



SEW
EURODRIVE

Manual



UHX71B Controller (Performance Class Power)





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1 General Information

1.1 How to use the documentation

The manual is part of the product and contains important information on operation and service. The manual is written for all employees who assemble, install, start up, and service the product.

The manual must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the manual carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
▲ DANGER	Imminent danger	Severe or fatal injuries
▲ WARNING	Possible dangerous situation	Severe or fatal injuries
▲ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of section safety notes

Section safety notes do not apply to a specific action, but to several actions pertaining to one subject. The used symbols indicate either a general or a specific hazard.

This is the formal structure of a section safety note:



▲ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- **▲ SIGNAL WORD** Nature and source of hazard.
Possible consequence(s) if disregarded.
– Measure(s) to prevent the danger.



1.3 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 documentation. Therefore, read the manual before you start operating the device.

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

1.4 Exclusion of liability

You must observe this documentation and the documentation of the connected devices from SEW-EURODRIVE to ensure safe operation 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.

1.5 Copyright

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2 Safety Notes

2.1 Other applicable documentation

- Read through this document carefully before you commence installation and startup of the UHX71B controller.

The following publications and documents apply to the connected units:

- Operating instructions for the units (such as for MOVIDRIVE® B, MOVITRAC® B, MOVIAXIS®)
- Only electrical specialists are allowed to perform installation and startup observing the relevant accident prevention regulations and the operating instructions of the connected units (such units are, for example, MOVIDRIVE® MDX60B/61B, MOVITRAC® B, MOVIAXIS®).
- For units with functional safety, also observe the corresponding manual "Functional Safety" or "Safe Disconnection – Conditions".
- You must adhere to the information in the documentation as a prerequisite to fault-free operation and fulfillment of warranty claims.

2.2 Bus systems

The UHX71B controller supports various bus systems. A bus system makes it possible to adapt frequency inverters to the particulars of the machinery within wide limits. As with all bus systems, there is a danger of invisible, external (as far as the inverter is concerned) modifications to the parameters which give rise to changes in the unit behavior. This may result in unexpected, though not uncontrolled, system behavior.

2.3 Safety functions

MOVIDRIVE® MDX60B/61B and MOVITRAC® B inverters may not perform any safety functions without higher-level safety systems. Use higher-level safety systems to ensure protection of equipment and personnel. For safety applications, ensure that the information in the following publications is observed: "Safe Disconnection for MOVIDRIVE® MDX60B/61B / MOVITRAC® B".

2.4 Hoist applications

MOVIDRIVE® MDX60B/61B, MOVITRAC® B and MOVIAXIS® must not be used as a safety device in hoist applications.

Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.



2.5 Disposal

Observe the applicable national regulations.

Dispose of the following materials separately in accordance with the country-specific regulations in force, as:

- Electronics scrap
- Plastic
- Sheet metal
- Copper



3 Introduction

3.1 General information

3.1.1 Content of this manual

This user manual describes and illustrates the

- installation of the UHX71B controller
- interface of the UHX71B controller
- interfaces and LEDs of the OSC71B option
- engineering access to the UHX71B controller
- project planning and startup of the UHX71B controller

3.1.2 Additional documentation

To be able to configure and start up the UHX71B controller simply and effectively, you should also order the following publications in addition to this manual:

- "UHX71B Controller PROFIBUS DP-V1 and DeviceNet Fieldbus Interfaces" manual (in preparation)
- "UHX71B Controller PROFINET IO, EtherNet/IP, Modbus TCP/IP Fieldbus Interfaces" manual (in preparation)
- MOVIDRIVE® MDX60/61B system manual
- MOVITRAC® B system manual
- MOVIAXIS® system folder

When used as freely programmable motion and logic controller with CFast card OMH71B:

- "MOVI-PLC® Programming in the PLC Editor" system manual

The "MOVI-PLC® Programming in the PLC Editor" system manual contains instructions for IEC 61131-3 compliant programming.

- "MPLCMotion_MDX and MPLCMotion_MX Libraries for MOVI-PLC®" manual
- "MultiMotion Program Module" manual

The library relevant manuals describe the motion libraries for controlling MOVIDRIVE® MDX60B/61B, MOVIAXIS®, MOVITRAC® B, and MOVIMOT® inverters.

When used as configurable application controller with CFast card OMC71B:

- "Configuration software Application Configurator for CCU" manual



3.2 Overview of controllers

3.2.1 Freely programmable motion and logic controller (MOVI-PLC®)

The controller can be operated as freely programmable motion and logic controller MOVI-PLC® when using memory cards of the type OMH71B-T. MOVI-PLC® is a series of programmable motion and logic controllers. It allows drive solutions, logic processes and sequence controls to be automated simply and efficiently using IEC 61131-3 compliant programming languages.

- MOVI-PLC® is a **universal** solution because it is able to control the entire portfolio of SEW inverters and offers a simple upgrade to a more powerful MOVI-PLC® version thanks to the universal execution of the programs.
- MOVI-PLC® is **scalable** due to several different hardware platforms (standard, advanced, etc.) and modular software concepts (libraries for numerous applications).
- MOVI-PLC® is **powerful** due to extensive technologies (such as electronic cam, synchronous operation) and the control of demanding applications (such as material handling).

Performance class MOVI-PLC® standard

DH.21B controllers enable coordinated single axis movements and integration of external inputs/outputs as well as Drive Operator Panels (DOP). The DH.21B.. option is therefore suitable for use as a module controller or stand-alone controller for machines of medium complexity.

Performance class MOVI-PLC® advanced

The DH.41B controller is characterized by a greater variety of interfaces and a higher performance level, which allows complex calculations and interpolated movements, for example. The DH.41B option is therefore suitable for the automation of cells and machines. The integrated Ethernet interface enables direct connection of the DH.41B controller to the control level.

Performance class MOVI-PLC® power

The UHX71B controller in the performance class "MOVI-PLC® power" is the high-end motion and logic controller for demanding automation tasks. The realtime operating system ensures short response times and a high-performance connection of SEW system buses and standard fieldbuses. Demanding visualization solutions can be implemented with the Windows® operating system running at the same time. The UHX71B controller is suited as a module controller for complex motion control tasks, such as electronic cam and robotics, as well as for the complete automation of machines and systems.



3.2.2 Configurable application controller (CCU)

The controller can be used as configurable application controller (CCU) by using memory cards of the type OMC71B-T. In this case you can only execute standardized application modules created by SEW-EURODRIVE. The application modules can be started up quickly and conveniently by graphical configuration. A defined process data interface provides this functionality to a higher-level controller. A process data monitor with control mode is available to support the startup procedure.

Performance class CCU standard

The performance class "CCU standard" is intended for application modules with single-axis and multi-axis functionality and fast response times. The following application modules are available:

- Single-axis functionality:
 - Speed control
 - Cam positioning
 - Bus positioning with 6 process data words
 - Single-axis universal module

Performance class CCU advanced/power

The performance class "CCU advanced/power" is intended for application modules with single-axis and multi-axis functionality and fast response times. The following application modules are available:

- Single-axis functionality:
 - Speed control
 - Cam positioning
 - Bus positioning with 6 process data words
 - Single-axis universal module
- Multi-axis functionality:
 - Energy-efficient SRU

3.3 UHX71B controller

3.3.1 Features

The UHX71B controller is available in book size format with the following fieldbus interfaces for installation in the control cabinet.

Unit variant	Part number	Fieldbus interface
UHX71B	1796 965 4	Without fieldbus interface
UHX71B-OSP71B ¹⁾	1796 966 2	PROFIBUS
UHX71B-OSR71B ¹⁾	1796 967 0	Industrial Ethernet, PROFINET, EtherNet/IP, Modbus TCP/IP

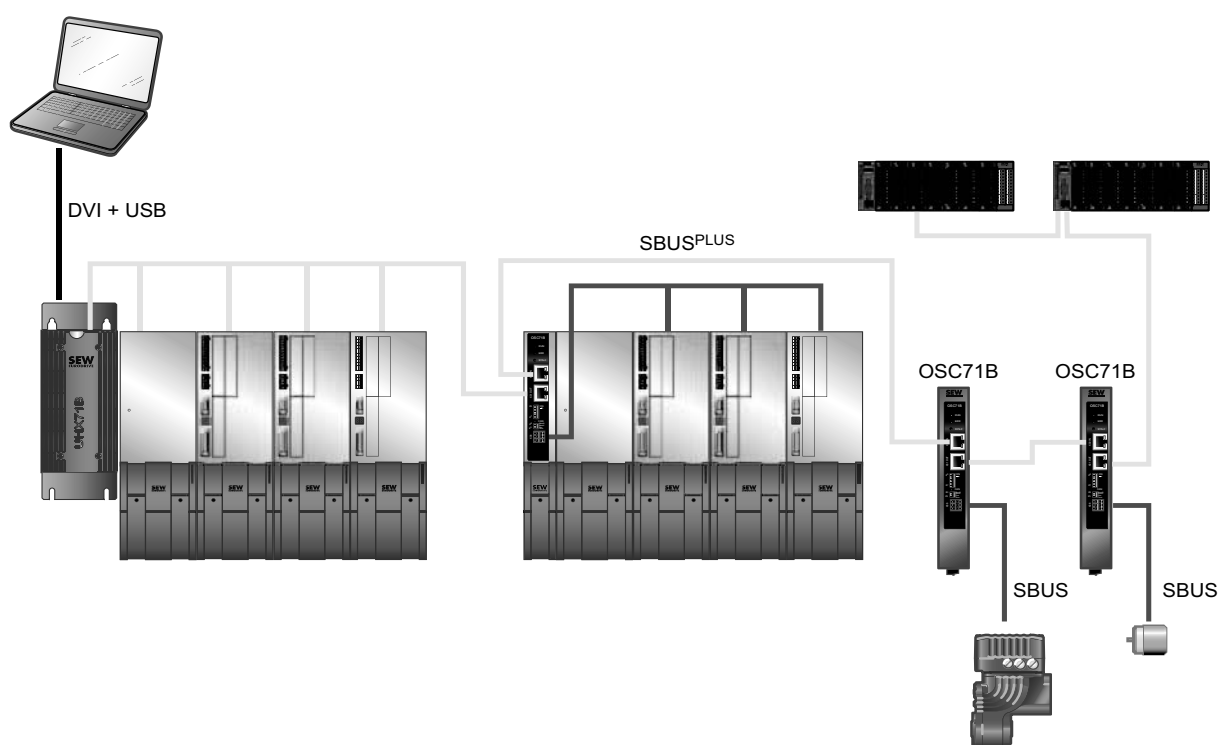
1) In preparation



3.3.2 Overview of communication interfaces

The UHX71B controller is equipped with numerous communication interfaces.

