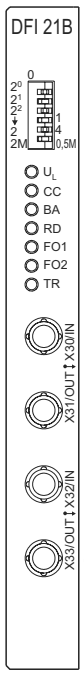
(2) Twist the signal wires together!

(3) Conductive connection is necessary between the plug housing and the shield!

INTERBUS with fiber optic cable (DFI21B)

For more detailed information, refer to the "MOVIDRIVE® MDX61B Fieldbus Interface DFI21B INTERBUS with Fiber Optic Cable" manual. This manual can be ordered from SEW-EURODRIVE.

Technical data

	Option	INTERBUS fieldbus interface type DFI21B (FO)
 55288AXX	Part number	824 311 5
	Resources for startup and diagnostics	MOVITOOLS® software, DBG60B keypad and CMD tool
	Supported baud rates	500 kBaud and 2 MBaud, can be selected via DIP switch
	Connection	Remote bus input: 2 F-SMA connectors Remote bus output: 2 F-SMA connectors Optically controlled FO interface
	Weight	0.2 kg (0.44 lb)

1. DIP switches for setting the process data length, PCP length and baud rate
2. Diagnostic LEDs
3. FO: Remote IN
4. FO: Incoming remote bus
5. FO: Remote OUT
6. FO: Outgoing remote bus

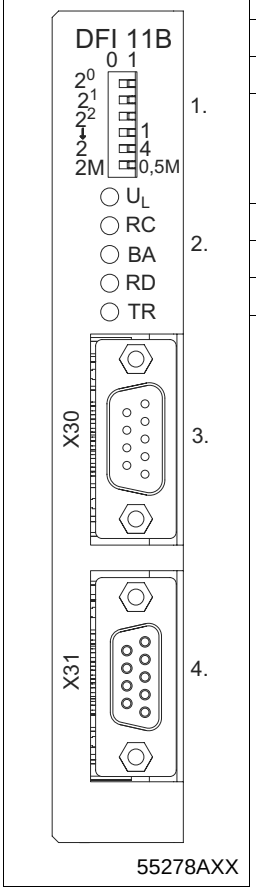
Connection assignment

Position	Signal	Direction	Wire color of FO cable
3	FO Remote IN	Receive data	Orange (OG)
4	Incoming remote bus	Send data	Black (BK)
5	FO Remote OUT	Receive data	Black (BK)
6	Outgoing remote bus	Send data	Orange (OG)

INTERBUS (DFI11B)

For more detailed information, refer to the "MOVIDRIVE® MDX61B Fieldbus Interface DFI11B INTERBUS" manual. This manual can be ordered from SEW-EURODRIVE.

Technical data

	Option	INTERBUS fieldbus interface type DFI11B
	Part number	824 309 3
	Resources for startup and diagnostics	MOVITOOLS® software and DBG60B keypad
	Supported baud rates	500 kBaud and 2 MBaud, can be selected via DIP switch
	Connection	Remote bus input: 9-pin sub-D connector Remote bus output: 9-pin Sub-D socket RS-485 transmission technology, 6-core shielded and twisted-pair cable
	Module ID	$E3_{hex} = 227_{dec}$
	Max. number of process data	6 process data
	Weight	0.2 kg (0.44 lb)

1. DIP switches for setting the process data length, PCP length and baud rate
2. Diagnostic LEDs: 4 x green LED (U_L, RC, BA, TR); 1 x red LED (RD)
3. 9-pin sub-D connector: Remote bus input
4. 9-pin Sub-D socket: Remote bus output

Pin assignment

Core color abbreviations to IEC 757.

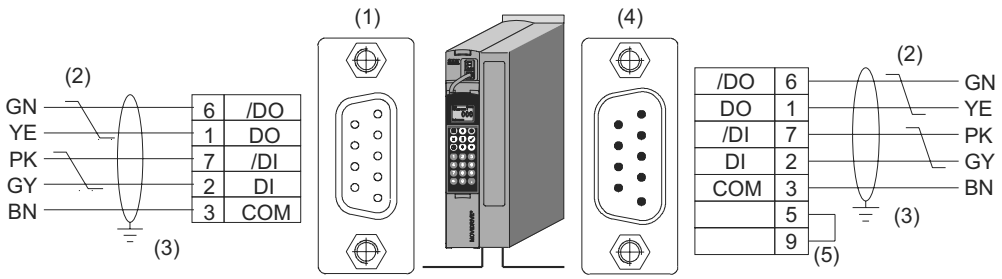


Figure 12: Assignment of the 9-pin sub D socket of the incoming remote bus cable and the 9-pin sub D plug of the outgoing remote bus cable

(1) 9-pin sub D socket of the incoming remote bus cable

(2) Twist the signal wires together!

(3) Conductive connection is necessary between the plug housing and the shield!

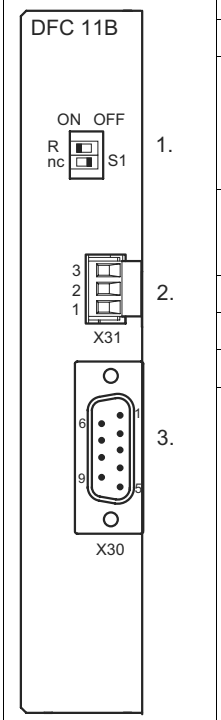
(4) 9-pin sub D plug of the outgoing remote bus cable

(5) Jumper pin 5 with pin 9!

CANopen (DFC11B)

For more information, refer to the "Communication" manual, which can be ordered from SEW-EURODRIVE (expected to be available from 03/2005).

Technical data

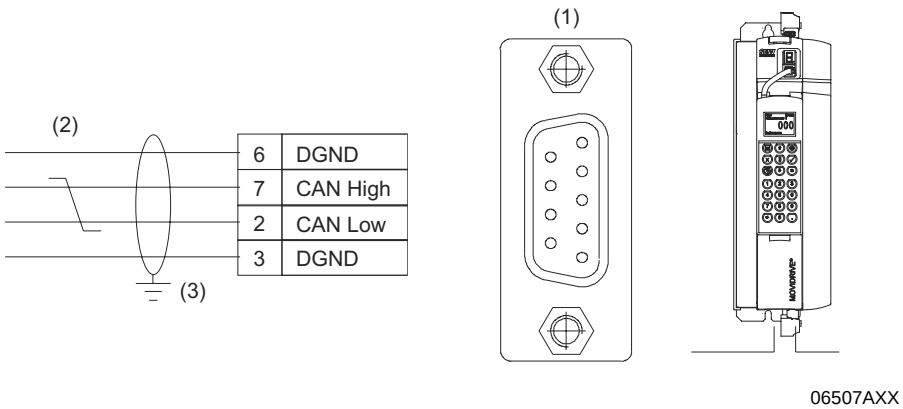
	Option	CANopen fieldbus interface type DFC11B
 55284AXX	Part number	824 317 4
	Resources for startup and diagnostics	MOVITOOLS® software and DBG60B keypad
	Supported baud rates	Setting using parameter P894: • 125 kbaud • 250 kbaud • 500 kbaud • 1000 kbaud
	Connection	9-pin sub D connector (X30) Assignment to CiA standard 2-core twisted cable to ISO 11898
	Bus termination	Can be activated using DIP switch (120 Ω)
	Address range	1 ... 127, can be selected using DIP switch
	Weight	0.2 kg (0.44 lb)

1. DIP switch for setting the bus terminating resistor
2. X31: CAN bus connection
3. X30: 9-pin sub-D connector: CAN bus connection

Connection MOVIDRIVE® - CAN

The DFC11B option is connected to the CAN bus at X30 or X31 in the same way as the SBus in the basic unit (X12). In contrast to the SBus1, SBus2 is electrically isolated and made available via option DFC11B.

Pin assignment (X30)



06507AXX

Figure 13: Assignment of 9-pin sub D socket of the bus cable

(1) 9-pin Sub-D socket

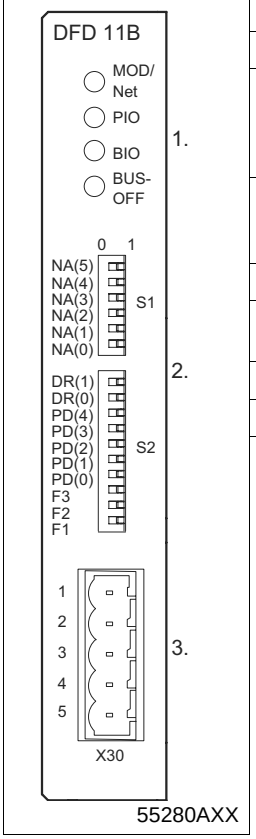
(2) Twist the signal wires together!

(3) Conductive connection is necessary between the plug housing and the shield!

DeviceNet (DFD11B)

For more detailed information, refer to the "MOVIDRIVE® MDX61B Fieldbus Interface DFD11B DeviceNet" manual. This manual can be ordered from SEW-EURODRIVE. You can download the EDS files for MOVIDRIVE® MDX61B from the SEW homepage (under the heading "Software") to facilitate startup.

Technical data



	Option	DeviceNet fieldbus interface type DFD11B
	Part number	824 972 5
	Resources for startup and diagnostics	MOVITOOLS® software and DBG60B keypad
	Supported baud rates	Can be selected using DIP switch: • 125 kbaud • 250 kbaud • 500 kbaud
	Connection	5-pin Phoenix terminal Assignment according to DeviceNet specification (Volume I, Appendix A)
	Permitted line cross section	According to DeviceNet specification
	Bus termination	Use of bus connectors with integrated bus terminating resistor (120 Ω) at the start and end of a bus segment.
	Address range that can be set (MAC-ID)	0 ... 63, can be selected using DIP switch
	Weight	0.2 kg (0.44 lb)

1. LED display
2. DIP switch for setting the node address (MAC-ID), the process data lengths and baud rate
3. 5-pin Phoenix terminal: bus connection

Terminal assignment

The assignment of connecting terminals is described in the DeviceNet specification Volume I, Appendix A.

Terminal	Description	Color
X30:1	V- (0V24)	Black (BK)
X30:2	CAN_L	Blue (BU)
X30:3	DRAIN	Blank
X30:4	CAN_H	White (WH)
X30:5	V+ (+24 V)	Red (RD)

4.4 System bus connection (SBus 1)

Only if P816 "SBus baud rate" = 1000 kbaud:

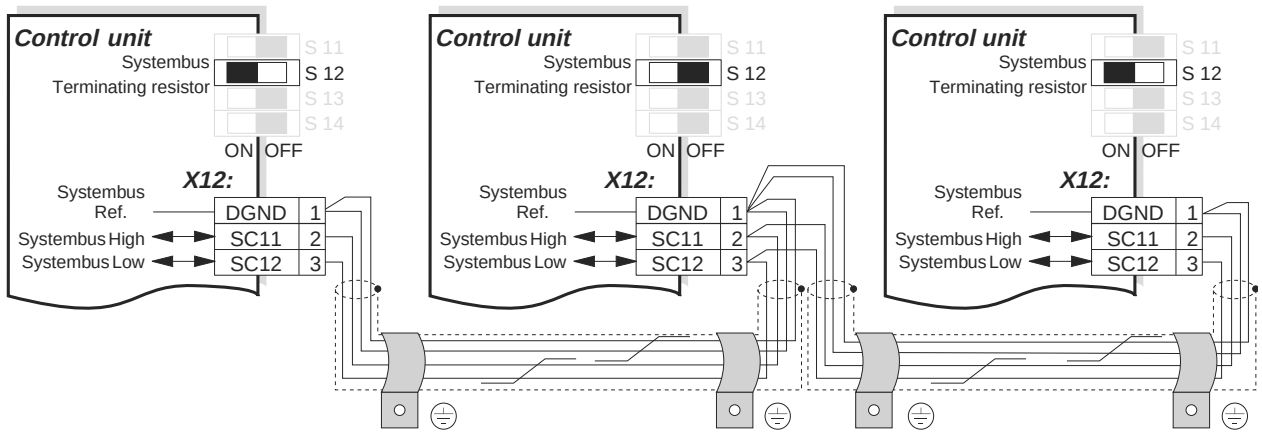
MOVIDRIVE® *compact* MCH4_A units must not be combined with other MOVIDRIVE® units in the same system bus combination.

The units may be combined at baud rates ≠ 1000 kbaud.

Max. 64 CAN bus stations can be addressed using the system bus (SBus). Use a repeater after 20 or 30 stations, depending on the length of the cables and the cable capacity. The SBus supports transmission technology compliant with ISO 11898.

The "Serial Communication" manual contains detailed information about the system bus. This manual can be ordered from SEW-EURODRIVE.

SBus wiring diagram



54534AEN

Figure 14: System bus connection

Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Core cross section 0.25 ... 0.75 mm^2 (AWG 23 ... AWG 18)
  - Line resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Shielding

- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.

Cable length

- The permitted total cable length depends on the baud rate setting of the SBus (P816):
  - 125 kbaud → 320 m
  - 250 kbaud → 160 m
  - **500 kBaud → 80 m**
  - 1000 kbaud → 40 m

Terminating resistor

- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the other units (S12 = OFF).

- There must not be any potential displacement between the units connected with the SBus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.5 Wiring diagram: MOVIDRIVE® compact MCH4_A

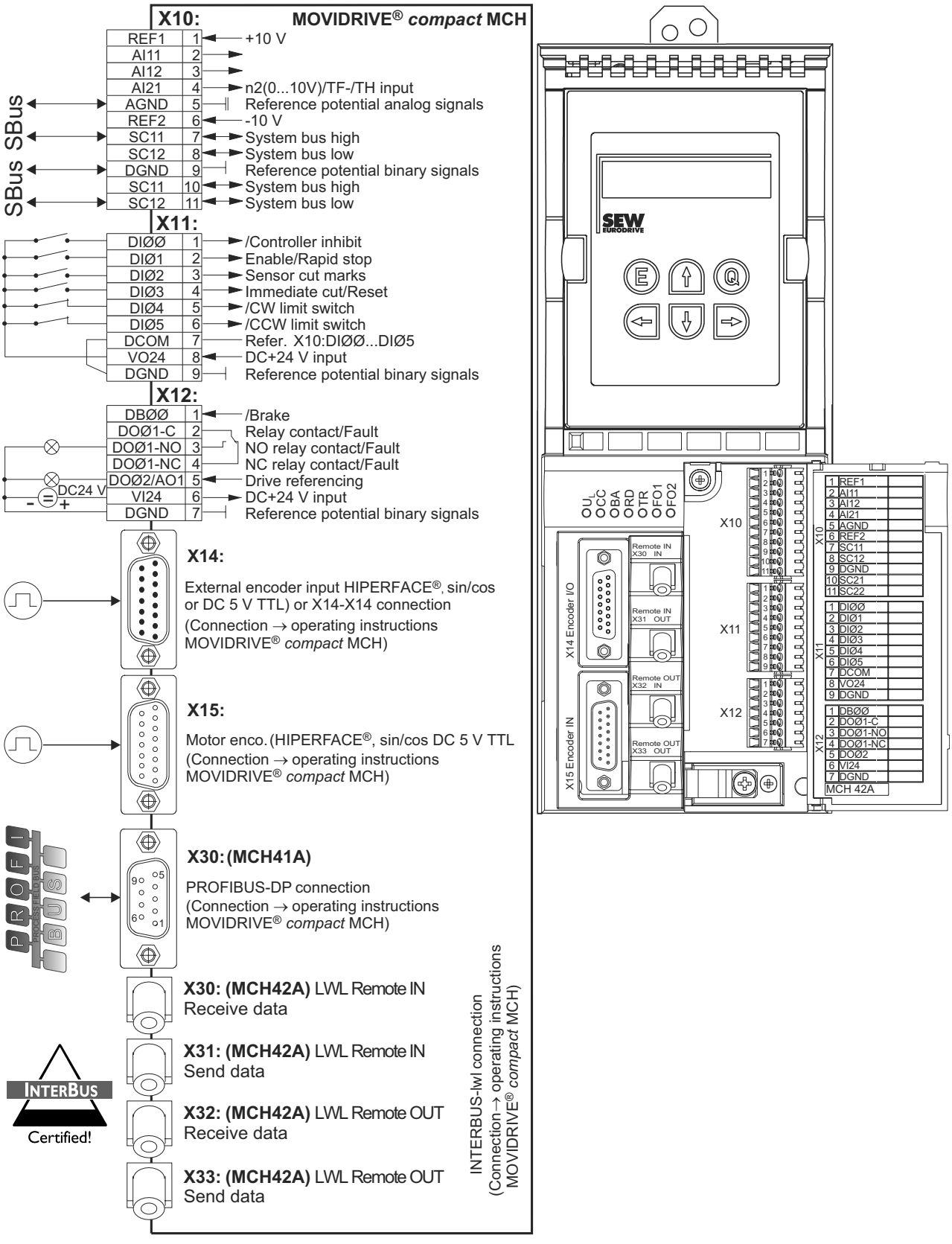
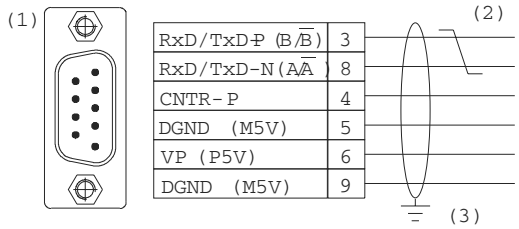


Figure 15: Wiring diagram: MOVIDRIVE® compact MCH4_A

PROFIBUS-DP (MCH41A) pin assignment

Refer to the instructions in the MOVIDRIVE® *compact* (MCV/MCS or MCH) operating instructions.



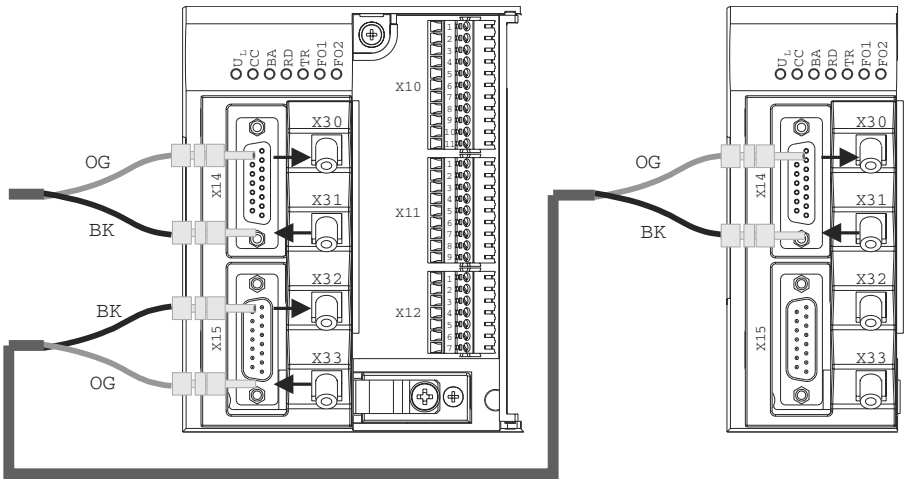
04915AXX

Figure 16: Assignment of 9-pin sub D plug to EN 50170 V2

(1) X30: 9-pin sub-D connector
(2) Twist the signal wires together!
(3) Conductive connection is necessary between the plug housing and the shield!

INTERBUS FO (MCH42A) pin assignment

Refer to the instructions in the MOVIDRIVE® *compact* MCH operating instructions.



05208AXX

Figure 17: FO connection assignment

Connection	Signal	Direction	Wire color of FO cable
X30	FO Remote IN (Incoming remote bus)	Receive data	Orange (OG)
X31		Send data	Black (BK)
X32	FO Remote OUT (outgoing remote bus)	Receive data	Black (BK)
X33		Send data	Orange (OG)

System bus (SBus) MCH

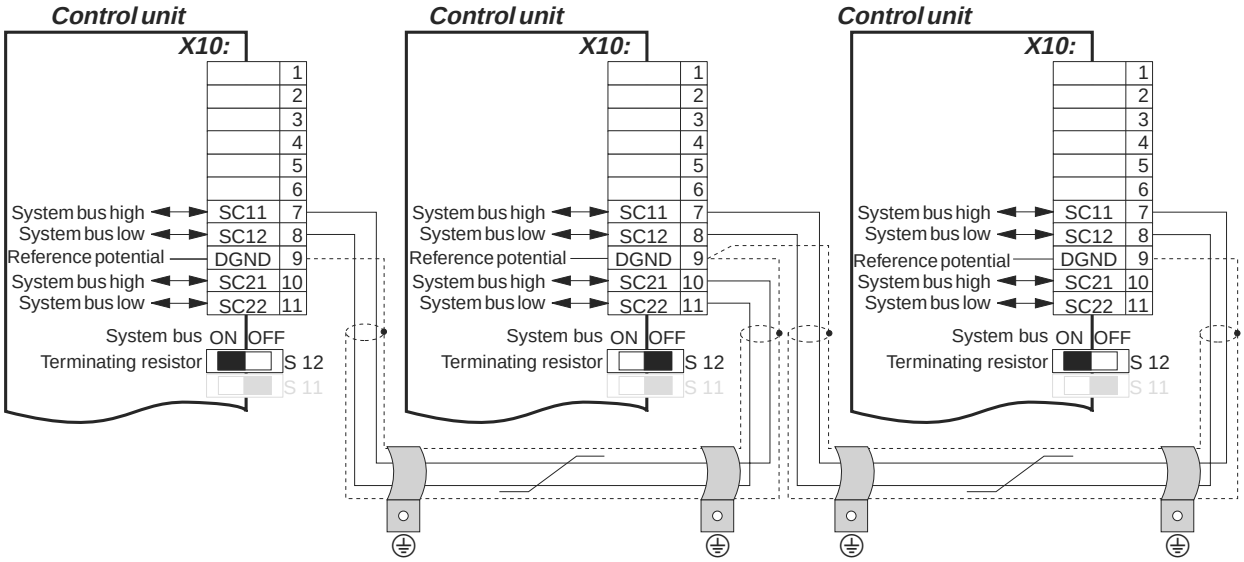
The "System bus (SBus)" manual contains detailed information. This manual can be ordered from SEW-EURODRIVE.

A maximum of 64 CAN bus stations can be connected using the system bus (SBus). The SBus supports transmission technology compliant with ISO 11898.

Only if P816 "SBus baud rate" = 1000 kbaud:

MOVIDRIVE® *compact* MCH4_A units must not be combined with other MOVIDRIVE® units in the same system bus combination.

The units may be combined at baud rates ≠ 1000 kbaud.



05210AEN

Figure 18: MOVIDRIVE® compact MCH4_A system bus connection

Cable specification

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Core cross section 0.75 mm^2 (AWG 18)
  - Line resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Shielding

- Connect the shield at both ends to the electronics shield clamp of the inverter or the master controller and ensure the shield is connected over a large area. Also connect the ends of the shield to DGND.

Cable length

- The permitted total cable length depends on the baud rate setting of the SBus (P816):
  - 125 kbaud → 320 m
  - 250 kbaud → 160 m
  - **500 kBaud → 80 m**
  - 1000 kbaud → 40 m

Terminating resistor

- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Disconnect the terminating resistor at the other devices (S12 = OFF).

- There must not be any potential displacement between the units connected with the SBus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

5 Startup

5.1 General information

Correct project planning and installation are the prerequisites for successful startup. For detailed project planning information, refer to the MOVIDRIVE® MDX60/61B and MOVIDRIVE® *compact* manuals.

Check the installation, including the encoder connection, by following the installation instructions in the MOVIDRIVE® operating instructions and in this manual (→ Sec. Installation).

5.2 Preliminary work

Perform the following steps before startup:

- Connect the inverter to the PC via the serial port.
  - With MDX61B: Xterminal via UWS21A option with PC-COM
  - With MCH4_A: TERMINAL via USS21A option with PC-COM
- Install the MOVITOOLS® SEW software (version 3.0 and higher).
- Start up the inverter using "MOVITOOLS/Shell."
  - MDX61B or MCH4_A with asynchronous motor: **CFC operating modes**
  - MDX61B or MCH4_A with synchronous motor: **SERVO operating modes**
- Select the menu path "MOVITOOLS/Shell/Startup/Select Technology Function...".

