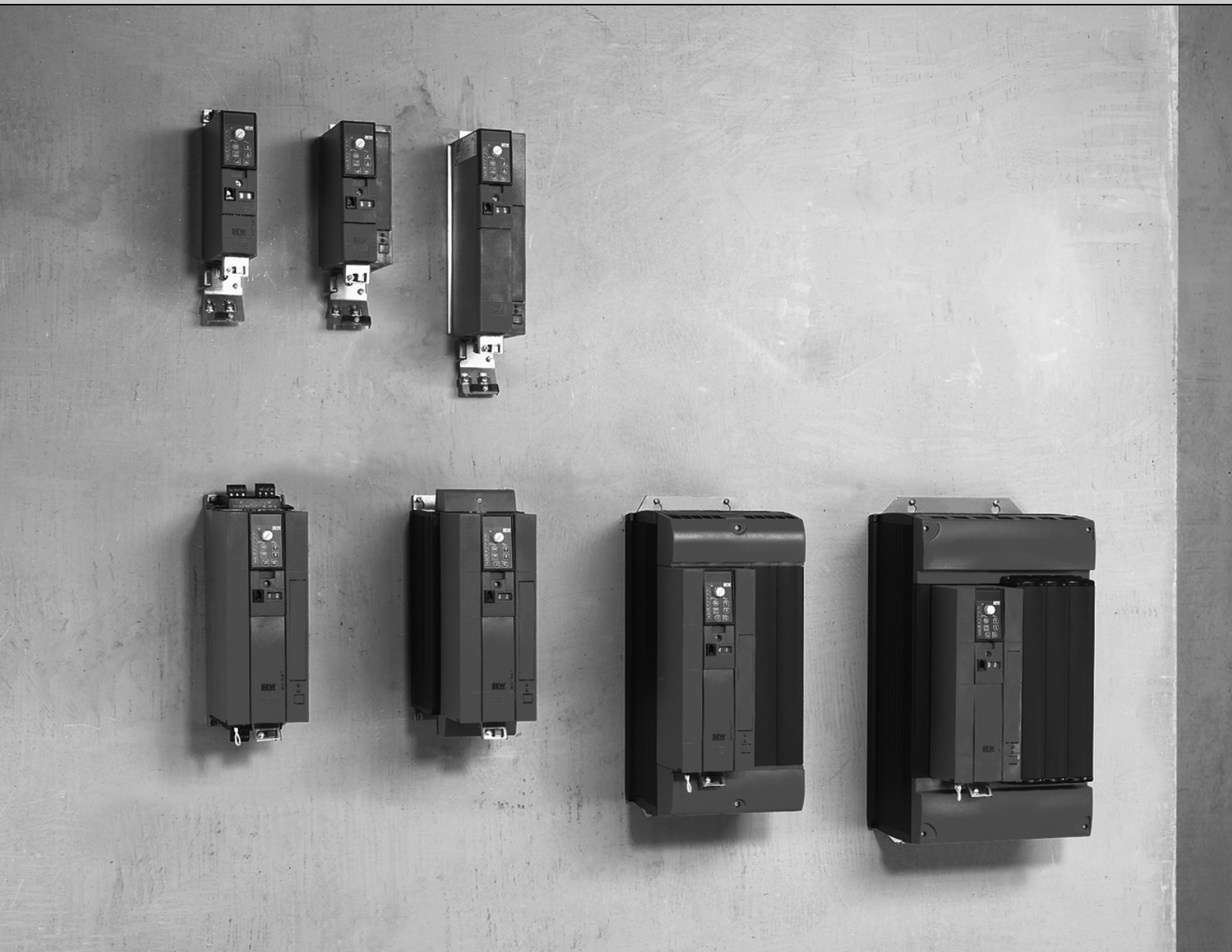




**SEW**  
**EURODRIVE**

# Manual



## **MOVITRAC® B** Simple Positioning Application Module






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## 1 General Notes

### 1.1 Structure of the safety notes

The safety notes in this documentation are structured as follows:

Pictogram	! <b>SIGNAL WORD</b>
	Type and source of danger. Possible consequence(s) if disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences if disregarded
Example:   General danger   Specific danger, e.g. electric shock	<div data-bbox="414 757 646 891">! <b>DANGER</b></div> <div data-bbox="414 891 646 1025">! <b>WARNING</b></div> <div data-bbox="414 1025 646 1160">! <b>CAUTION</b></div> <div data-bbox="414 1160 646 1240"><b>NOTICE</b></div>	Imminent danger  Possible dangerous situation  Possible dangerous situation  Possible damage to property	Severe or fatal injuries  Severe or fatal injuries  Minor injuries  Damage to the drive system or its environment
	<b>INFORMATION</b>	Useful information or tip. Simplifies the handling of the drive system.	

### 1.2 Right to claim under warranty

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

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

### 1.3 Exclusion of liability

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



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

- This manual does not replace the detailed operating instructions and the corresponding manuals.
- Installation and startup only by trained personnel observing the relevant accident prevention regulations and the following documents:
  - 'MOVITRAC® B' operating instructions and corresponding manuals



## 2 System Description

### 2.1 Areas of application

The "Simple Positioning" application module replaces can be used for applications previously realized with rapid/creep switch-over and initiator evaluation. The variable definition of any setpoint position along with different speeds and acceleration ramps ensures more flexibility.

With an accuracy of 1/4 of a motor revolution, the 'Simple Positioning' application module is suitable for the following industries and applications with non-dynamic positioning:

- **Materials handling**
  - Trolleys
  - Roller conveyers
- **Logistics**
  - Trolleys
  - Transverse carriages
- **Format adjustment**

**The "Simple Positioning" module offers the following advantages:**

- User-friendly user interface.
- You only have to enter the parameters required for simple positioning (reduction ratios, speeds, diameters).
- 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.

Consider the following properties for project planning:

- No direct position control  
To hold a position, the application of the brake is activated in the position window.
- No time-critical positioning tasks
- Supported encoder types:
  - Built-in encoder EI7C (96 increments / revolution)
  - HTL encoder


Simple Positioning can be operated in two ways:

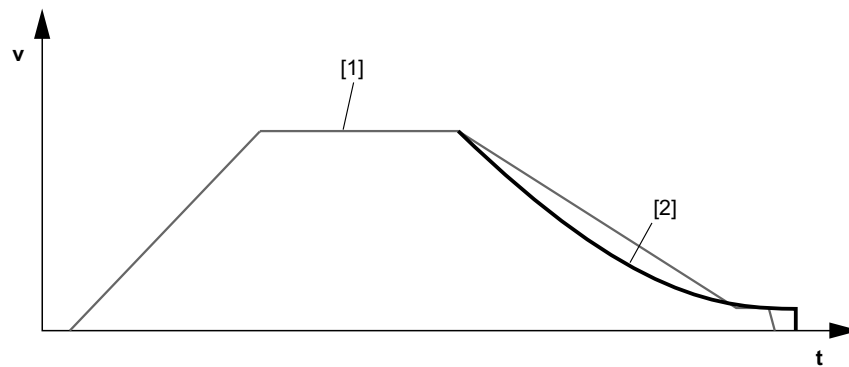
- Control via fieldbus gateway (SBus) using 3 process data words (functionally compatible with bus positioning of MOVIDRIVE® B)
- Control via terminals using digital module FIO21B



## 2.2 Speed characteristics of Simple Positioning

The following figure shows the speed characteristics of a typical positioning process. Take into account for project planning that the specified ramp time directly affects the stability of the positioning process.

	INFORMATION
	<p>Important:</p> <ul style="list-style-type: none"> <li>• Ramp times below 1.5 s can cause the drive to overshoot.</li> <li>• With longer ramp times and higher positioning speeds, the actually travelled ramp can be increased by up to 80%.</li> </ul>



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- [1] Speed characteristics for positioning via rapid/creep speed switchover with initial evaluation
- [2] Speed characteristics with "Simple Positioning" application module



## 3 Project Planning

### 3.1 Prerequisites

#### 3.1.1 PC and software

The "Simple Positioning" application module is implemented as an IPOS<sup>plus</sup>® program and forms part of the SEW MOVITOOLS<sup>®</sup> MotionStudio software version 4.20 and higher. In order to use MOVITOOLS<sup>®</sup> MotionStudio, you need a PC with one of the following operating systems: Windows<sup>®</sup> 95, Windows<sup>®</sup> 98, Windows NT<sup>®</sup> 4.0, or Windows<sup>®</sup> 2000.