- The Ethernet communication interface serves for engineering of the UHX71B controller, for connecting an operator terminal, and for communication with other Ethernet nodes.
- SEW drives or non-SEW components can be connected to the CAN interface of the OSC71B option (connection via SBus^{PLUS}).
- SEW drives and SEW I/O modules with EtherCAT[®] interface can be connected to the SBus^{PLUS} system bus interface.
- Various USB interfaces are available for the Windows operating system to connect a mouse, keyboard or touchpad. A monitor can be connected via the DVI interface.



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3.3.3 Engineering

Engineering of the UHX71B controller includes the following activities:

- Configuration
- Parameterization
- Programming (only MOVI-PLC[®] performance class)

These activities are carried out using the MOVITOOLS[®] MotionStudio engineering software. The software has a number of useful features for startup and diagnostics of all SEW-EURODRIVE units. The connection between UHX71B controller and engineering PC is established via the Ethernet communication interface (LAN 3).



3.3.4 Ethernet communication interfaces LAN 1 and LAN 3

LAN 1

The communication interface LAN 1 (Ethernet) is assigned to the Windows operating system of the UHX71B controller. The interface is only available if the second CFast card is plugged with Windows operating system. The following functions can be implemented via LAN 1:

- Engineering of the UHX71B controller via internal network bridge
- Connection of a visualization system
- Connection to master level

LAN 3

The communication interface LAN 3 (Ethernet) is assigned to the realtime operating system of the UHX71B controller. The following functions can be implemented via this interface:

- Engineering of the UHX71B controller
- PC visualization (e.g. OPC interface)
- Connection to master level

3.3.5 SBus^{PLUS} system bus interface (LAN 2)

Up to 64 of the following units can be connected to the UHX71B controller via SBus^{PLUS} based on EtherCAT[®]:

- MOVITRAC[®] B frequency inverter with FSE24B option
- MOVIDRIVE[®] MDX60B/61B drive inverter with DFE24B option
- MOVIAXIS[®] servo inverter with XSE/XFE option
- I/O coupler OCE11B
- CAN interface OSC71B



3.4 CAN interface option OSC71B

3.4.1 Characteristics

The OSC71B option is a CAN-based external SBus interface for the UHX71B controller. Each OSC71B option represents an SBus branch. Several OSC71B options can be operated on an UHX71B controller.



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3.4.2 SBus system bus interface (X38 connection)

Non-SEW units as well as the following SEW units can be connected to the CAN-based SBus using the X38 connection of the OSC71B option:

- MOVITRAC[®] B frequency inverters
- MOVIDRIVE[®] MDX60B/61B drive inverters
- MOVIAXIS[®] servo inverters
- MOVITRAC[®] LTX universal servo inverters
- MOVIGEAR[®] mechatronic drive system
- MOVIMOT[®] gearmotors with integrated frequency inverter (DeviceNet fieldbus interface required)

3.4.3 SBus^{PLUS} interface (X30/X31 connections)

X30/X31 are used to integrate the OSC71B option in the SBus^{Plus} network of the controller.

3.4.4 Status LED

The CAN LED indicates the status of the SBus. The LEDs SYS-F, RUN and ERR indicate the status of the SBus^{PLUS}.



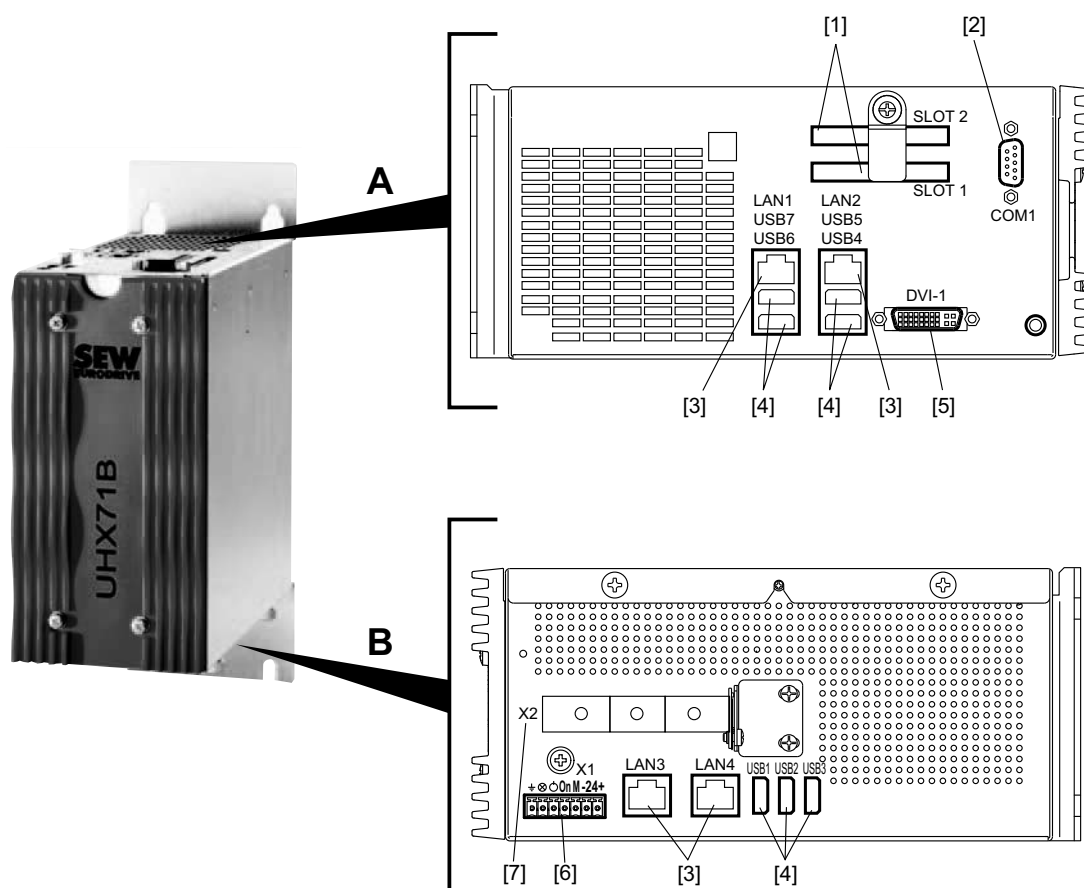
4 Installation

4.1 Installation notes for the UHX71B controller

4.1.1 Minimum clearance and mounting position

- The UHX71B controller in book size format can be installed in the control cabinet. Leave **at least 100 mm clearance above and below the unit** for optimum cooling. Make sure air circulation in the clearance is not impaired by cables or other installation equipment.
- Ensure unobstructed cooling air supply and make sure that the units are not subjected to heated air from nearby components.
- There is no need for clearance at the sides of the unit. You can arrange the controller and other units (e.g. MOVIAXIS® servo inverter) next to one another.
- Install the units only vertically. You must not install them horizontally, tilted or upside down.

4.1.2 Description of terminal functions



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Pos.	Designation	Terminal	Function
[1]	CFast card slot	SLOT 1	Card slot for CFast memory card OMC71B/OMH71B (firmware, IEC program, user data).
		SLOT 2	Card slot for CFast memory card OMW71B (in preparation, realtime operating system control).
[2]	Connector COM 1: (D-sub connector, 9-pole)	COM 1	Reserved
[3]	Connector LAN 1: Ethernet interface connection (RJ45 socket)	LAN 1	Engineering interface for Windows® operating system.
[3]	Connector LAN 2: SBus ^{PLUS} interface connection (RJ45 socket)	LAN 2	SBus ^{PLUS} interface.
[3]	Connector LAN 3: Ethernet interface connection (RJ45 socket)	LAN 3	Engineering interface for the realtime operating system. Default IP address: 192.168.10.4
[3]	Connector LAN 4: Ethernet interface connection (RJ45 socket)	LAN 4	In preparation.
[4]	Connector USB 1, 2, 3, 4, 5, 6, 7: 7 × USB port (USB 2.0)	USB 1 – 7	Standard USB assignment (USB 2.0)
[5]	Connector DVI-I: DVI-I interface	DVI-I	Monitor connection
[6]	Connector X1: Plug-in terminals	X1: ⊥	Digital ground and housing potential.
		X1: ⊗	Electrically isolated output with internal resistor to limit the current to about 10 mA. An LED can be connected here as a power status display.
		X1: ○	Electrically isolated input. Connection of a button to switch on the controller.
		X1:On	Electrically isolated input. Connection of a button to switch the controller on and off. <ul style="list-style-type: none"> Pushing the button briefly switches the deactivated controller on. Pushing the button briefly during operation shuts down the controller. Pushing the button for at least 5 s switches off the controller.
		X1:M	Common ground for all electrically isolated inputs/outputs.
		X1:–	Connection of DC 24 V supply (–)
		X1:+	Connection of DC 24 V supply (+)
[7]	Connector X2: PCIe slot	X2	Option slot for fieldbus interface OSP71B or OSR71B (in preparation)



