



SEW
EURODRIVE

Manual



MOVI-C® CONTROLLER power UHX85A and power eco UHX84A



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1 General information

1.1 About this 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 require further information, please 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 hazard	Severe or fatal injuries
WARN- ING	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
INFORMA- TION	Useful information or tip: Simplifies handling of the drive system.	

1.2.2 Structure of the section safety notes

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

This is the formal structure of a section safety note:

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

1.2.3 Structure of the embedded safety notes

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

This is the formal structure of a safety instruction:

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

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 system and its operation, as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.4 Exclusion of liability

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 Other applicable documentation

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

The following publications and documents apply to the connected units:

- Operating instructions of the units (e.g. MOVIDRIVE® modular, MOVIDRIVE® system)
- Only electrical specialists are allowed to perform installation and startup observing the relevant accident prevention regulations and the operating instructions of the connected units (e.g. MOVIDRIVE® modular, MOVIDRIVE® system).
- 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.

1.6 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of the respective titleholders.

1.7 Copyright notice

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2 Safety notes

2.1 Operator's duties

The operator must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation 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.

As operator, make sure that the following work is carried out only by qualified personnel:

- Transport
- Storage
- Setup and assembly
- Installation and connection
- Startup
- Maintenance and repair
- Shutdown
- Disassembly
- Waste disposal

Make sure that persons working on the device adhere to the following regulations, instructions, documents, and notes:

- National and regional safety and accident prevention regulations
- Warning and safety signs on the device
- All other associated project planning documents, installation and startup instructions, wiring and circuit diagrams
- Never install damaged products or take them into operation
- All system-specific requirements and regulations

Make sure that systems where the device is installed are equipped with additional monitoring and protection devices. Observe the applicable safety guidelines and laws governing technical equipment and accident prevention regulations.

2.2 Bus systems

The MOVI-C® 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, not uncontrolled, system behavior.

2.3 Safety functions

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

2.4 Waste disposal

Observe the applicable national regulations. Dispose of materials separately in accordance with the nature of the materials and the regulations in force, for example:

- Electronics scrap (printed circuit boards)
- Plastics
- Sheet metal
- Copper
- Aluminum
- Battery

2.5 Short designation

The following short designations are used in this documentation.

Type designation	Short designation
MOVI-C [®] CONTROLLER power UHX85A and MOVI-C [®] CONTROLLER power eco UHX84A	MOVI-C [®] CONTROLLER
MOVI-C [®] CONTROLLER power UHX85A	MOVI-C [®] CONTROLLER power UHX85A
MOVI-C [®] CONTROLLER power eco UHX84A	MOVI-C [®] CONTROLLER power eco UHX84A

3 Introduction

3.1 General information

3.1.1 Content of this manual

This manual describes:

- The installation of the MOVI-C® CONTROLLER
- The interfaces of the MOVI-C® CONTROLLER
- The interfaces and LEDs
- The engineering access to the MOVI-C® CONTROLLER
- The configuration and startup of the MOVI-C® CONTROLLER

Observe the following chapters when you install the OMW71B/72B Windows® memory card:

- The installation the OMW71B/72B Windows® memory card
- The interfaces of the MOVI-C® CONTROLLER used in connection with the OMW71B/72B Windows® memory card
- Connection examples for the Ethernet communication interface
- The first boot process of the OMW71B/72B Windows® memory card

3.1.2 Additional documentation

To be able to configure and startup the MOVI-C® CONTROLLER simply and effectively, you should also order the following publications in addition to this manual.

- "MOVI-C® CONTROLLER power UHX85A PROFIBUS DP-V1 fieldbus interface" manual (in preparation)
- "MOVI-C® CONTROLLER power UHX85A PROFINET IO, EtherNet/IP™, Modbus TCP/IP fieldbus interfaces" manual (in preparation)
- MOVIDRIVE® modular product manual
- MOVIDRIVE® system product manual

When using the OMW71B/72B Windows® memory card:

- Observe the Microsoft documentation for configuration and operation of the Windows® 7 embedded operating system.
- Observe the "HMI Builder.PRO" manual (in preparation) for plant visualization

3.2 MOVI-C® CONTROLLER

3.2.1 Freely programmable MOVI-C® CONTROLLER

The MOVI-C® CONTROLLER can be programmed freely by using OMH85A type CFast memory cards. It allows drive solutions, logic processes and sequence controls to be automated simply and efficiently using IEC 61131-3 compliant programming languages.

- The freely programmable MOVI-C® CONTROLLER is a **universal** solution because it is able to control the entire portfolio of SEW-EURODRIVE inverters and offers a simple upgrade to a more powerful controller due to universal execution of the programs.

- The freely programmable MOVI-C® CONTROLLER is **scalable** due to several different hardware platforms (standard, advanced, etc.) and modular software concepts (libraries for numerous applications).
- The freely programmable MOVI-C® CONTROLLER is **powerful** due to extensive technologies (such as electronic cam, synchronous operation) and the control of demanding applications (such as material handling).

Performance class "power eco"

The MOVI-C® CONTROLLER power eco UHX84A is characterized by a higher level of performance and is suitable for automating machines and cells for up to 16 interpolating axes and 16 auxiliary axes.

Performance class "power"

The MOVI-C® CONTROLLER power UHX85A is the high-end motion controller for demanding automation tasks. The real-time operating system guarantees very short response times as well as a high-performance connection of system buses from SEW-EURODRIVE and standard fieldbuses. Demanding visualization solutions can be realized via the Windows® operating system that is running in parallel.

The MOVI-C® CONTROLLER power eco UHX84A is suitable for automating machines and cells for up to 32 interpolating axes and 32 auxiliary axes. It is suited as a module controller for complex motion functions such as electronic cams and robotics, as well as for the complete automation of machines and systems.

3.2.2 Features

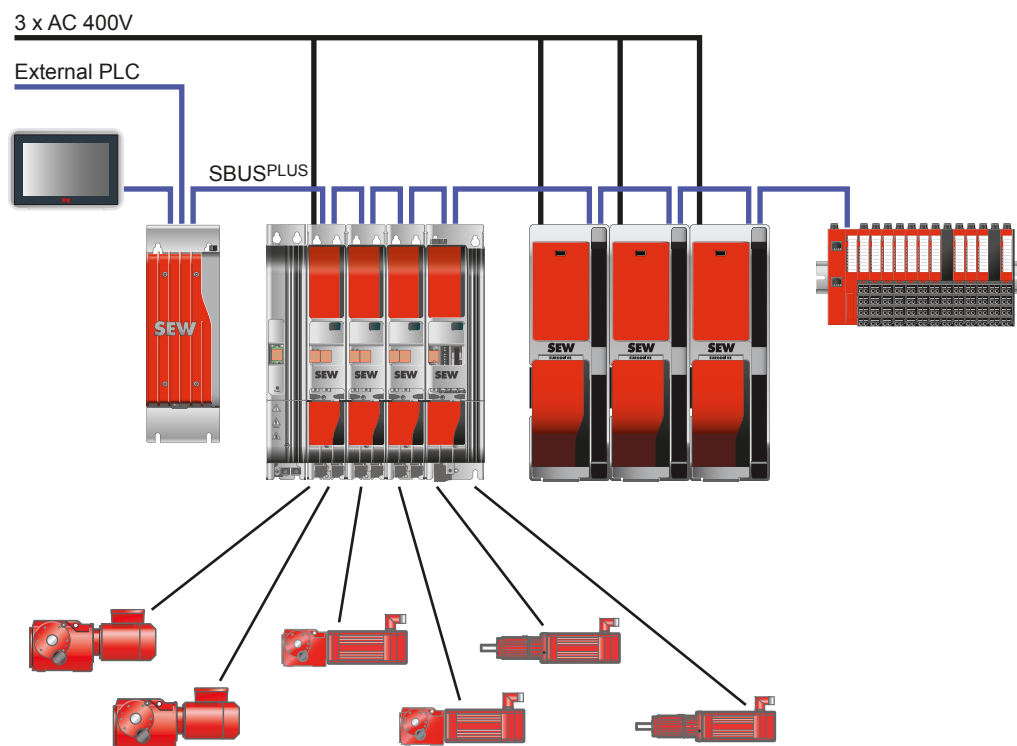
The MOVI-C® CONTROLLER is available in booksize format with the following fieldbus interfaces for control cabinet installation.