#### 3.1.2 Inverters, motors and encoders

**Inverter** The "Simple Positioning" application module can only be used on MOVITRAC<sup>®</sup> B units in technology version (/T).

**Motors** Asynchronous DR motors with built-in EI7C encoder.

**Encoder** The encoder must be mounted directly to the motor. External mounting, e.g. in applications with non-positive connection between motor shaft and load, is not supported.

*Technical data of the encoder input*

Technical data of encoder input	
Encoder signals (2 tracks)	Track A and track B
Phase position	90° ± 20°
Pulse duty factor	1:1 ±20 %
Max. pulse frequency	120 kHz
Connection of track A	MOVITRAC <sup>®</sup> B: Terminal X12:5 (DI04)
Connection of track B	MOVITRAC <sup>®</sup> B: Terminal X12:4 (DI03)
Reference potential	GND to PE potential





## 3.2 Description of functions

### 3.2.1 Four operating modes

- **Jog mode**
  - The direction is selected via the 2 signals "Jog +" and "Jog -".
  - With control via fieldbus, the speed can be specified variably, and the ramp can be switched via a control bit.
  - With control via terminals, a terminal input switches between rapid and creep speed. The ramp is predefined during startup.
- **Teach mode (only with terminal control)**
  - In a referenced axis status, the actual position can be saved to the selected table cell.
- **Referencing mode**
  - Reference travel establishes the reference point (machine zero) for absolute positioning operations.
- **Positioning mode**
  - With control via fieldbus, the speed and target position can be specified variably, and the ramp can be switched via a control bit.
  - Control via terminals allows for binary selection of 8 positions with corresponding ramp and speed.

### 3.2.2 Limit switches, reference position and machine zero

The hardware and software limit switches are evaluated in IPOS<sup>plus®</sup>. Note the following points during project planning:

- Software limit switches must be located within the travel distance of the hardware limit switches.
- You can enter a reference offset during startup if you do not want the machine zero to be located on the reference position. The following formula applies: Machine zero = reference position + reference offset. This way, you can alter the machine zero without having to move the reference position.



## Project Planning

### Process data assignment for control via fieldbus gateway (SBus)

#### 3.3 Process data assignment for control via fieldbus gateway (SBus)

The higher-level controller (PLC) sends three process output data words (PO1 PO3) to the inverter and receives three process input data words (PI1 PI3) from the inverter.

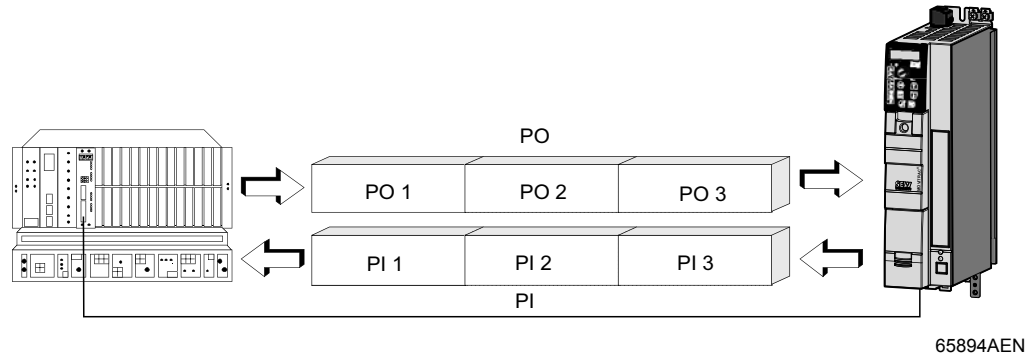


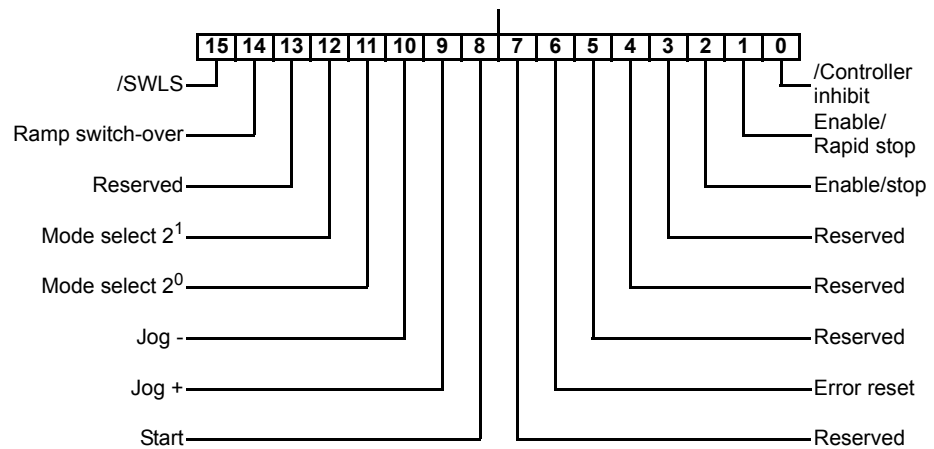
Figure 1: Data exchange via 3 process input and output data words

PO	=	Process output data	PI	=	Process input data
PO1	=	Control word 2	PI1	=	Status word (IPOS PI data)
PO2	=	Setpoint speed	PI2	=	Actual speed
PO3	=	Target position	PI3	=	Actual position

#### Process output data

The process output data words are assigned as follows:

- PO1: Control word 2



- PO2: Setpoint speed

PO2 setpoint speed (user unit)

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

- PO3: Setpoint position

PO3 setpoint position (user unit)

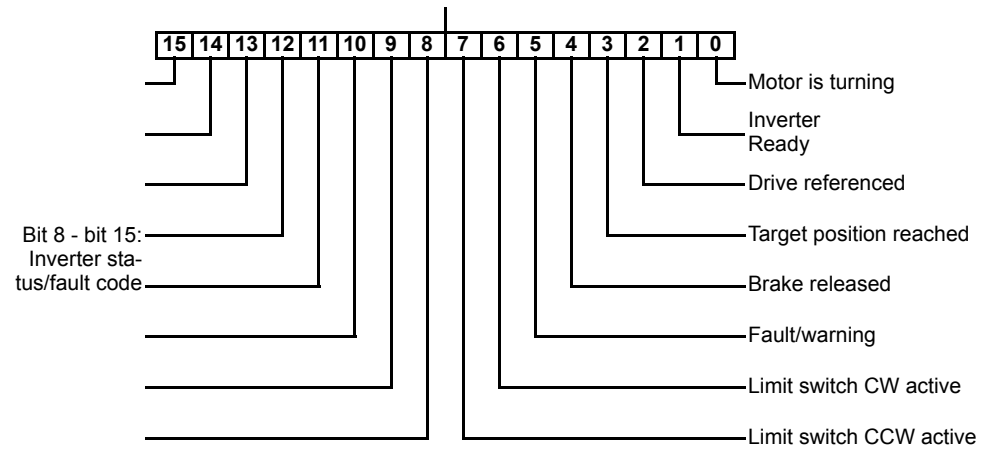
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---



**Process input data**

The process input data words are assigned as follows:

- PI1: Status word 1



- PI2: Actual speed

Actual speed (user unit)

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

- PI3: Actual position

Actual position (user unit)

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



## 4 Installation

### 4.1 MOVITOOLS® MotionStudio software

#### MOVITOOLS MotionStudio®

The "Simple Positioning" application module is available in MOVITOOLS® MotionStudio version 5.60 and higher. Proceed as follows to install MOVITOOLS® MotionStudio on your computer:

- Insert the MOVITOOLS® MotionStudio CD into the CD-ROM drive of your PC.
- Wait until the installation starts automatically. The "Start.htm" file is displayed in the browser.



#### INFORMATION

If the "Start.htm" file does **NOT** automatically open, open the file manually from the root directory of the installation CD.

- Click on the link "MOVITOOLS® MotionStudio".
- Click on the link "Start installation".
- The MOVITOOLS® MotionStudio setup wizard is started. You will be guided through the installation process: Follow the instructions.



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#### Technology version

The "Simple Positioning" application module can be used with MOVITRAC® B units in technology version (/T). The application module cannot be used with units in the standard version (-00).