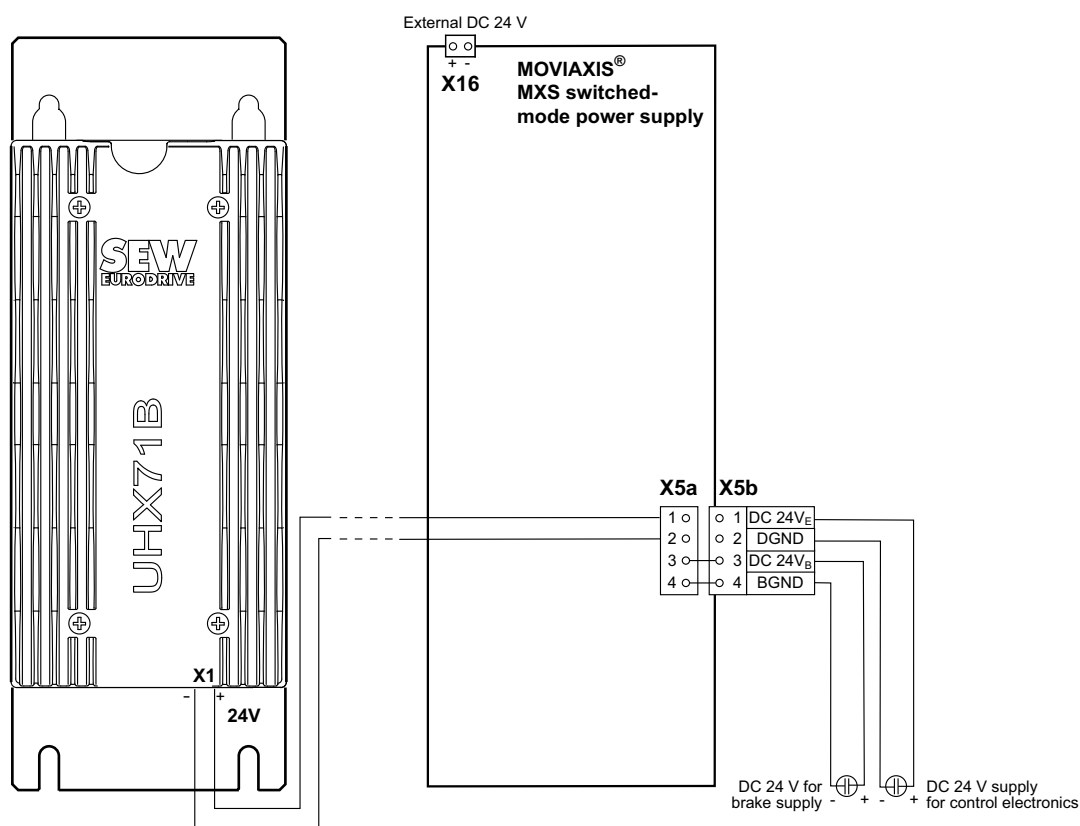
Installation

Installation notes for the UHX71B controller

4.1.3 Voltage supply

During operation with MOVIAXIS®, the UHX71B controller is supplied with voltage (at X1:- and X1:+) via the switched-mode power supply of MOVIAXIS®. Instead, you can use an external DC 24 V power supply unit (power consumption $P_{\max} = 100 \text{ W}$).

Wiring diagram of voltage supply for UHX71B controller when operated with MOVIAXIS®



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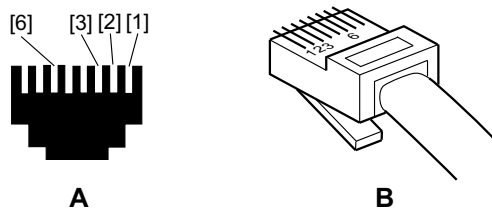


4.1.4 Connecting the UHX71B controller to an Ethernet network

To connect the UHX71B controller to the Ethernet network, connect one of the Ethernet interfaces LAN 1 or LAN 3 (RJ45 plug connector) to the other network nodes using a shielded, category 5, class D twisted-pair cable in accordance with IEC 11801 edition 2.0.

Pin assignment

Use prefabricated, shielded RJ45 plug connectors compliant with IEC 11801 edition 2.0, category 5.



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A = View from front

B = View from back

[1] Pin 1 TX+ Transmit Plus

[2] Pin 2 TX– Transmit Minus

[3] Pin 3 RX+ Receive Plus

[4] Pin 6 RX– Receive Minus

4.1.5 SBus^{PLUS} interface connection (LAN 2)

SBus^{PLUS} (LAN 2 connection) serves as the system bus master of the fast SBus^{PLUS}.

SBus^{PLUS} bus topology

SBus^{PLUS} is designed for a linear bus structure with RJ45 connectors. The SBus^{PLUS} slave units are connected to LAN 2 using a shielded twisted-pair cable.

INFORMATION



According to IEC 802.3, the maximum cable length for 10/100 MBd Ethernet (10BaseT/100BaseT), e.g. between two SBus^{PLUS} stations, is 100 m.

Bus termination

Bus termination (e.g. with bus terminating resistors) is not necessary. If no follow-up unit is connected to a unit, this is automatically detected.

Setting the station address

On SBus^{PLUS} units from SEW-EURODRIVE, the address can not be set on the unit. The units are detected by their position in the bus structure and are assigned an address by the SBus^{PLUS} master.

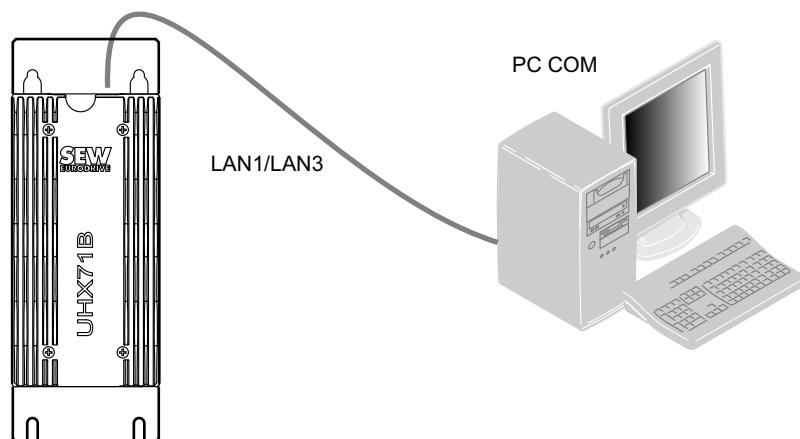


Installation

Installation notes for the UHX71B controller

4.1.6 Connecting Ethernet communication interfaces

You can connect an engineering PC or other network stations (such as visualization systems) to the Ethernet interfaces LAN 1 and LAN 3. Ethernet interface LAN 1 is only available in connection with a CFast memory card with Windows® operating system.



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4.1.7 Connecting USB interfaces

The USB interfaces USB1, USB2, USB3, USB6 and USB7 are assigned to the Windows operating system (CFast memory card). You can connect a keyboard, mouse or touchpad to these USB interfaces. USB interfaces USB4 and USB5 are assigned to the controller.

4.1.8 Connecting a DVI interface

The DVI interface assigned to the Windows operating system (via CFast memory card) serves for connecting a monitor to the UHX71B controller.



4.1.9 CFast memory card types OMH71B-T. and OMC71B-T. (card slot 1)

The CFast memory card (**C**ompact**F**lash **A**TA **S**erial **T**ransfer) is necessary to operate the UHX71B controller and includes the firmware, the IEC program, and user data (such as recipes). You can use the memory card for data backup and automatic parameterization in the event of an axis replacement. The CFast memory card OMH71B-T. or OMC71B-T. is plugged in card slot 1 of the controller.

The CFast memory card is available in 26 variants (T0 – T25). The different variants let you execute different technology functions. The technology level can be changed by changing the CFast memory card.

Type OMH71B-T.

With the CFast memory card OMH71B-T., the UHX71B controller is used as freely programmable controller.

CFast memory card OMH71B-T.		
Technology levels T0 – T25	Part number	Description
T0	1824 913 2	<ul style="list-style-type: none"> Speed control management Positioning, e.g. with the MPLCMotion_MDX library
T1	1824 914 0	Additional technology functions for T0: <ul style="list-style-type: none"> Electronic cam Electronic gear unit Cam controller
T2	1824 915 9	MultiMotion program module.
T3	1824 916 7	A certain number of technology points is consumed depending on the functionality used. Refer to the relevant documentation for information on how many technology points are required.
T4	1824 917 5	
T5	1824 918 3	
T6	1824 919 1	
T7	1824 920 5	
T8	1824 921 3	
T9	1824 922 1	
T10	1824 924 8	
T11	1824 925 6	
T12	1824 926 4	
T13	1824 927 2	
T14	1824 928 0	
T15	1824 929 9	
T16	1824 930 2	
T17	1824 931 0	
T18	1824 932 9	
T19	1824 933 7	
T20	1824 934 5	
T21	1824 935 3	
T22	1824 936 1	
T23	1824 938 8	
T24	1824 939 6	
T25	1824 941 8	



Type OMC71B-T.

The CFast memory card OMC71B-T.. lets you use the UHX71B controller as configurable application controller (CCU). A certain technology level is required for this purpose depending on the application module used. Refer to the documentation of the application module for information on the required technology level.