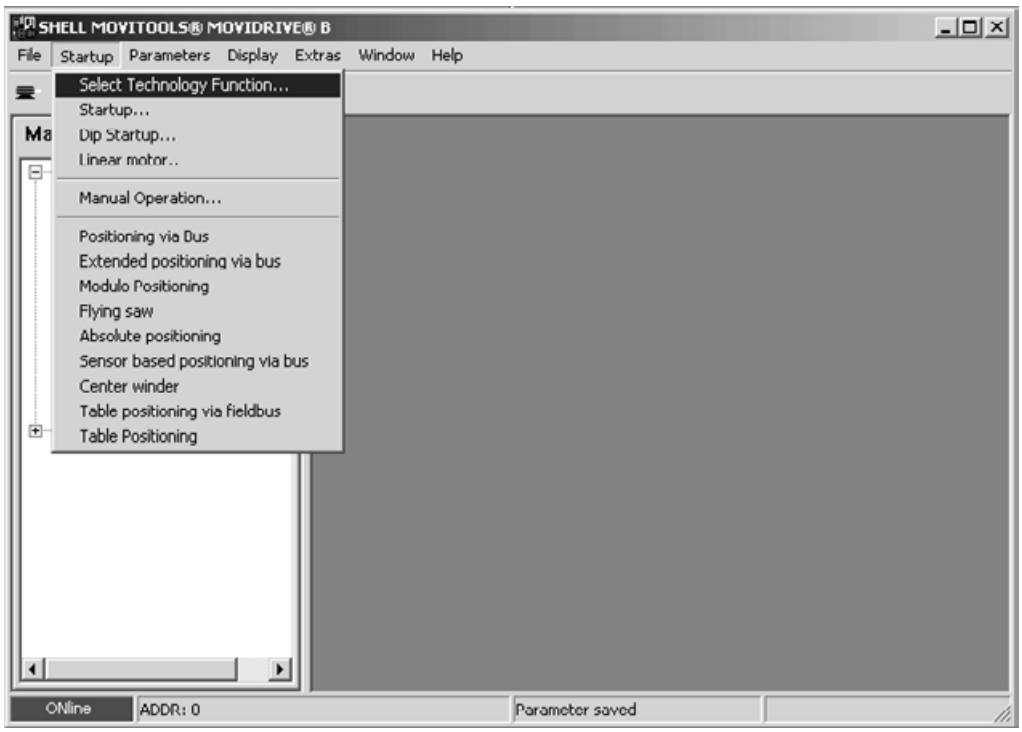


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Figure 19: Starting up the inverter

- Enter a "0" signal at terminal DIØØ "/CONTROLLER INHIBIT/".
- Select the "ISynch" technology function.

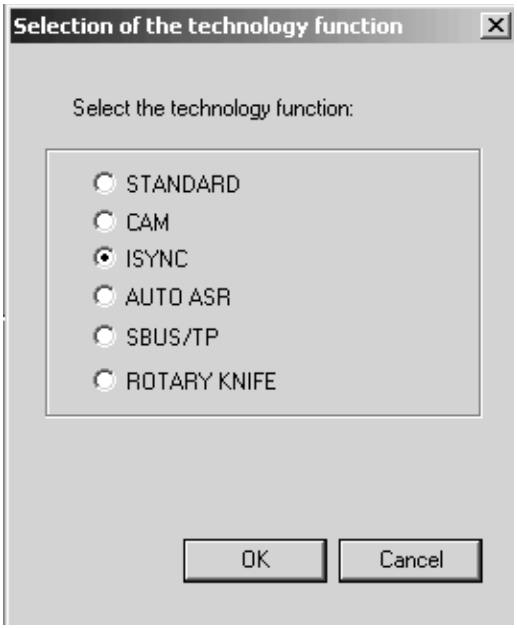

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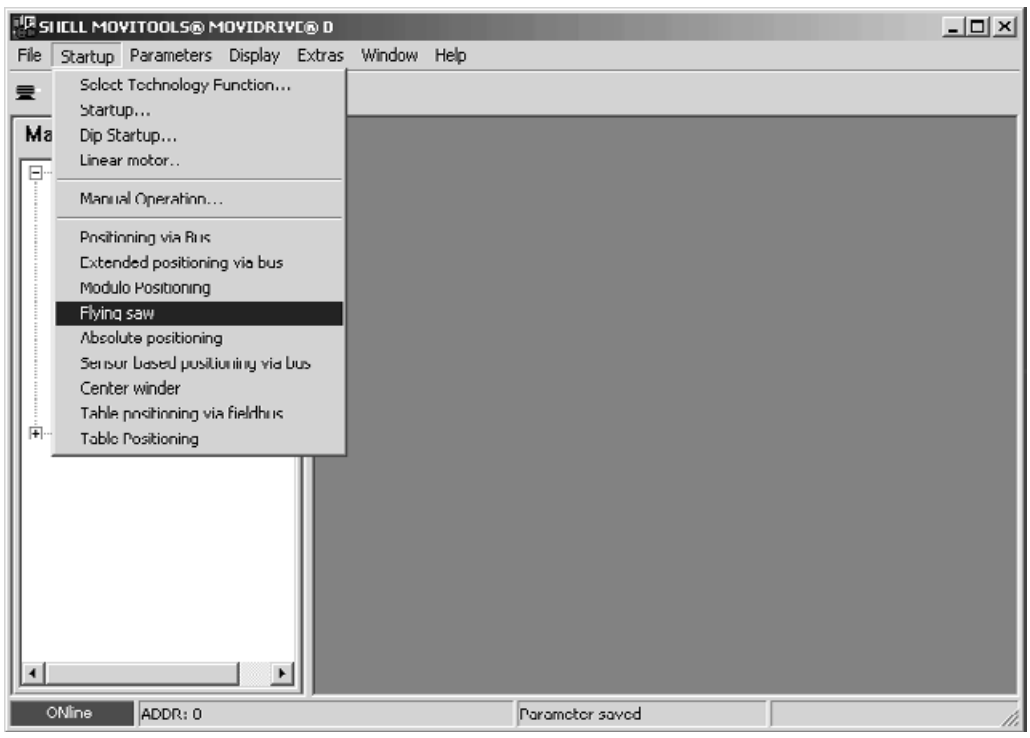
Figure 20: Select the "ISynch" technology function

5.3 Starting the "Flying saw" program

General information

- Start "MOVITOOLS/Shell."
- Select "Startup/Flying saw."



11135AEN

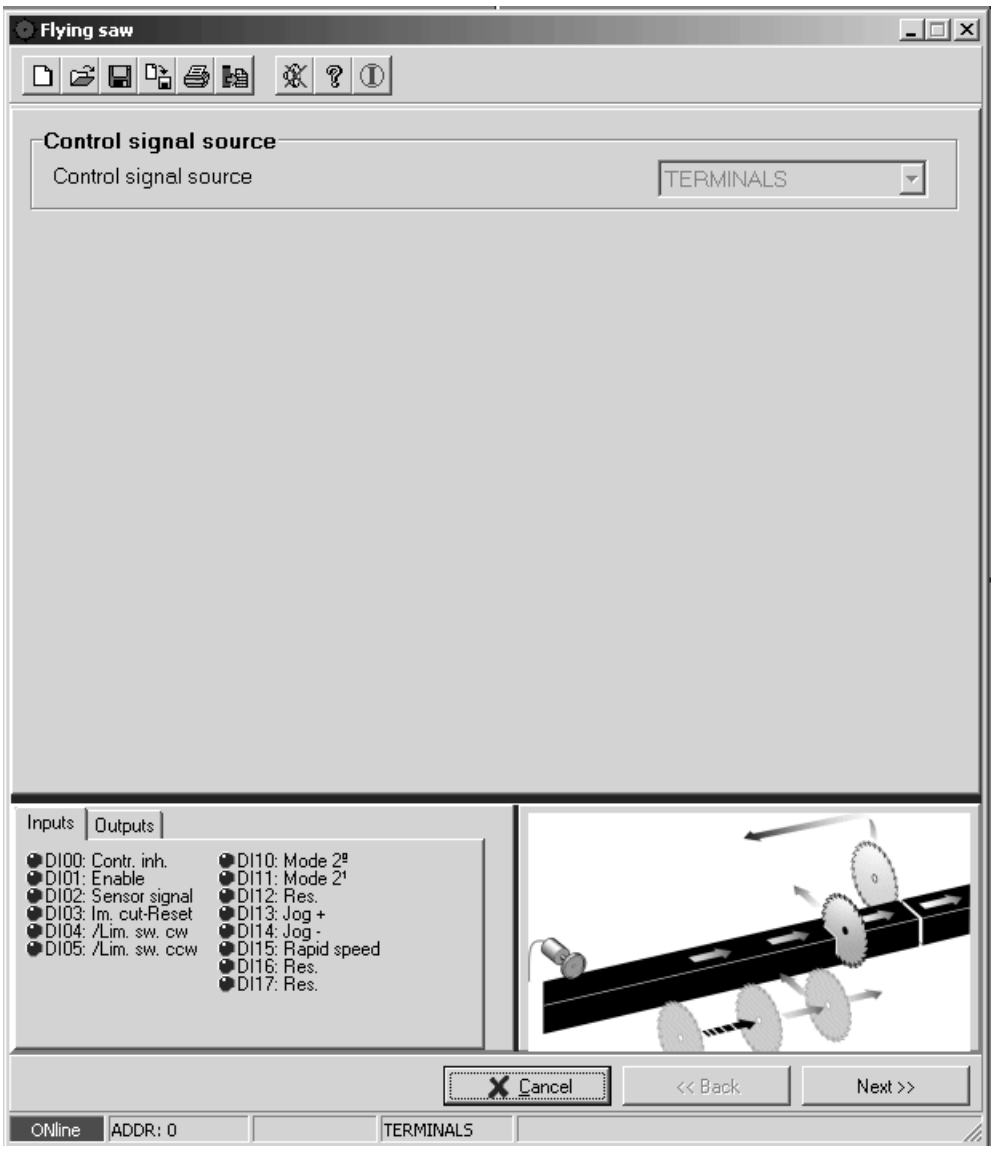
Figure 21: Starting the "Flying saw" program

Initial startup

The startup windows will appear immediately if the "flying saw" is started for the first time.

Step 1: Control signal source, fieldbus parameters and process data assignment

Control via terminals:



11093AEN

Figure 22: Setting the control signal source

- **Control signal source:**"TERMINALS" is set automatically for terminal control (that is, option DIO11B is installed).

Control via SBus / fieldbus with 1 PD or 3 PD (fieldbus option, e.g. DFP21B, is installed; option DIO11B is not installed):

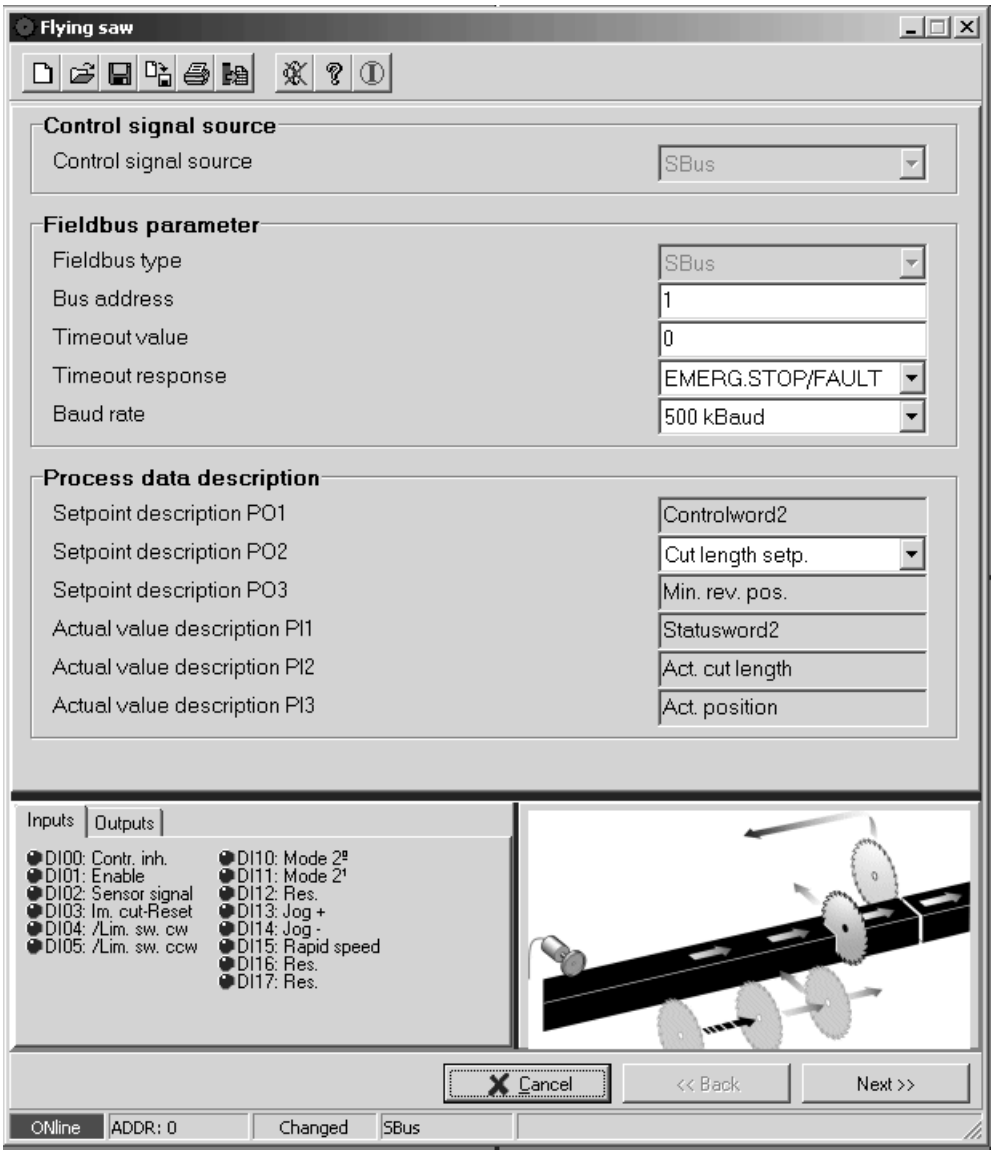


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Figure 23: Setting the control signal source, fieldbus parameters and process data assignment

- **Control signal source:** "FIELDBUS" or "SBUS" is set automatically with bus control.
- **Fieldbus parameters:** Set the fieldbus parameters. Fixed parameters are blocked and cannot be changed.
- **Process data assignment:** Set the functions of process output data word PO2. You can set one of the following functions:
  - No function: Setting for cut length control and for operation with 1 PD. The cut lengths are available as table values.
  - Setpoint cut length: Setting for operation with 3 PD and cut length control. The cut length is specified as a variable via the bus.

  If "No function" is set, then process output data word PO3 also has no function. If "Setpoint cut length" is set, PO3 has the "Minimum reversing position" function. The minimum reversing position is the earliest possible position of the drive at which it can be decoupled and it is possible to move back to the home position.

Step 2: Calculating the master scaling

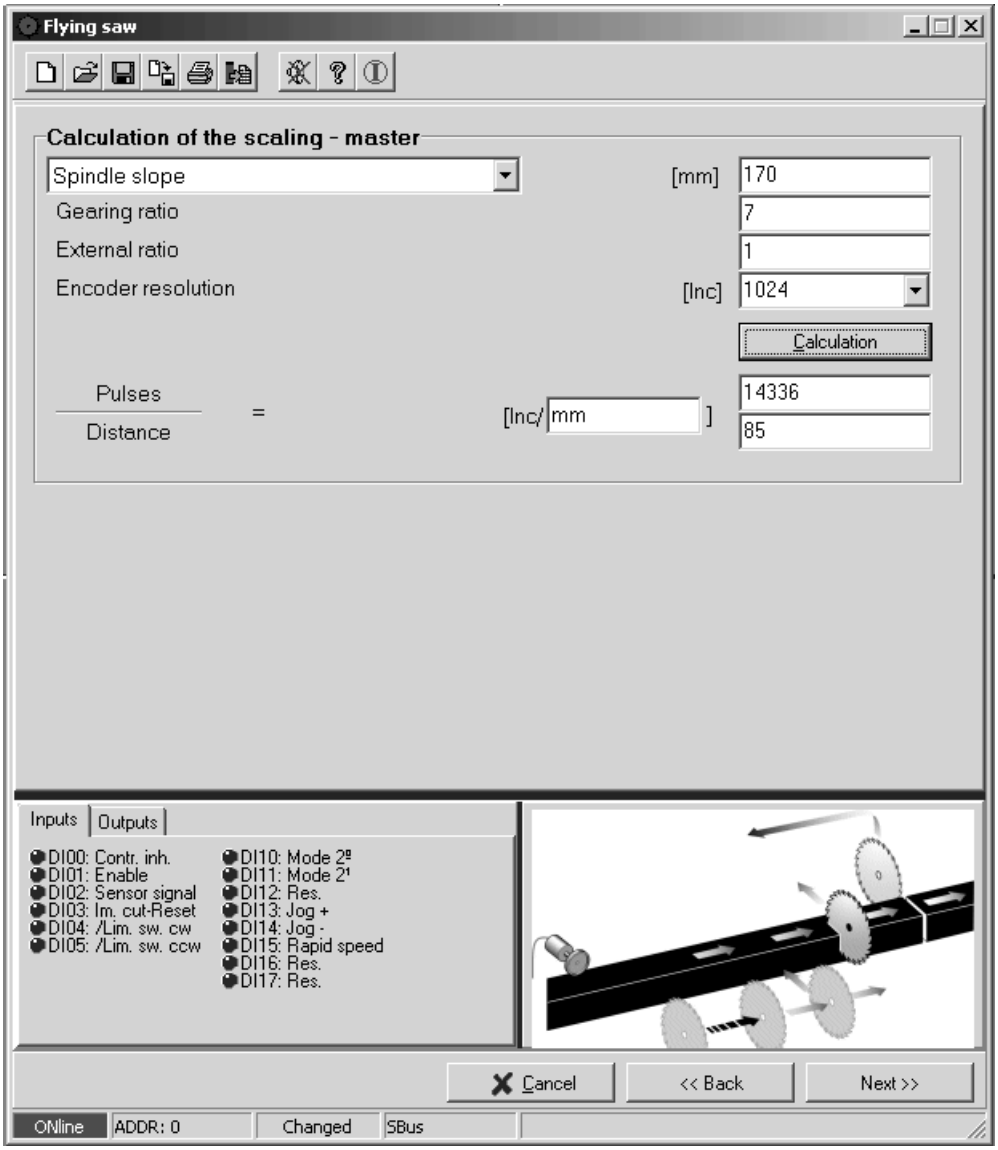

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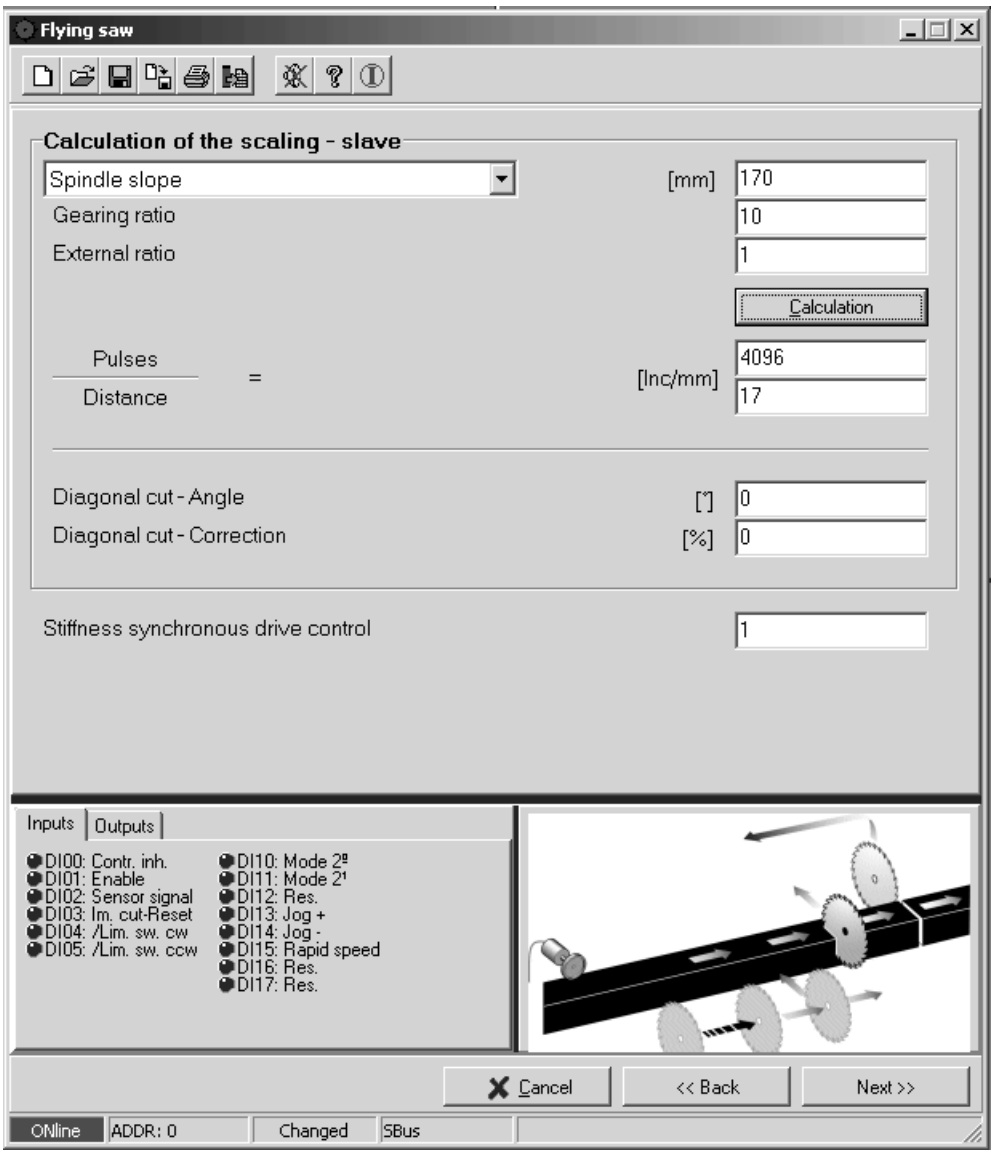
Figure 24: Setting parameters for calculating the master scaling

- **Diameter of driving wheel or spindle pitch:** Select whether you have to enter "Diameter of driving wheel" or "Spindle pitch." Enter the value in [mm]. The value must not exceed two decimal places.
- **Gear ratio (i gear unit):** Enter the gear ratio of the gear unit. The value must not exceed three decimal places.
- **Additional gear ratio (i additional gear):** Enter the gear ratio of the additional gear if you are using one. Enter the value 1 if you are not using an additional gear. The value must not exceed three decimal places.
- **Encoder resolution [Inc]:** Enter the resolution of the encoder in increments according to the nameplate.
- **Calculate the master scaling:** Click the <Calculation> button. The program then calculates the pulses per distance in [increments/mm].

- **Stiffness for synchronous drive control:** You can set the stiffness of the control loop used for synchronous drive control. The default setting is 1. Set a value less than 1 if the slave drive tends to oscillate. Set a value greater than 1 if the slave cannot follow the master (lag error). Make changes in small steps, for example 0.01. The usual range of values is 0.7 ... 1.3. An entry in the "Stiffness synchronous drive control" has an effect on the parameter *P228 Feedforward filter*. When the unit is started again, P228 will be overwritten.
- **User unit [Inc/...]:** The user unit "mm" is set by default. You must enter a larger user travel unit, for example "cm", for travel distances in excess of 6.50 m. You will then have to change the conversion factor manually, e.g. "60" instead of "6" for the user travel unit "cm" instead of "mm."