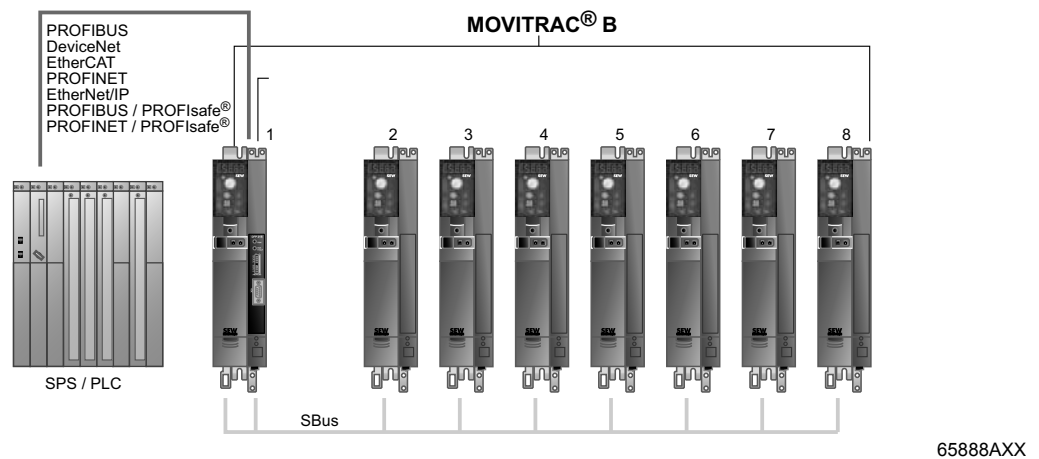
## Installation MOVITRAC® B bus installation

### 4.3 MOVITRAC® B bus installation

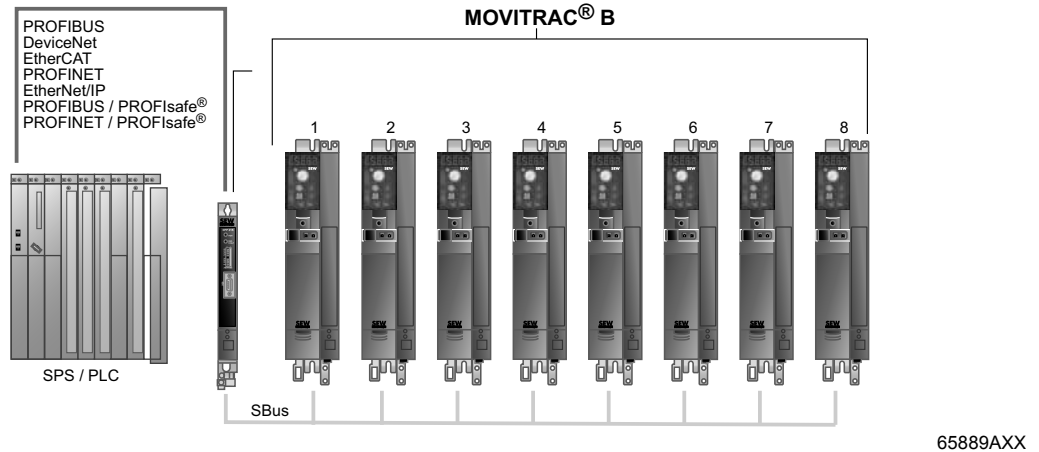
The fieldbus gateways convert standard fieldbuses to SBus. This means that up to 8 inverters can be addressed through one fieldbus gateway.

The gateway is available in 2 different variants:

- Integrated in the inverter: The fieldbus interface DF.B is installed in the inverter (see following figure).

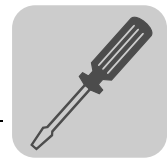


- In separate housing: The fieldbus interface DF.B is installed in a UOH11B housing, or available as gateway (e.g. UFI1B for INTERBUS) (see following figure).

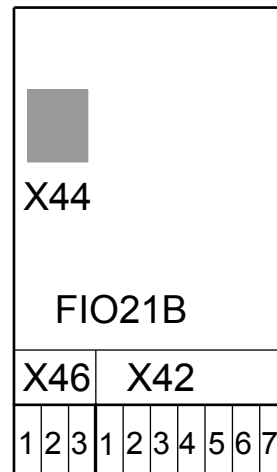
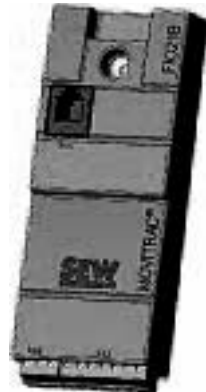


Fieldbus gateways are available for connecting fieldbuses the following bus systems.

Bus	Separate housing	Integrated in the inverter (not size 0XS)
PROFIBUS	DFP21B / UOH11B	MC07B.../FSC11B/DFP21B
DeviceNet	DFD11B / UOH11B	MC07B.../FSC11B/DFD11B
EtherCAT	DFE24B / UOH11B	MC07B.../FSC11B/DFE24B
PROFINET	DFE32B / UOH11B	MC07B.../FSC11B/DFE32B
EtherNet/IP	DFE33B / UOH11B	MC07B.../FSC11B/DFE33B
PROFIBUS/PROFIsafe	DFS11B / UOH11B	MC07B.../FSC11B/DFS11B
PROFINET / PROFIsafe	DFS21B / UOH11B	MC07B.../FSC11B/DFS21B
INTERBUS	UFI11A (823 898 7)	-



#### 4.4 Terminal control via digital module FIO21B



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Functions of the input terminals X42:1 - 7 at the FIO21B digital module:

Binary input terminal X42	Operating mode			
	Jog mode	Teach mode	Referencing mode	Positioning mode
DI10/X42:1	0	1	0	1
DI11/X42:2	0	0	1	1
DI12/X42:3	/SWLS	Start	Start	Start
DI13/X42:4	Jog +	Position 2 <sup>0</sup>	Reserved	Position 2 <sup>0</sup>
DI14/X42:5	Jog	Position 2 <sup>1</sup>	Reserved	Position 2 <sup>1</sup>
DI15/X42:6	Rapid speed	Position 2 <sup>2</sup>	Reserved	Position 2 <sup>2</sup>
DI16/X42:7	Error reset	Error reset	Error reset	Error reset

Function of the output terminals (basic unit):

Binary output terminal X13	Operating mode			
	Jog mode	Teach mode	Referencing mode	Positioning mode
DO01/X13:1	/Fault	/Fault	/Fault	/Fault
DO02/X13:2	Brake released	Brake released	Brake released	Brake released
DO03/X13:3	No function	Position saved	Drive referenced	Drive in position



## 5 Startup

### 5.1 General prerequisites

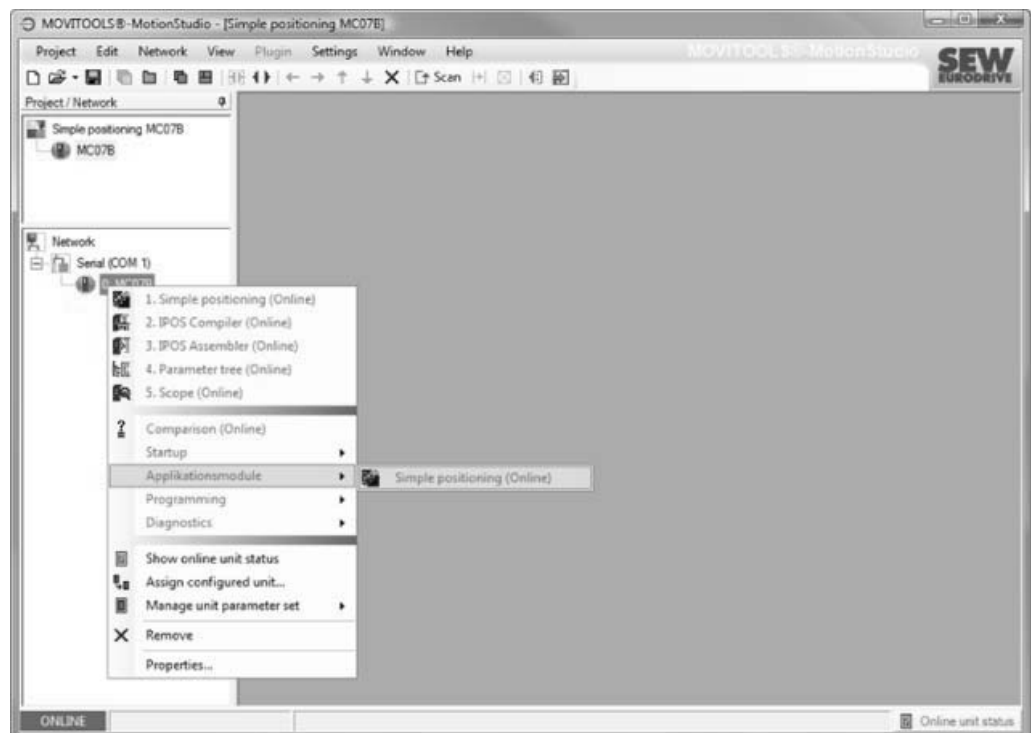
Correct project planning and installation are the prerequisites for successful startup. Refer to the MOVITRAC® B system manual for detailed project planning instructions.