CFast memory card OMC71B-T.		
Technology levels T0 – T25	Part number	Description
T0	1824 942 6	Single-axis applications: <ul style="list-style-type: none"> • Velocity specification • Bus positioning • Universal module, etc.
T1	1824 943 4	Technology functions: <ul style="list-style-type: none"> • Cam positioning • Synchronous operation, etc.
T2	1824 944 2	Multi-axis application modules: <ul style="list-style-type: none"> • Energy-efficient SRU • Sync crane, etc.
T3	1824 945 0	A certain number of technology points is consumed depending on the functionality used. Refer to the relevant documentation for information on how many technology points are required.
T4	1824 946 9	
T5	1824 947 7	
T6	1824 948 5	
T7	1824 949 3	
T8	1824 950 7	
T9	1824 951 5	
T10	1824 952 3	
T11	1824 953 1	
T12	1824 955 8	
T13	1824 956 6	
T14	1824 957 4	
T15	1824 958 2	
T16	1824 959 0	
T17	1824 960 4	
T18	1824 961 2	
T19	1824 962 0	
T20	1824 963 9	
T21	1824 964 7	
T22	1824 965 5	
T23	1824 966 3	
T24	1824 967 1	
T25	1824 969 8	

4.1.10 CFast memory card type OMW71B (in preparation, card slot 2)

The CFast memory card OMW71B (in preparation) includes the Windows® 7 Embedded operating system and can be plugged into card slot 2 of the controller in addition to the CFast memory card OMH71B-T. or OMC71B-T.



4.2 Installation notes for OSC71B option

4.2.1 Installation

The OSC71B option can be installed in the control cabinet. It is available in the MOVIAXIS® master module or as stand-alone module in the UOH12B universal housing.

4.2.2 Description of terminal functions

OSC71B	Designation	Function/terminal
	LED SYS-F (red)	Indicates the operating state of the OSC71B option.
	LED RUN (green)	Shows the operating state of bus electronics and communication.
	LED ERR (red)	Indicates SBus ^{PLUS} errors.
	LED CAN (green/red)	Indicates the status of the CAN system bus.
	X30 IN: RJ45 plug connector	Incoming SBus ^{PLUS} connection.
	X31 OUT: RJ45 plug connector	Outgoing SBus ^{PLUS} connection.
	DIP switch S1 (2⁰ – 2⁷)	For setting the device identification (in preparation).
	DIP switch S2 (2⁰ – 2³)	2 ⁰ : Setting the baud rate 2 ¹ : Setting the baud rate 2 ² : Reserved 2 ³ : Enabling or disabling the terminating resistor of the CAN system bus connection
	X38: Plug-in terminal	For connecting the CAN system bus connection X38:1 = CAN GND X38:2 = CAN_H X38:3 = CAN_L

4.2.3 Setting the system bus baud rate

You set the system bus baud rate using DIP switches S2:2⁰ and S2:2¹.

2 ⁰	DIP switch S2		Baud rate
	2 ¹		
OFF	OFF		125 kBaud
ON	OFF		250 kBaud
OFF	ON		500 kBd
ON	ON		1 MBd



Installation

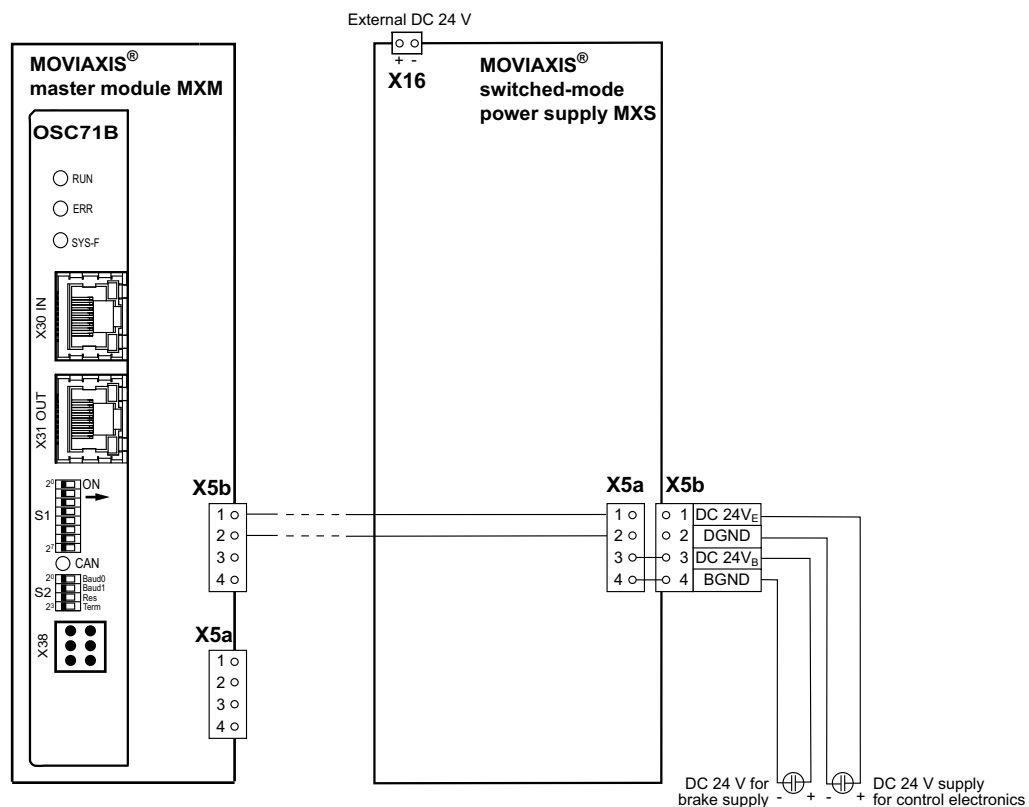
Installation notes for OSC71B option

4.2.4 Voltage supply

*OSC71B in the
MOVIAXIS®
master module*

When operated in the MOVIAXIS® master module, the OSC71B option can be supplied with voltage by the MOVIAXIS® MXS switched-mode power supply. Instead, you can use an external DC 24 V power supply unit.

Wiring diagram of OSC71B in the MOVIAXIS® master module

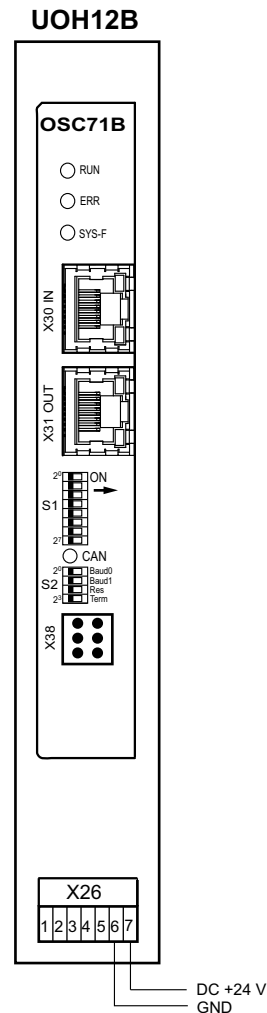


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OSC71B in UOH12B universal housing The OSC71B option is supplied with voltage in the UOH21B universal housing via X26:6/7.

Wiring diagram of OSC71B in UOH12B universal housing



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4.2.5 Connecting the OSC71B option to an SBus^{PLUS} network

The OSC71B is designed for a linear bus structure for connection to an SBus^{PLUS} network based on EtherCAT[®]. The LAN 2 connection of the UHX71B controller is connected with the X30 connection of the OSC71B option.

INFORMATION



No SBus^{PLUS} address needs to be set because the SBus^{PLUS} master automatically assigns the address.

Setting device identification (in preparation)

A unique device identification can be set for each option. Unique identification of the SBus^{PLUS} node in the network is possible in this way even if the bus wiring is changed.



Installation

Installation notes for OSC71B option

4.2.6 Connecting SBus nodes to the OSC71B option

SEW units with SBus interface (CAN) or non-SEW units with CAN interface can be connected to X38 of the OSC71B option.

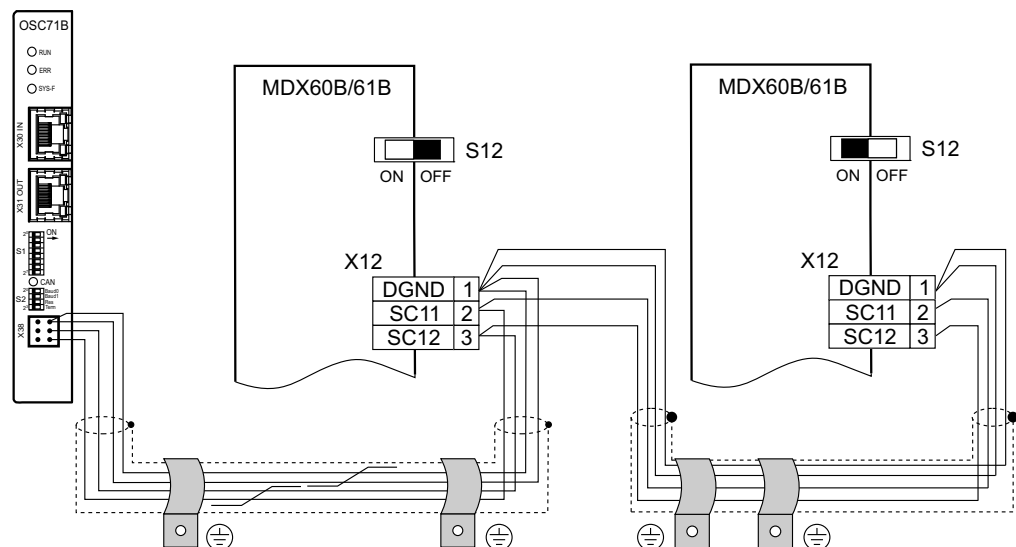
INFORMATION



- The baud rate of the OSC71B option is set using DIP switch S2.
- The maximum number of nodes on the SBus depends on the set baud rate and the transmission rates to the individual nodes. Please observe the notes in the project planning guidelines.
- The SBus address is always set to "0" and cannot be changed.