Step 3: Calculating the master scaling

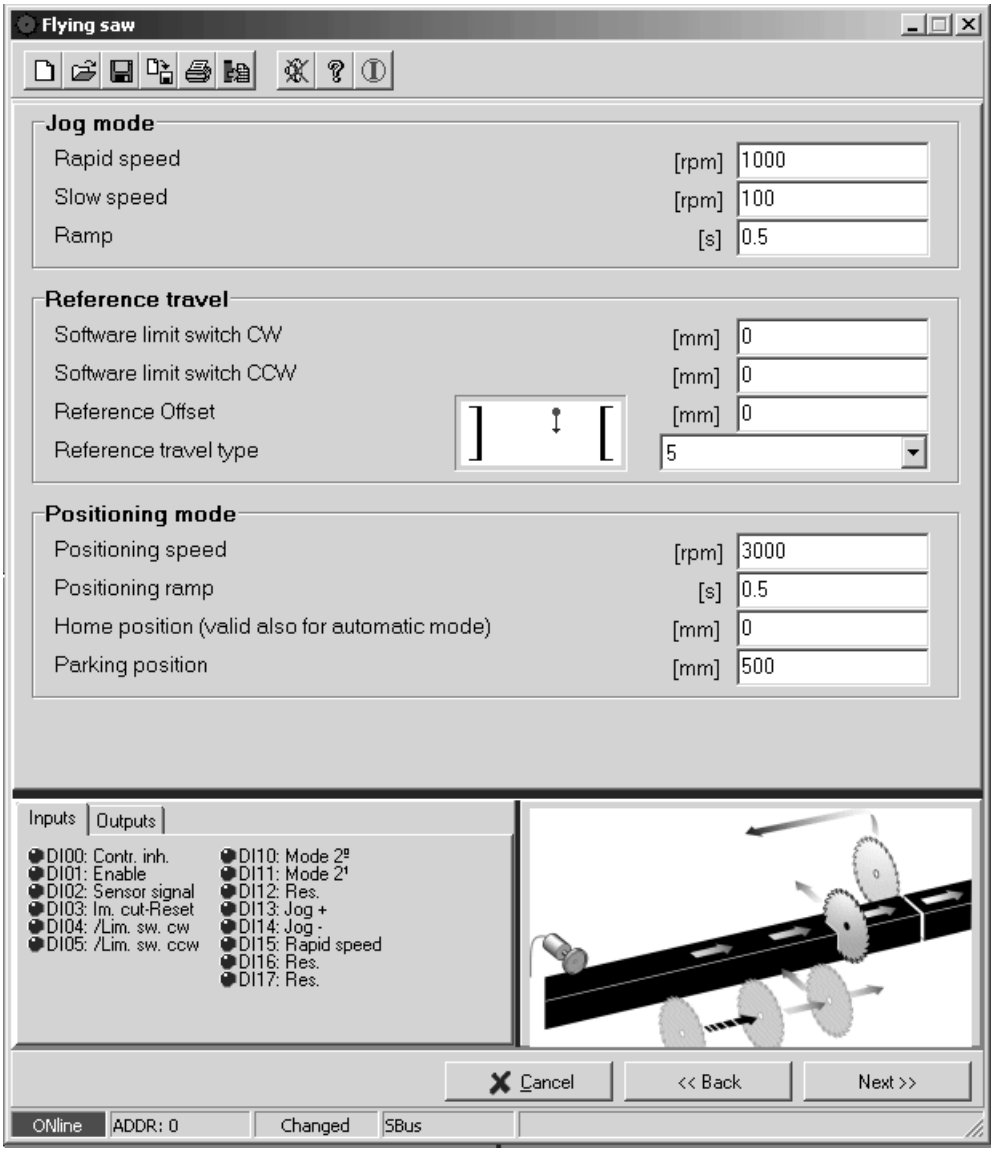


11095AEN

Figure 25: Setting parameters for calculating the slave scaling

- **Diameter of driving wheel or spindle pitch:** Select whether you have to enter "Diameter of driving wheel" or "Spindle pitch." Enter the value in [mm]. The value must not exceed two decimal places.
- **Gear ratio (i gear unit):** Enter the gear ratio of the gear unit. The value must not exceed three decimal places.
- **Additional gear ratio (i additional gear):** Enter the gear ratio of the additional gear if you are using one. Enter the value 1 if you are not using an additional gear. The value must not exceed three decimal places.
- **Calculate the slave scaling:** Click the <Calculation> button. The program then calculates the pulses per distance in [increments/mm].
- **Changing direction of rotation:** Use this setting if the slave runs in the opposite direction to the master. Do not use parameter P350 "Change direction of rotation."
- **Diagonal cut:** If you are using a diagonal saw, enter the required angle between the saw feed direction and the material feed direction. The correction value enables you to align the cut angle exactly. Enter a maximum of ±10 % as the correction angle; the resolution is 0.01 %. If you are not using a diagonal saw, enter the value 0 for both the angle and the correction. The value must not exceed two decimal places.

Step 4: Jog mode, reference travel and positioning



11096AEN

Figure 26: Setting parameters for jog mode, reference travel and positioning

- **Jog mode:** Set the "Rapid speed", "Slow speed" and "Ramp" parameters.
- **Reference travel:** Define the positions of the software limit switches, the reference offset and the reference travel type. The reference offset can be used to change the machine zero point without having to adjust the reference position. You can set the following reference travel types:
  - Type 0: Referencing to the next encoder zero pulse
  - Type 3: Referencing to the CW limit switch (falling edge of the limit switch)
  - Type 4: Referencing to the CCW limit switch (falling edge of the limit switch)
  - Type 5 or type 8: No reference travel, current position is machine zero point
- **Positioning parameters:** Set parameters "Positioning speed", "Positioning ramp", "Home position" and "Parking position." The home position is the rest position for the "flying saw." The sawing procedure starts from the home position. You can use the parking position to move flying saw out of the working area for maintenance work.

  Important: Set parameter *P302 Maximum speed 1* ca. 10 % above the maximum travel speed.

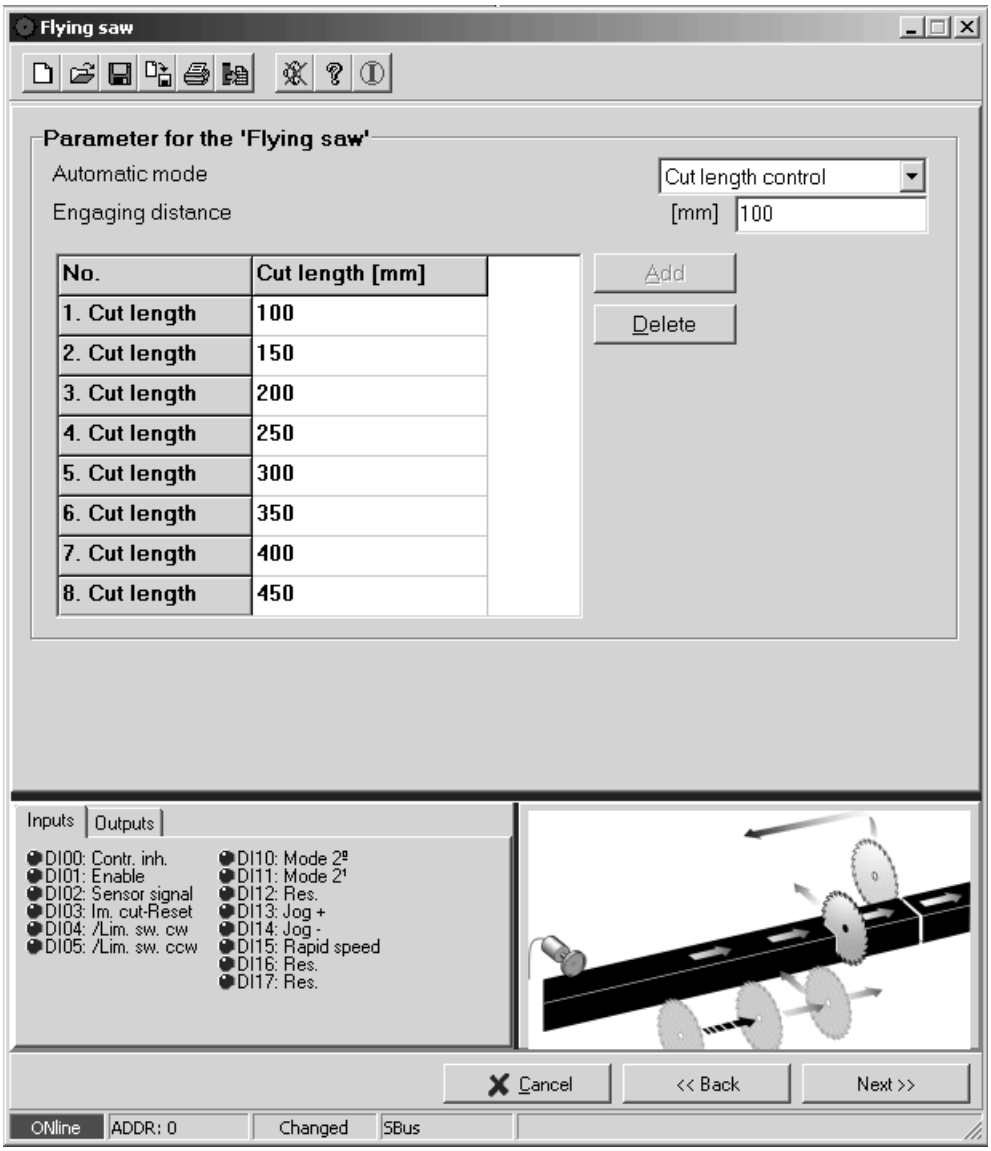
Step 5: Entering parameters for the saw

In this startup window, you define how the "flying saw" will be controlled.

The settings "Cut length control with / without material sensor" and "Cut length control with label sensor" that are described in this section only apply to terminal control and fieldbus control with 1 PD (→ Example 1 to example 3). Example 4 applies to fieldbus control with 3 PD.

Example 1: Cut length control without material sensor

You specify the cut length. The position of the material is measured either using an external encoder on the web or the motor encoder of the web drive. With control via terminals (MDX61B with DIO11B option) or via bus (fieldbus or system bus) with one process data word (1 PD), you can specify a maximum of eight cut lengths at startup. You must select the cut length for the particular sawing procedure in binary code using binary inputs DI15, DI16 and DI17 (terminal control) or the process output data PO1:13, PO1:14 and PO1:15 (bus control with 1 PD).



11097AEN

Figure 27: Cut length control without material sensor (terminal or bus with 1 PD)

– **Engaging distance:** Enter the distance in [mm] for the startup cycle process. During the startup cycle process, the slave drive (= saw carriage) is brought into synchronous operation with the master drive (material feed).
– **Cut length [mm]:** Enter the required cut length. You can specify up to 8 different cut lengths. Choose the required cut length using the binary inputs DI15 ... DI17 (terminal control) or the process output data PO1:13 ... PO1:15 (bus control with 1 PD).

Binary input or process output data PO1	Cut length no.							
	1	2	3	4	5	6	7	8
DI15 or PO1:13	"0"	"1"	"0"	"1"	"0"	"1"	"0"	"1"
DI16 or PO1:14	"0"	"0"	"1"	"1"	"0"	"0"	"1"	"1"
DI17 or PO1:15	"0"	"0"	"0"	"0"	"1"	"1"	"1"	"1"

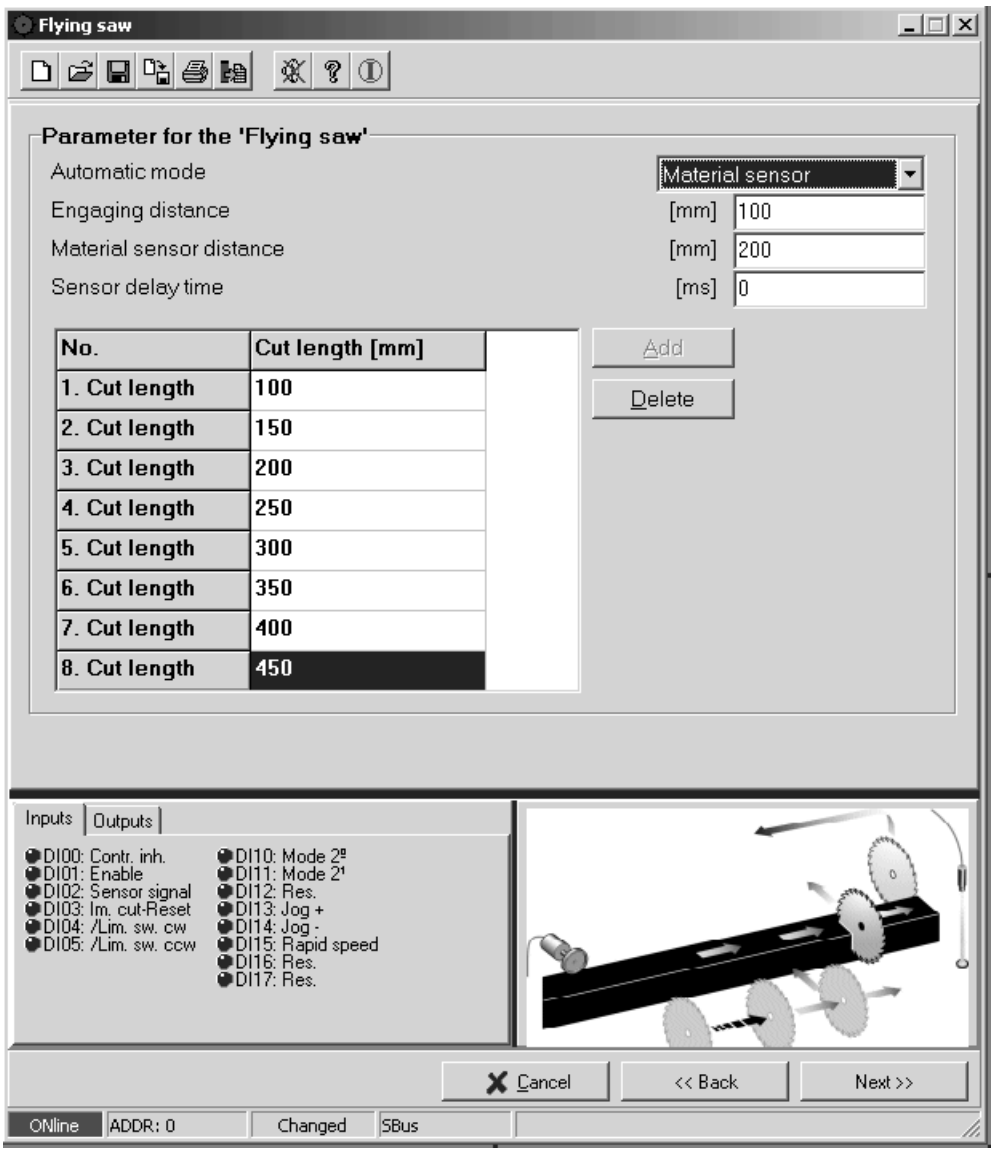
This cut length table is not required for control via fieldbus with three process data words (3 PD). Specify the variable cut length using the process output data word PO2 via the fieldbus.

Example 2: Cut length control with material sensor

Specify the cut length in the same way as for cut length control without material sensor. Control is effected by a sensor behind the saw drive. The sensor signal is sent to binary input DIØ2. The saw carriage is started depending on the set cut length when the material reaches this sensor. Note the following rule when specifying the cut length:

Cut length ≥ Sensor distance + Engaging distance

(Sensor distance = Distance between home position of the saw and material sensor)



11098AEN

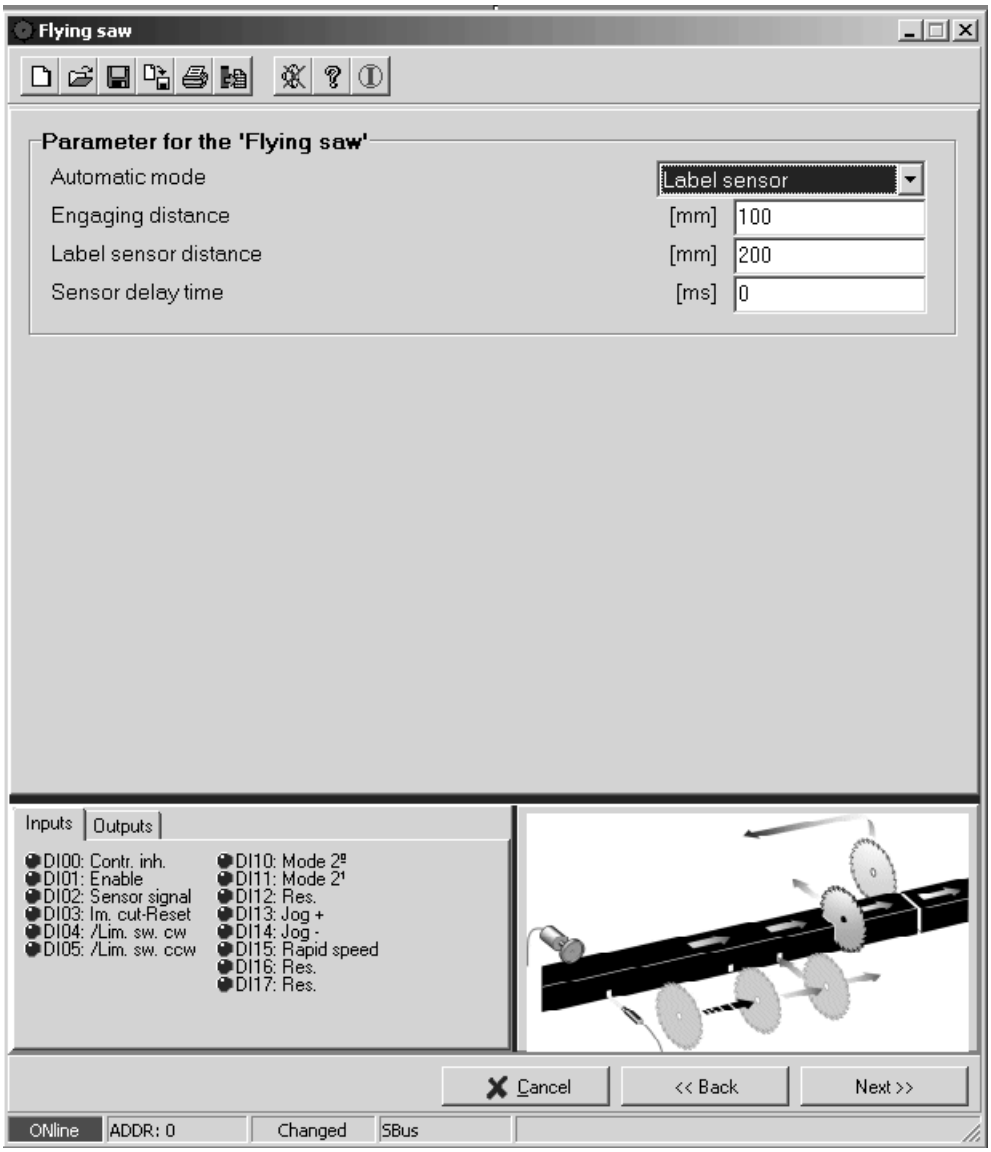
Figure 28: Cut length control with material sensor (terminal or bus with 1 PD)

You must enter the following values in addition to cut length control:

– **Material sensor distance:** Enter the distance between the home position of the saw and the material sensor in [mm].
– **Sensor delay time:** Enter the delay of the material sensor in [ms]. This value affects the startup cycle mode control of the saw drive.

Example 3: Cut length control with label sensor

Cut marks must be made on the material to be sawn. A sensor must detect the marks. The sensor signal is sent to binary input DIØ2 and it triggers the sawing procedure.

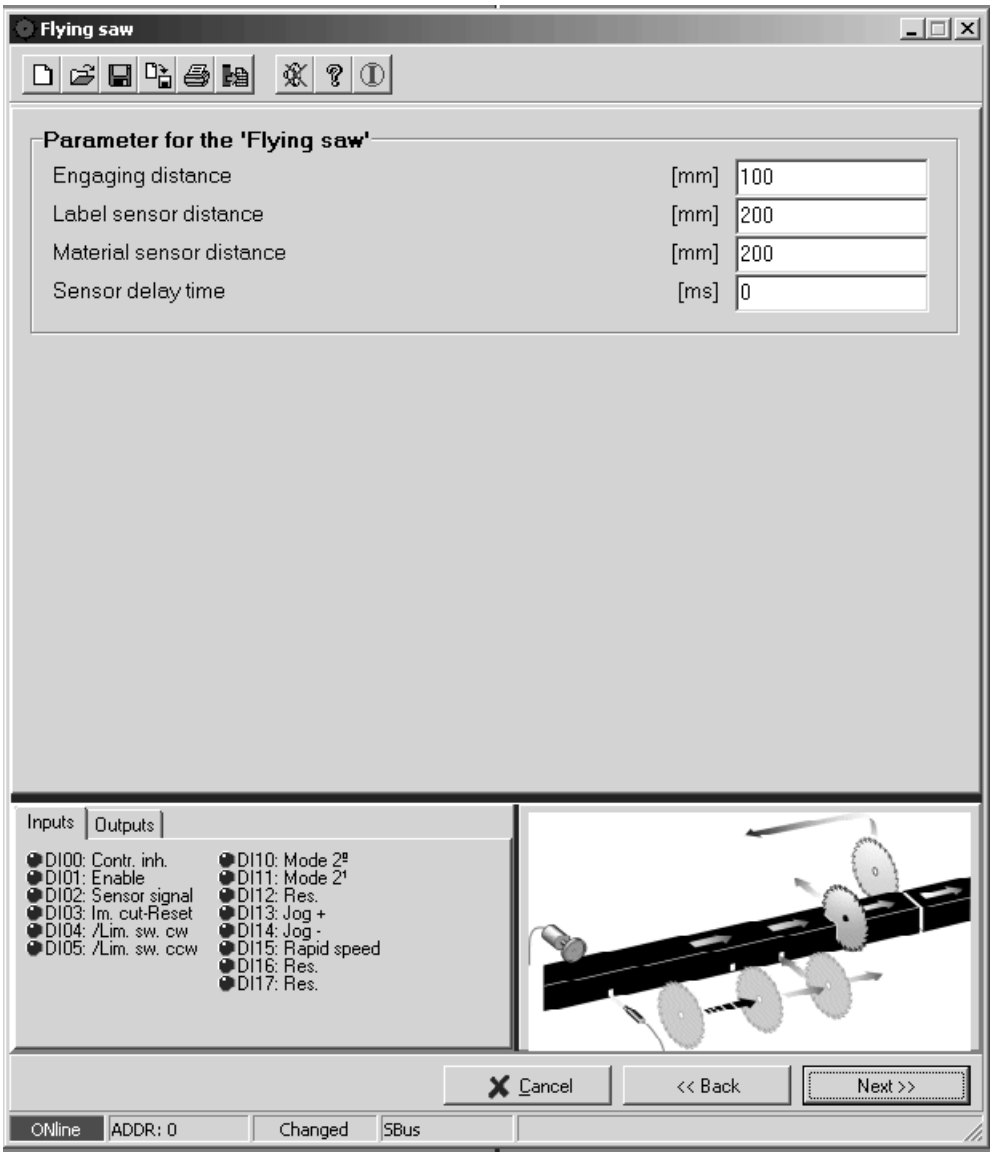


11099AEN

Figure 29: Cut length control with label sensor (terminal or bus with 1 PD)

– **Label sensor distance:** Enter the distance between the home position of the saw and the label sensor in [mm].
– **Sensor delay time:** Enter the delay of the label sensor in [ms] (→ data sheet of the sensor). This value affects the startup cycle mode control of the saw drive.

Example 4: For **fieldbus control with 3 PD**, enter the vairable cut length using process output data word PO2.