Check the installation, the encoder connection and the installation of the fieldbus interfaces by following the installation instructions in the MOVITRAC® B operating instructions, in the fieldbus manuals and in this manual.

### 5.2 Starting the "Simple positioning" application module

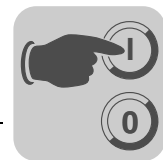
#### General information

- Start MOVITOOLS® MotionStudio.
- Check the unit firmware (1822.563.2.10 or higher). To do so, choose [Startup] / [Parameter tree] from the context menu of the unit. Select parameter *P076 Firmware of basic unit*.
- Startup the motor. Test in manual operation whether the motor has been started up correctly.
- Inhibit the unit (X12:2 DI01 CW/stop to "0")
- Start the "Simple Positioning" application module. To do so, choose [Application module] / [Simple positioning] from the context menu of the unit (see following figure).



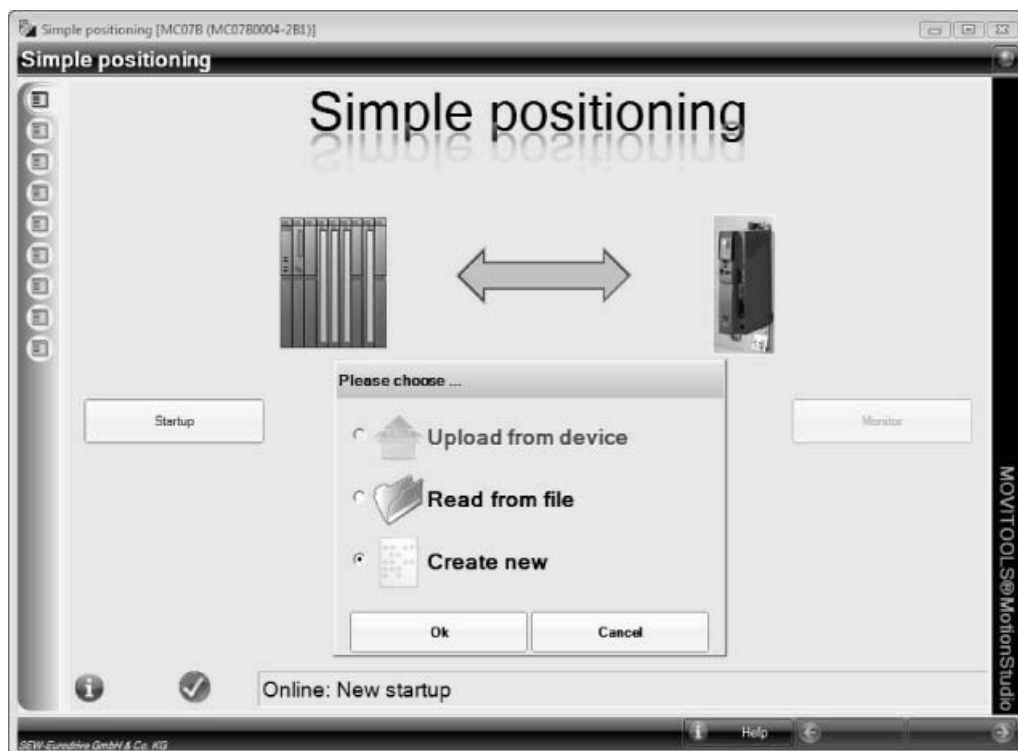
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### Initial screen

The initial screen of the "Simple Positioning" application module opens (see following figure).



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- To commence startup, click the [Startup] button.  
Select one of the following options:
  - "Create new" to perform initial startup
  - "Read from file" to load an existing parameter set
  - "Upload from device" to perform re-startup
 The following chapters describe the next steps.
- To monitor or control the started up application, click the [Monitor] button. For more information, refer to section "Operation and Service".  
The [Monitor] button is disabled if
  - you are not online
  - the application module has not been detected

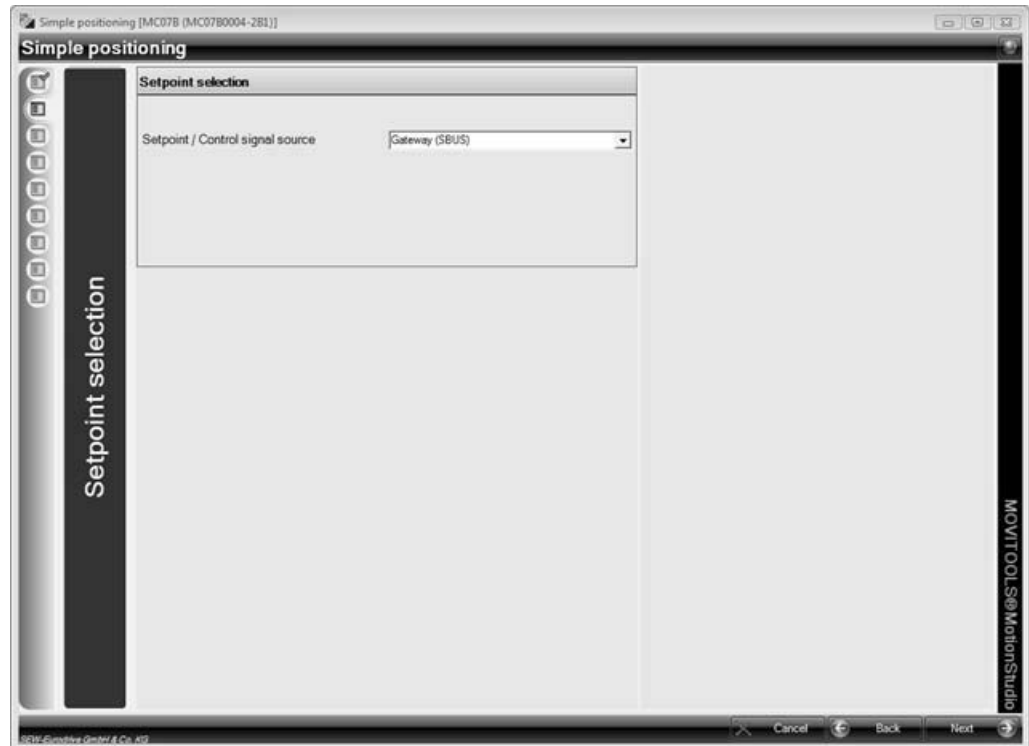


## Startup

### Starting the "Simple positioning" application module

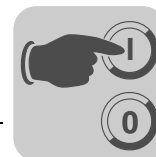
#### Selecting the setpoint source

In this window, you can specify the setpoint/control signal sources (see following figure).



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In the "Setpoint/control signal source" selection list, you can specify whether the application is controlled via fieldbus gateway (setting: SBus fieldbus gateway) or via terminals (setting: Terminal with FIO21B).



## Calculating the scaling factors

You can set the scaling factors for distance and speed in this window.

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Make the following settings in this window:

- **Calculating the scaling factors**
  - Enter values in the "Diameter of driving wheel" field or the "Spindle pitch" field according to your application.
  - In the input fields "Gearing ratio" and "External ratio", enter the total gear ratio of the drive with up to 2 decimal places.
  - Select the unit of speed.
  - The default setting in the "Encoder type" selection list is encoder type "EI7C". If you are using a different encoder type, select the setting "HTL". Consider the internal quadrupling of the physical resolution. This means that for an encoder with a physical resolution of 24 increments/revolution, for example, you must enter the value "96".
  - Click the [Calculation] button. The "Distance" scaling factor is determined and displayed in the "Pulses/distance" display field. The "Speed" scaling factor is determined and displayed in the "Numerator/denominator" display field. The scaling factors are limited to  $2^{13}$ .



## Startup

### Starting the "Simple positioning" application module

#### Setting parameters and limits

In this window, you can enter the position of the software limit switches, the reference offset, the reference travel type, and the speed limits.

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- **"Limit switches" group**

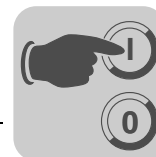
In the input fields "Software limit switch CCW/CW", enter the position of the software limit switches. Make sure the positions of the software limit switches are **within** the travel distance of the hardware limit switches and that they do not overlap the reference position. If you enter the value "0" in both input fields, the software limit switches are deactivated.