The CAN system bus supports transmission systems compliant with ISO 11898. The "Serial Communication" manual contains detailed information about the CAN system bus. This manual can be ordered from SEW-EURODRIVE.

Wiring diagram for CAN system bus



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- Cable specification**
- Use a 2 × 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). IEC 60999 allows clamping without conductor end sleeves. The cable must meet the following specifications:
 - Cable cross section 0.2 mm² – 1.0 mm² (AWG24 – AWG18)
 - Cable resistance 120 Ω at 1 MHz
 - Capacitance per unit length ≤ 40 pF/m at 1 kHz
- Suitable cables include CAN bus or DeviceNet cables.

- Cable length**
- The permitted total cable length depends on the baud rate setting of the system bus:
 - 125 kBaud → 500 m
 - 250 kBaud → 250 m
 - **500 kBaud → 100 m**
 - 1000 kBaud → 40 m



Terminating resistor

- Switch on the system bus terminating resistor at the start and end of the CAN system bus connection (MOVIDRIVE® B, DIP switch S12 = ON; MOVITRAC® B, DIP switch S1 = ON). For all other devices, switch off the terminating resistor (MOVIDRIVE® B, DIP switch S12 = OFF; MOVITRAC® B, DIP switch S1 = OFF). For example, if the OSC71B option is located at the end of the CAN system bus, then you have to set DIP switch S2:2³ to ON (= terminating resistor 120 Ω).



NOTICE

- There **should** not be any potential displacement between the units connected with the system bus.
- Take appropriate measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.2.7 Status LEDs of OSC71B

There are 4 LEDs on the OSC71B communication option that display the current status of the OSC71B option and its interfaces.

LED RUN (green)

The **RUN** LED (green) indicates the status of the OSC71B communication option.

Status	Condition	Description
Off	INIT	The OSC71B communication option is in INIT condition.
Flashing green	PRE-OPERATIONAL	The OSC71B communication option is in PRE-OPERATIONAL condition.
Flashing once (green)	SAFE-OPERATIONAL	The OSC71B communication option is in SAFE-OPERATIONAL condition.
Green	OPERATIONAL	The OSC71B communication option is in OPERATIONAL condition.

LED ERR (red)

The LED **ERR** (red) indicates an SBus^{PLUS} error.

Status	Error	Description
Off	No error	The SBus ^{PLUS} communication of the OSC71B option is in operating condition.
Flickering	Boot error	A boot error was detected. The state INIT was achieved, but the "Change" parameter in the AL status register has been set to "0x01:change/error".
Flashing	Invalid configuration	General configuration error.
On	PDI watchdog timeout	A PDI watchdog timeout occurred.

LED SYS-F (red)

The **SYS-F** LED (red) indicates the operating state of the OSC71B option.

Status	Condition	Description
Off	OK	No errors during communication via CAN system bus.
On	SBus system error	Faulty communication via CAN system bus. The CAN status is "warning" or "BUS OFF".



Installation

Installation notes for OSC71B option

LED CAN (green/red)

The **CAN** LED indicates the status of the system bus and is only active when the OSC71B option is in *OPERATIONAL* condition.

Status	Diagnostics	Error remedy
Orange	The system bus is being initialized.	-
Green	The system bus is initialized.	
Flashing green (0.5 Hz)	The system bus is currently in SCOM suspend mode.	
Flashing green (1 Hz)	The system bus is in SCOM-On mode.	
Red	The system bus is off (BUS-OFF).	<ol style="list-style-type: none"> 1. Check and correct the cabling of the system bus. 2. Check and correct the baud rate set for the system bus. 3. Check and correct the terminating resistors of the system bus.
Flashing red (1 Hz)	Warning at the system bus	<ol style="list-style-type: none"> 1. Check and correct the cabling of the system bus. 2. Check and correct the baud rate set for the system bus.



5 Project Planning and Startup with MOVITOOLS® MotionStudio

5.1 About MOVITOOLS® MotionStudio

5.1.1 Tasks

The software package enables you to perform the following tasks:

- Establishing communication with units
- Executing functions with the units

5.1.2 Establishing communication with units

The SEW Communication Server is integrated in the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

The available channels can vary depending on the unit and its communication options.

5.1.3 Executing functions with the units

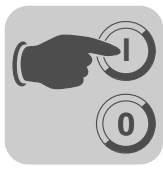
The software package offer uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.



5.2 First steps

5.2.1 Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:
[Start]/[Programs]/[SEW]/[MOVITOOLS-MotionStudio]/[MOVITOOLS-MotionStudio]
2. Create a project with name and storage location.

5.2.2 Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

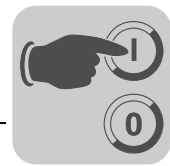
1. Set up a communication channel to communicate with your units.
For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.



[1]

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3. Select the unit you want to configure.
4. Right-click to open the context menu.
As a result you will see a number of unit-specific tools to execute various functions with the units.

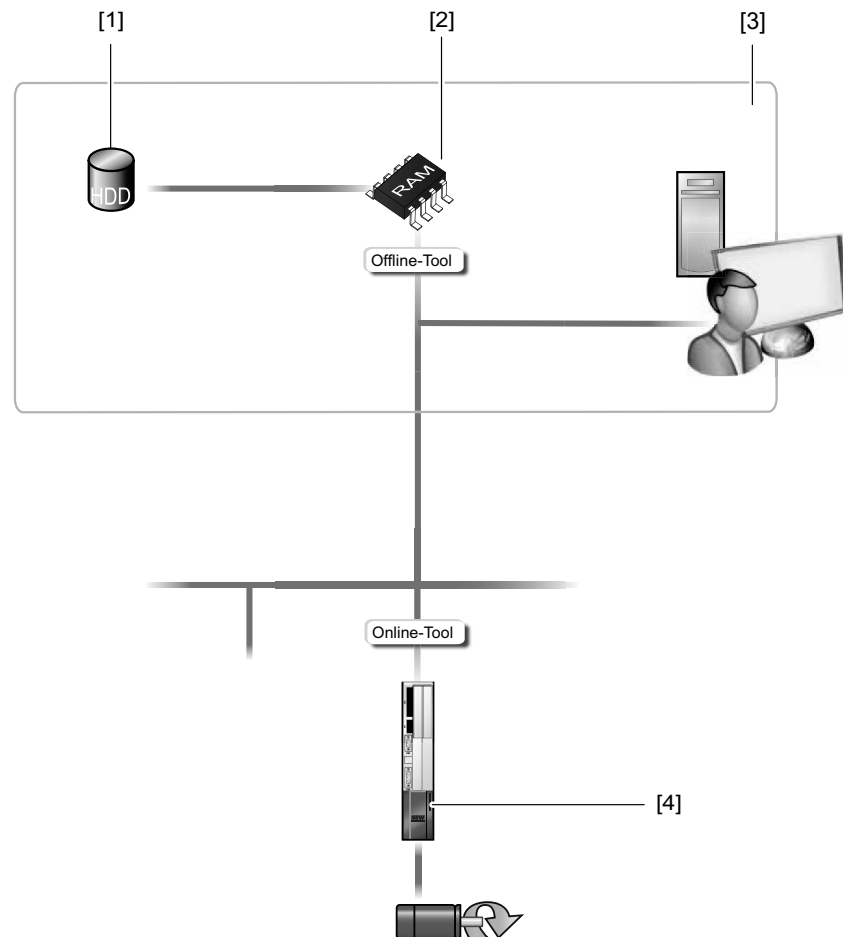


5.3 Connection mode

5.3.1 Overview

MOVITOOLS® MotionStudio differentiates between "online" and "offline" connection mode. You determine the connection mode yourself. Depending on the selected connection mode, you can choose offline or online tools specific to your unit.

The following figure illustrates the two types of tools:



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- [1] Hard drive of the engineering PC
- [2] RAM of the engineering PC
- [3] Engineering PC
- [4] Unit

Tools	Description
Offline tools	<p>Changes made using offline tools affect "ONLY" the RAM [2] at first.</p> <ul style="list-style-type: none"> • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3]. • Execute the "Download (PC->unit)" function if you want to transfer the changes to your unit [4] as well.
Online tools	<p>Changes made using online tools affect "ONLY" the unit [4] at first.</p> <ul style="list-style-type: none"> • Perform the "Upload (unit->PC)" function if you want to transfer the changes to your RAM. • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3].



INFORMATION



- The "online" communication mode is **NOT** a response message which informs you that you are currently connected to the unit or that your unit is ready for communication. Should you require this feedback, observe chapter "Setting the cyclical accessibility test" in the online help (or the manual) of MOVITOOLS® MotionStudio.
- Project management commands (such as "download" and "upload"), the online unit status, and the "unit scan" work independently of the set connection mode.
- MOVITOOLS® MotionStudio starts up in the connection mode that was set before the program was closed.

5.3.2 Selecting the connection mode (online or offline)

Proceed as follows to set the connection mode:

1. Select the connection mode:
 - "Switch to online mode" [1] for functions (online tools) that should directly influence the unit.
 - "Switch to offline mode" [2] for functions (offline tools) that should influence your project.