11100AEN

Figure 30: Setting parameters for control via fieldbus with 3 PD

Step 6: Repositioning and pulling a gap (with terminal control or fieldbus control with 1 PD)

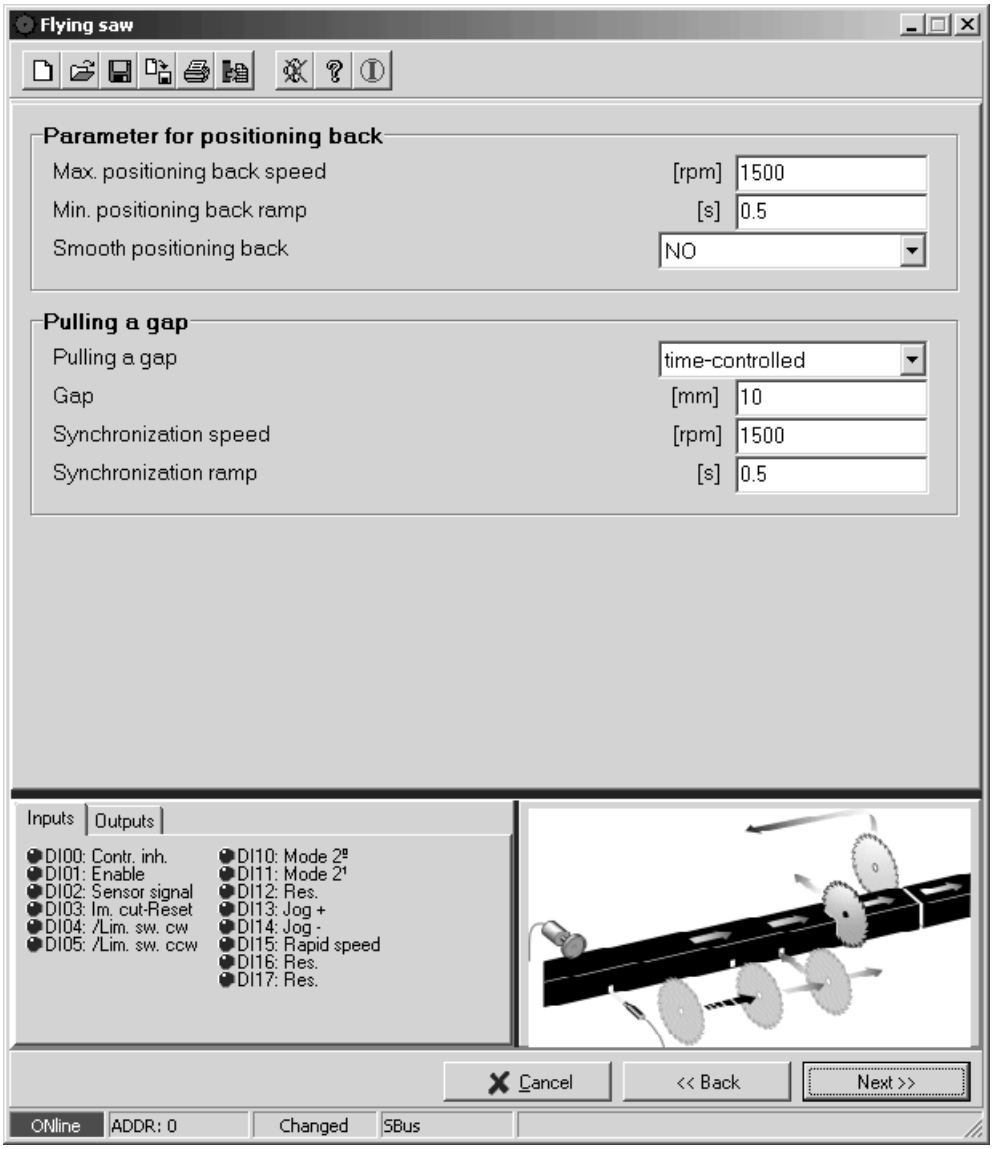


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Figure 31: Setting parameters for repositioning and "pulling a gap" (time-controlled)

- **Parameters for repositioning:** The saw drive must be moved back to the home position after the sawing procedure is complete. This process is called repositioning. You have to set various parameters for this process.
  - Smooth repositioning: "Yes" or "No." "Yes": repositioning takes place with the lowest possible acceleration and as smoothly as possible. This setting reduces stress on the mechanism and cuts down the waiting time in the home position.
  - Max. repositioning speed: Enter the value in [1/min] for the maximum motor speed at which repositioning should take place. Set parameter *P302 Maximum speed 1* ca. 10 % above the maximum repositioning speed.
  - Min. repositioning ramp: Enter the value in [s] of the minimum ramp time for accelerating the repositioning drive.
  - Minimum reversing position (only for terminal control or fieldbus control with 1 PD): Enter the value in [mm] of the position from which the saw drive responds to the repositioning signal.

  Important: For fieldbus control with 3 PD, the minimum reversing position is specified via the fieldbus

- **Pulling a gap:** The "pulling a gap" function pulls the saw blade away from the material after the sawing procedure is complete. In this way, you can implement what is referred to as "cut edge protection." Pulling back the saw blade prevents additional marks on the cut edge. In addition, you can use this function for separating the cut material so that it can be processed more easily subsequently.
  - Pulling a gap: "time-controlled" or "position-dependent". "Time-controlled" means that the gap is established using the values for "Synchronization speed" and "Synchronization ramp." The setting "position-dependent" means that the gap is established using the value for "master distance."
  - Gap: Enter the size of the gap in [mm].
  - Synchronization speed (with "time-controlled" only): Motor speed for time-controlled "pulling a gap." Note that the "Synchronization speed" must be faster than the web speed.
  - Synchronization ramp (with "time-controlled" only): Acceleration ramp for time-controlled "pulling a gap."
  - Master distance (with "position-dependent" only): The "pulling a gap" function is completed by the time the material has covered this distance.

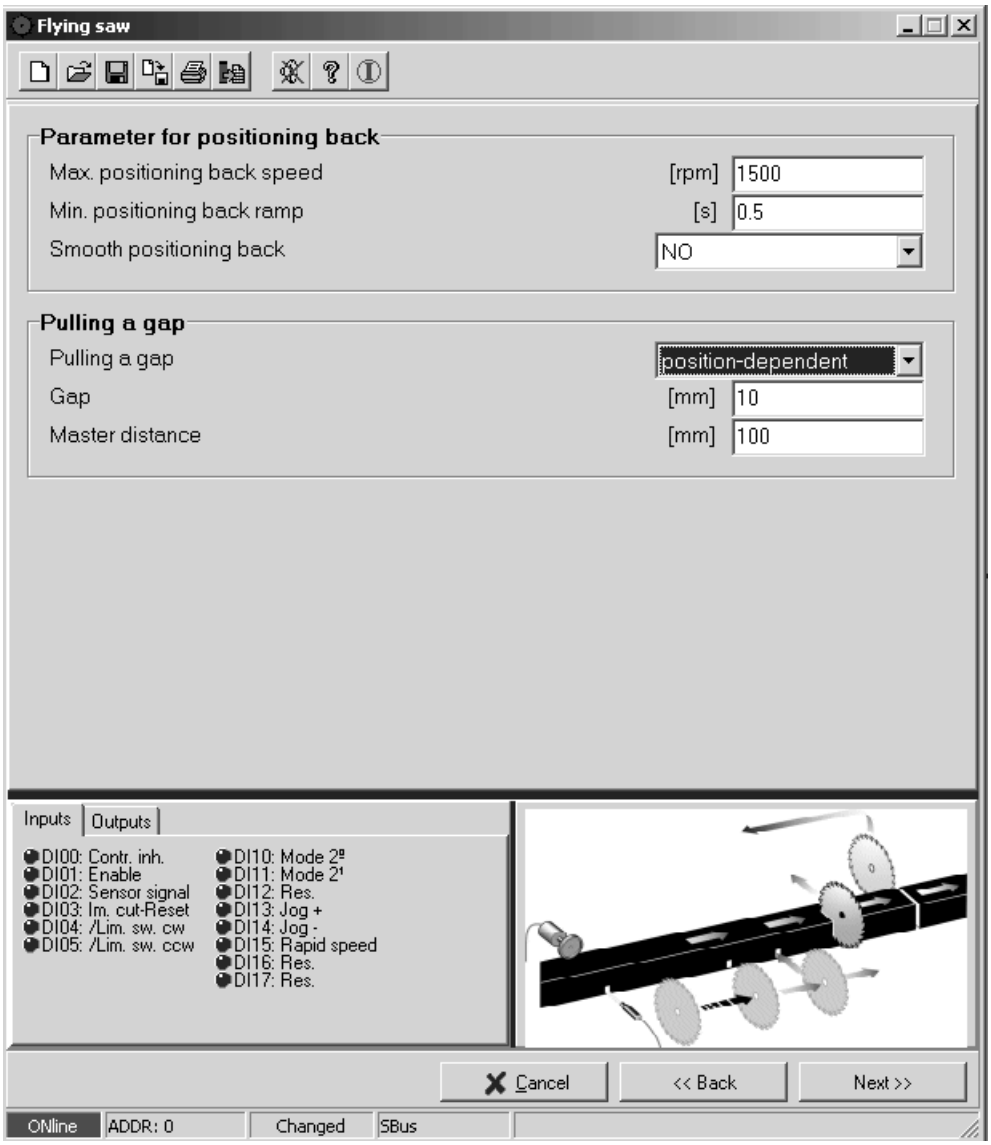

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Figure 32: Setting parameters for repositioning and "pulling a gap" (position-dependent)

Step 7: Saving changes

The program prompts you to save your entries. The saved startup data is now available in your file system for further processing.

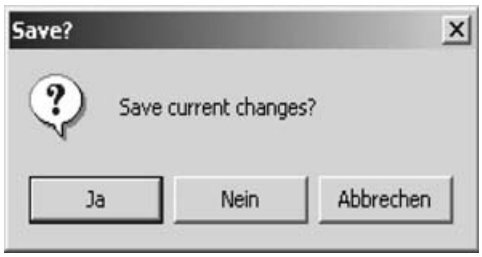

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Figure 33: Saving changes

Download

Press "Download". All necessary settings are made automatically in the inverter and the "Flying saw" IPOS$^{plus®}$ program is started.

11103AEN

Figure 34: Download window

Starting the monitor

After the download, the program asks you if you want to start the monitor.

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Figure 35: Monitor Yes/No

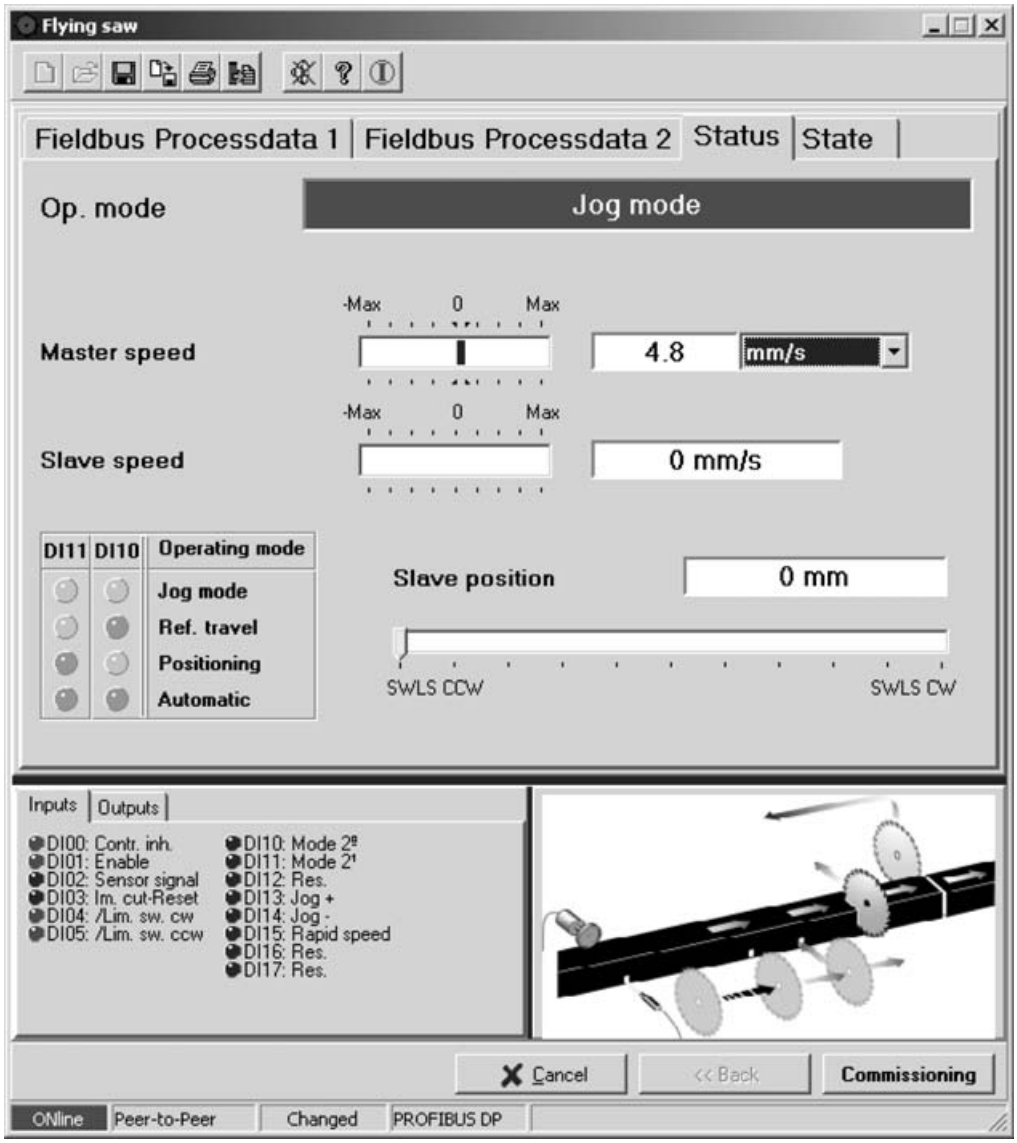
Select "Yes" to switch to the monitor where you can start it in the required operating mode. Select "No" to switch to MOVITOOLS/Shell.

Monitor

The monitor with the status display appears immediately if the "flying saw" is restarted after initial startup has already been performed.

- Operation without bus: You can select between "Status" and "State."
- Operation with fieldbus/system bus: In addition to "Status" and "State," you can also display "Fieldbus process data 1" and "Fieldbus process data 2."

Status



05913AEN

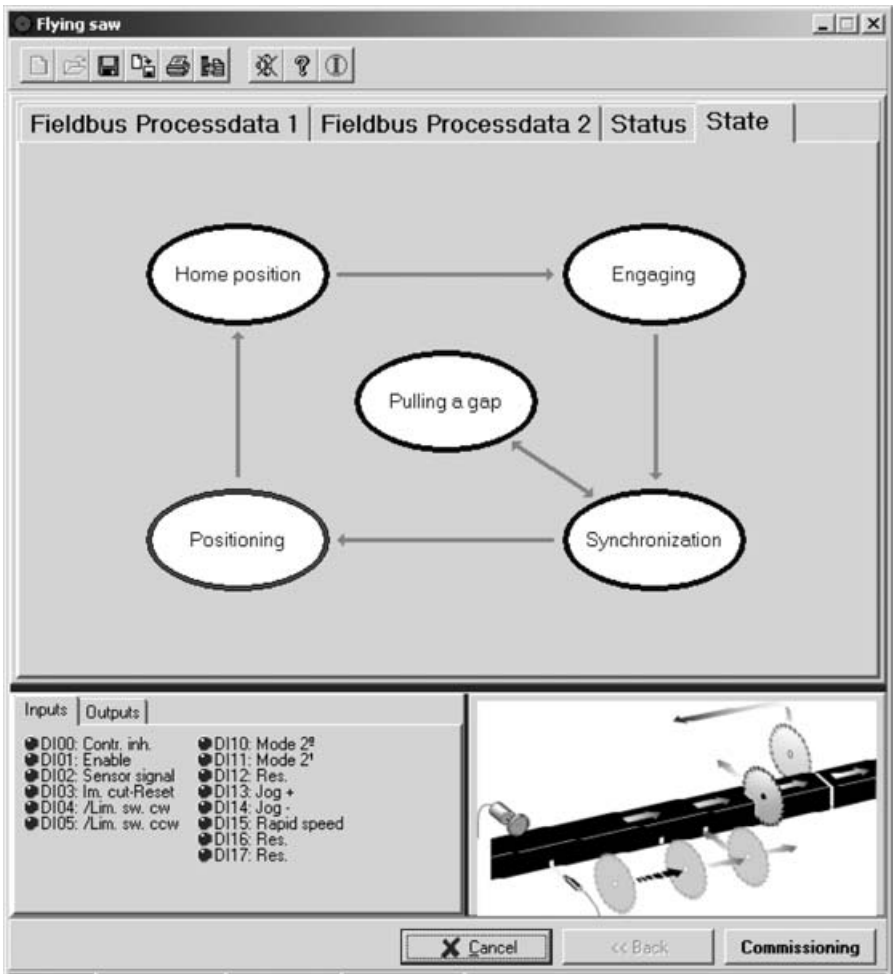
Figure 36: "Flying saw" monitor, status display

Repeated startup

Press "Startup" if you want to repeat the startup. The startup windows will appear (→ Initial startup).

State

The "State" display presents a state chart with the states of the "flying saw." The chart shows the current state and in what direction a change of condition is possible.



05914AEN

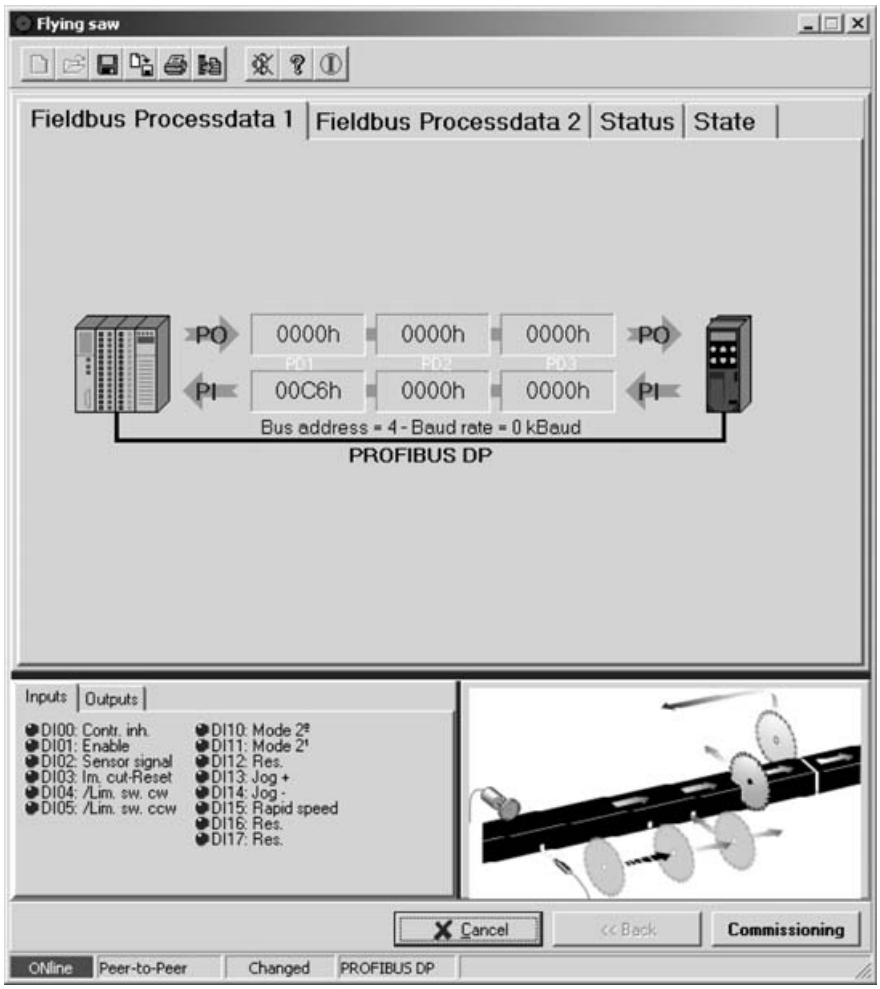
Figure 37: "Flying saw" monitor, state display

Operation with fieldbus/system bus

For operation with the fieldbus/system bus, you can also display the fieldbus process data.

Fieldbus process data 1

For operation with fieldbus/system bus (1 PD):



05915AEN

Figure 38: "Flying saw" monitor, fieldbus process data 1

Fieldbus process data 2

For operation with fieldbus/system bus (1 PD):

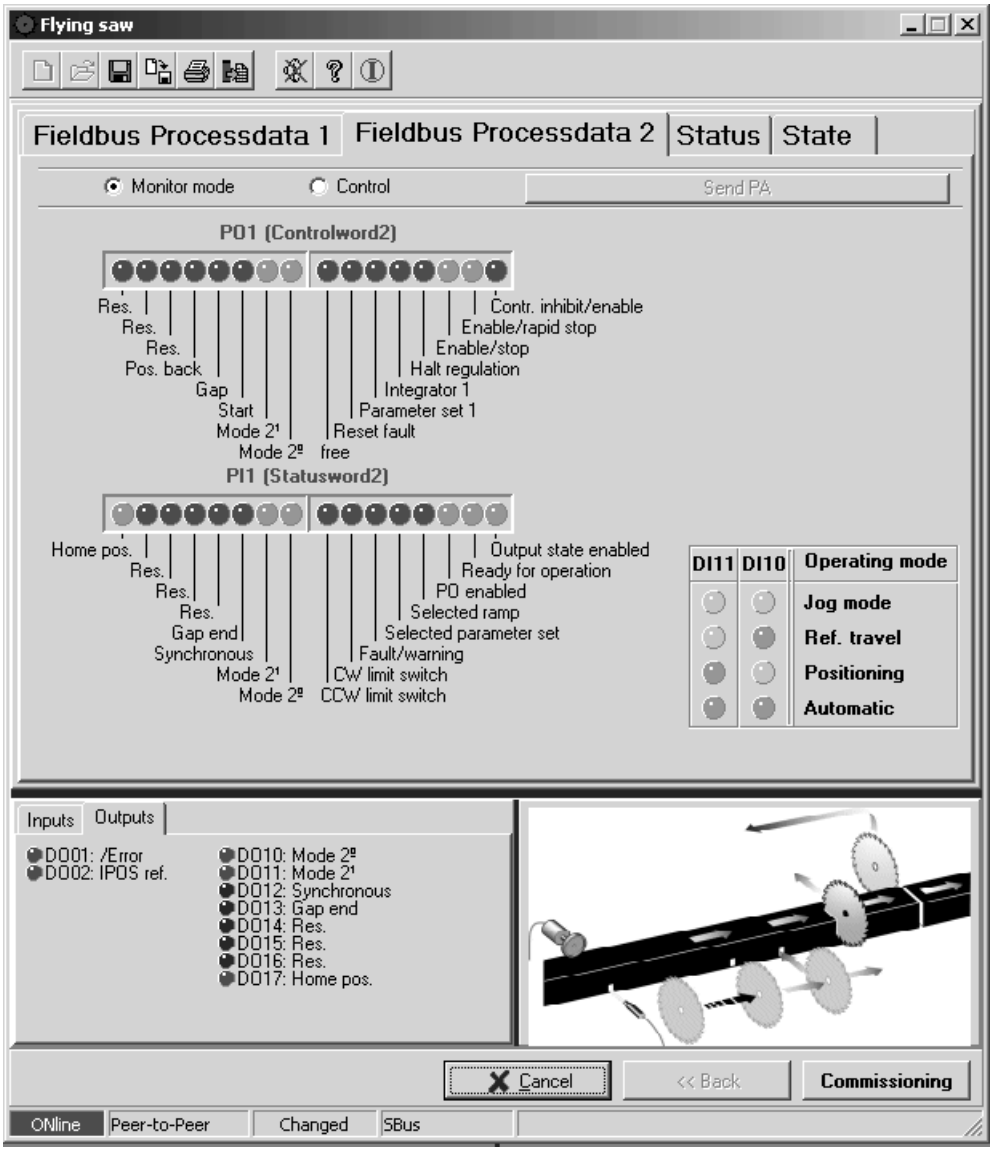


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Figure 39: "Flying saw" monitor, fieldbus process data 2

For operation with fieldbus (3 PD):