Unit design	Fieldbus interface
UHX85A/UHX84A	MOVI-C® CONTROLLER without fieldbus interface
UHX85A – P/ UHX84A – P	MOVI-C® CONTROLLER with PROFIBUS for slave connection
UHX85A – R/ UHX84A – R	MOVI-C® CONTROLLER with EtherNet/IP™, Modbus TCP/IP and PROFINET for slave connection

3.2.3 Overview of communication interfaces

The MOVI-C® CONTROLLER has various communication interfaces:

- The Ethernet communication interface allows for engineering purposes for the MOVI-C® CONTROLLER, for connecting an operator panel as well as for communication with other Ethernet nodes.
- The EtherCAT®/SBus^{PLUS} interface is used to control drive inverters, I/O modules and other EtherCAT® slave components.
- The Windows® operating system provides various USB interfaces for connecting a mouse, a keyboard, or a touchpad. A monitor can be connected via the DVI interface.



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3.2.4 Communication interfaces LAN 1, LAN 3, and VNET

LAN 1

The Ethernet communication interface (LAN 1) is assigned to the Windows® section of the MOVI-C® CONTROLLER. The interface is only available if the second CFast memory card with Windows® operating system is installed. The following functions can be realized via this interface:

- Access to the Windows® operating system via remote desktop connection
- Connection of a visualization system
- Connection to master level

LAN 3

The Ethernet communication interface (LAN 3) is assigned to the control section (real-time operating system) of the MOVI-C® CONTROLLER. The following functions can be realized via this interface:

- Engineering of the MOVI-C® CONTROLLER
- PC visualization (e.g. OPC interface)
- Connection to master level

Virtual network card (VNET)

The virtual network card (VNET) is only available when the OMW71B/72B Windows® memory card is installed. VNET allows you to perform the MOVI-C® CONTROLLER engineering via the Windows® operating system without LAN 1 cable connection.

3.2.5 EtherCAT®/SBus^{PLUS} interface LAN 2

You can connect up to 64 of the following units to the MOVI-C® CONTROLLER via the EtherCAT®/SBus^{PLUS} interface:

- MOVIDRIVE® modular drive inverter
- MOVIDRIVE® system drive inverter
- MOVI-PLC® I/O system C
- Third-party components with ETG configuration file

3.2.6 Engineering

The engineering of the MOVI-C® CONTROLLER comprises the following activities:

- Configuration
- Parameterization
- Programming

Engineering is carried out using the MOVISUITE® engineering software. The software has a number of useful features for startup and diagnostics of all connected SEW-EURODRIVE units. The connection between the MOVI-C® CONTROLLER and the engineering PC is carried out via the Ethernet communication interface (LAN 3).

3.3 CFast memory card OMH85A (card slot 1)

The CFast memory card (**C**ompact**F**lash **A**TA **S**erial **T**ransfer) is required for operation of the MOVI-C® CONTROLLER and contains the firmware, the IEC program and user data (e.g. recipes). You can use the memory card for data backup and automatic parameterization in the event of an axis replacement. The CFast memory card OMH85A is plugged into card slot 1 of the MOVI-C® CONTROLLER.

3.4 Windows® memory card option OMW71B/72B (card slot 2)

3.4.1 Features

The Windows® memory cards OMW71B (16 GB) and OMW72B (32 GB) are designed as CFast memory cards. It extends the MOVI-C® CONTROLLER by a Windows® platform and can be used for plant visualization. The Windows® memory card OMW71B/72B is plugged into card slot 2 of the MOVI-C® CONTROLLER.

The Windows® memory card OMW71B/72B contains the operating system Windows® 7 Embedded in English.

The MOVI-C® CONTROLLER provides the following hardware for the Windows® system:

- Core2Duo 2.2 GHz (Windows® 7-Embedded merely uses 1 core)
- 1.5 GB RAM
- 5 × USB 2.0 (USB 1, 2, 3, 6, 7)
- Windows® 7-Embedded 32 bit
- 1 × Ethernet 10/100 MBaud (LAN 1)
- 1 × virtual Ethernet to the control section

**INFORMATION**

- In the following cases, SEW-EURODRIVE recommends the 32 GB variant:
 - If you would like to use third-party software.
 - If you would like to use the Windows® section as permanent working platform for plant programming.
 - SEW-EURODRIVE does not assume liability if you would like to install third-party software in addition to the installed basic software.
-

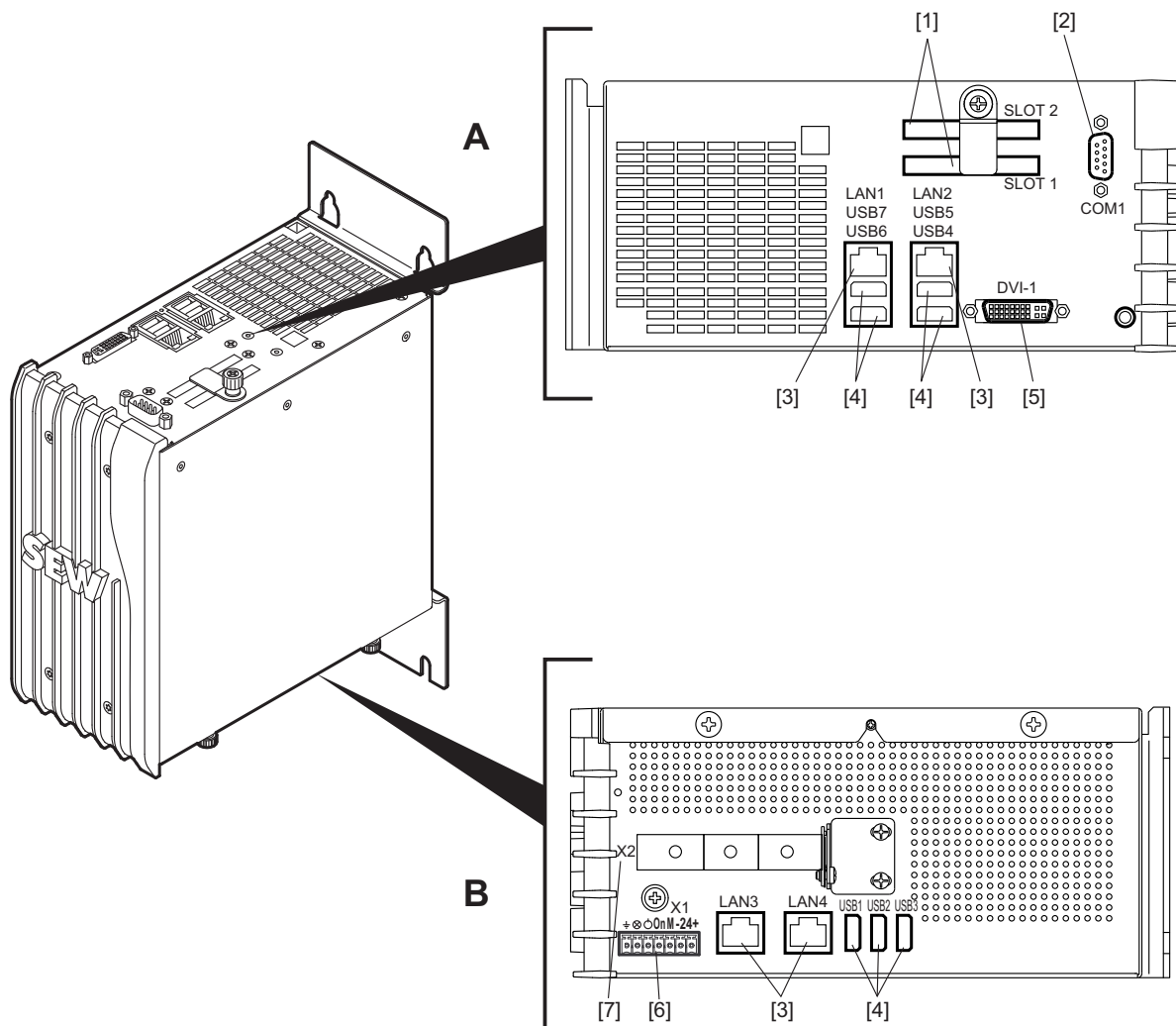
4 Installation notes

4.1 MOVI-C® CONTROLLER power UHX85A / power eco UHX84A

4.1.1 Minimum clearance and mounting position

- The booksize MOVI-C® CONTROLLER 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 MOVI-C® CONTROLLER is not exposed to the warm exhaust air from other devices.
- There is no need for clearance at the sides of the unit. You may connect the MOVI-C® CONTROLLER and other devices (e.g. MOVIDRIVE® modular) in series.
- Install the units vertically only. You must not install them horizontally, tilted or upside down.