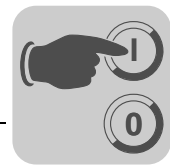


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[1] "Switch to online mode" icon

[2] "Switch to offline mode" icon

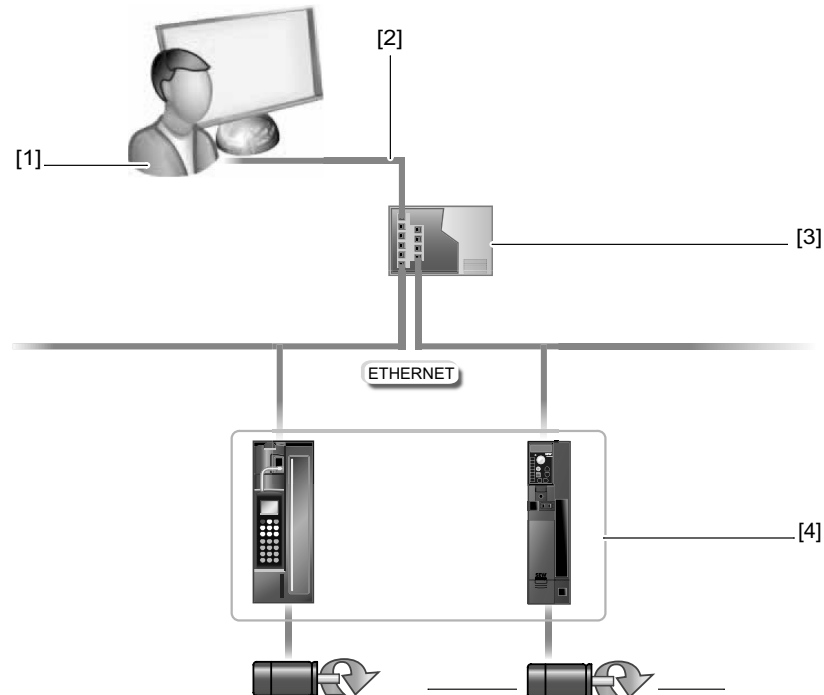
2. Select the unit node.
3. Right-click to open the context menu and display the tools for configuring the unit.



5.4 Communication via Ethernet

5.4.1 Direct communication

Overview The figure shows the network with direct communication using Ethernet:



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- [1] PC with Ethernet TCP/IP interface
- [2] Ethernet TCP/IP connection
- [3] Switch
- [4] Units (examples) with Ethernet interfaces

Function

Parameter requests from MOVITOOLS® MotionStudio are transferred to a switch [3] via Ethernet [2] from a PC [1] using the Ethernet TCP/IP interface.

The switch [3] then directly passes on the parameter requests to the Ethernet interface of the units [4].

5.4.2 Address Editor

Overview

The Address Editor is a freeware tool offered by SEW-EURODRIVE GmbH & Co KG. It is available once the "MOVITOOLS® MotionStudio" engineering software is installed. However, it is used separately.

You can use the Address Editor to establish a communication for your units via Ethernet and to address the units.

If you use a patch cable to connect the Ethernet interface of your engineering PC to the Ethernet, the Address Editor detects all Ethernet nodes in the connected network segment (local network).

Unlike with "MOVITOOLS® MotionStudio", you will **not** have to adjust the IP address of the engineering PC to the local network.

This means the Address Editor is a useful addition to "MOVITOOLS® MotionStudio".



Proceed as follows if you have added other Ethernet nodes to an existing network:

- Start the Address Editor
- Search for Ethernet nodes

Once you have found the added Ethernet nodes, you have two options:

- Set the detected Ethernet nodes according to the network (addressing)
- Set the engineering PC according to the network (address)

Starting the Address Editor

You can use the Address Editor once MOVITOOLS® MotionStudio has been installed.

Do the following to start the Address Editor:

1. Close MOVITOOLS® MotionStudio.
2. Start the Address Editor from the Windows start menu via:
[Start] / [Programs] / [SEW] / [MOVITOOLS MotionStudio] / [Address Editor]

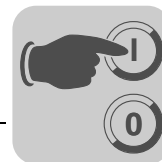
Searching for Ethernet nodes

You can use the Address Editor to find Ethernet nodes in a network. It can also be used for detecting new Ethernet nodes. The Address Editor also helps you locate the Ethernet interface of detected Ethernet nodes.

Proceed as follows to search for Ethernet nodes:

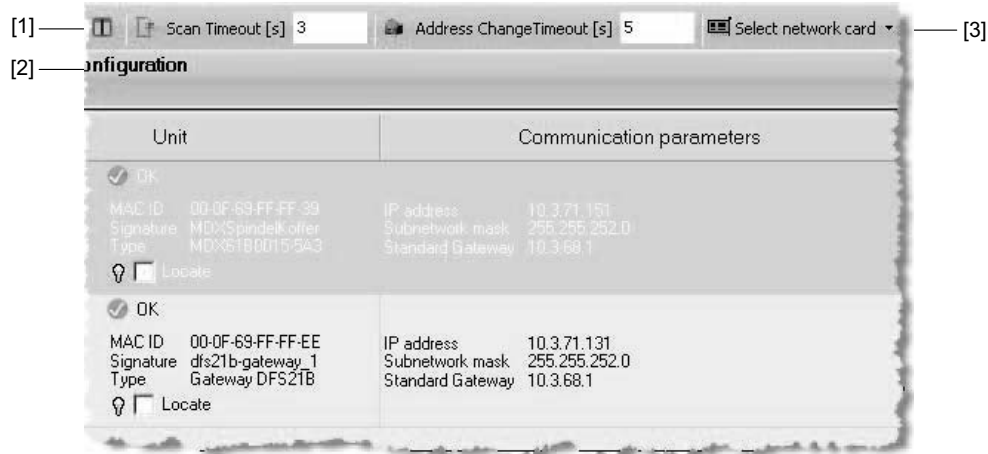
1. Select "Ethernet" as the interface for PC and unit. To do so, click on the corresponding option field in the lower part of the window.
2. Click [Next] to confirm your selection and proceed to the next dialog.
3. Wait for the network scan to start **automatically**. The default setting for the waiting time (scan timeout) is 3 s [2].

Note: If no units are detected during the network scan, the wiring might be inadequate, or you have several network cards installed (activated) in your PC.



In this case, proceed as follows:

- Select the required card. To do so, click "Select network card" [3] in the toolbar.
- Start the network scan **manually**. To do so, click "Start network scan" [1] in the toolbar.



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- [1] "Start network scan" icon
- [2] "Scan timeout" edit box
- [3] "Select network card" icon

As a result, the current addresses of all Ethernet nodes in the connected network will be displayed.

Setting the detected Ethernet nodes according to the network (addressing)

Proceed as follows to adjust (address) the localized Ethernet nodes to the network:

1. Double-click in the "Communication parameters" area of the respective unit [1].



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- [1] "Communication parameters" window
- [2] "Download" button

You can now change the following settings:

- IP address of the Ethernet node
 - IP address of the subnet mask
 - IP address of the standard gateway
2. Transmit the address changes to the Ethernet node. Click [Download] [2].
 3. Switch the unit off and on again in order to apply the changes.



Setting the engineering PC according to the network (address)

Do the following to adapt the engineering PC to the network setting (addressing):

1. From the Windows start menu, choose Control Panel and "Network and Internet" ("Network and Sharing Center" in the classic view).
2. Click [Manage network connection].
A list opens with all existing network connections.
3. Select the respective network connection and choose [Properties] from the context menu.
4. Select the internet protocol "IPv4".
5. Click on the [Properties] button.
6. For the subnet mask and standard gateway, enter the same IP addresses that are used for the other Ethernet nodes in this local network.
7. For the engineering PC, enter an IP address that meets the following conditions:
 - In the blocks that define the **network**, the address segment for the engineering PC must correspond to that of the other Ethernet stations.
 - In the blocks that define the **node**, the address segment for the engineering PC must differ from the other stations.
 - The last block must not contain the values "0", "4", "127" or "255".

NOTE: In the IP address of the subnet mask (such as 255.255.255.0), the values in the blocks have the following meaning:

 - "255", defines the address of the network where the nodes are located.
 - "0", defines the address of the actual node to distinguish it from other nodes.
8. Confirm with [OK].
9. Click [OK] again to close the dialog.

5.4.3 Configuring the communication channel via Ethernet

Do the following to configure a communication channel for Ethernet:

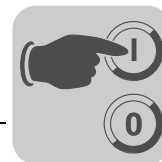
1. Click on "Configure communication connections" [1] in the toolbar.



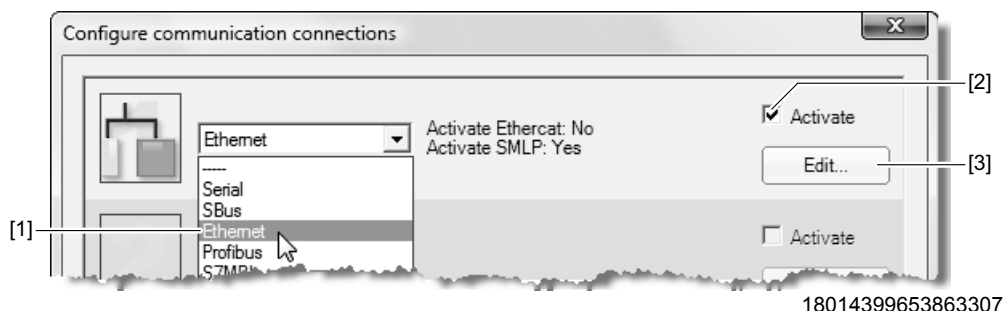
[1]

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[1] "Configure communication connections" icon



This opens the "Configure communication plugs" window.



- [1] "Type of communication" dropdown menu
- [2] "Activate" checkbox
- [3] [Edit...] button

2. From the list [1], select "Ethernet" as the communication type.

In this example, the first communication channel is activated with communication type "Ethernet" [2].

3. Click [Edit] [3] on the right side of the window.

This will display the settings for the "Ethernet" communication type.

4. Set up the SMLP protocol. Select the "SMLP settings" tab.

SMLP stands for **S**imple **MOVILINK**® **P**rotocol. This is the SEW-EURODRIVE device protocol and is transmitted directly via TCP/IP.