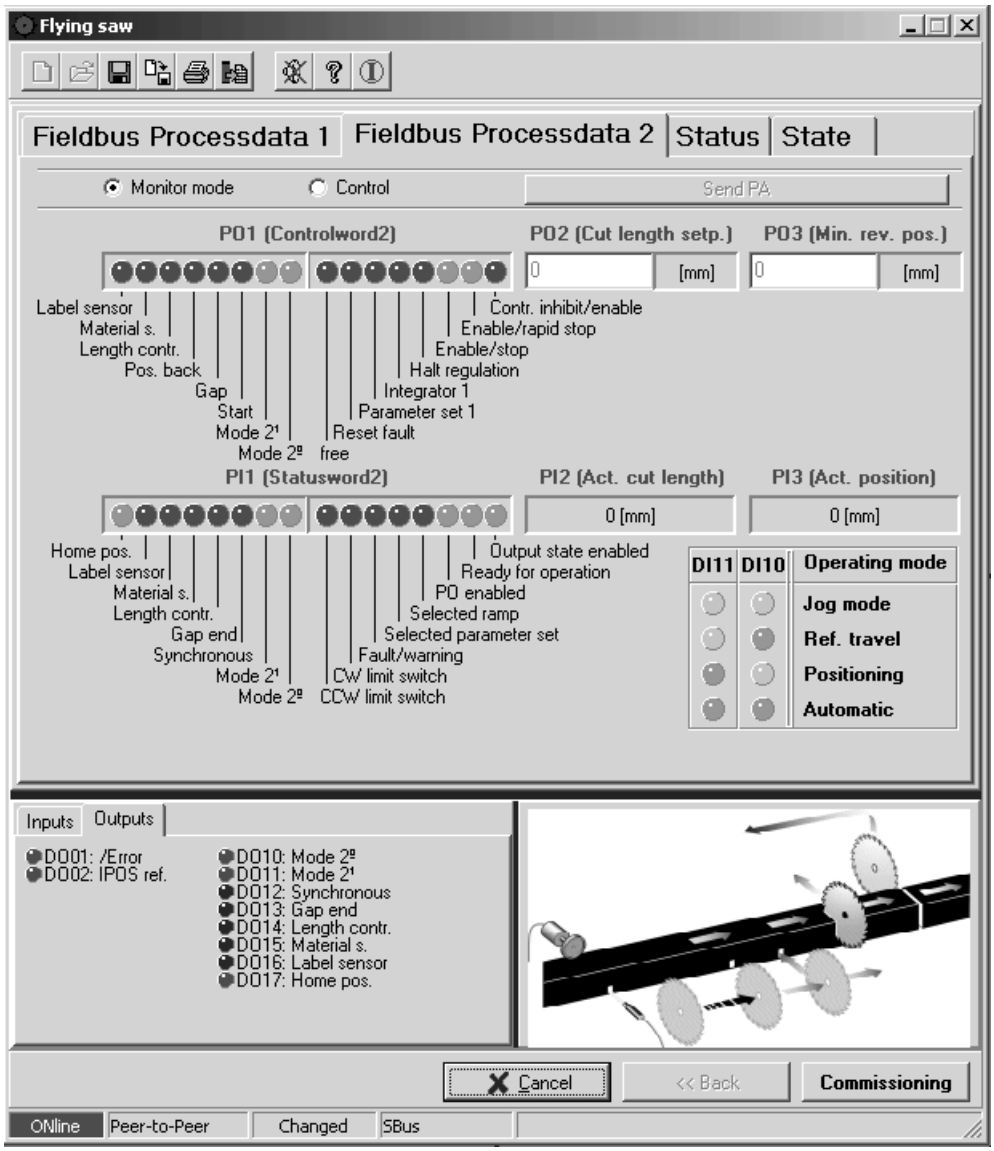

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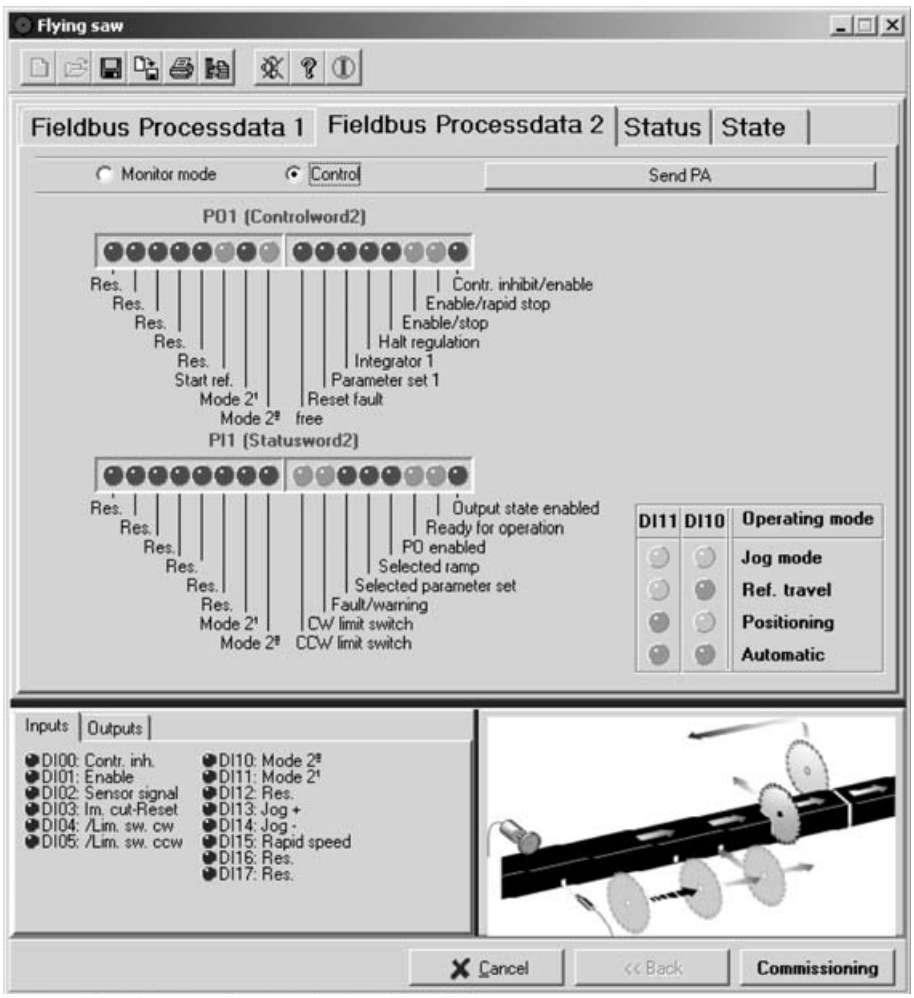
Figure 40: "Flying saw" monitor, fieldbus process data 2

Control in the monitor

In addition to simple monitor operation, you can also simulate control in the "Fieldbus process data 2" display.

- "0" signal at terminal DIØØ "/CONTROLLER INHIBIT/."
- To do so, select the "Control" radio button above "PO1: Control word."
- You can now activate and deactivate the individual bits of the control word (PO1) and specify values for the process output data words PO2 and PO3.
- Click the button "Send PO" to send these control words to the inverter.



05917AEN

Figure 41: Control simulation

The inverter now performs the travel command in accordance with these specifications.

- DIØØ "/CONTROLLER INHIBIT" = "0" must be set to switch from "Control" to "Monitor."
- The "Monitor" option must be active to exit the "flying saw" program.

5.4 Parameters and IPOS$^{plus®}$ variables

The following parameters and IPOS$^{plus®}$ variables are set automatically during startup and are loaded into the inverter during the download:

Parameter number P...	Index	Description
100	8461	Setpoint source
101	8462	Control signal source
228	8438	Feedforward filter (DRS)
240	8513	Synchronous speed
241	8514	Synchronous ramp
600	8335	Binary input DI01
601	8336	Binary input DI02
602	8337	Binary input DI03
603	8338	Binary input DI04
604	8339	Binary input DI05
605	8919	Binary input DI06 (MDX61B only)
606	8920	Binary input DI07 (MDX61B only)
610	8340	Binary input DI10
611	8341	Binary input DI11
612	8342	Binary input DI12
613	8343	Binary input DI13
614	8344	Binary input DI14
615	8345	Binary input DI15
616	8346	Binary input DI16
617	8347	Binary input DI17
620	8350	Binary output D001
621	8351	Binary output D002
622	8916	Binary output D003 (MDX61B only)
623	8917	Binary output D004 (MDX61B only)
624	8918	Binary output D005 (MDX61B only)
630	8352	Binary output D010
631	8353	Binary output D011
632	8354	Binary output D012
633	8355	Binary output D013
634	8356	Binary output D014
635	8357	Binary output D015
636	8358	Binary output D016
637	8359	Binary output D017
700	8574	Operating mode
803	8595	Parameter lock
813	8600	SBus address
815	8602	SBus timeout delay
816	8603	SBus baud rate

Parameter number P...	Index	Description
819	8606	Fieldbus timeout delay
831	8610	Response fieldbus timeout
870	8304	Setpoint description PO1
871	8305	Setpoint description PO2
872	8306	Setpoint description PO3
873	8307	Actual value description PI1
874	8308	Actual value description PI2
875	8309	Actual value description PI3
876	8622	PO data enable
900	8623	Reference offset
903	8626	Reference travel type
920	8633	CW SW limit switch
921	8634	CCW SW limit switch
960	8835	Modulo function

IPOS$^{plus®}$ variable	Description
H0	Control signal source for IPOS program
H1	PO2 description
H2	Slave type
H3	Slave value
H4	i gear unit slave
H5	Additional i gear slave
H6	Slave pulses
H7	Distance slave
H8	Diagonal angle
H9	Master type
H10	Master value
H11	i gear unit master
H12	i additional gear master
H13	Master pulses
H14	Distance master
H15	Stiffness
H16	MFilterTime
H17	GFMaster
H18	GFSlave
H19	Slave 1 unit
H20	Slave 2 unit
H21	Master 1 unit
H22	Master 2 unit
H26	Rapid speed
H27	Slow speed
H28	Jog ramp
H29	CW software limit switch - user
H30	CCW software limit switch - user

IPOS$^{plus®}$ variable	Description
H31	Use hardware limit switch
H32	Reference offset - user
H33	Reference travel type - user
H34	Travel speed
H35	Ramp
H36	Home position - user
H37	Home position
H38	Parked position - user
H39	Parked position
H41	Automatic mode for IPOS program
H42	Engaging distance - user
H43	Engaging distance
H44	Label sensor distance - user
H45	Label sensor distance
H46	Sensor delay time - user
H47	Sensor delay time
H48	Number of cut lengths for IPOS program
H49	Cut length 1 - user
H50	Cut length 1
H51	Cut length 2 - user
H52	Cut length 2
H53	Cut length 3 - user
H54	Cut length 3
H55	Cut length 4 - user
H56	Cut length 4
H57	Cut length 5 - user
H58	Cut length 5
H59	Cut length 6 - user
H60	Cut length 6
H61	Cut length 7 - user
H62	Cut length 7
H63	Cut length 8 - user
H64	Cut length 8
H65	Number of actual cut lengths
H66	Automatic mode - user
H70	Smooth repositioning
H71	Travel speed
H72	Ramp
H73	Minimum reversing position - user
H74	Minimum reversing position
H75	Maximum reversing position - user
H76	Maximum reversing position
H77	Minimum cut length - user
H78	Minimum cut length
H79	Maximum master speed - user

IPOS$^{plus®}$ variable	Description
H80	Maximum master speed
H81	Speed unit
H82	Pulling a gap
H83	Gap - user
H84	Gap
H85	Master distance gap - user
H86	Master distance gap
H90	Bus type for GetSys command
H91	Master encoder resolution
H92	Diagonal cut correction
H93	Material sensor distance - user
H94	Material sensor distance
H100	MasterSource
H111	Slave value (diameter of the drive wheel or spindle slope) with new scaling
H112	Master value (diameter of the drive wheel or spindle slope) with new scaling

Do not alter these parameters and IPOS$^{plus®}$ variables after startup!

5.5 Recording IPOS$^{plus®}$ variables

IPOS$^{plus®}$ variables can be recorded during operation using the "Scope" program in MOVITOOLS® This is only possible for the MOVIDRIVE® MDX61B inverter.

The two 32-Bit IPOS$^{plus®}$ variables *H474* and *H475* are available for recording. Two pointer variables (H125/H126) to *H474* and *H475* can be used to record any IPOS$^{plus®}$ variable using the "Scope" program:

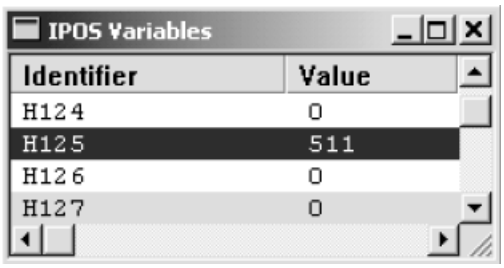
- H125 → Scope474Pointer
- H126 → Scope475Pointer

The number of the IPOS$^{plus®}$ variable that is to be recorded in "Scope" must be entered in the variable window of the IPOS Assembler or Compiler in one of the pointer variables H125 or H126.

Example

The IPOS$^{plus®}$ variable *H511 Current motor position* is to be recorded. Proceed as follows:

- In the "Scope" program, enter the value 511 in variable H125 in the variable window.



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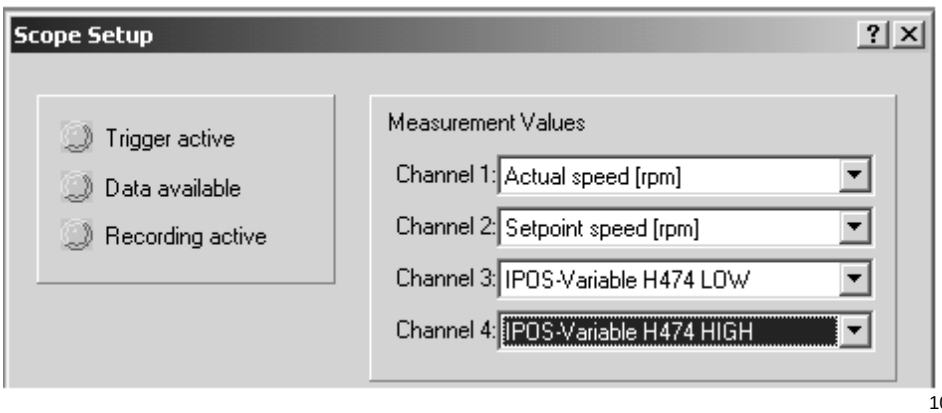
- In the "Scope" program, choose [File] / [New]. Set channel 3 to *IPOS variable H474 LOW* and channel 4 to *IPOS variable H474 HIGH*. The "Scope" program now records the value of the IPOS$^{plus®}$ variable H511.



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- The pointer variables are copied to the IPOS$^{plus®}$ variable H474 or H475 in TASK 3 of the IPOS$^{plus®}$.
- The speed (commands / ms) of Task 3 is dependent on the processor utilization of MOVIDRIVE® MDX61B.
- The time (ms) needed in Task 3 to copy the values from the pointer variables to the IPOS$^{plus®}$ variables H474 and H475 is stored in variable H1002. If the value is zero, the copying process lasts less than 1 ms.

6 Operation and Service

6.1 Starting the drive

Following the download, switch to the "flying saw" monitor by selecting "Yes." You can set the operating mode using terminals DI1Ø and DI11 in terminal control or bits 8 and 9 of "PO1: control word" in bus control.

Note the following points when starting the drive. This procedure applies to all operating modes:

- Binary inputs DIØØ "/CONTROLLER INHIBIT" and DIØ1 "ENABLE/RAPID STOP" must receive a "1" signal.
- **Only with operation via fieldbus/system bus:** Set the control bit PO1:0 "CONTROLLER INHIBIT/ENABLE" to "0" and the control bits PO1:1 "ENABLE/RAPID STOP" and PO1:2 "ENABLE/STOP" to "1."

Operating modes

Operating mode	Terminal (for bus operation, virtual terminal in control word PO1)	
	DI1Ø (PO1:8)	DI11 (PO1:9)
Jog mode	"0"	"0"
Reference travel	"1"	"0"
Positioning	"0"	"1"
Automatic mode	"1"	"1"

- **Jog mode (DI1Ø = "0", DI11 = "0"):** Direction of rotation as seen onto the A-side of the motor.
  - DI13 = "1": The motor is turning clockwise.
  - DI14 = "1": The motor is turning counterclockwise.
  - DI15 = "0"/"1": Jog mode in slow speed/rapid speed
  - With regard to the direction of rotation, take into account whether you are using a 2 or 3-stage gear unit.

- **Reference travel (DI1Ø = "1", DI11 = "0"):**
  - Reference travel is started by DI12 = "1."
  - The reference position is determined using reference travel. The reference offset set during startup can be used to change the machine zero point without having to adjust the limit switches.
  - The following formula applies: Machine zero = reference position + reference offset

- **Positioning (DI1Ø = "0", DI11 = "1"):**
  - Positioning is started by DI12 = "1."
  - DI13 = "0"/"1": Movement to home position/parking position.
  - Positioning is used for moving between the home and parking position under position control.

- **Automatic mode (DI1Ø = "1", DI11 = "1")**
  - Automatic mode is started by DI12 = "1."
  - The drive is moved to the home position by DI14 = "1."
  - Terminal control or fieldbus with one process data word (1 PD): During startup of the "flying saw," you define whether cut length control or cut length control with label sensor is active in automatic mode.
  - Fieldbus with 3 process data words (3 PD): You can change between the automatic modes cut length control or cut length control with label sensor during operation.

6.2 Jog mode

- DI1Ø (PO1:8) = "0" and DI11 (PO1:9) = "0"

Specify the direction of rotation as seen onto the drive side of the motor. With regard to the direction of rotation, take into account whether you are using a 2 or 3-stage gear unit.

DI13 = "1" = Motor turns clockwise (CW).

DI14 = "1" = Motor turns counterclockwise (CCW).

DI15 = "0" = Jog mode at slow speed.

DI15 = "1" = Jog mode at fast speed.

The speeds for slow speed / rapid speed and the ramp are set during startup of the "flying saw."

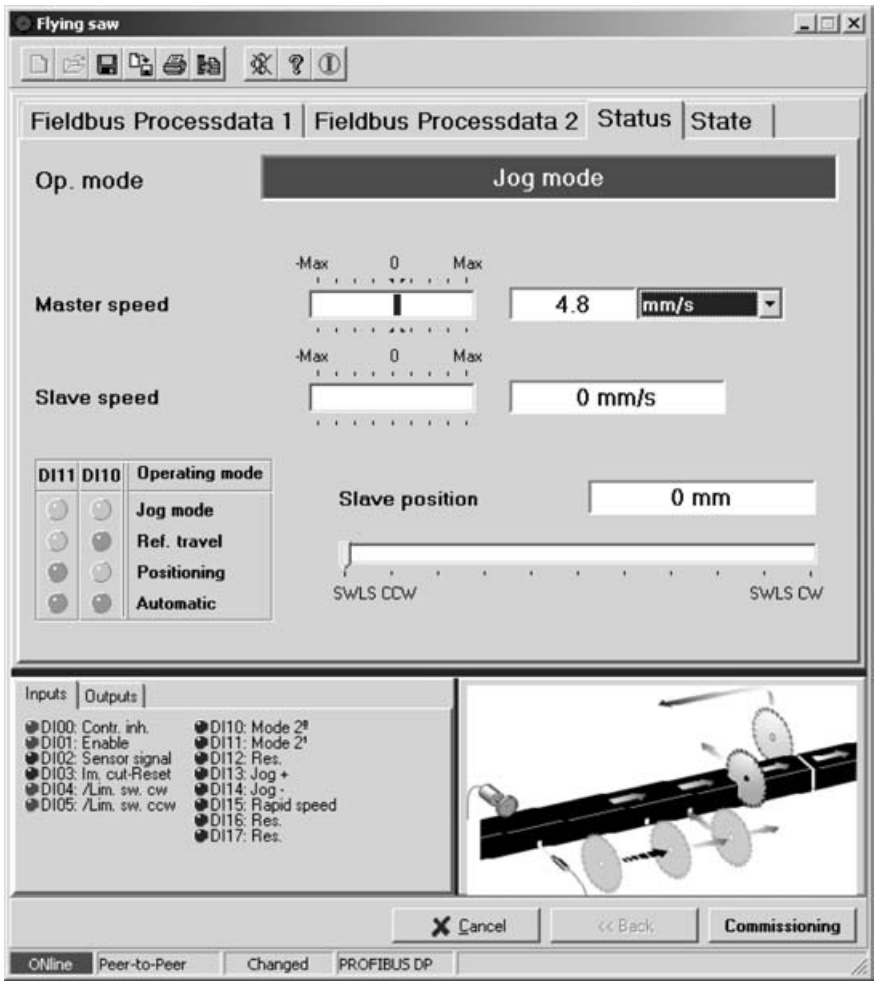

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Figure 42: Jog mode

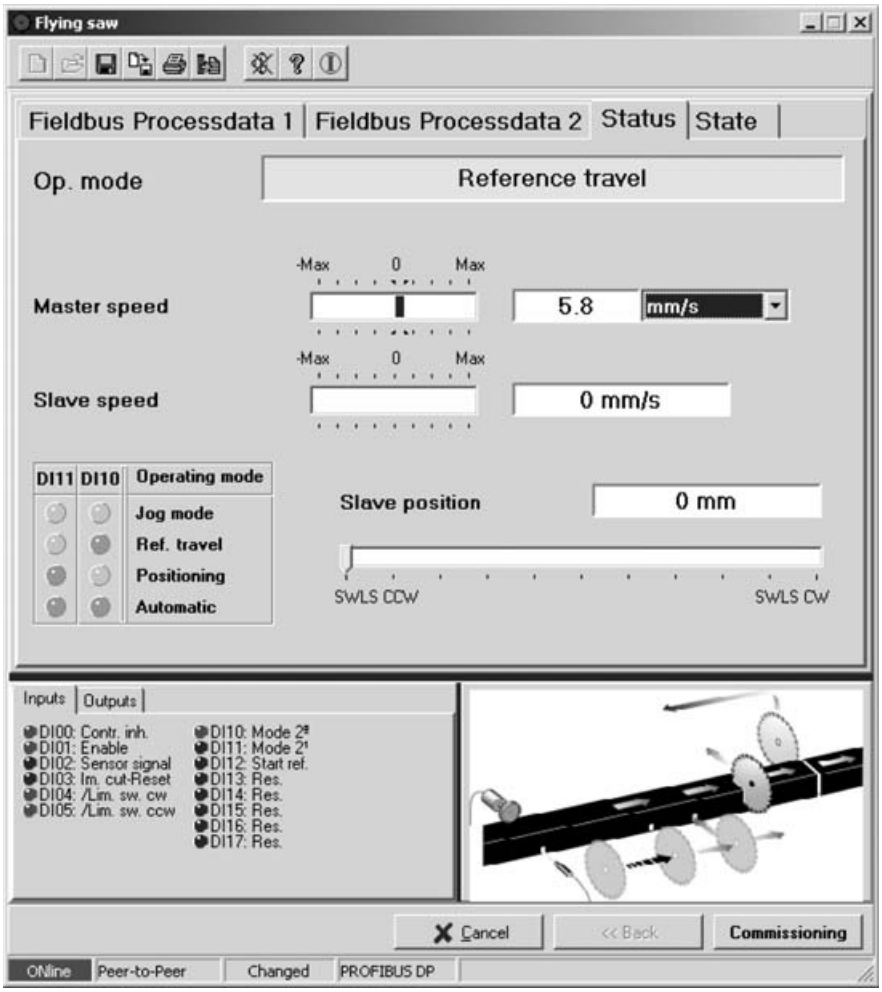
6.3 Reference travel

- DI1Ø (PO1:8) = "1" and DI11 (PO1:9) = "0"

DI12 = "1" starts reference travel.

The reference position is determined using reference travel. The reference offset set during startup can be used to change the machine zero point without having to adjust the limit switches.