4.1.2 Description of terminal functions



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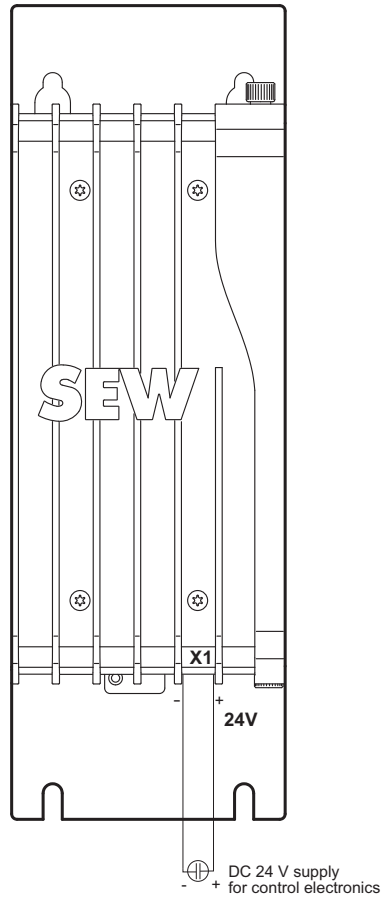
No.	Designation	Terminal	Function
[1]	CFAST card slot	Slot 1	Card slot for CFAST memory card OMH85A (control section with firmware, IEC program, user data)
		Slot 2	Card slot for Windows® CFAST memory card OMW71B/72B (Windows® 7 Embedded)
[2]	Connector COM 1: (D-sub connector, 9-pole)	COM 1	Reserved
[3]	Connector LAN 1: Ethernet interface connection (RJ45 socket)	LAN 1	Engineering interface for the Windows® section (OMW71B/72B) of the MOVI-C® CONTROLLER Default IP address: 192.168.10.5
[3]	Connector LAN 2: Connection EtherCAT®/SBus ^{PLUS} interface (RJ45 socket)	LAN 2	EtherCAT®/SBus ^{PLUS} interface

No.	Designation	Terminal	Function
[3]	Connector LAN 3: Ethernet interface connection (RJ45 socket)	LAN 3	Engineering interface for the control section of the MOVI-C® CONTROLLER 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 the MOVI-C® CONTROLLER on and off: <ul style="list-style-type: none"> Pushing the button briefly switches on the deactivated MOVI-C® CONTROLLER. Pushing the button briefly during operation shuts down the MOVI-C® CONTROLLER. Pushing the button for at least 5 s switches off the MOVI-C® CONTROLLER.
		X1:On	Electrically isolated input. Connection of a button to switch the MOVI-C® CONTROLLER on.
		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 card slot for fieldbus interface UHX85A – P/UHX84A – P or UHX85A – R/UHX84A – R Cannot be changed later. Only available as unit variant.

4.1.3 Voltage supply

An external DC 24 V power supply unit (power consumption $P_{\max} = 100 \text{ W}$) has to be used for the voltage supply of the MOVI-C® CONTROLLER.

Wiring diagram



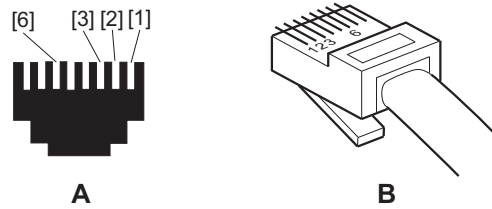
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4.1.4 Connecting the MOVI-C® CONTROLLER to the Ethernet network

To connect the MOVI-C® CONTROLLER to the Ethernet, connect one of the Ethernet communication interfaces LAN 1 or LAN 3 (RJ45 plug connector) to the other network stations using a 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 EtherCAT®/SBus^{PLUS} interface (LAN 2) connection

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

EtherCAT®/SBus^{PLUS} bus topology

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

INFORMATION



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

Bus termination

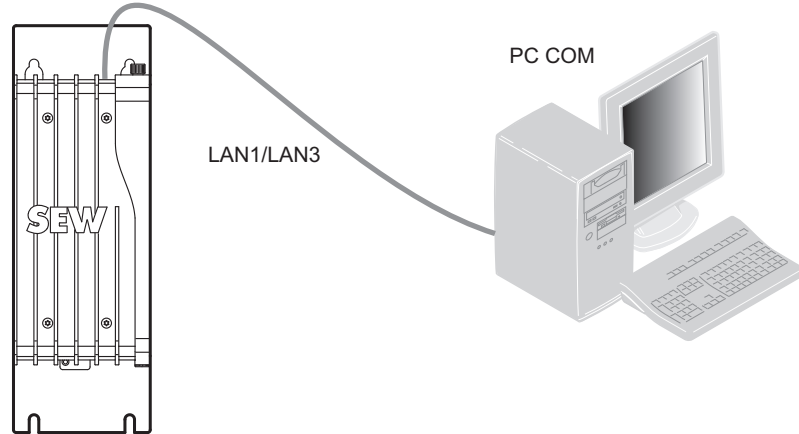
Bus termination (for example with bus terminating resistors) is not necessary. The system detects automatically if there is no subsequent device connected to a device.

Setting the station address

EtherCAT®/SBus^{PLUS} devices from SEW-EURODRIVE do not have an address that can be set on the unit. The units are detected by their position in the bus structure and are assigned an address by the EtherCAT®/SBus^{PLUS} master.

4.1.6 Connection to Ethernet communication interfaces

You can use the Ethernet communication interfaces LAN 1 and LAN 3 to connect an engineering PC or other network stations (e.g. visualization systems). The Ethernet communication interface LAN 1 is only available in combination with the OM-W71B/72B Windows® memory card.



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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 (OMW71B/72B option). You can use those USB interfaces to connect a keyboard, a mouse or a touchpad. The USB interfaces USB4 and USB5 are assigned to the MOVI-C® CONTROLLER.

4.1.8 DVI-I interface connection

The DVI-I interface assigned to the Windows® operating system (OMW71B/72B option) is used for connecting a monitor to the MOVI-C® CONTROLLER.

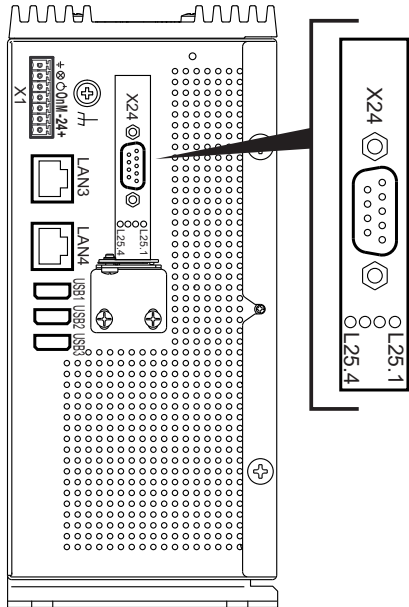
SEW-EURODRIVE recommends the connection of the following monitors:

- OPT71C-120 (part number 1797 428 3)
12 inch touchscreen with a resolution of 1280 × 800
- OPT71C-150 (part number 1797 429 1)
15 inch touchscreen with a resolution of 1280 × 800

4.2 MOVI-C® CONTROLLER power UHX85A – P / power eco UHX84A – P

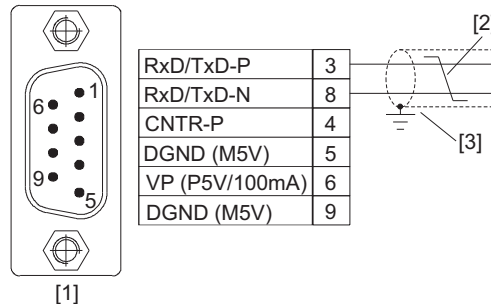
4.2.1 Connecting the controller to the PROFIBUS network

The following chapters describe the terminals and LEDs relevant for PROFIBUS operation.