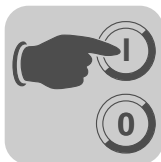
5. Set the parameters. Follow the instructions described in the section "Setting communication parameters for SMLP".

5.4.4 Setting communication parameters for SMLP

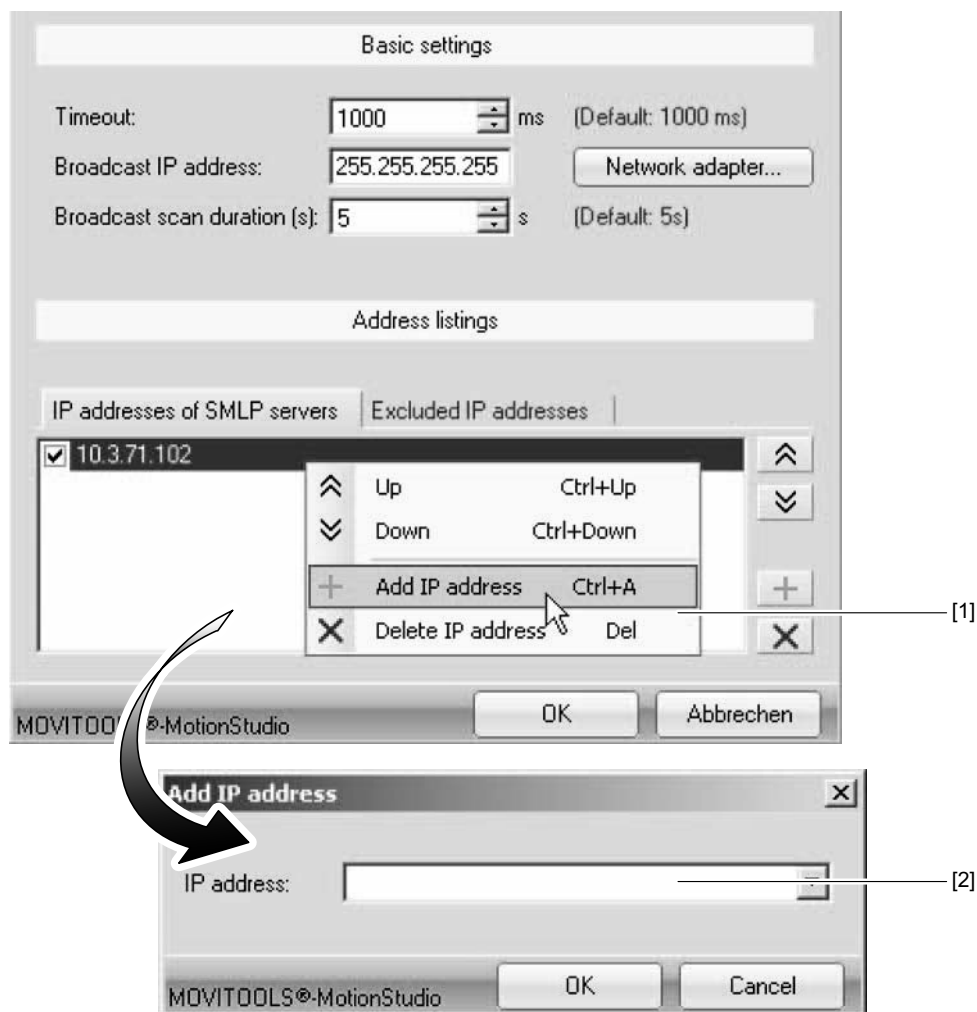
Proceed as follows to set the Ethernet communication parameters:

1. Change the set communication parameters if necessary. Refer to the detailed description of the communication parameters for SMLP.

NOTE: During a unit scan, the system recognizes only units that are in the same (local) network segment as the PC that is running on MOVITOOLS® MotionStudio. If you have units that are outside the local network segment, add the IP addresses of these units to the list of SMLP servers.



2. To add an IP address, open the context menu and select [Add IP address] [1].

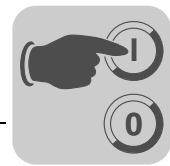


[1] [Add IP address] button

[2] "IP address" edit box

3. Enter the IP address in the input field [2] and click the [OK] button.

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5.4.5 Communication parameters for SMLP

The following table describes the communication parameters for SMLP:

Communication parameters	Description	Information
Timeout	Waiting time in ms that the client waits for a response from the server after it has made a request.	<ul style="list-style-type: none"> Default setting: 1000 ms Increase the value as required if a delay in communication is causing malfunctions.
Broadcast IP address	IP address of the local network segment within which the unit scan is carried out.	In the default setting, the unit scan only detects units that are in the local network segment.
IP address of SMLP server	IP address of the SMLP server or of other units that are to be included in the unit scan but are outside the local network segment.	<ul style="list-style-type: none"> Enter the IP address of units that are to be included in the unit scan but are outside the local network segment. Enter the IP address of the SIMATIC S7 control, if you are operating an indirect Ethernet to PROFIBUS communication via SIMATIC S7.
Excluded IP address	IP addresses of units that should not be included in the unit scan	Enter the IP address of units that should not be included in the unit scan. This can be units that are not ready for communication (for example because they have not been started up yet)

5.4.6 Communication ports used

The following table describes the communication ports that MOVITOOLS® MotionStudio uses:

Application	Communication port number	Description
ETH server	300	For using a PC as Ethernet gateway with the program "ETHServer.exe"
SEW communication server	301	For communication between MOVITOOLS® MotionStudio and SEW Communication Server
Offline data server	302	For communication of MOVITOOLS® MotionStudio in offline mode
MOVIVISION® server	303	For communication with a PC with active MOVIVISION® server
MOVI-PLC® visualization	304	For communication between MOVI-PLC® and the 3D simulation of MOVITOOLS® MotionStudio
TCI server	305	For communication via TCI
EcEngineeringServer remote control (in preparation)	306	For direct communication (without master) with SEW EtherCAT® slaves
EcEngineeringServer mailbox gateway (in preparation)	307	For direct communication (without master) with SEW EtherCAT® slaves



5.5 Executing functions with the units

5.5.1 Parameterizing units

Units are parameterized in the parameter tree. The parameter tree shows all unit parameters grouped in folders.

You can manage unit parameters using the context menu or the toolbar. The following steps illustrate how to read or edit unit parameters.

5.5.2 Reading or changing unit parameters

To read or change unit parameters, proceed as follows:

1. Switch to the required view (project view or network view).
2. Select the communication mode:
 - Click the "Switch to online mode" button [1] if you want to read or change parameters directly on the **unit**.
 - Click the "Switch to offline mode" button [2] if you want to read or change parameters in the **project**.

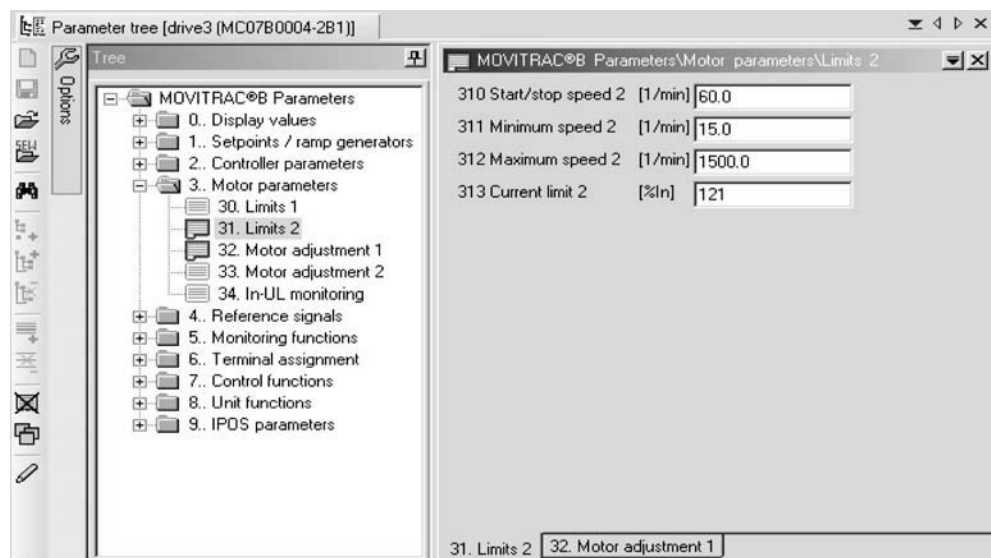


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[1] "Switch to online mode" icon

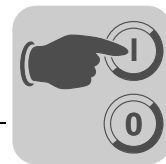
[2] "Switch to offline mode" icon

3. Select the unit you want to set parameters for.
4. Open the context menu and select the [Parameter tree] command.
The "Parameter tree" view opens on the right section of the screen.
5. Expand the "Parameter tree" up to the required node.



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6. Double-click to display a particular group of unit parameters.



7. Press the enter key to finalize any changes you make to numerical values in the input fields.

INFORMATION



- Refer to the parameter list in the unit documentation for detailed information on the unit parameters.

5.5.3 Starting up the units (online)

Do the following to start up the units (online):

1. Switch to the network view.
2. In the toolbar, click on "Switch to online mode" [1].



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[1] "Switch to online mode" icon

3. Select the unit you want to start up.
4. Open the context menu and select the [Startup] / [Startup] command.
The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data into your unit.

5.6 Replacing the unit

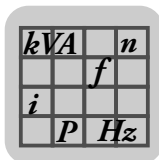
For replacing an UHX71B controller, a compact controller or a controlled drive, follow the instructions in the "Assembly and Installation Notes" chapter. Insert the CFast card of the previous controller into the new controller.

INFORMATION



The variable values stored remanently on the UHX71B controller are not stored on the CFast card by default. This can be programmed through the application (IEC program), or the data backup must be imported through the project management in MOVITOOLS® MotionStudio.