The hardware and software limit switches are evaluated in IPOS<sup>plus</sup>®.

- **"Reference travel" group**

Enter the reference offset in user units in the "Reference offset" input field. The reference offset is used to correct the machine zero. The following formula applies:

Machine zero = reference position + reference offsets



- Select the correct reference travel type (3, 4, 5, 8) from the "Reference travel type" selection box. The reference travel type specifies the reference travel strategy that is used to establish the machine zero of a machine.

 54949AXX	<b>Type 3:</b> The reference position is the CW hardware limit switch. No reference cam is required. Machine zero = reference position + reference offset
 54950AXX	<b>Type 4:</b> The reference position is the CCW hardware limit switch. No reference cam is required. Machine zero = reference position + reference offset
 54951AXX	<b>Type 5:</b> No reference travel. The reference position is the current position. Machine zero = current position + reference offset
 54951AXX	<b>Type 8:</b> No reference travel. The reference position is the current position. In contrast to type 5, type 8 reference travel can also be performed when the system is in status "No enable/controller inhibit". Machine zero = current position + reference offset.

- **Input fields for reference travel speed 1 and 2**

When selecting reference travel type 3 or 4, the hardware limit switch is 'searched' with reference travel speed 1. Then, the drive moves away from the hardware limit switch with reference travel speed 2.

- **"Speed limits" group**

- "Maximum speed in positioning mode" input field  
You can limit the specified positioning speed by entering a value here.
- "Maximum speed in jog mode" input field  
You can limit the specified jog speed by entering a value here.
- "Maximum motor speed" input field  
Enter a value at least 10% higher than the maximum positioning or jog speed.

- **'Ramps' group (only for fieldbus control)**

- "Ramp 1", "Ramp 2" input fields  
You can switch between the ramp times via PO1:Bit 14 when using fieldbus gateway control



## Startup

### Starting the "Simple positioning" application module

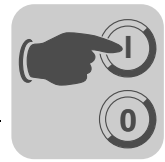
#### Setting parameters for terminal control

For terminal control (setting "Terminal with FIO21B" in the "Setpoint/control signal source" selection field, see section "Setpoint selection"), you have to set the following parameters for jog and positioning mode (see following figure).

No.	Setpoint position [mm]	Ramp [ms]	Speed [1/min]
Tab 0	0	2000	1000
Tab 1	8000	2000	1000
Tab 2	6000	2000	1000
Tab 3	4000	2000	1000
Tab 4	2000	2000	1000
Tab 5	-2000	1000	500
Tab 6	-4000	1000	500
Tab 7	-6000	1000	500

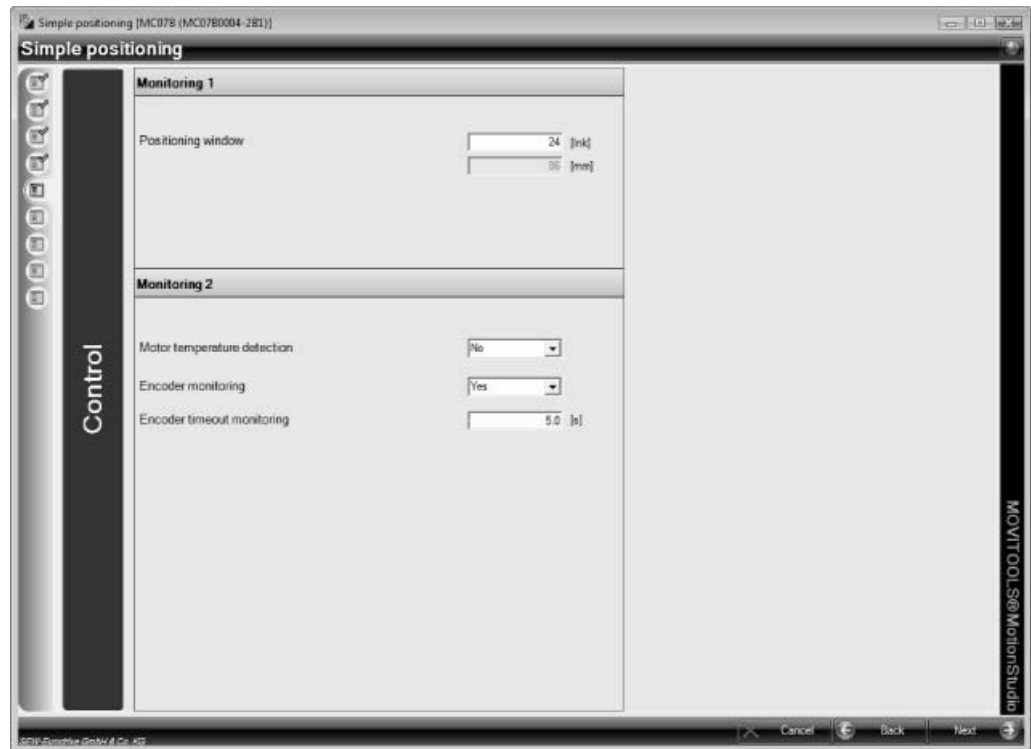
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- **"Jog mode" group**  
Enter the values for rapid and creep speed and the ramp time.
- **"Positioning mode" group**  
Here, you can enter up to 8 setpoint positions with corresponding ramp and speed values.



### 5.3 Monitoring function setup

Startup window for setting the monitoring functions (see following figure).



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- **"Monitoring 1" group**
  - "Position window" edit box  
Positioning is completed (i.e. brake is applied) when the actual position is in this range (target position  $\pm$  position window).
- **"Monitoring 2" group**
  - "Temperature sensor evaluation" selection field  
Activating or deactivating the temperature sensor evaluation (TF signal) via binary input DI05.
  - "Encoder monitoring" selection field  
Activating or deactivating encoder monitoring. When encoder monitoring is activated, the encoder signals are monitored with respect to plausibility (direction of rotation) and wire breakage.
  - "Encoder monitoring timeout" input field  
After the timeout interval set here has elapsed, the error message F116, suberror code 14 (encoder) is issued during startup when encoder monitoring is active and an error occurs.



#### INFORMATION

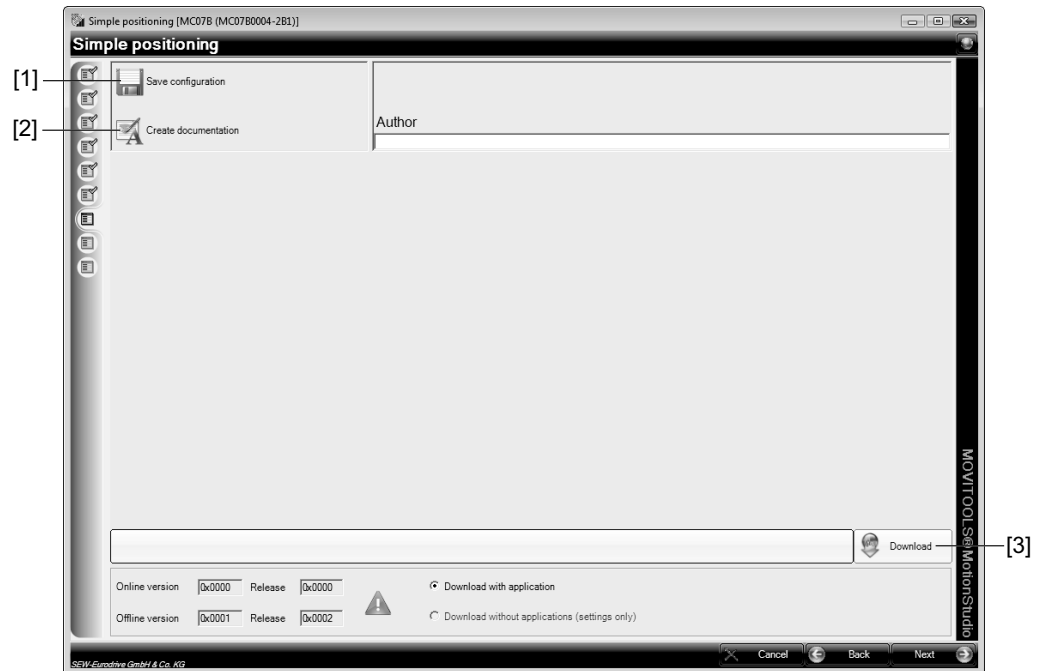
See section "Monitoring functions" for additional information.