Front view (PROFIBUS)	Designation	Function	
 <p>7613167499</p>	LEDs		
	LED 25.1	Reserved	
	LED 25.2	Reserved	
	LED 25.3	PROFIBUS communication status	
	LED 25.4	System status	
	X24 connector: PROFIBUS (D-sub, 9-pin)		
	X24:9	GND (M5V)	Reference potential for PROFIBUS
	X24:8	RxD/TxD-N	Receive/transmit negative signal
	X24:7	N.C.	Terminal not assigned
	X24:6	VP (P5V/100 mA)	DC+5 V potential for bus terminator
	X24:5	GND (M5V)	Reference potential for PROFIBUS
	X24:4	CNTR-P	PROFIBUS control signal for re-peater
	X24:3	RxD/TxD-P	Receive/transmit positive signal
	X24:2	N.C.	Terminal not assigned
	X24:1	N.C.	Terminal not assigned

4.2.2 Connecting the PROFIBUS connector (X24)

Connection to the PROFIBUS system is implemented using a 9-pin D-sub connector in compliance with IEC 61158. The T-bus connection must be made using a plug with the corresponding configuration. The following figure shows the PROFIBUS connector that is connected to X24 of the controller.



155128331

[1] 9-pin D-sub connector

[2] Signal line, twisted

[3] Conductive connection over a large area between connector housing and shield

Connection of controller and PROFIBUS

The controller is usually connected to the PROFIBUS system using a shielded twisted pair cable. Observe the maximum supported transmission rate when selecting the bus connector.

The twisted-pair cable is connected to the PROFIBUS connector at pins 3 (RxD / TxD-P) and 8 (RxD / TxD-N). Communication takes place using these two pins. The RS485 signals *RxD/TxD-P* and *RxD/TxD-N* must be connected to the same pins in all PROFIBUS stations. Otherwise, the bus components cannot communicate via PROFIBUS.

The PROFIBUS interface sends a TTL control signal for a repeater or fiber optic adapter (reference = pin 9) via pin 4 (CNTR-P).

Baud rates greater than 1.5 MBaud

The controller with baud rates > 1.5 MBaud can only be operated with special 12-MBaud PROFIBUS connectors.

Bus termination

When the controller is located at the start or end of a PROFIBUS segment and when there is only one PROFIBUS cable connected to the controller, then you have to use a connector with an integrated bus terminating resistor.

Switch on the bus terminating resistors for this PROFIBUS connector.

4.2.3 Status LEDs

Four two-color LEDs are available for diagnostics that indicate the present state of the PROFIBUS system.

Status LED "25.3" (COM)

Signals proper communication via PROFIBUS interface.

Status	Possible cause	Measure
Green	Connection to the PROFIBUS master is OK.	–
Red	Wrong PROFIBUS DP configuration.	Check the configuration settings.
Flashing red, cyclically	<ul style="list-style-type: none"> • Connection to the DP master has failed. • Bus interruption has occurred. • PROFIBUS DP master not in operation. 	<ul style="list-style-type: none"> • Check the PROFIBUS connection of the device. • Check the project planning of the PROFIBUS DP master. • Check all the cables in the PROFIBUS network.
Flashing red, acyclically	The PROFIBUS station has not been configured.	–

Status LED "25.4" (SYS)

Signals proper operation of the PROFIBUS electronics (hardware).

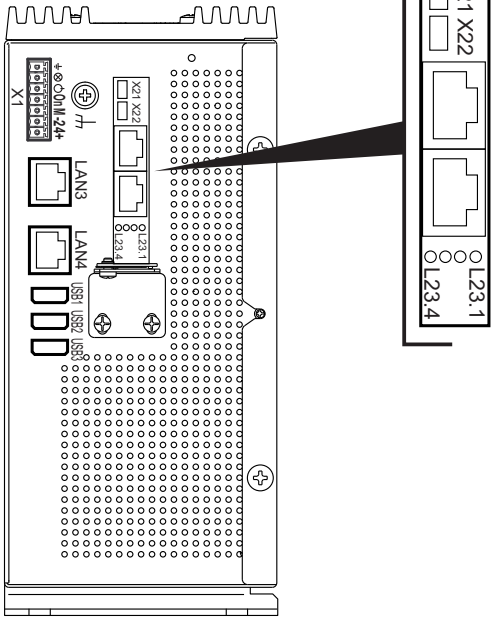
Status	Possible cause	Measure
Green	The fieldbus slave is OK.	–
Orange	The fieldbus slave is being initialized.	–

4.3 MOVI-C® CONTROLLER power UHX85A – R / power eco UHX84A – R

4.3.1 Connecting the controller to the Ethernet network

You can connect the controller to the Ethernet network via the following Ethernet interfaces:

- X21 (RJ45 connector)
- X22 (RJ45 connector)

Front view (Ethernet)	Designation	Function
	X21: Ethernet interface with LEDs	
	LED "Link" (green)	There is an Ethernet connection.
	LED "Activity" (yellow)	Data is currently being exchanged via Ethernet.
	X22: Ethernet interface with LEDs	
	LED "Link" (green)	There is an Ethernet connection.
	LED "Activity" (yellow)	Data is currently being exchanged via Ethernet.
7995857803	LEDs	
	LED 23.1	Reserved
	LED 23.2	Reserved
	LED 23.3	Ethernet communication status
	LED 23.4	System status

To connect the device to the Ethernet, connect one of the Ethernet interfaces to the other network node using a category 5, class D twisted-pair cable in accordance with IEC 11801, edition 2.0.

INFORMATION



According to IEC 802.3, the maximum cable length for 10/100 MBaud Ethernet (10BaseT/100BaseT) between 2 network nodes, is 100 m.

INFORMATION

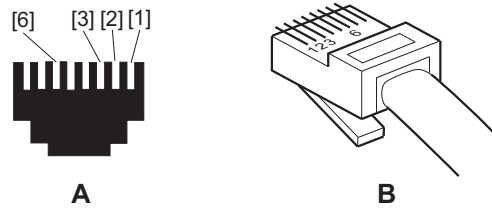


In order to minimize the load on the end units resulting from unintended multi-cast data transmission in Ethernet networks, SEW-EURODRIVE recommends not to connect any third-party end devices directly to units from SEW-EURODRIVE.

- Connect third-party end devices via a network component that supports the IGMP snooping functionality (e.g. managed switch).
- Managed switches with IGMP snooping functionality are not required for Modbus/TCP and PROFINET IO networks.

4.3.2 Pin assignment X21 and X22

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

[6] Pin 6 RX– Receive Minus

4.3.3 Shielding and routing bus cables

NOTICE

Risk of a compensating current flowing as a result of incorrect bus cable type, improper shielding and/or improperly routed bus cables.

Possible damage to property.

- In case of fluctuations in the ground potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding in accordance with relevant VDE regulations in such a case.

Only use shielded cables and connection elements that meet the requirements of category 5, class D according to IEC 11801 edition 2.0.

Correct shielding of the bus cable attenuates electrical interference that can occur in industrial environments. The following measures ensure the best possible shielding:

- Manually tighten the mounting screws on the connectors, modules, and equipotential bonding conductors.
- Use only connectors with a metal housing or a metalized housing.
- Connect the shielding in the connector over a wide surface area.
- Apply the shielding of the bus cable on both ends.
- Route signal and bus cables in separate cable ducts. Do not route them parallel to power cables (motor leads).
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding close to each other using the shortest possible route.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

4.3.4 The integrated Ethernet switch

The device is equipped with an integrated 2 port Ethernet switch for connecting the fieldbus technology. The following network topologies are supported:

- Tree topology
- Star topology
- Line topology
- Ring topologies (supported by device firmware version V19 and later)

INFORMATION



The number of industrial Ethernet switches connected in line impacts the telegram runtime. If a telegram passes through the devices, the telegram runtime is delayed by the "store-and-forward" function of the Ethernet switch:

- For a telegram length of 64 bytes by approximately 10 µs (at 100 MBit/s)
 - For a telegram length of 1500 bytes by approximately 130 µs (at 100 MBit/s)
- This means the more devices a telegram has to pass through, the higher the telegram runtime is.