For information on replacing the drives, please refer to the manual of the inverter in use.



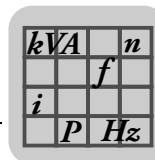
6 Technical Data and Dimension Drawings

6.1 General technical data of UHX71B controllers

UHX71B controller	
Interference immunity	Meets EN 61800-3
Ambient temperature	0 °C to +50 °C
Storage temperature	–25 °C to +70 °C
Climate class	EN 60721-3-3, class 3k3
Type of cooling	Convection cooling
Degree of protection	IP20
Duty type	Continuous duty (see MOVIDRIVE® MDX60B/61B, MOVIAXIS® system manual)
Pollution class	2 according to IEC 60664-1 (VDE0110-1)
Installation altitude	max. 3000 m (asl)

6.2 Technical data of UHX71B controllers

UHX71B controller	
Part number	1796 965 4 (without fieldbus interface)
Electrical supply	<ul style="list-style-type: none"> Power consumption: $P_{\max} = 100 \text{ W}$ $U = \text{DC } 24 \text{ V } (-15\% / +20\%)$ $I_{\max} = 4 \text{ A}$ The UHX71B controller can be supplied from the MOVIAXIS® switched-mode power supply (MXS) or from an external voltage source. To do so, connect X5 between the individual units. If the UHX71B controller is supplied with DC 24 V from the MOVIAXIS® switched-mode power supply, then the function of the UHX71B controller is ensured when power supply is switched off (external DC 24 V supply at X16 of the MOVIAXIS® switched-mode power supply).
Memory	<ul style="list-style-type: none"> Retain data: 32 kB System variables (retain): 24 kByte Program memory: <ul style="list-style-type: none"> 16 MByte for application program, incl. IEC libraries Data memory: <ul style="list-style-type: none"> 64 MByte
LAN 1, LAN 3	<ul style="list-style-type: none"> TCP/IP Connection options: Engineering PC, visualization, other controller
LAN 2	Fast SBUS ^{Plus} system bus based on EtherCAT®
USB	7 × USB 2.0
CFast memory cards OMH71B-T0 – T25 OMC71B-T0 – T25 OMW71B	<ul style="list-style-type: none"> PC-readable Includes: <ul style="list-style-type: none"> Firmware IEC application program Application data Windows® 7 Embedded operating system (only OMW71B) 2 GB of RAM
Engineering	Engineering takes place via the LAN 3 Ethernet interface The engineering of all the SEW components connected to UHX71B can be carried out via the UHX71B controller.

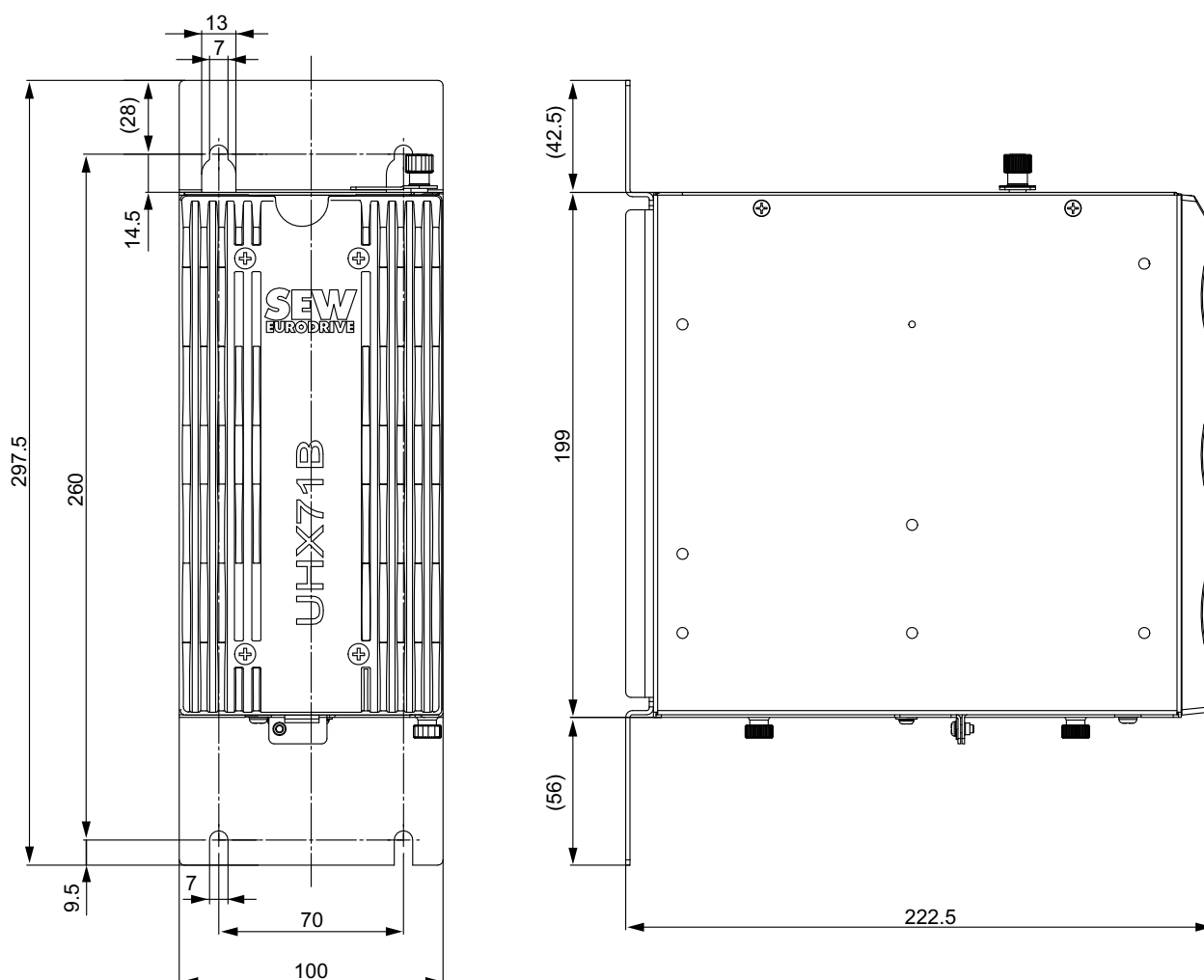


6.3 Technical data of the OSC71B option

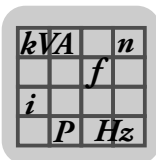
OSC71B option	
Part number	1824 991 4
Electrical supply	Integrated in the UOH12B universal housing: <ul style="list-style-type: none"> Power consumption: $P_{\max} = 2.5 \text{ W}$ $U = \text{DC } 24 \text{ V } (-15\% / +20\%)$ $I_{\max} = 100 \text{ mA}$
Potential levels	Option OSC71B has the following potential levels: <ul style="list-style-type: none"> Potential system bus CAN
System bus CAN X38	<ul style="list-style-type: none"> CAN system bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898 The CAN system bus is electrically isolated Address range 0 – 63 Baud rate: 125 kBaud – 1 MBaud You can remove connector X38 without interrupting the system bus
EtherCAT® X30 IN	Incoming EtherCAT® connection (RJ45 socket)
EtherCAT® X30 OUT	Outgoing EtherCAT® connection (RJ45 socket)

6.4 Dimension drawings

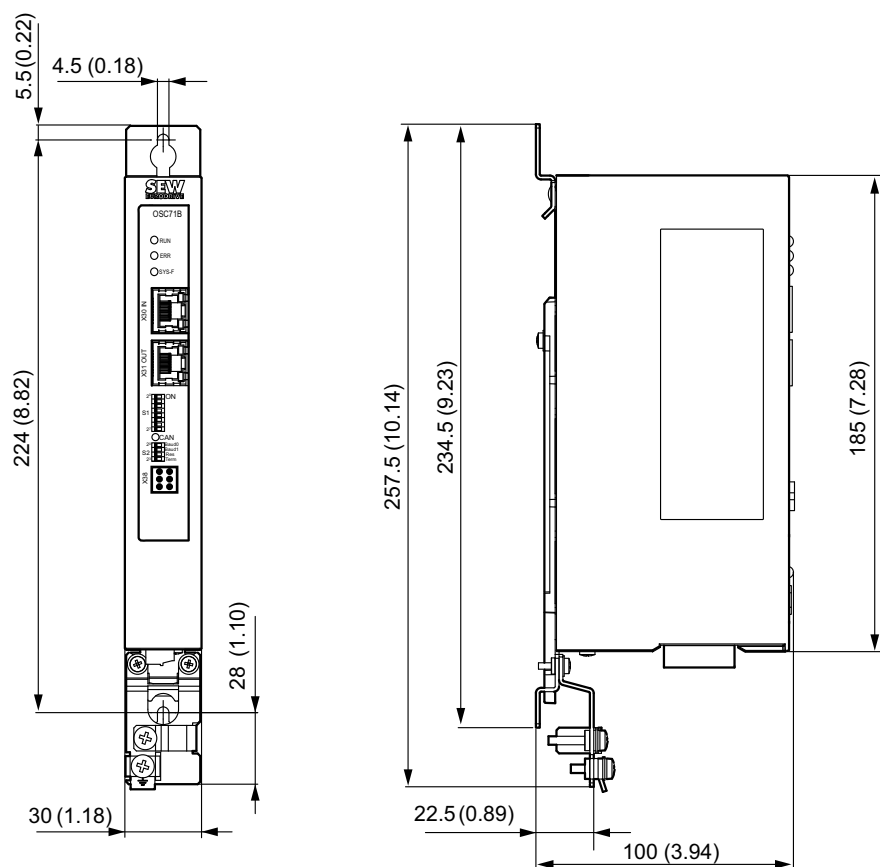
6.4.1 UHX71B controller



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6.4.2 OSC71B option in the UOH12B universal housing



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