#### 5.4 Completing startup

Once you have entered all the parameters, save the configuration (click on the [Save configuration] button [1]). You can also click on [Create documentation] [2] to generate a PDF file with the current configuration.

Click the [Download] button [3] to download the data into the inverter (see following figure).

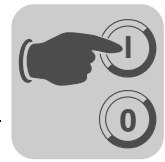


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The following functions are performed when completing startup (download):

- Downloading the SHELL parameters
- Downloading the IPOS<sup>plus</sup>® variables
- Downloading the IPOS<sup>plus</sup>® program, if the option "Download with application" has been selected. This option is selected automatically during initial startup.





## 5.5 Parameters and IPOS<sup>plus</sup>® variables

The following parameters and IPOS<sup>plus</sup>® variables are set automatically during startup and are loaded into the inverter during the download.

Parameter P...	Index	Description	Setting
100	8461	Setpoint source	SBus1 / fixed setpoints
101	8462	Control signal source	SBus1 or terminals
608	8844	Binary input DI00	IPOS input / No function
Reserved		Binary input DI01	CW/Stop (fixed assignment) • 0: No unit enable • 1: Unit enabled
601	8336	Binary input DI02	IPOS input/ No function
602	8337	Binary input DI03	IPOS input (position)
603	8338	Binary input DI04	IPOS input (position)
604	8339	Binary input DI05	TF signal / No function
620	8350	Binary output DO01	IPOS output
621	8351	Binary output DO02	Brake released
622	8916	Binary output DO03	IPOS output
809	10204	IPOS enable	ON
938	8888	Task 1 speed	5
939	8962	Task 2 speed	4
870	8304	Setpoint description PO1	Control word 2
871	8305	Setpoint description PO2	IPOS PO data
872	8306	Setpoint description PO3	IPOS PO data
873	8307	Actual value description PI1	IPOS PI data
874	8308	Actual value description PI2	IPOS PI data
875	8309	Actual value description PI3	IPOS PI data
876	8622	Process data enable	1: Yes



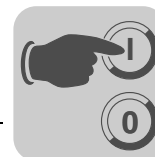
## Startup Parameters and IPOSplus® variables

IPOSplus® variable H..	Index	Description	Unit
Scaling			
H018	11018	Encoder resolution	Increments/revolution
H020	11020	Scaling distance numerator	
H021	11021	Scaling distance denominator	
H022	11022	Scaling speed numerator	
H023	11023	Scaling speed denominator	
Limits and reference travel			
H030	11030	Software limit switch left	User unit
H031	11031	Software limit switch right	User unit
H032	11032	Hardware limit switch 1 = active / 0 = inactive	
H033	11033	Reference offset	User unit
H034	11034	Reference type	
H035	11035	Reference speed 1	0.1/min
H036	11036	Reference speed 2	0.1/min
H040	11037	Maximum speed in positioning mode	0.1/min
H041	11038	Maximum speed in jog mode	0.1/min
Ramps (with fieldbus gateway control)			
H042	11042	Ramp 1	ms
H043	11043	Ramp 2	ms
Speeds and ramps (with terminal control) Jog mode			
H061	11061	Slow speed	0.1/min
H062	11062	Rapid speed	0.1/min
H063	11063	Ramp	ms
Speeds and ramps (with terminal control) Positioning mode			
H065	11065	Table 0: Position	User unit
H066	11066	Table 0: Velocity	0.1/min
H067	11067	Table 0: Ramp	ms
...	...	...	
H086	11086	Table 7: Position	User unit
H087	11087	Table 7: Velocity	0.1/min
H088	11088	Table 7: Ramp	ms
Other			
H050	11050	Position window	Increments
H056	11056	Encoder monitoring 1 = on / 0 = off	
H057	11957	Encoder monitoring timeout	ms



### INFORMATION

**Do not alter these parameters and IPOSplus® variables after startup!**



## 6 Operation and Service

### 6.1 Starting the drive

After the download, click on "Continue" to go to the "Simple Positioning" monitor.

#### Operating modes



#### INFORMATION

Note that after changing the operating mode, the signals "Jog +", "Jog -" and "Start" must be delayed by 50 ms.

Control via fieldbus:

Operating mode	Invalid mode	Jog mode	Referencing mode	Positioning mode
PO1:Bit 11	"0"	"1"	"0"	"1"
PO1:Bit 12	"0"	"0"	"1"	"1"

Control via terminals:

Operating mode	Jog mode	Teach mode	Referencing mode	Positioning mode
DI10	"0"	"1"	"0"	"1"
DI11	"0"	"0"	"1"	"1"

#### • Jog mode

The drive can be moved via the Jog + and Jog - signals.

##### – Fieldbus control:

Specify the setpoint speed with process output data word PO2. With a value = 0, the drive runs at minimum speed.

If PO2:Bit 14 (ramp switch-over) is set to "1", ramp 2 is active instead of ramp 1.

##### – Terminal control (see section 'Setting parameters for terminal control'):

The drive is moved with 'Creep speed' and the ramp set during startup in jog mode. If the binary input DI15 is set to "1", "Rapid speed" is selected.

#### • Teach mode (only with terminal control)

In a referenced state, the current position can be saved to the previously selected table cell through an edge change (min. 200 ms per status) "0" - "1" - "0" at binary input DI12 (Start). The teaching process is successfully completed when binary output DO03 is set to "1" (position saved).



#### INFORMATION

A non-referenced drive is signaled via DO01 (/malfunction) = "0". Note that MOVITRAC® B does not display an error in this case.



- **Referencing mode**

The reference position is defined through reference travel (e.g. to one of the two hardware limit switches). Set PO1:Bit 8 (or DI12) "Start" to "1" to start reference travel. The "1" signal must be present for the entire duration of the reference travel. Once reference travel has been completed successfully, PI1:Bit 2 (or DO04) "Drive referenced" is set. The "1" signal at PO1:Bit 8 (or DI12) "Start" can now be revoked. The drive is now referenced.

- **Positioning mode**

- In positioning mode, the drive can be positioned absolutely based on the machine zero point (reference position).
- After you have specified the setpoint speed via PO2 and the setpoint position via PO3 (or binarily selected the table cell with position bits DI13 - DI15 ), you can start the positioning process via PO1:Bit 8 (or DI12) "Start".
- With a setpoint speed selection = 0, the drive runs at minimum speed.
- With terminal control, the ramp assigned to the selected table cell is active.
- If PO2:Bit 14 (ramp switch-over) is set to "1" in fieldbus control mode, ramp 2 is active instead of ramp 1.
- If the software limit switch is activated, the drive cannot travel outside the limit switch ranges.
- A new target position is immediately adopted during travelling.
- Once the target position has been reached ( $\pm$  position window), the brake is applied and PI1:Bit 3 (or DO03) "Target position reached" is set.



#### INFORMATION

With terminal control, a non-referenced drive is signaled via DO01 (/malfunction) = "0". Note that MOVITRAC® B does not display an error in this case.

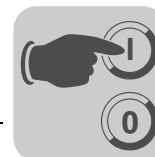
## 6.2 Monitoring functions

- **Function of the hardware limit switches**

If the hardware limit switches were activated during startup, the axis is stopped (ramp t11) when it reaches a hardware limit switch. The error message F116, suberror code 29 (limit switch reached) is displayed. The error message can be deleted by reversing the direction of travel. An error reset is not necessary.

- **Function of the software limit switches**

- The monitoring of the software limit switches is activated if the value of the right software limit switch is larger than the value of the left software limit switch during startup and if the axis is referenced.
- In jog mode, the axis is stopped when three position windows before the software limit switch position are reached (stop ramp t13), and the error message F116, suberror code 78 (software limit switch reached) is issued. The error message can be deleted by reversing the direction of travel and resetting the error.
- In jog mode, setting PO1:Bit 15 (or DI12) switches off monitoring of the software limit switches.



- In positioning mode, specifying a setpoint position outside the software limit switches also leads to the error message F116, suberror code 78 (software limit switch reached). The error message can be deleted by specifying a setpoint position inside the software limit switches and by resetting the error.
- **Encoder monitoring function**  
When encoder monitoring is activated, the encoder signals are monitored with respect to plausibility (direction of rotation) and wire breakage. In case of an error, the error message F116, suberror code 14 (encoder) is issued when the timeout interval set during startup has elapsed.
- **Display of suberror codes**
  - Terminal control:  
The suberror code pertaining to F116 is displayed on the interface of the application module and via the parameter tree in error status (P012).
  - Fieldbus control:  
In addition to terminal control, the suberror code is issued via PI1:Bit 8 - 15.