Auto-crossing

The two ports leading out of the Ethernet switch have auto-crossing functionality. You can use both patch and crossover cables to connect to the next Ethernet node.

Auto-negotiation

The baud rate and duplex mode are negotiated by both Ethernet nodes when establishing the connection. For this purpose, both Ethernet ports of the EtherNet/IP™ connection support an auto-negotiation functionality and work with a baud rate of either 100 MBit or 10 MBit in full duplex or half-duplex mode.

Notes on multicast handling

- The integrated Ethernet switch does not provide a filter function for Ethernet multicast telegrams. Multicast telegrams are sent from the adapters (device) to the scanners (PLC) and passed on to all switch ports.
- IGMP snooping (e.g. Managed Switches) is not supported.

INFORMATION



SEW-EURODRIVE recommends to connect the device only with the following network components:

- That support IGMP snooping (e.g. Managed Switch).
- That have protection mechanisms against high Multicast load (e.g. units from SEW-EURODRIVE). Devices that do not have this function may be faulty due to high network load.

4.3.5 Status LEDs in EtherNet/IP™ and Modbus/TCP mode

Status LED "L23.2" (NETWORK STATUS)

Indicates the status of the fieldbus system.

Status LED	Operating status
Green	There is a controlling connection to the fieldbus system.
Green, flashing	No controlling connection.
Green/red, flashing	The controller performs a self-test.
Red, flashing	The previously established controlling connection has timed out. The status can be reset by restarting the communication.
Red	Conflict detected in the assigned IP addresses. Another node in the network uses the same IP address.
Off	No IP address parameter has been assigned to the controller yet.

Status LED "L23.3" (MODULE STATUS)

Indicates proper functioning of the bus electronics.

Status LED	Operating status
Green	The controller is in normal operating state.
Green, flashing	The controller has not been configured yet and is in "Standby" state.
Green/red, flashing	The controller performs a LED test.
Red, flashing	Conflict detected in the assigned IP address. Another station in the network uses the same IP address.
Red	Controller fault.
Off	The controller is either not supplied with voltage, or is defective.

Status LED "L23.4" (SYS)

Indicates proper functioning of the fieldbus slaves.

Status	Possible cause	Measure
Green	The fieldbus slave is OK.	—
Orange	The fieldbus slave is being initialized.	—

4.3.6 Status LEDs in PROFINET IO mode

Status LED "L23.2" (BUS FAULT)

Indicates the status of the fieldbus system.

Status	Possible cause	Measure
Off	The PROFINET IO slave exchanges data (DataExchange) with the PROFINET IO master (higher-level controller).	—
Red, flashing with 2 Hz	No data is being exchanged.	—

Status	Possible cause	Measure
Red	<ul style="list-style-type: none"> • Connection to the PROFINET IO master has failed. • PROFINET IO slave does not detect a link. • Bus interruption • PROFINET IO master not in operation. 	<ul style="list-style-type: none"> • Check the fieldbus connection of the controller. • Check the PROFINET IO master. • Check the cabling of the fieldbus network.

Status LED "L23.3" (SYS FAULT)

Indicates proper functioning of the bus electronics.

Status	Possible cause	Measure
Off	No fault	–
Red, flashing for 3 s with 2 Hz	The PROFINET IO master (higher-level controller) has triggered a DCP signal service. The flashing function in the PROFINET IO controller configuration is activated to visually locate the stations.	Switch on the controller again. If this fault occurs again, contact SEW-EURODRIVE.
Red	Fault in the controller hardware.	Switch on the controller again. If this fault occurs again, contact SEW-EURODRIVE.

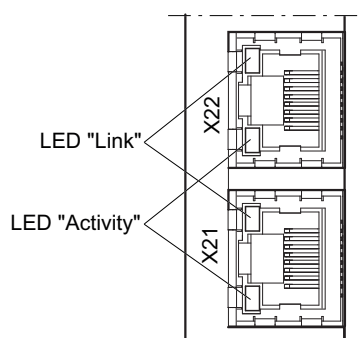
Status LED "L23.4" (SYS)

Indicates proper functioning of the fieldbus slaves.

Status	Possible cause	Measure
Green	The fieldbus slave is OK.	–
Orange	The fieldbus slave is being initialized.	–

4.3.7 Status LEDs "Link/Activity"

The two LEDs **Link (green)** and **Activity (yellow)** integrated in the RJ45 connectors (X21, X22) indicate the state of the Ethernet connection.



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Status LED "Link"

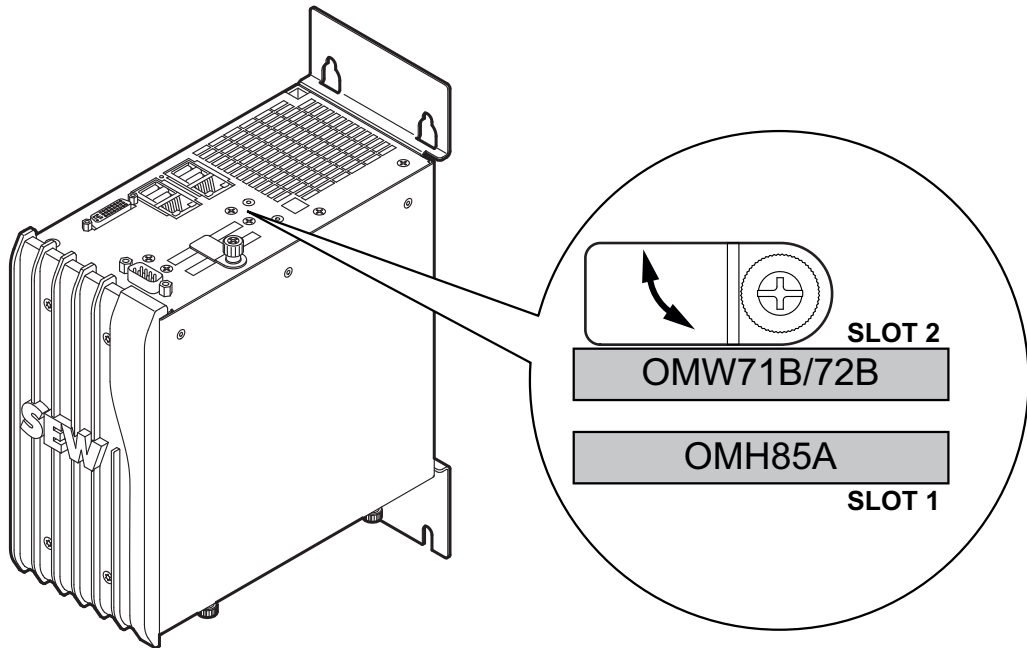
Status LED	Operating status
Green	There is an Ethernet connection.
Flashes	Function for locating in the Address Editor of SEW-EURODRIVE.
Off	There is no Ethernet connection.

Status LED "Activity"

Status LED	Operating status
Yellow	Data is currently being exchanged via Ethernet.

4.4 OMW71B/72B Windows® memory card

Turn the blocking mechanism to the open position for installation.



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Plug the OMW71B or OMW72B Windows® memory card in slot 2. Slot 1 may only be used for OMH85A CFast memory cards.

5 Project planning and startup with Windows® 7 Embedded

5.1 General information

INFORMATION



- The Windows® 7 Embedded operating system on the OMW71B/72B memory card is only available in English.
- If you want to use a OMW71B/72B remote desktop connection, you have to use a user password.

5.2 Starting the Windows® operating system the first time after delivery

The initial start process of the Windows® 7 Embedded operating system includes several setup screens that allow you to adjust the operating system to your requirements. You will be prompted to confirm the system time and set the user name. The conventional Windows® dialogs allow you to adapt, for example, the currency and date format to your region.

The setup of the operating system is completed by initially starting the MOVI-PLC® power apps software. The "Addresses" window opens automatically. This window lists the preset IP addresses (LAN 1 and VNET). SEW-EURODRIVE recommends to adopt these default values. This especially applies to the virtual network card (VNET settings) as it is otherwise not possible to establish a direct connection of Windows® and the control section. You find more information in chapter "Using the MOVI-PLC® power apps software".