The following formula applies: Machine zero = reference position + reference offset



06258AEN

Figure 43: Reference travel

6.4 Positioning

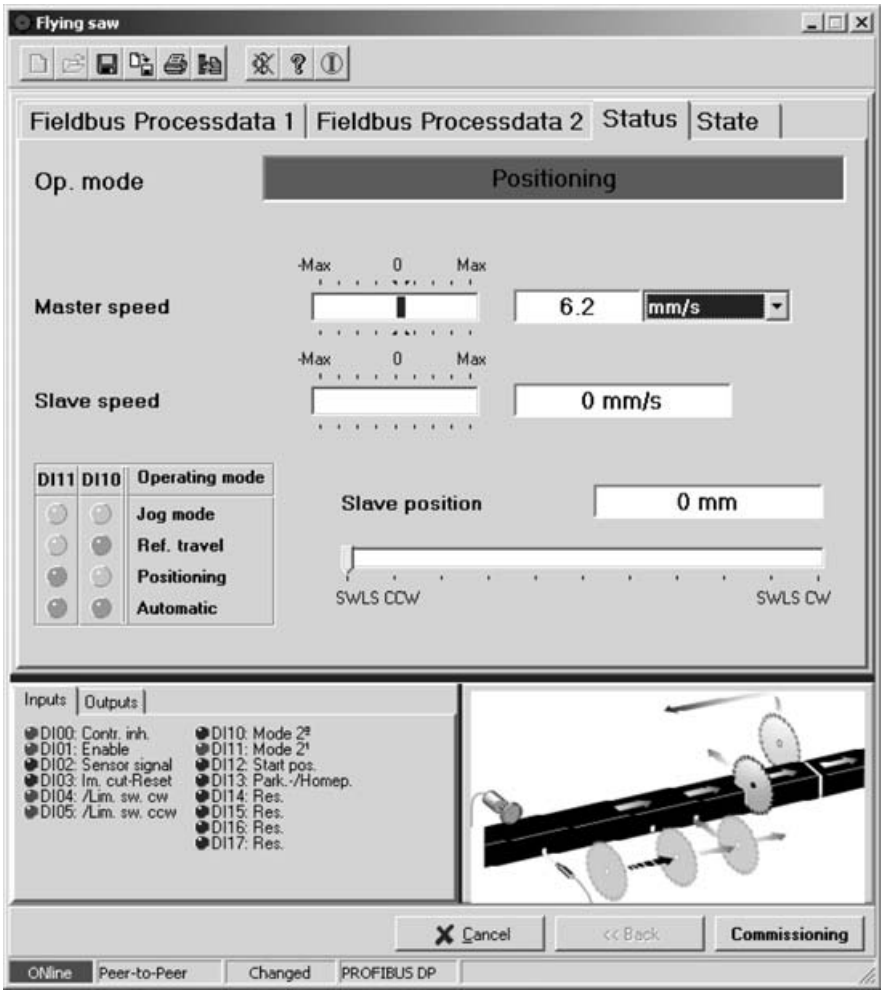
- DI1Ø (PO1:8) = "0" and DI11 (PO1:9) = "1"

DI12 = "1" = starts positioning.

DI13 = "0" = Positioning to home position.

DI13 = "1" = Positioning to parking position.

Positioning is used for moving between the home and parking position under position control. Both positions as well as the travel speed and ramp are set during startup.



06259AEN

Figure 44: Positioning

6.5 Automatic mode

- DI1Ø (PO1:8) = "1" and DI11 (PO1:9) = "1"

DI12 = "1" = Starts automatic mode.

DI14 = "1" = Starts repositioning.

Terminal control or control via fieldbus with 1 process data word (1 PD): During startup of the "flying saw," you define whether cut length control or cut length control with label sensor is active in automatic mode.

For control via fieldbus with 3 PD, you can change between the automatic modes cut length control or cut length control with label sensor during operation.

Cut length control

The setpoint cut length is specified in three ways when cut length control is active:

1. In terminal control, using binary code via binary inputs DI15 ... DI17. A maximum of eight different cut lengths are possible.
2. In control via fieldbus or system bus with 1 PD, the cut length is specified using binary code via process output data PO1:13, PO1:14 and PO1:15.
3. In control via fieldbus with 3 PD, the cut length and the minimum reversing position are specified via the process output data PO2 and PO3.

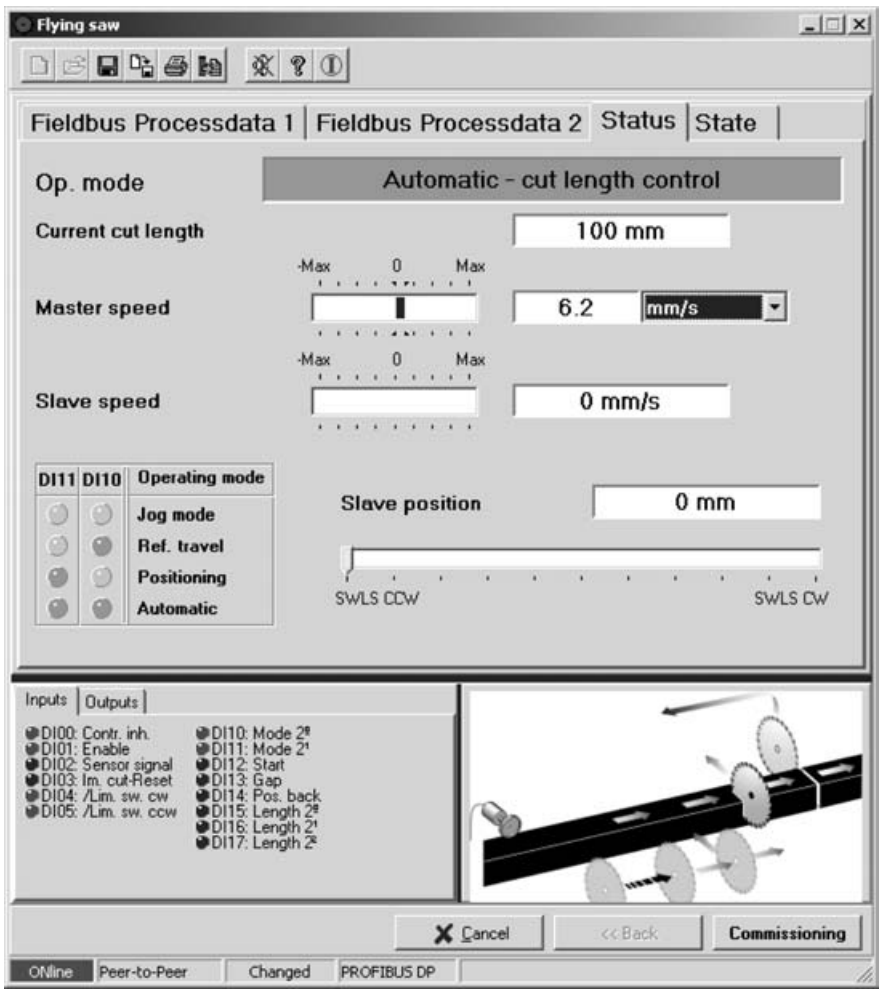


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Figure 45: Automatic mode with cut length control

Sequence of cut length control

Note the following sequence for cut length control:

- Apply "1" signals to binary inputs DIØØ "/Controller inhibit" and DIØ1 "Enable/rapid stop."
- Only for control with fieldbus/system bus: Set the following control bits:
  - PO1:0 "Controller inhibit/enable" = "0"
  - PO1:1 "Enable/rapid stop" = "1"
  - PO1:2 "Enable/Stop" = "1"
- Terminal control or control via fieldbus with 1 process data word (1 PD): Select the required cut length via DI15 ... DI17 or PO1:13 ... PO1:15.
- Control via fieldbus with 3 process data words (3 PD): Specify the cut length via process output data word PO2 and set bit PO1:13 "Length control" = "1".
- Start automatic mode with DI12 (PO1:10) "Start" = "1." The "1" signal must be active for the entire duration of positioning.
- Apply a "1" signal to binary input DI14 (PO1:12) "Repositioning." The signal must be present at least until the home position is reached.
- The drive now moves to the home position and waits there until the set material length is reached. With cut length control without material sensor, the material length is recorded starting from the "0"-"1" edge at DI12 "Start." With cut length control with material sensor, the material length is recorded starting from the "0"-"1" edge at DIØ2 "Sensor."
- When the material length has been reached, the drive automatically engages and synchronizes itself with the master position. Binary output DO12 (PI1:10) "Drive synchronous" is set to "1" during synchronous operation.
- Once the drive reaches the set reversing position, movement back can be triggered by a "1" signal at binary input DI14 (PO1:12) "Repositioning." The drive disengages and moves back to the home position under position control.
- When the drive reaches the home position, binary output DO17 (PI1:15) "Home position reached" is set to "1." The drive comes to a standstill subject to position control.

Note the following:

- The "1" signal can be permanently present at binary input DI14 (PO1:12) "Repositioning." The drive disengages when reaching the minimum reversing position and moves back to the home position.
- The drive remains in synchronous operation if DI14 (PO1:12) "Repositioning" remains set to "0."
- Use the "pulling a gap" function if you want to separate the material following the cut. Proceed as follows:
  - Apply a "1" signal to binary input DI14 (PO1:11) "Gap." Once the minimum reversing position is reached, an offset corresponding to the value entered during startup is established. The "1" signal can be permanently present.
  - Once the drive has reached the offset value, binary output DO13 (PI1:11) "Gap finished" is set to "1." The drive remains in synchronous operation.
- Fault F42 "Lag fault" is signaled if the cut length is set to so small a value that the material feed has already exceeded the cut length by the time the home position is reached. Remedy: Less feed.
- The cut length is adopted the first time the system is started after the automatic mode is selected and then every time the saw moves synchronously. If a new cut length is set during synchronous travel, the new length is only effective as of the next cut but one.

Cut length control with label sensor

The setpoint cut length is determined by the distance between labels when the cut length control with label sensor is active. The labels must be located on the material to be cut and are picked up by a sensor.

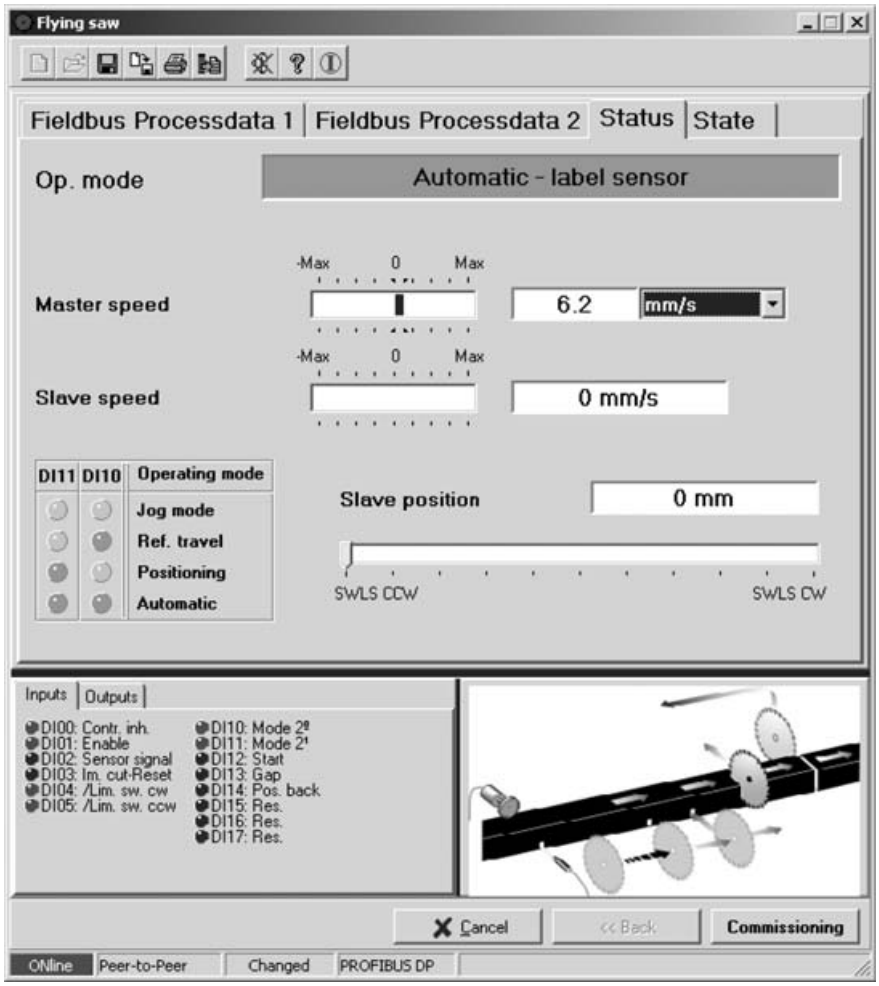

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Figure 46: Automatic mode with cut length control with label sensor

Sequence of cut length control with label sensor

Note the following sequence for cut length control with label sensor:

- Apply "1" signals to binary inputs DIØØ "/Controller inhibit" and DIØ1 "Enable/rapid stop."
- Only for control with fieldbus/system bus: Set the following control bits:
  - PO1:0 "Controller inhibit/enable" = "0"
  - PO1:1 "Enable/rapid stop" = "1"
  - PO1:2 "Enable/Stop" = "1"
- Start automatic mode with DI12 (PO1:10) "Start" = "1." The "1" signal must be active for the entire duration of positioning.
- Apply a "1" signal to binary input DI14 (PO1:12) "Repositioning." The signal must be present at least until the home position is reached.
- The drive now moves to the home position until a "0"-"1" signal edge on binary input DIØ2 "Sensor" starts the sawing procedure.
- The drive automatically engages and synchronizes itself with the material to be cut. Binary output DO12 (PI1:10) "Drive synchronous" is set to "1" during synchronous operation.
- Once the drive reaches the set reversing position, movement back can be triggered by a "1" signal at binary input DI14 (PO1:12) "Repositioning." The drive disengages and moves back to the home position under position control.
- When the drive reaches the home position, binary output DO17 (PI1:15) "Home position reached" is set to "1." The drive comes to a standstill subject to position control.

Note the following:

- The "1" signal can be permanently present at binary input DI14 (PO1:12) "Repositioning." The drive disengages when reaching the minimum reversing position and moves back to the home position.
- The drive remains in synchronous operation if DI14 (PO1:12) "Repositioning" remains set to "0."
- Use the "pulling a gap" function if you want to separate the material following the cut. Proceed as follows:
  - Apply a "1" signal to binary input DI14 (PO1:11) "Gap." Once the minimum reversing position is reached, an offset corresponding to the value entered during startup is established. The "1" signal can be permanently present.
  - Once the drive has reached the offset value, binary output DO13 (PI1:11) "Gap finished" is set to "1." The drive remains in synchronous operation.

6.6 Cycle diagrams

The following conditions apply to the cycle diagrams:

- Startup has been performed correctly
- DIØØ "/CONTROLLER INHIBIT" = "1" (no lock)
- DIØ1 "ENABLE/RAPID STOP" = "1"

With control via fieldbus/system bus, you must set the following bits in control word PO1:

- PO1:0 = "0" (CONTROLLER INHIBIT/ENABLE)
- PO1:1 = "1" (ENABLE/RAPID STOP)
- PO1:2 = "1" (ENABLE/STOP)

Jog mode

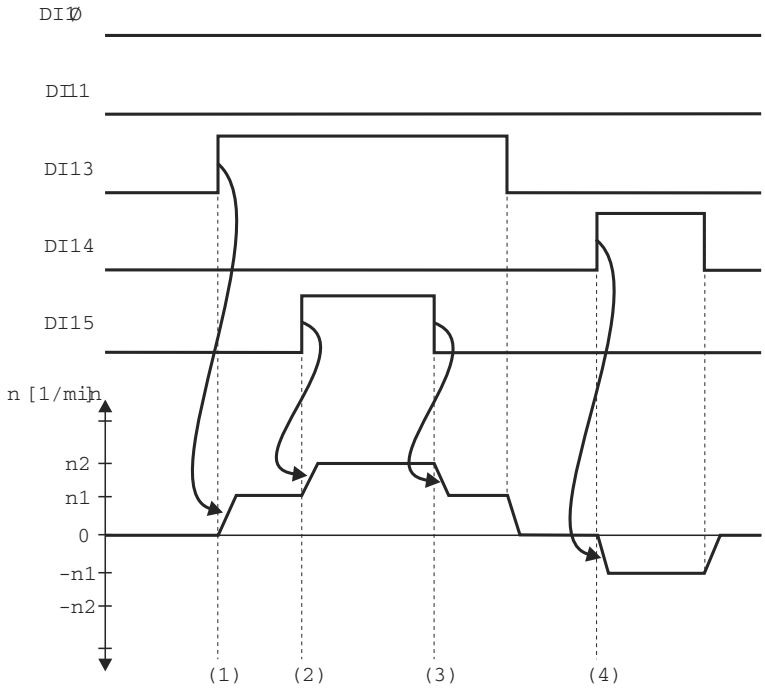

Figure 47: Cycle diagram: Jog mode

DI1Ø = Mode selection
DI11 = Mode selection
DI13 = Clockwise
DI14 = Counterclockwise
DI15 = Slow speed/rapid speed
DBØØ= /Brake

(1) = Start jog mode, clockwise
(2) = Switch mode slow speed → rapid speed
(3) = Switch mode rapid speed → slow speed
(4) = Start jog mode, counterclockwise
n1 = slow speed for jog mode (set during startup)
n2 = fast speed for jog mode (set during startup)

Referencing mode

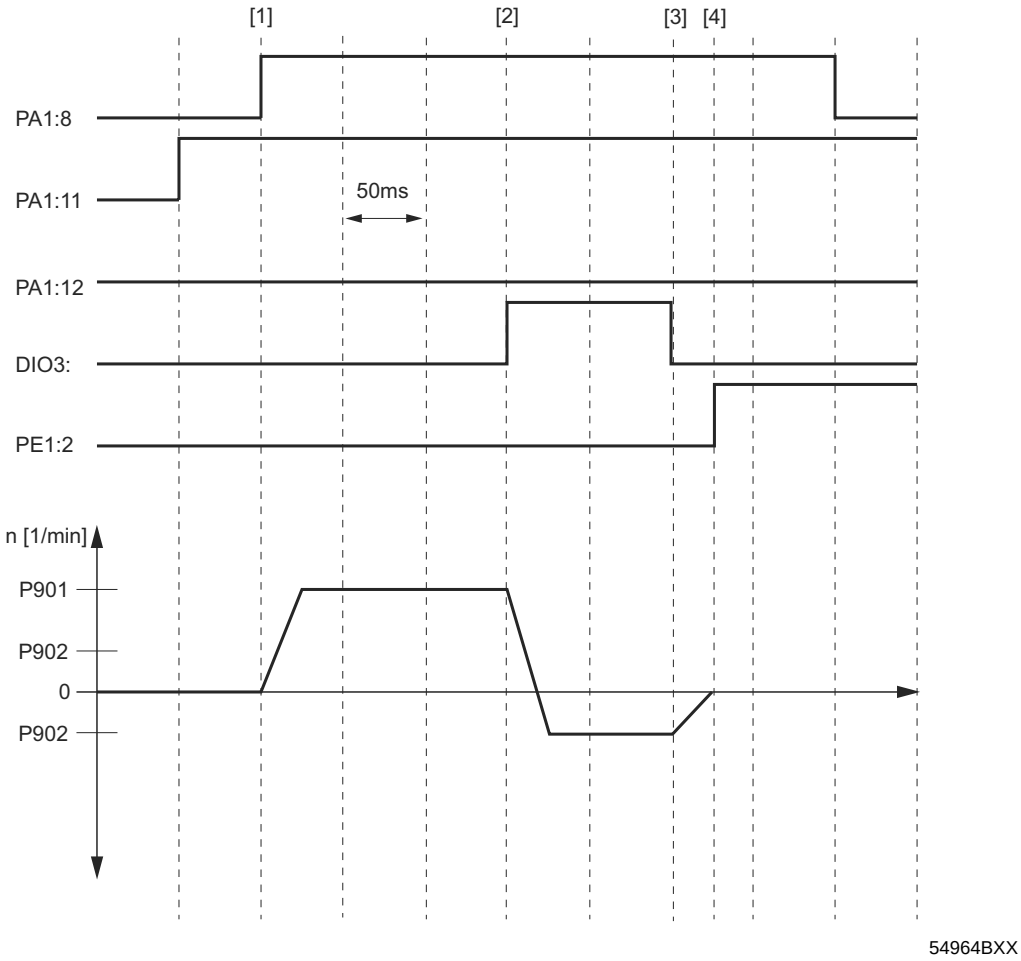

Figure 48: Cycle diagram: Referencing mode

PA1:8 = Start
PA1:11 = Mode Low
PA1:12 = Mode High
DI03 = Limit switch
PE1:2 = IPOS reference

[1] = Start of reference travel (reference travel type 3)
[2] = Drive reaches reference cam
[3] = Drive leaves reference cam
[4] = When the drive is at a standstill, PE1:2 "IPOS reference" is set. The drive is now referenced.

Positioning

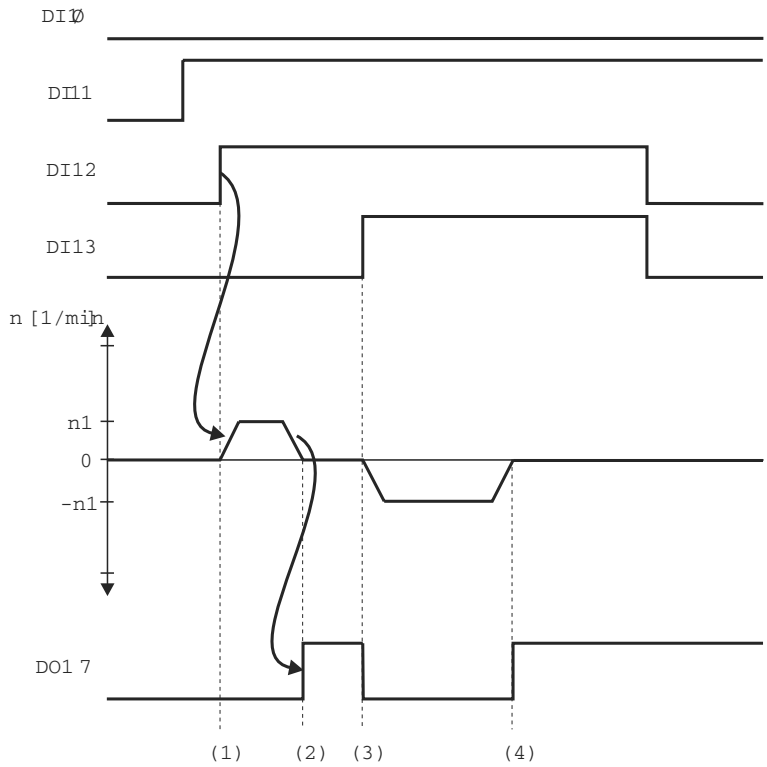

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Figure 49: Cycle diagram: Positioning

DI1Ø = Mode selection
DI11 = Mode selection
DI12 = Start positioning
DI13 = Select target for positioning
"0" = Home position, "1" = Parking position
DO17 = Target position reached

(1) = Start positioning
(2) = Target = Home position reached
(3) = Parking position is Target
(4) = Target = Parking position reached

Automatic mode

For control via terminals or fieldbus / system bus with 1 PD.