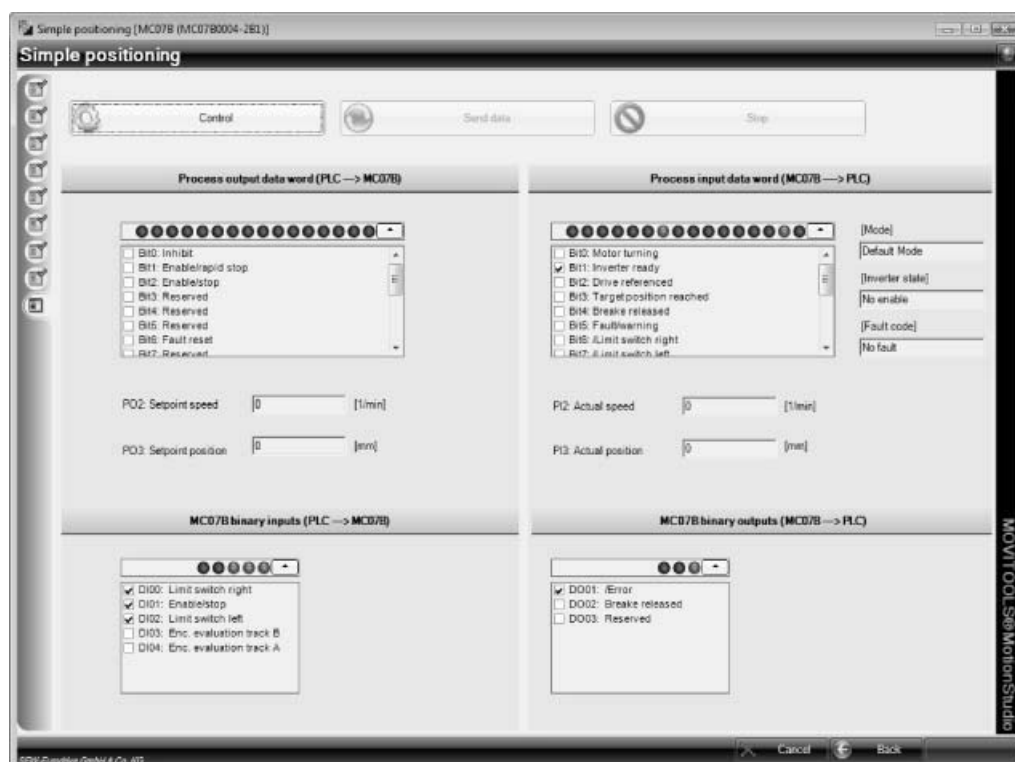
## 6.3 Diagnostics

### Monitor mode

You can call up the monitor during operation by selecting [MotionStudio] / [Application modules] / [Simple Positioning]. Then click the [Monitor] button (see chapter "Start Simple Positioning", section "Start monitor")

### Fieldbus operation

The process input and output data transferred via fieldbus are displayed in decoded form (see following figure).



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## Terminal mode

The binary input and output signals are displayed in decoded form (see following figure).



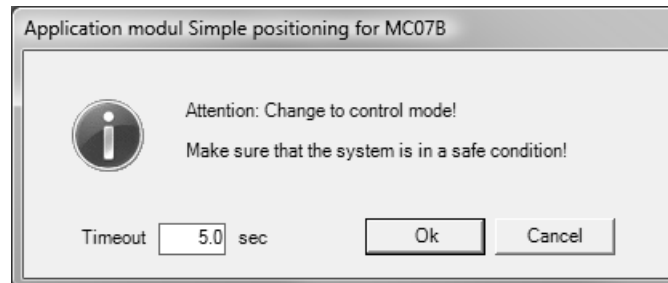
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The assignment of input and output signals depends on the selected operating mode. Read chapter "Terminal control via digital module FIO21B".



## 6.4 Control mode

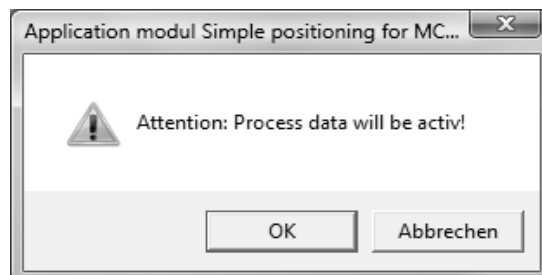
You can use the [Control] button to move the drive manually via the user interface. The process data (in fieldbus mode) or the binary signals (in terminal mode) are ignored. Before control mode becomes active, you must acknowledge the following safety note.



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- If communication is interrupted, the drive stops after the timeout interval set here.
- In control mode, you can specify the respective signals and send them to the drive by clicking [Send data].
- You can stop the drive at any time using the [Stop] button.

To go back to the status view, click the [Status] button and acknowledge the following safety information (see following figure).



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## 7 Appendix

### 7.1 Compatibility comparison of positioning with MOVIDRIVE® B / MOVITRAC® B

	MOVIDRIVE® B Positioning	MOVITRAC® B Simple positioning
<b>Fieldbus interface</b>	3 PD	3 PD
<b>Terminal assignment</b>	DI00: /Controller inhibit DI01: Enable DI02: Error reset DI03: Cam DI04: /Limit switch right DI05: /Limit switch left  DO00: No error DO01: Ready	DI00: Right limit switch DI01: CW stop DI02: Left limit switch DI03: IPOS input for encoder evaluation DI04: IPOS input for encoder evaluation DI05: TF evaluation  DO01: No malfunction DO02: Brake released DO02: IPOS output
<b>Motor encoder</b>	Direct position control	Open loop no position control
<b>External encoder</b>	Direct position control	Not possible
<b>Hiperface® encoder</b>	Direct position control	Not possible
<b>Encoder monitoring</b>	Realized via firmware	Realized via IPOS <sup>plus</sup> ®
<b>Position control</b>	Yes (drive remains energized)	No (brake is applied, de-energized drive)
<b>Setting range</b>	High	Low
<b>Ramp type</b>	Linear	Linear or asymmetrical
<b>Additional ramp type</b>	Sine, square, jerk	Not possible
<b>Reference travel</b>	Realized via firmware (Type 0 - 8)	Realized via IPOS <sup>plus</sup> ® program (Type 3, 4, 5, 8)
<b>Jog mode</b>	Position-controlled	Speed-controlled
<b>Positioning mode</b>	Position-controlled	Speed-controlled
<b>Positioning characteristics</b>	Direct position control (via firmware)	IPOS-controlled run-in to target (asymptotic approach with controlled brake application)
<b>On-the-fly</b>	<ul style="list-style-type: none"> <li>Setpoint position</li> <li>Setpoint speed</li> <li>Ramp switch-over</li> </ul>	<ul style="list-style-type: none"> <li>Setpoint position</li> <li>Setpoint speed</li> <li>Ramp switch-over</li> </ul>
<b>Error messages:</b> <ul style="list-style-type: none"> <li>F78 software limit switch</li> <li>F79 hardware limit switch approached</li> <li>F14 encoder error</li> </ul>	Firmware generates inverter error and stops the drive	IPOS <sup>plus</sup> ® stops movement and displays error.