5.3 Switch-off and reboot behavior of the MOVI-C® CONTROLLER

5.3.1 General information

If the controller is operated with the OMW71B/72B memory card and the OMH71B Windows® CFast memory card, then it represents a combined device. The controller comprises a control section as well as a Windows® section. In this case, the Windows® switch-off and reboot behavior is different to that of normal desktop PCs.

- Restarting Windows®
Windows® restarts. The control section keeps running normally without a restart.
- Shutting down Windows®
Windows® and the control section are shut down. Switch the controller's voltage supply off and back on to start the system.

INFORMATION



- SEW-EURODRIVE recommends to properly shutdown Windows® 7 before you switch off the supply voltage.
- In MOVI-PLC® power apps, activate the "Write protection" menu to switch off the supply voltage during normal operation of Windows®.

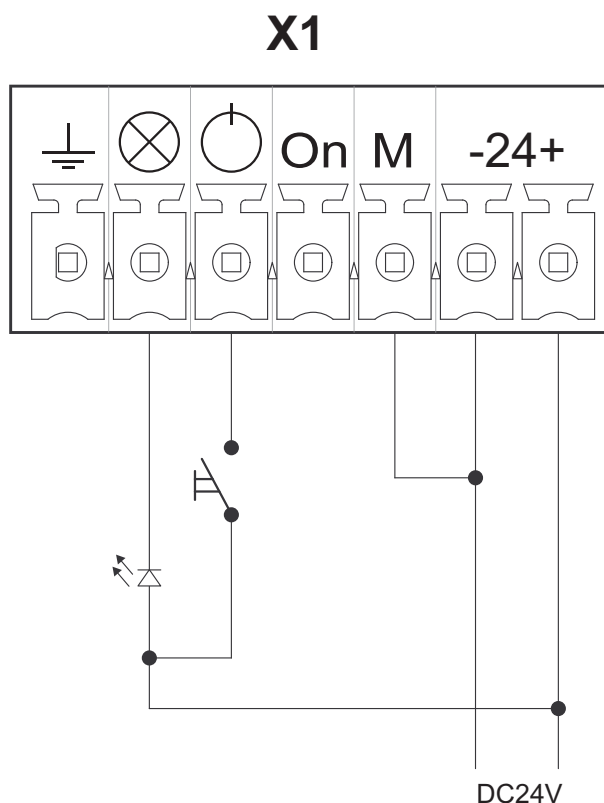
5.3.2 Using an on/off button on X1

You can use terminal X1 on the controller to connect an on/off button for the controller. The button works like a PC on/off button.

- Press the button briefly to switch the controller on or off during operation.
- Press the button for at least 5 seconds to switch off the controller.

If you have switched-off the controller via the button, you also have to use the button to switch the controller back on.

Wiring diagram – button on X1



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5.4 Procedure after a unit replacement

You can use the normal Windows® programs to create a backup image of the OM-W71B/72B Windows® memory card. SEW-EURODRIVE strongly recommends creating a data backup.

5.5 Restoring the delivery condition

You can download a recovery image from the software section on the SEW website to restore the delivery condition of the software package. The recovery image is designed to prepare a USB stick for the installation.

INFORMATION



Installing the recovery image will clear all data from the OMW71B/72B memory card.

1. Connect the USB stick to a USB port of the controller.
2. Switch on the controller.
3. During the boot process of the controller, keep the <F11> key pressed and select the connected USB stick.
4. Now the system boots from the USB stick and guides you through dialogs for system recovery.

5.6 Setting the LAN and VNET address

Selecting "LAN address/VNET address" on the start screen opens the "Addresses" window. The "Addresses" window is split and has the following content:

- On the left side (LAN settings), you can set the name, the IP address and the subnet mask for the physical network card (LAN 1).
- On the right side (VNET settings), you can set the name, the IP address and the subnet mask for the internal virtual network card (Windows® section). If you change the VNET settings of the Windows® section, you also have to change the corresponding settings on the control section as it is otherwise not possible to establish a connection between the control section and the Windows® section.

INFORMATION



Use the Windows® control panel for further settings.

5.7 Setting write protection

You have to shutdown Windows® before you switch off the supply voltage of the controller. Otherwise you may encounter data loss. With the "Set write protection" function, you can switch off the supply voltage of the controller before you shutdown Windows® without losing any data. In addition, this function minimizes the write access to the CFast memory cards.

As long as write protection is enabled, there is no write access to the blocked sections of the CFast memory card. To make sure that Windows® programs keep working properly, the actual write accesses are routed to the volatile RAM.

This means, for example, that a newly created text file is no longer available after a system reboot. The changes made to a file are lost as well after a system reboot. Note that Windows® does not generate a message when you try to write on a write protected medium.

The "Set write protection" function allows you to except certain folders or files (such as log files) on the hard drive from write protection.

The "Set write protection" function can only be set via MOVI-PLC® power apps. It is not possible to make the settings via Windows®.

5.7.1 Reserved RAM

You can set the size of the reserved memory according to your requirements. Each write access of a program is routed to this reserved section.

The reserved memory should be large enough to cope with all memory accesses and small enough to make sure there is sufficient memory left for the correct execution of programs.

The currently used memory of the reserved section is displayed to allow you to correctly determine the exact value.

INFORMATION



Do not use the activated "Write protection" function in combination with an activated Windows® swap file.

5.8 Startup and visualization

In order to use the OMW71B/72B Windows® memory card as visualization platform, use the HMI-Builder.PRO software that is included in the MOVISUITE® engineering software. In addition, you require a suitable monitor, such as OPT71C-120 or OPT71C-150, and the ORV71C USB-dongle to permanently enable the visualization runtime of the HMI-Builder PRO software.

INFORMATION



For more information, refer to the "HMI-Builder PRO" manual.

5.8.1 Configuring the Windows® section during startup

During startup, you should activate the Windows® swap file and deactivate the "Write protection" menu in the MOVI-PLC® power apps. Due to the Windows® swap file, there is more memory available for applications. Deactivating the "Write protection" menu is required as otherwise it is impossible to save a changed MOVISUITE® project to the hard drive.

5.8.2 Configuring the Windows® section during system operation

Once the system has been started up successfully, deactivate the Windows® swap file and activate the "Set protection" menu in MOVI-PLC® power apps. By deactivating the Windows® swap file, you make sure that the system does not perform unnecessary write operations on the Windows® memory card. Activating the "Write protection" menu also allows for switching off the supply voltage during operation.

INFORMATION



When switching off the controller, make sure that the system controlled by the control section is in a safe state.

5.9 Application examples – operation of the Windows® section

The following sections illustrate typical cases for the operation of the Windows® section.

INFORMATION



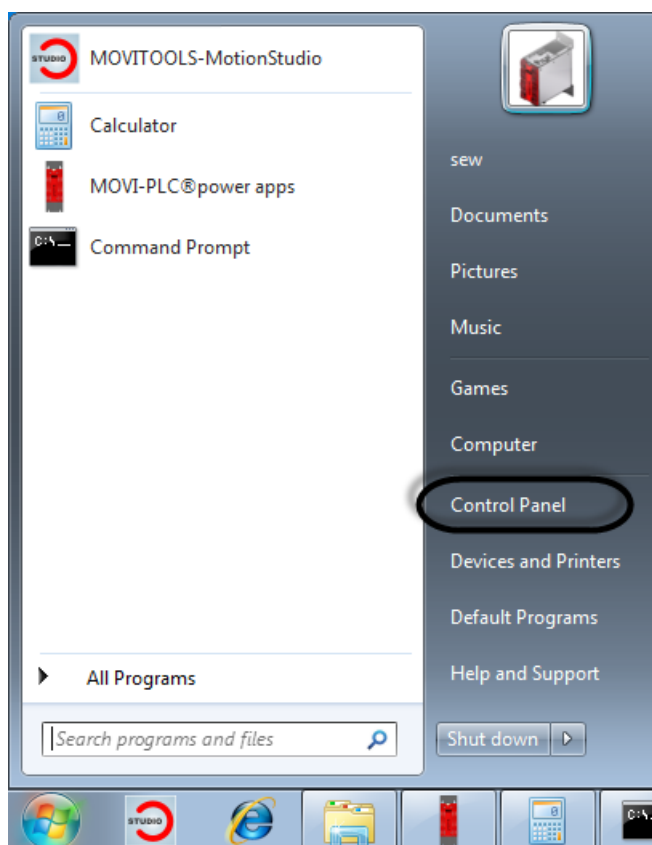
- SEW-EURODRIVE provides the non-exhaustive application examples as a general reference and does not assume corresponding liability.
- SEW-EURODRIVE does not offer support for setting up your Windows® system.