Cut length control without material sensor

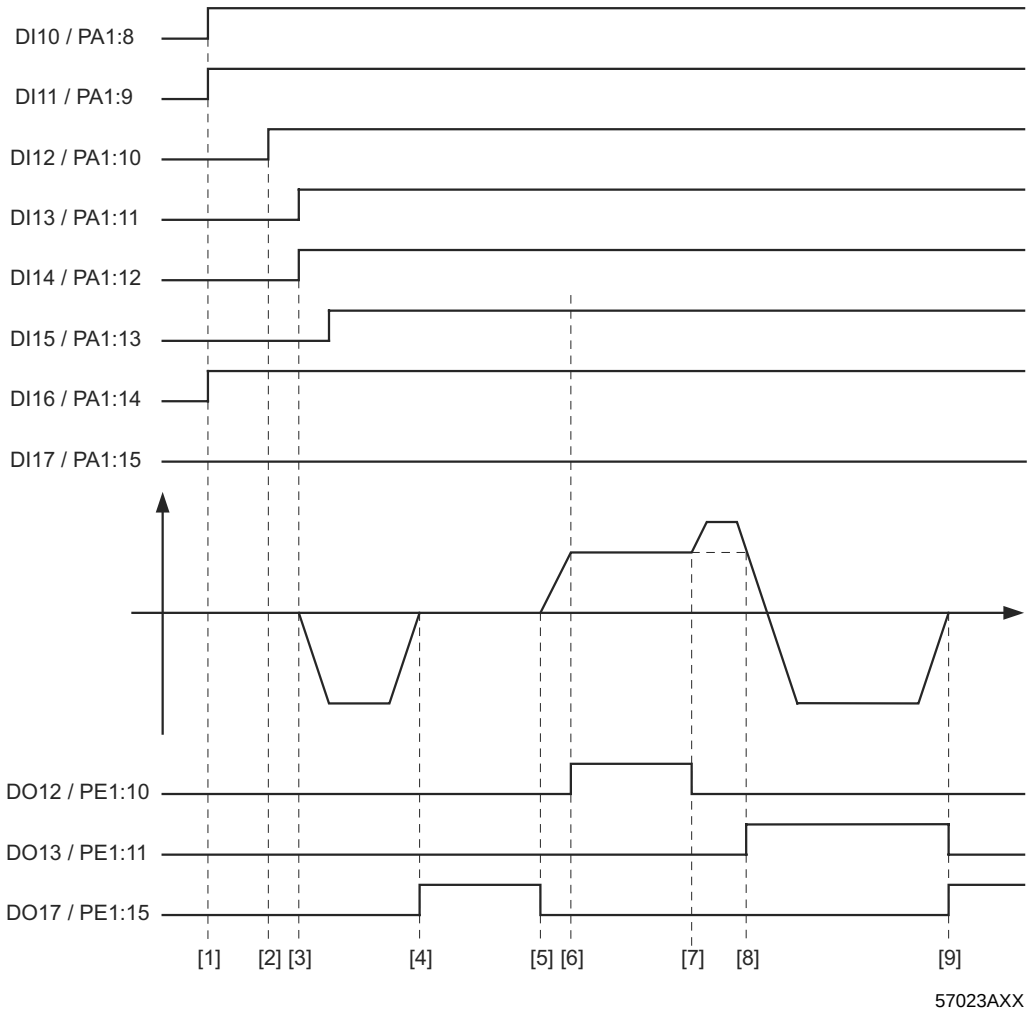

Figure 50: Cycle diagram: Automatic cut length control without material sensor

DI1Ø = Mode selection
DI11 = Mode selection
DI12 = Start automatic mode
DI13 = Pulling a gap
DI14 = Repositioning
DI15 = Cut length in binary code 2^0
DI16 = Cut length in binary code 2^1
DI17 = Cut length in binary code 2^2
DO12 = Drive in synchronous operation
DO13 = Pulling a gap finished
DO17 = Home position reached

(1) = Automatic mode selection
(2) = Start automatic mode, cut lengths selected with DI15, DI16, DI17 are used
(3) = Start repositioning (with DI14)
(4) = Home position reached (DO17)
(5) = Material feed reaches cut length, engaging process starts
(6) = Synchronous speed reached (DO12), cut lengths selected with DI15, DI16, DI17 are used for the following cut
(7) = Minimum reversing position has been reached, start to pull a gap
(8) = Gap has been pulled (DO13), start repositioning
(9) = Home position reached (DO17)

For control via fieldbus with 3 PD.

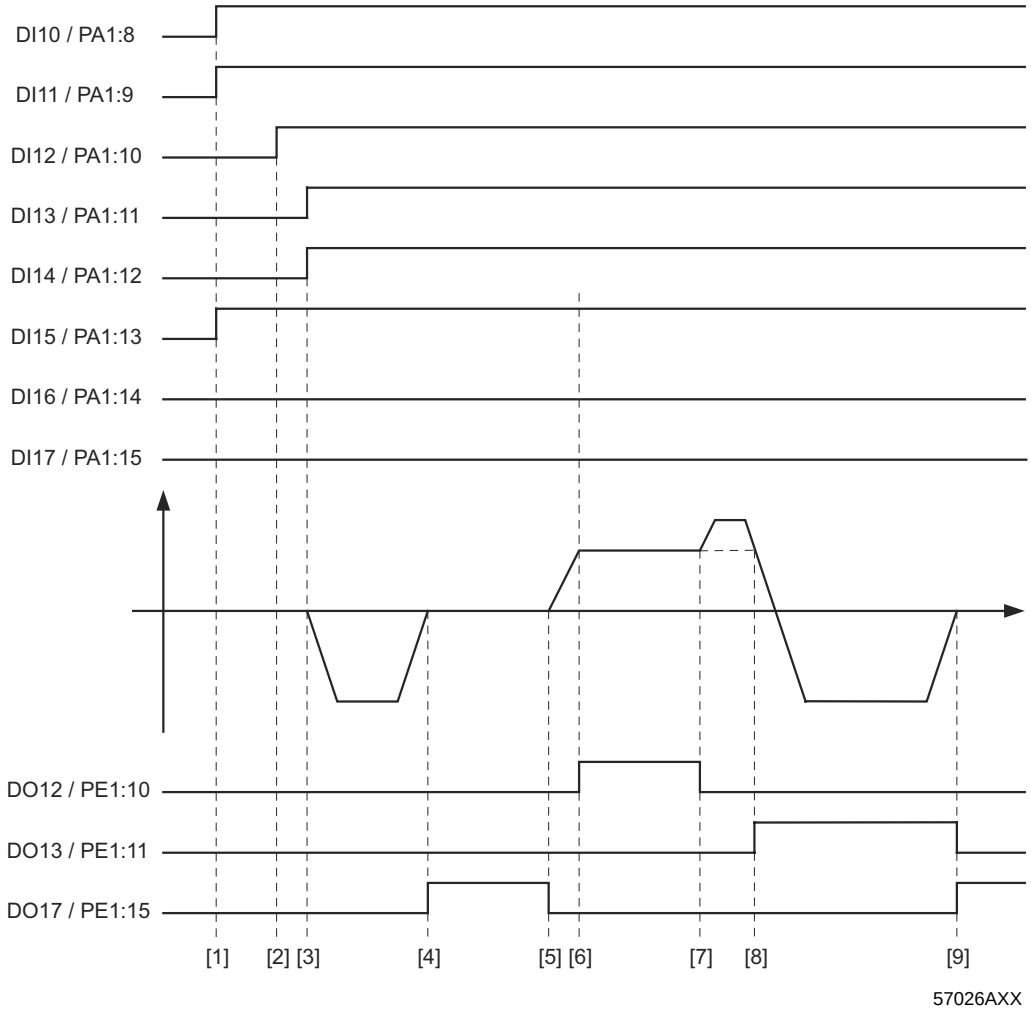

Figure 51: Cycle diagram: Automatic cut length control without material sensor

DI1Ø = Mode selection
DI11 = Mode selection
DI12 = Start automatic mode
DI13 = Pulling a gap
DI14 = Repositioning
DI15 = Cut length control
DI16 = Material sensor
DI17 = Label sensor
DO12 = Drive in synchronous operation
DO13 = Pulling a gap finished
DO17 = Home position reached

(1) = Automatic mode selection
(2) = Start automatic mode, assume cut length, assume cut length control (DI15)
(3) = Start repositioning (with DI14)
(4) = Home position reached (DO17)
(5) = Material feed reaches cut length, engaging process starts
(6) = Synchronous speed reached (DO12), cut length assumed for following cut, cut length control assumed (DI15)
(7) = Minimum reversing position has been reached, start to pull a gap
(8) = Gap has been pulled (DO13), start repositioning
(9) = Home position reached (DO17)

Cut length control with material sensor

For control via terminals or system bus / fieldbus with 1 PD.

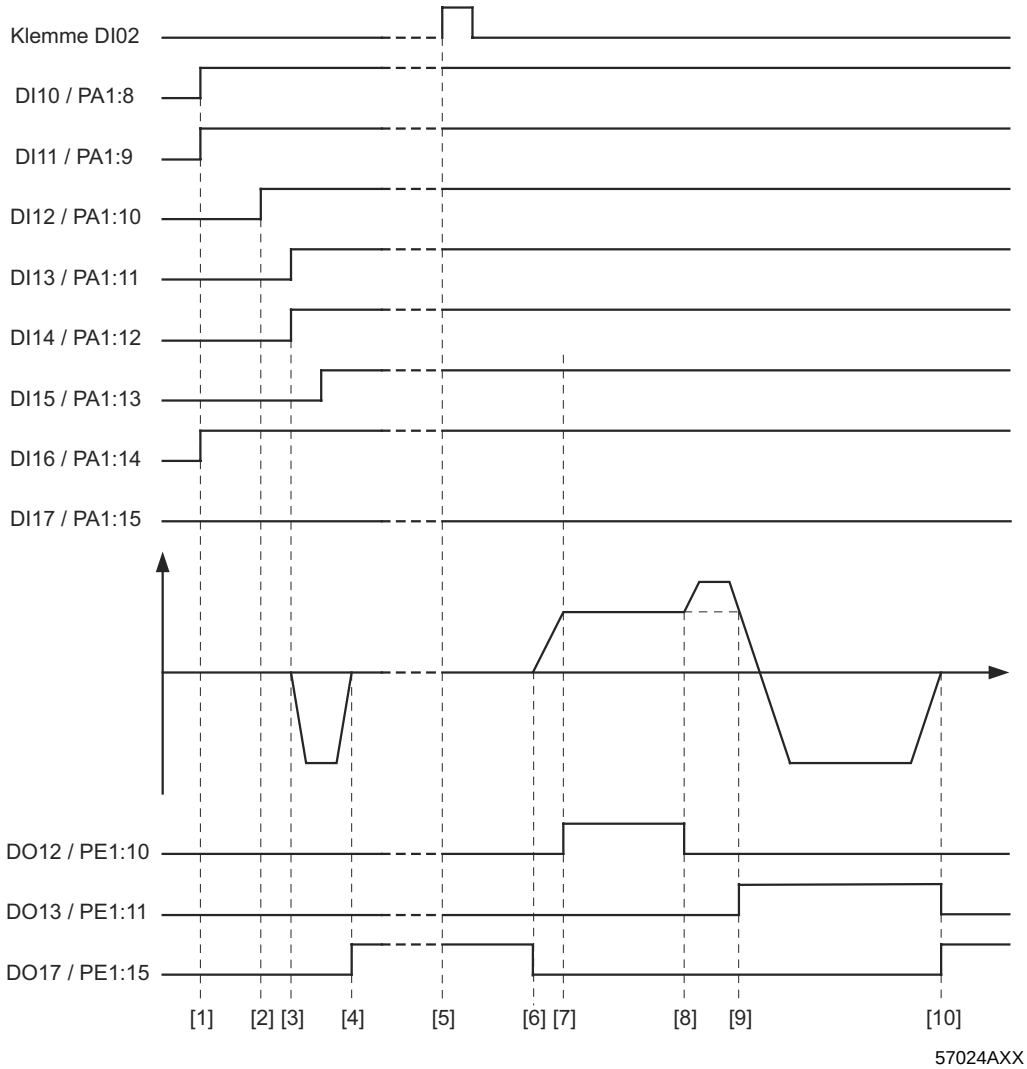

Figure 52: Cycle diagram: Automatic cut length control with material sensor

DIØ2 = Material sensor
DI1Ø = Mode selection
DI11 = Mode selection
DI12 = Start automatic mode
DI13 = Pulling a gap
DI14 = Repositioning
DI15 = Cut length in binary code 2^0
DI16 = Cut length in binary code 2^1
DI17 = Cut length in binary code 2^2
DO12 = Drive in synchr: operation
DO13 = Pulling a gap finished
DO17 = Home position reached

(1) = Automatic mode selection
(2) = Start automatic mode, cut lengths selected with DI15, DI16, DI17 are used
(3) = Start repositioning (with DI14)
(4) = Home position reached (DO17)
(5) = Material sensor detects front edge of the material
(6) = Material feed reaches cut length, engaging process starts
(7) = Synchronous speed reached (DO12), cut lengths selected with DI15, DI16, DI17 are used for the following cut
(8) = Minimum reversing position has been reached, start to pull a gap
(9) = Gap has been pulled (DO13), start repositioning
(10) = Home position reached (DO17)

For control via fieldbus with 3 PD.

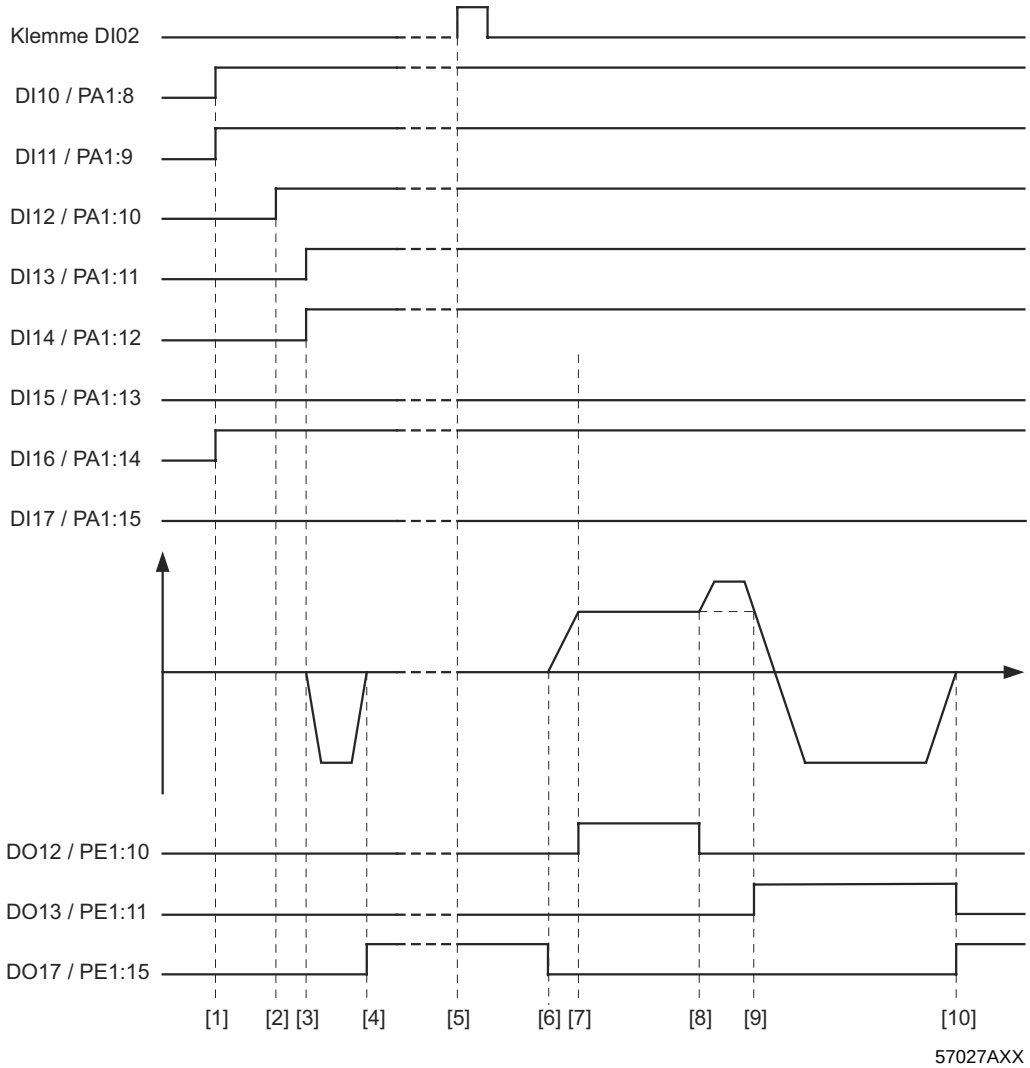

Figure 53: Cycle diagram: Automatic cut length control with material sensor

DIØ2 = Material sensor	DO17 = Home position reached
DI1Ø = Mode selection	(1) = Automatic mode selection
DI11 = Mode selection	(2) = Start automatic mode, assume cut length, assume control with material sensor (DI16)
DI12 = Start automatic mode	(3) = Start repositioning (with DI14)
DI13 = Pulling a gap	(4) = Home position reached (DO17)
DI14 = Repositioning	(5) = Material sensor detects front edge of the material
DI15 = Length control	(6) = Material feed reaches cut length, engaging process starts
DI16 = Material sensor	(7) = Synchronous speed reached (DO12), cut length assumed for following cut, control with material sensor assumed (DI16)
DI17 = Label sensor	(8) = Minimum reversing position has been reached, start to pull a gap
DO12 = Drive in synchronous operation	(9) = Gap has been pulled (DO13), start repositioning
DO13 = Pulling a gap finished	(10) = Home position reached (DO17)

Cut length control with label sensor

For control via terminals or system bus / fieldbus with 1 PD.

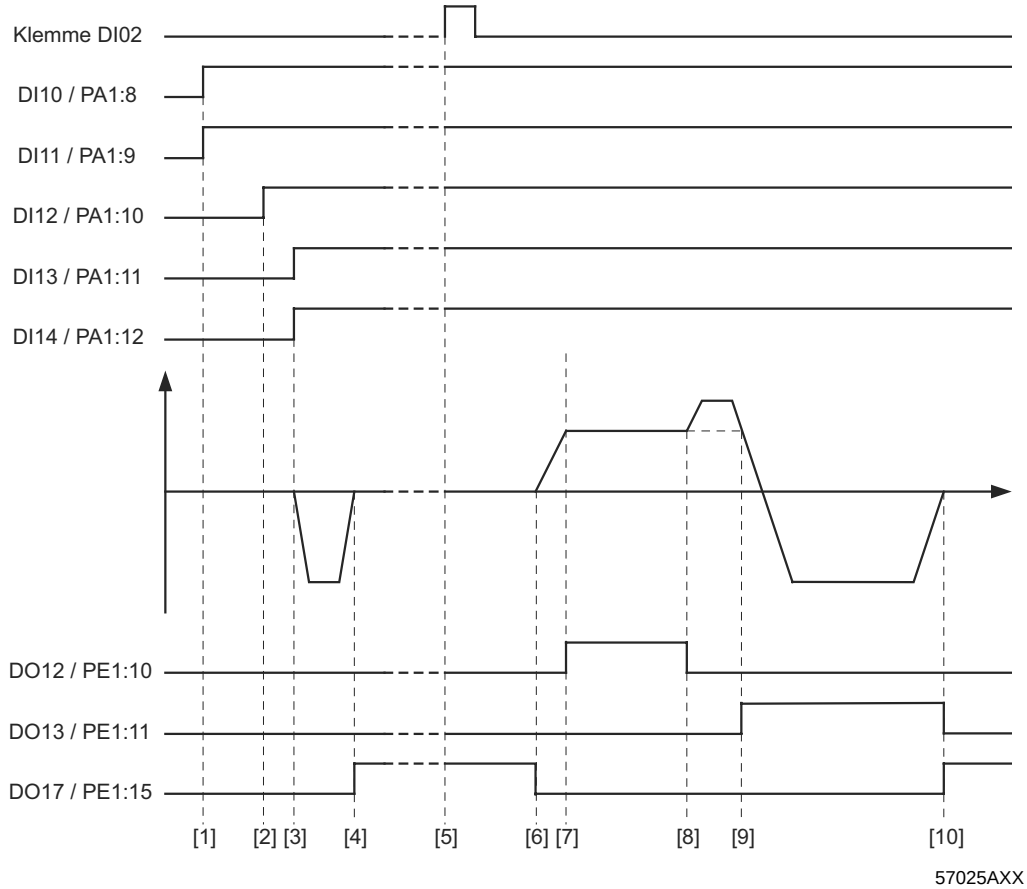

Figure 54: Cycle diagram: Automatic cut length control with label sensor

DIØ2 = Label sensor	(1) = Automatic mode selection
DI1Ø = Mode selection	(2) = Start automatic mode
DI11 = Mode selection	(3) = Start repositioning (with DI14)
DI12 = Start automatic mode	(4) = Home position reached (DO17)
DI13 = Pulling a gap	(5) = Label sensor detects cutting mark
DI14 = Repositioning	(6) = Material feed reaches the offset set during start-up
DO12 = Drive in synchronous operation	(7) = Synchronization speed reached (DO12)
DO13 = Pulling a gap finished	(8) = Minimum reversing position has been reached, start to pull a gap
DO17 = Home position reached	(9) = Gap has been pulled (DO13), start repositioning
	(10) = Home position reached (DO17)

For control via fieldbus with 3 PD.

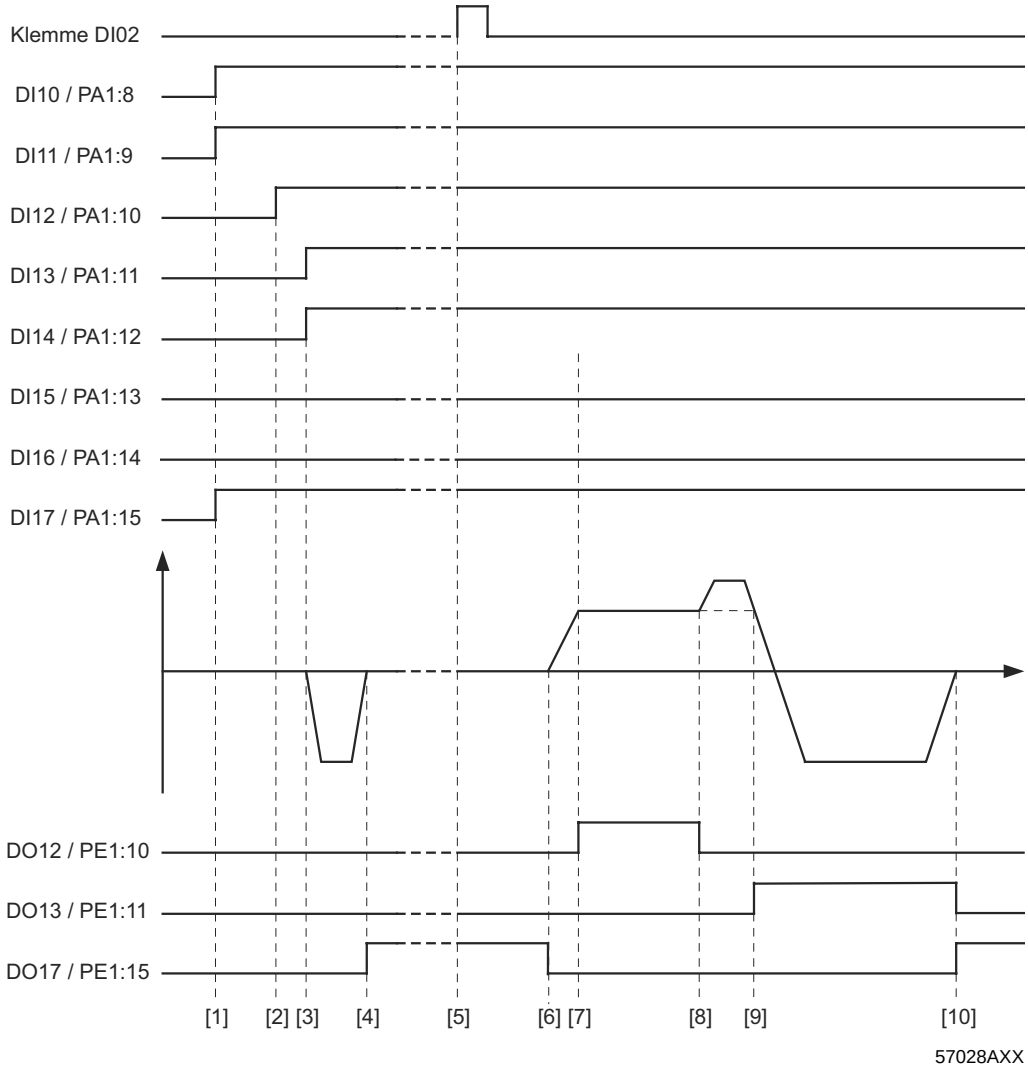

Figure 55: Cycle diagram: Automatic cut length control with label sensor

DIØ2 = Label sensor
DI1Ø = Mode selection
DI11 = Mode selection
DI12 = Start automatic mode
DI13 = Pulling a gap
DI14 = Repositioning
DI15 = Length control
DI16 = Material sensor
DI17 = Label sensor
DO12 = Drive in synchronous operation
DO13 = Pulling a gap finished
DO17 = Home position reached

(1) = Automatic mode selection
(2) = Start automatic mode, assume control with label sensor (DI17)
(3) = Start repositioning (with DI14)
(4) = Home position reached (DO17)
(5) = Label sensor detects cutting mark
(6) = Material feed reaches the offset set during start-up, engaging process starts
(7) = Synchronization speed reached (DO12), assume control with label sensor (DI17)
(8) = Minimum reversing position has been reached, start to pull a gap
(9) = Gap has been pulled (DO13), start repositioning
(10) = Home position reached (DO17)

6.7 Fault information

The fault memory (P080) stores the last five fault messages (faults t-0 to t-4). The oldest fault message is deleted whenever more than five fault messages have occurred. The following information is stored when a malfunction occurs:

Fault that occurred • Status of binary inputs/outputs • Operating status of the inverter • Inverter status • Heat sink temperature • Speed • Output current • Active current • Unit utilization • DC link voltage • ON hours • Enable hours • Parameter set • Motor utilization.