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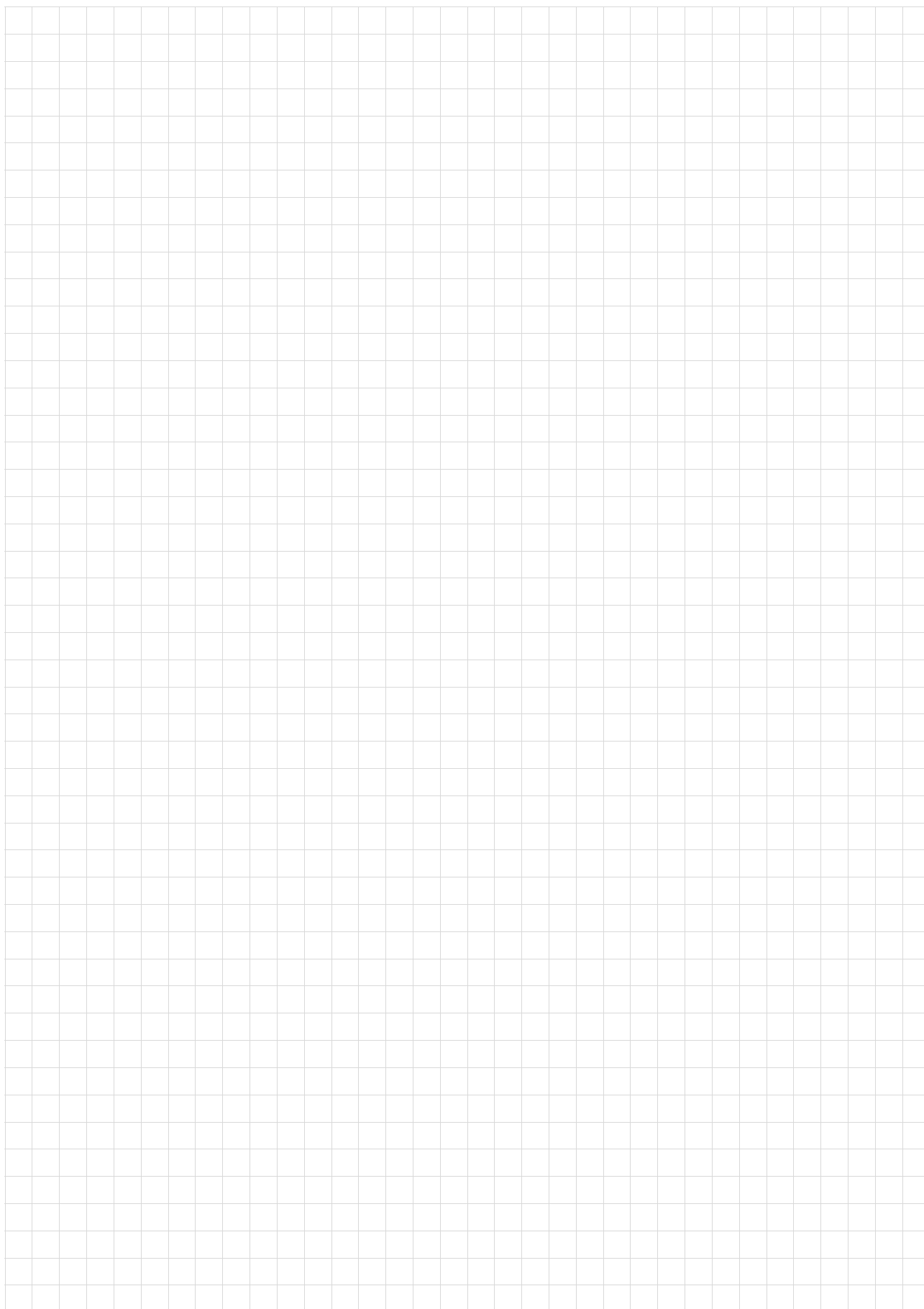
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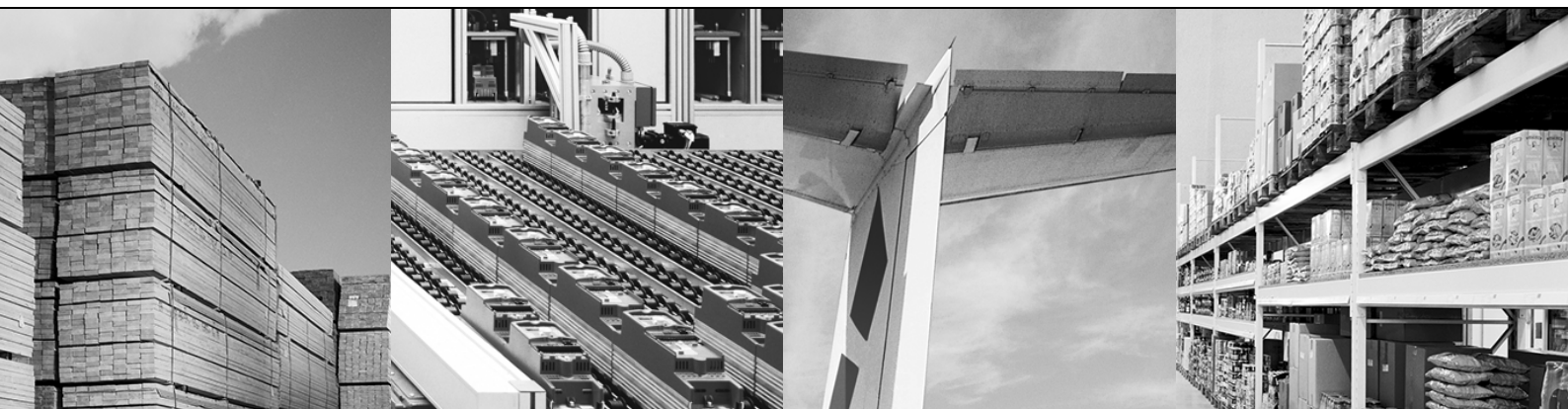
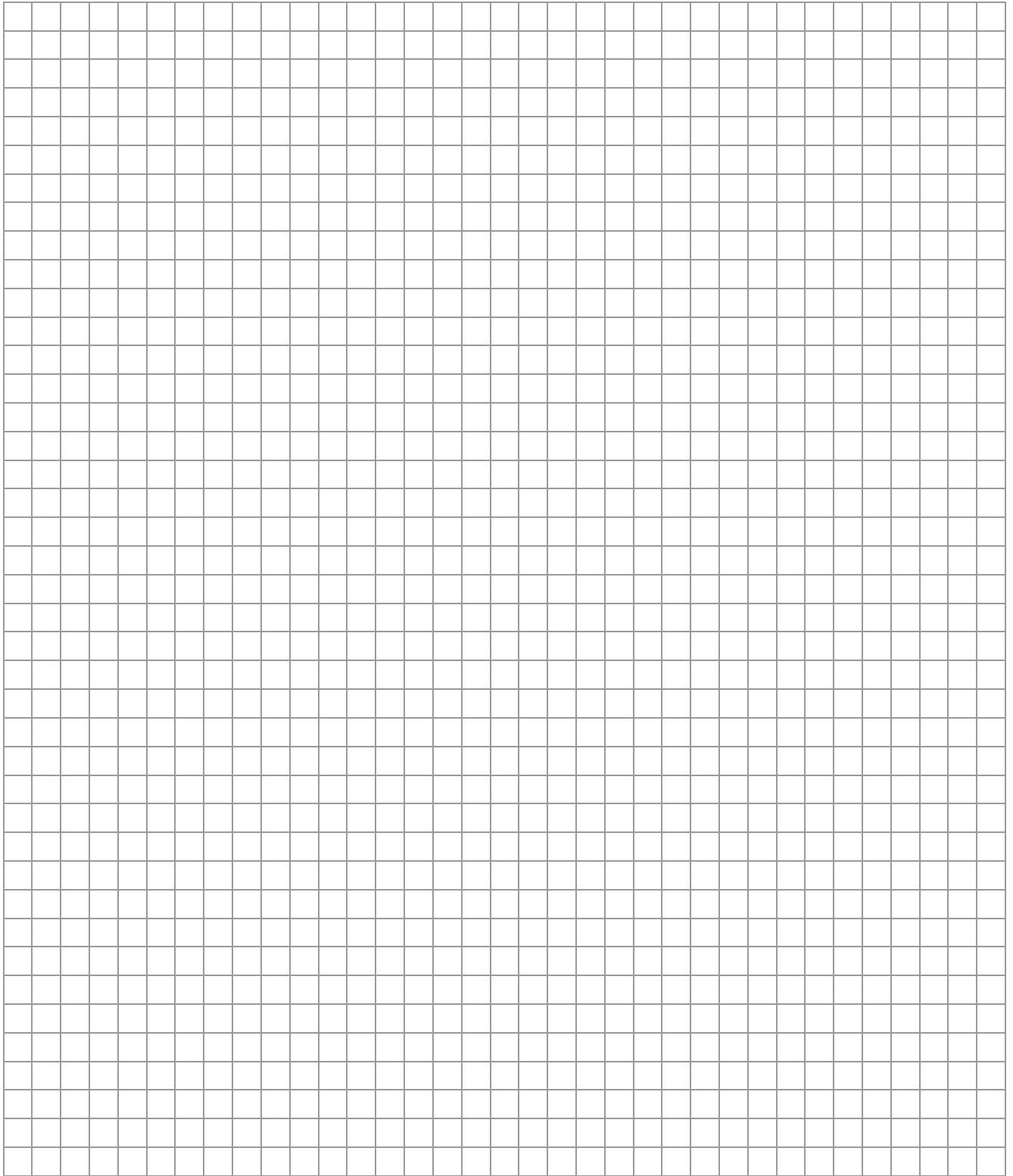
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