5.9.1 Remote desktop connection

You can use the remote desktop connection in Windows® for remote maintenance purposes. Note that remote maintenance does not allow you to monitor the state of the system on-site.

Proceed as follows:

1. Make sure that there is a network connection between your computer and the Windows® section of the controller.
2. Make sure that you use a password-protected user account when you work with the controller.
3. Activate the remote desktop connection on the controller. To do so, open the Windows® Control Panel (see the following figure).



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5.9.2 Working with a touchscreen monitor

On-screen keyboard

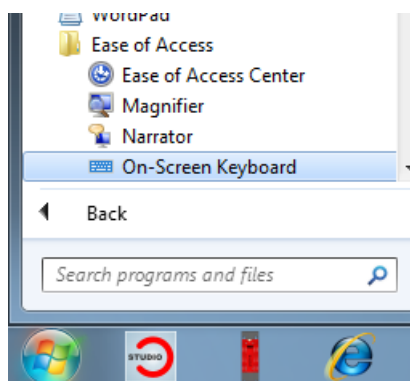
You can use the on-screen keyboard if you are working with a touchscreen monitor without keyboard and mouse.



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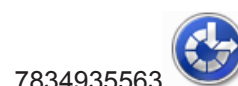
You can open the on-screen keyboard via [Windows® start menu] / [Ease of access] / [On-screen keyboard] [1], or via the icon [2] at the lower left on the Windows® login screen.

[1]



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[2]



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Right mouse button

You can also simulate a right click via the on-screen keyboard. To do so, use the following on-screen key.



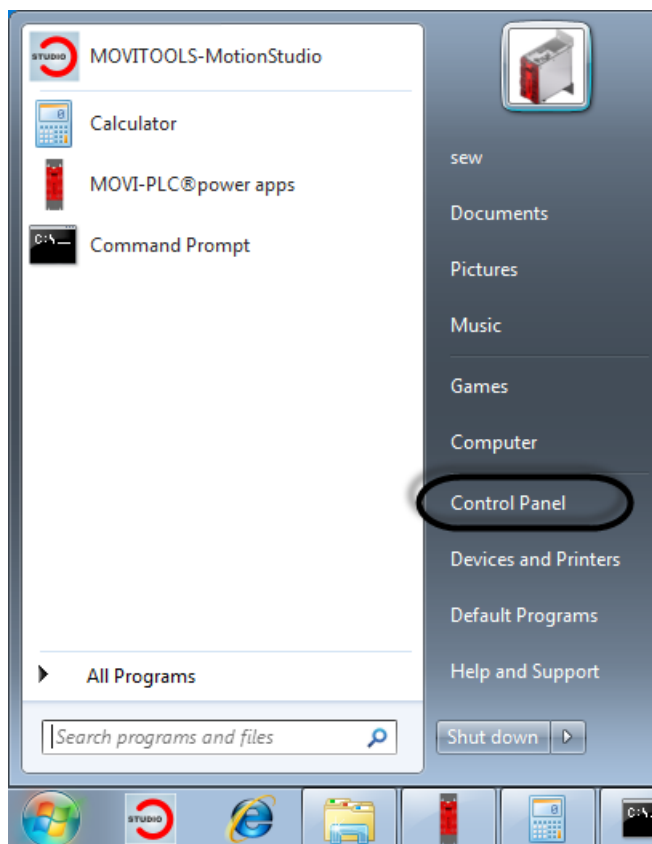
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5.9.3 Settings for the Windows® swap file

For a high workload on the controller, you should activate the Windows® swap file. Doing so makes available more memory capacity for the programs.

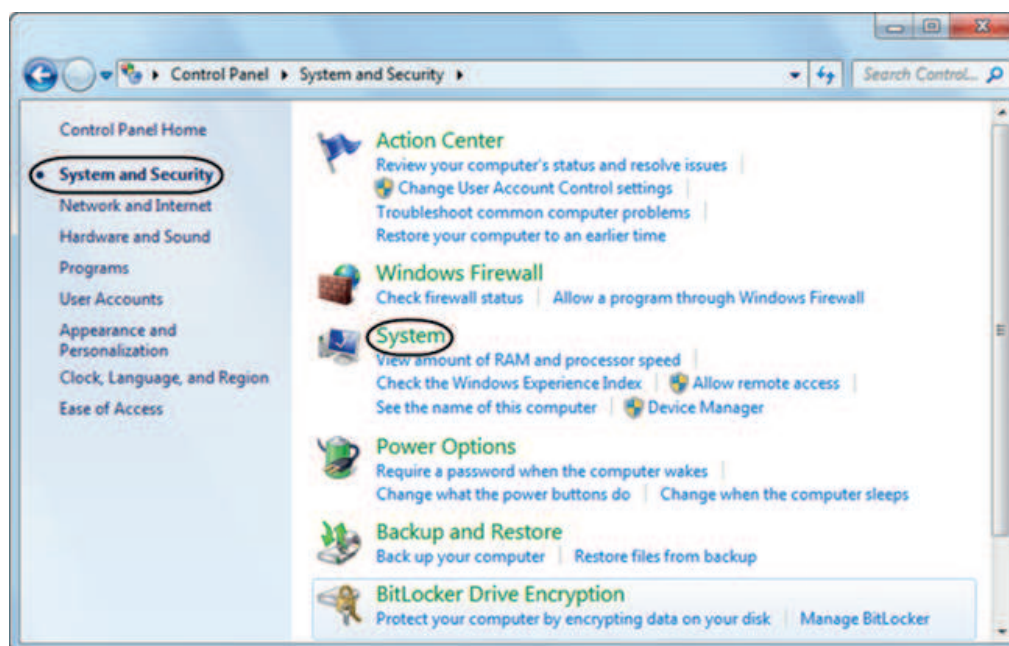
Proceed as follows to activate the Windows® swap file:

1. Open the Windows® control panel.



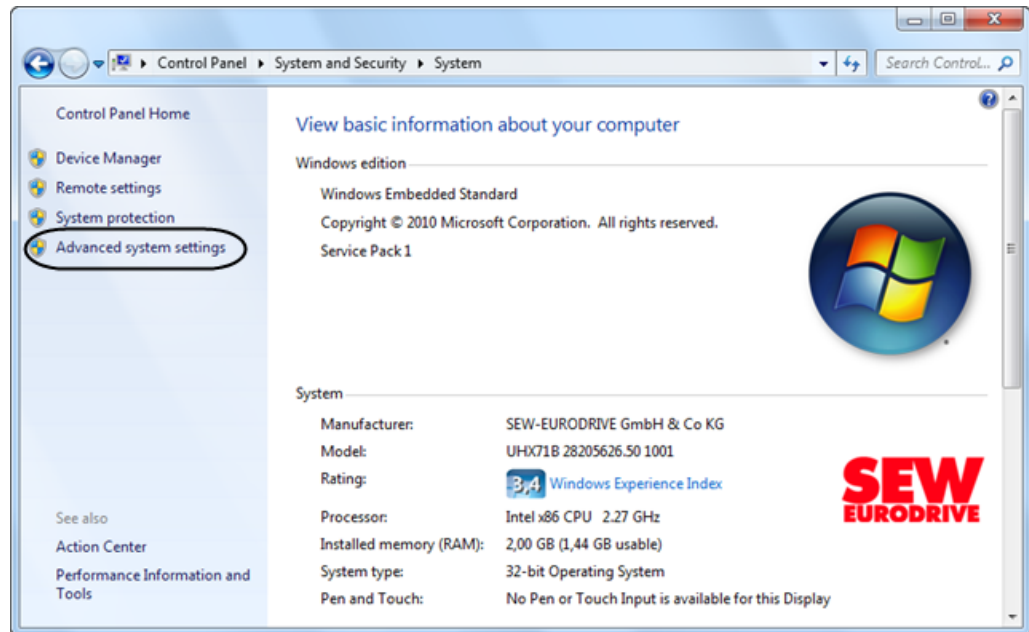
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2. Choose "System and Security". Click on "System".