There are three switch-off responses depending on the fault; the inverter remains blocked in fault status:

- **Immediate switch-off:**

  The unit can no longer brake the drive; the output stage goes to high resistance in the event of a fault and the brake is applied immediately (DBØØ "/Brake" = "0").

- **Rapid stop:**

  The drive is braked with the stop ramp t13/t23. 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).

- **Emergency stop:**

  The drive is braked with the emergency ramp t14/t24. 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).

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.

- Reset via binary input DIØ3. Startup of the "Flying saw" causes this binary input to be assigned with the "Reset" function.
- Only for control with fieldbus/system bus: "0"→∀1"→"0" signal at bit PO1:6 in control word PO1.
- Press the reset button in the MOVITOOLS® Manager.

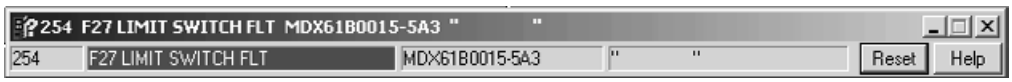

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Figure 56: Reset with MOVITOOLS®

- Manual reset in MOVITOOLS/Shell (P840 = "YES" or [Parameter] / [Manual reset]).
- Manual reset with DBG60B (MDX61B) or DBG11A (MCH4_A).

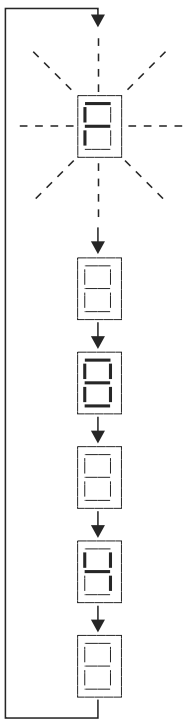
Timeout active

If the inverter is controlled via a communication interface (fieldbus, RS-485 or SBus) and the power was switched off and back on again or a fault reset was performed, then the enable remains ineffective until the inverter receives valid data again via the interface, which is monitored with a timeout.

6.8 Fault messages

Display

The fault or warning code is displayed in binary-coded format. The following display sequence is adhered to:



Flashes, ca. 1 s

Display off, ca. 0.2 s

Tens, ca. 1 s

Display off, ca. 0.2 s

Ones, ca. 1 s

Display off, ca. 0.2 s

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

List of faults

The following table shows a selection from the complete fault list (→ MOVIDRIVE® operating instructions). Only those faults are listed that can occur specifically with this application.

A dot in the "P" column indicates that the response is programmable (P83_ Fault response). The factory set fault response appears in the "Response" column.

Fault code	Designation	Response	P	Possible cause	Measure
00	No error	-			
07	U_Z overvoltage	Immediate switch-off		DC link voltage too high	• Extend deceleration ramps • Check connection leads to the braking resistor • Check technical data of braking resistor
08	n-monitoring	Immediate switch-off		• Speed controller or current controller (in VFC operating mode without encoder) operating at setting limit due to mechanical overload or phase failure in the power supply or motor. • Encoder not connected correctly or incorrect direction of rotation. • n_{max} is exceeded during torque control.	• Reduce load • Increase deceleration time setting (P501 or P503). • Check encoder connection, swap A/A and B/B pairs if necessary • Check encoder voltage supply • Check current limitation • Extend ramps if necessary • Check motor cable and motor • Check mains phases

Fault code	Designation	Response	P	Possible cause	Measure
10	IPOS-ILLOP	Emergency stop		• Incorrect command detected during running of IPOS$^{plus®}$ program. • Incorrect conditions during command execution.	• Check the content of the program memory and, if necessary, correct. • Load the correct program into the program memory. • Check program sequence (→ IPOS$^{plus®}$ manual)
14	Encoder	Immediate switch-off		• Encoder cable or shield not connected correctly • Short circuit/broken encoder wire • Encoder defective	Check encoder cable and shield for correct connection, short circuit and broken wire.
25	EEPROM	Rapid stop		Access to the EEPROM of the memory card has failed	• Activate factory settings, perform reset and reset parameters. • Contact SEW service if the error occurs again. • Replace memory card.
28	fieldbus Timeout	Rapid stop	•	No communication between master and slave within the projected response monitoring.	• Check communications routine of the master • Extend fieldbus timeout time (P819)/deactivate monitoring
29	Limit switch was hit	Emergency stop		A limit switch was reached in IPOS$^{plus®}$ operating mode.	• Check travel range. • Correct user program.
31	TF trip	No response	•	• Motor too hot, TF sensor has tripped • TF sensor of motor not connected or connected incorrectly • Connection of MOVIDRIVE® and TF on motor interrupted • No jumper between X10:1 and X10:2.	• Let motor cool off and reset error • Check connections/link between MOVIDRIVE® and TF. • If a TF is not connected: Jumper X10:1 with X10:2. • Set P835 to "NO RESPONSE"
36	Option missing	Immediate switch-off		• Type of option card not allowed. • Setpoint source, control signal source or operating mode not permitted for this option card. • Incorrect encoder type set for DIP11A.	• Use correct option card. • Set correct setpoint source (P100). • Set correct control signal source (P101). • Set correct operating mode (P700 or P701). • Set the correct encoder type.
42	setpoint deviation	Immediate switch-off	•	• Encoder connected incorrectly • Acceleration ramps too short • P component of positioning controller too small • Incorrectly set speed controller parameters • Value of lag fault tolerance too small	• Check encoder connection • Extend ramps • Set P component to higher value • Reset speed controller parameters • Increase lag fault tolerance • Check wiring of encoder, motor and mains phase. • Check whether mechanical system components can move freely or if they are blocked
94	EEPROM checksum	Immediate switch-off		Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send unit in for repair.

7 Compatibility Between MOVIDRIVE® A / B / *compact*

7.1 Important notes

The "Flying saw" application module for MOVIDRIVE® MDX61B offers a number of additional functions that are not available with MOVIDRIVE® MD_60A or MOVIDRIVE® *compact*. This section provides you with information on the differences between the application module when using a MOVIDRIVE® MD_60A or MOVIDRIVE® *compact* unit and gives you important information on project planning.

Project planning for MOVIDRIVE® MD_60A / MOVIDRIVE® compact

The "Flying saw" application module must have encoder feedback, which means it can only be used with the following drive inverters:

- MOVIDRIVE® MDV60A / MDS60A
- MOVIDRIVE® *compact* MCV / MCS
- MOVIDRIVE® *compact* MCH41A /MCH42A

Compatibility between the hardware terminals

Compared to MOVIDRIVE® MD_60A, MOVIDRIVE® MDX61B has two extra digital inputs (DI06, DI07) and three additional digital outputs (DO03, DO04, DO05). The additional hardware inputs and outputs are set to "No function" during initial startup and are not processed in the program.

Software limit switches

The function to move clear of the software limit switches is only possible as of the following firmware versions for MOVIDRIVE® MD_60A, MOVIDRIVE® *compact* MCx / MCH:

- MOVIDRIVE® MD_60A: 823 854 5.15
- MOVIDRIVE® *compact* MCx: 823 859 6.14
- MOVIDRIVE® *comapct* MCH: 823 947 9.17

Recording IPOS$^{plus®}$ variables

Recording IPOS$^{plus®}$ variables using the MOVITOOLS® program "Scope" is only possible with MOVIDRIVE® MDX61B.

SBus send object for DriveSync slave

If you use MOVIDRIVE® MD_60A or MOVIDRIVE® *compact* MCx / MCH, you do not have the option of setting up an SBus send object to transfer the actual position. It is also not possible to connect the "DriveSync" application module via fieldbus.

7.2 Wiring diagrams

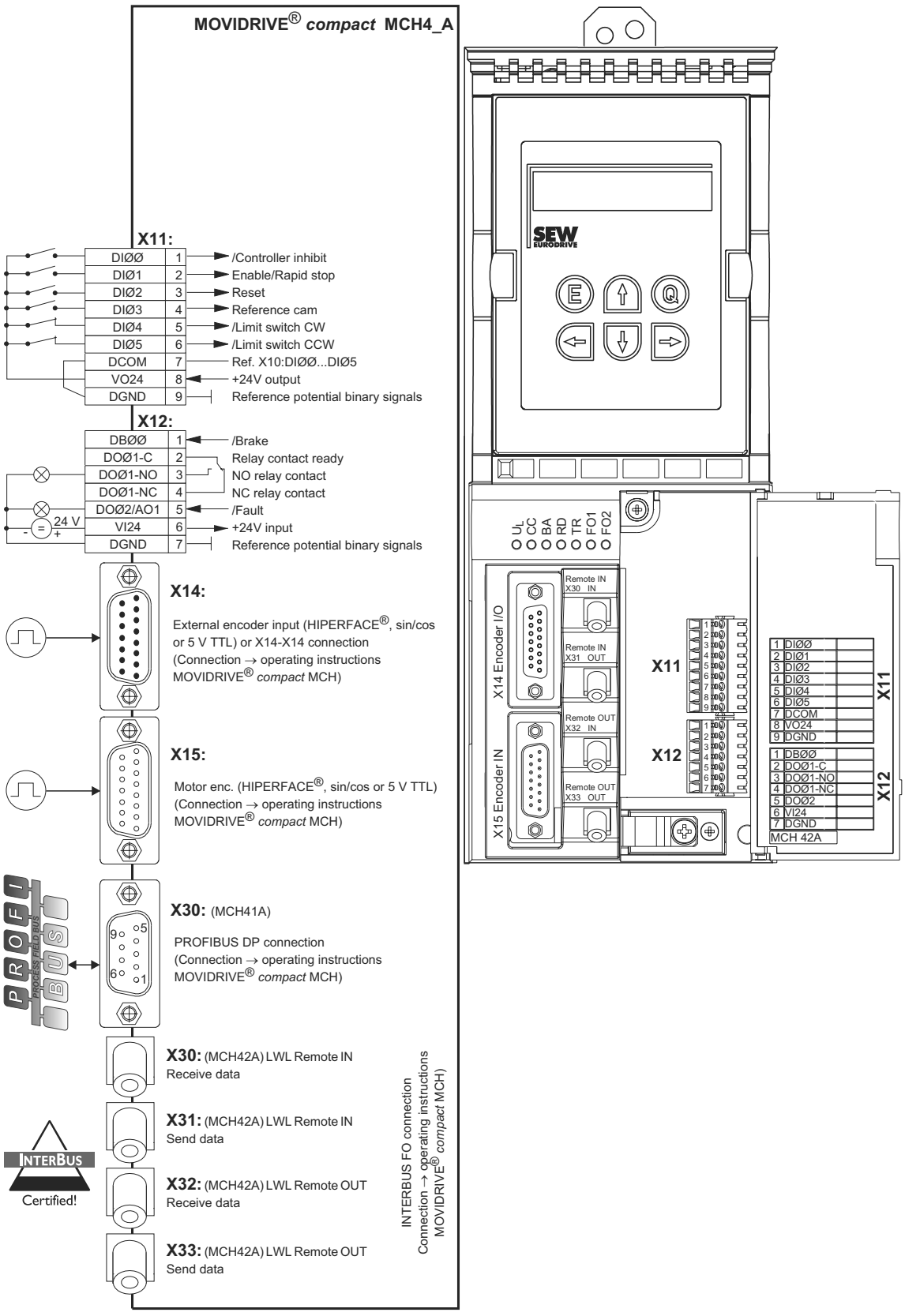

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Figure 57: MOVIDRIVE® compact MCH4_A

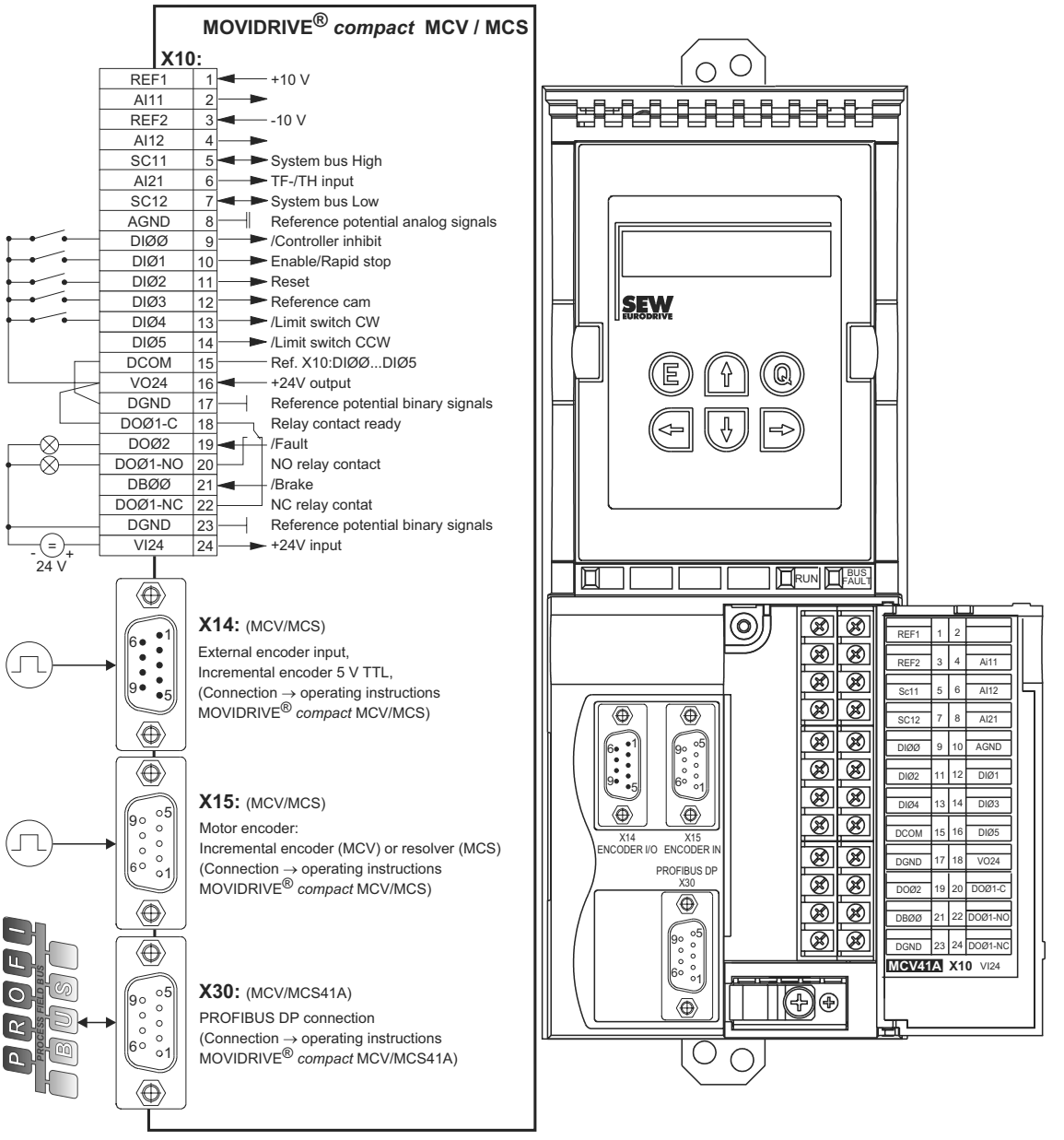

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Figure 58: MOVIDRIVE® compact MCV / MCS

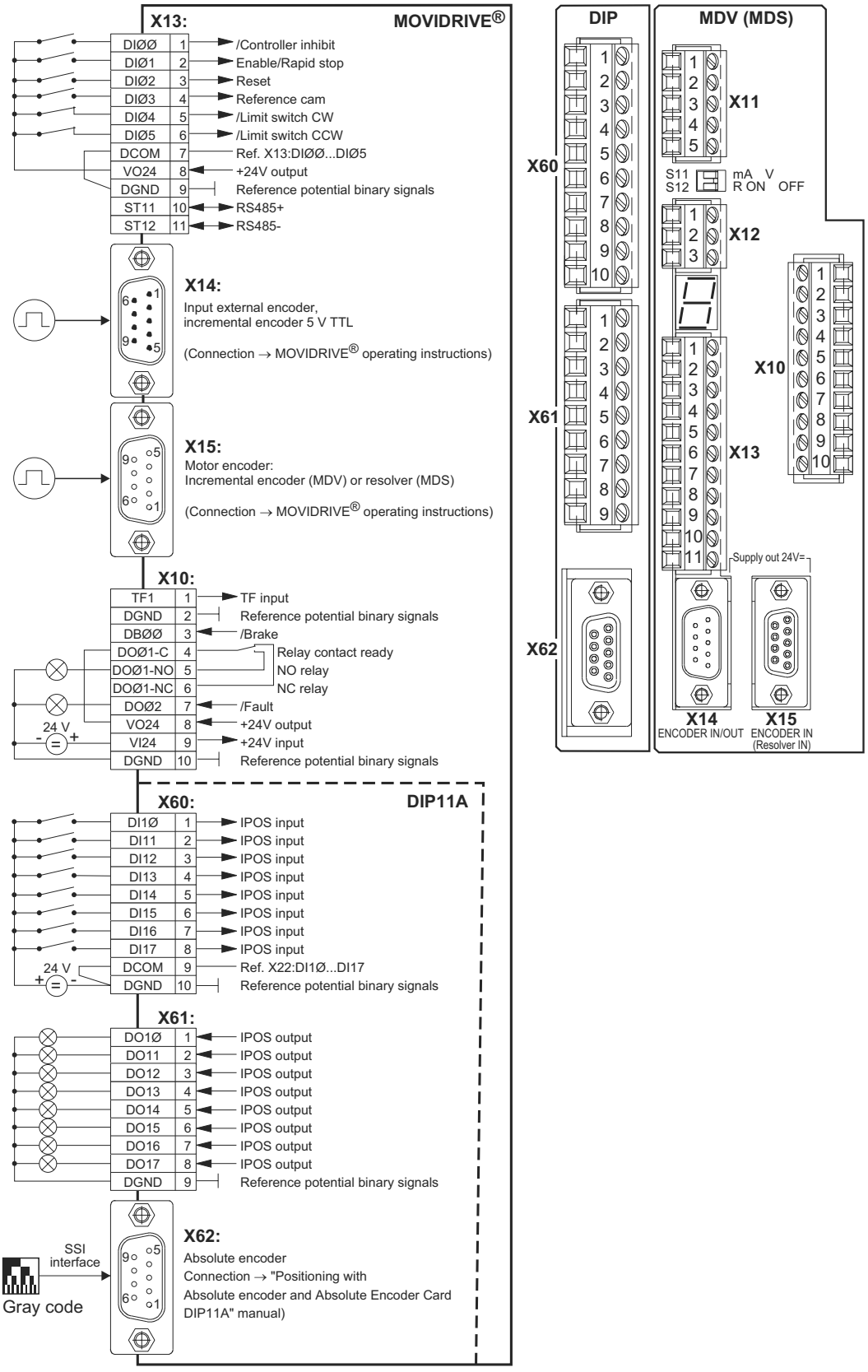

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Figure 59: MOVIDRIVE® MDV / MDS60_A

8 Index

Address List

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

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

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	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			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	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

Austria			
Assembly **Sales** **Service**	**Wien**	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 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	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 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9532565 Fax +359 2 9549345 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	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 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	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 ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 gm-tianjin@sew-eurodrive.cn http://www.sew.com.cn

China			
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	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 sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 a220121236 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	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 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	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 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	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 sew@sewhk.com

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 mdoffice@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveinindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza Andheri Kurla Road, Andheri (E) Mumbai	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	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			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139386 Fax +371 7139386 info@alas-kuul.ee

Lebanon			
Sales	**Beirut**	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			
Sales	**Alytus**	UAB Irseva Merkines g. 2A LT-62252 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	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 kchtan@pd.jaring.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE, Sales and Distribution, S. A. de C. V. Privada Tequisquiapan No. 102 Parque Ind. Queretaro C. P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 2 6186-69 + 6186-70 + 6186-71 Fax +212 2 6215-88 srm@marocnet.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	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			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 sales@sew-eurodrive.co.nz
	Christchurch	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			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Kajmakcalanska 54 SCG-11000 Beograd	Tel. +381 11 3088677 / +381 11 3088678 Fax +381 11 3809380 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Sered**	SEW-Eurodrive SK s.r.o. Trnavska 920 SK-926 01 Sered	Tel. +421 31 7891311 Fax +421 31 7891312 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	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 dross@sew.co.za
	Capetown	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
	Durban	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			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 41717-17 Fax +41 61 41717-00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.co.th

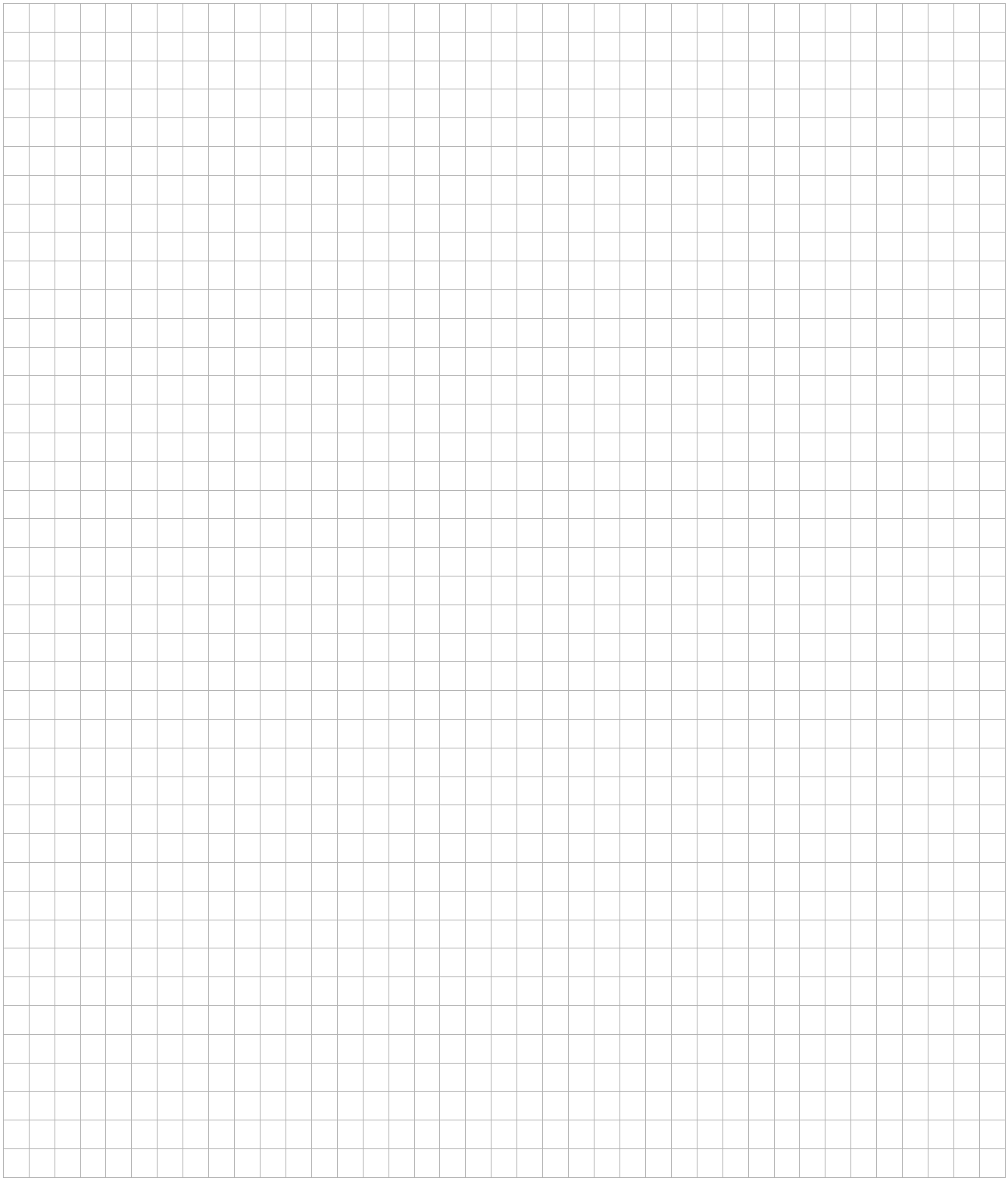
Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn EI Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 + 216 4419164 + 216 3838014 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	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 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	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 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	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 sewventas@cantv.net sewfinanzas@cantv.net



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With drives and controls that automatically improve your productivity.

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