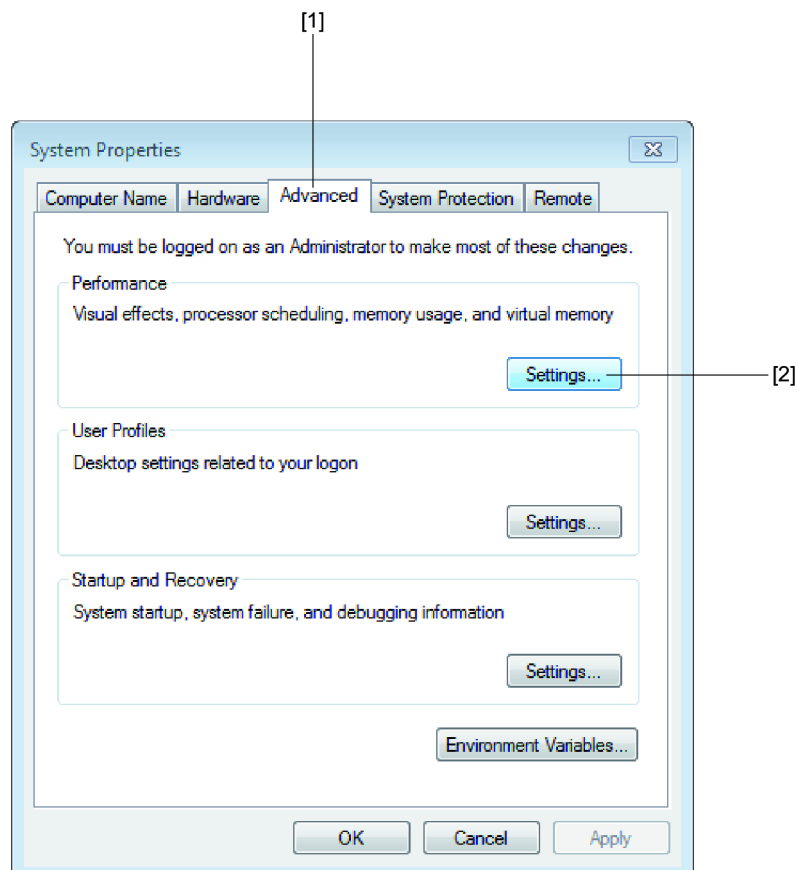
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- The "View basic information about your computer" window opens. Choose "Advanced system settings" on the left.



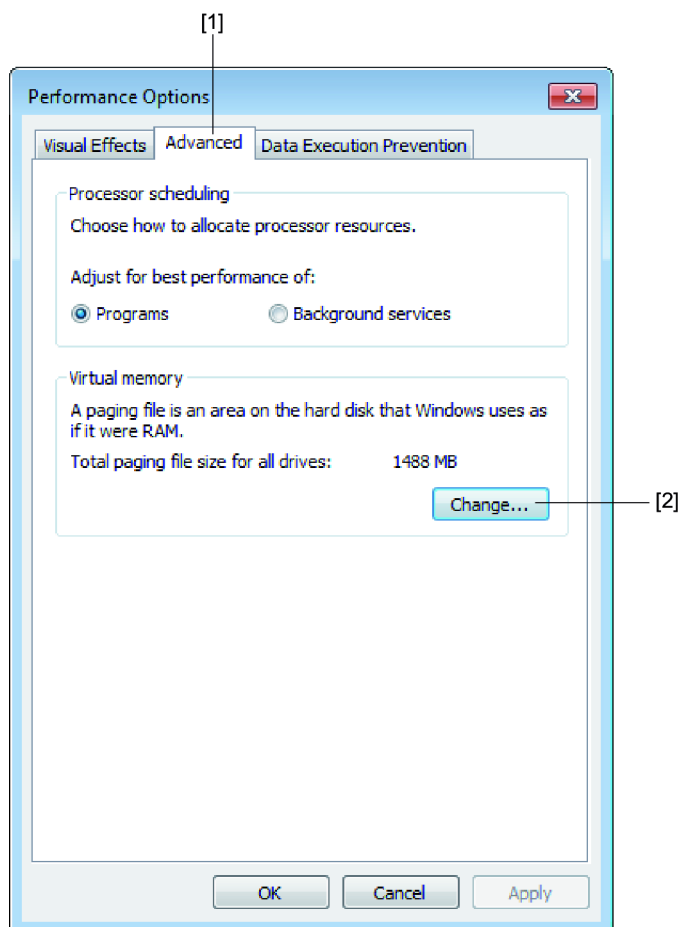
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- The "System Properties" window opens. Choose the "Advanced" tab [1]. In the "Performance" section, click [Settings] [2].



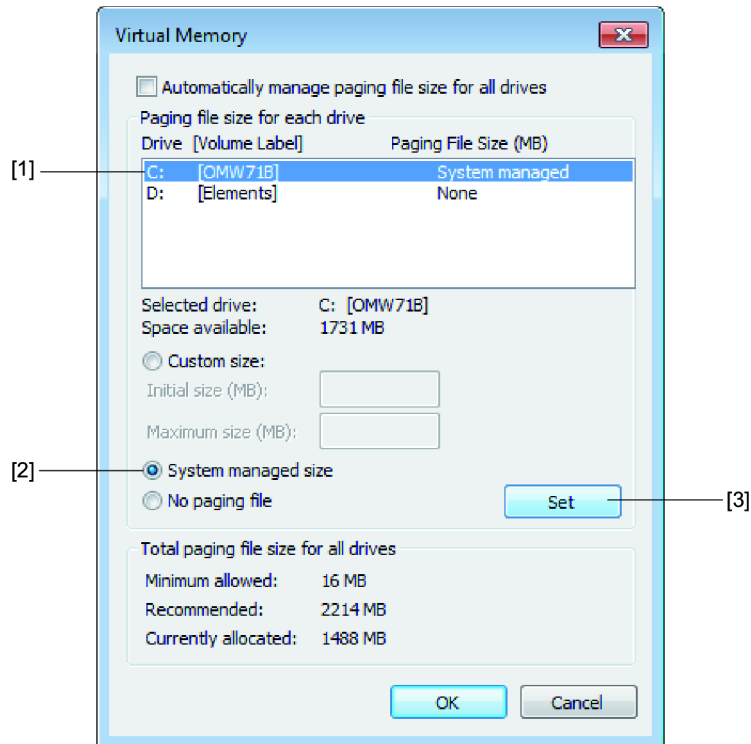
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5. The "Performance Options" window opens. Select the "Advanced" tab [1]. In the "Virtual memory" section, click [Change] [2].



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6. The "Virtual Memory" window opens. Select "System managed size" [2]. To activate the swap file [1], click [Set] [3] and then click [OK]



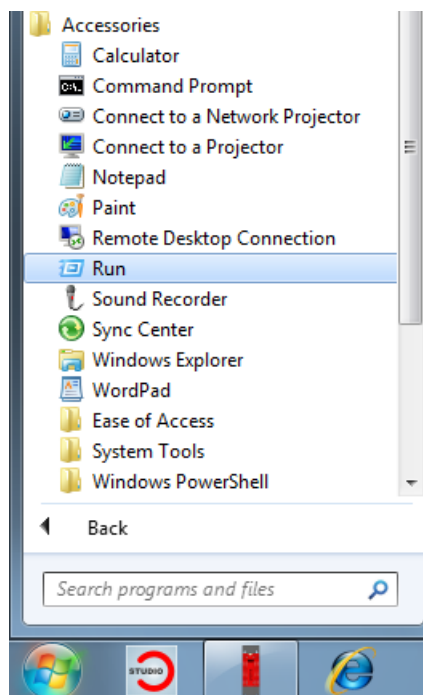
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5.9.4 Automatic system startup

After startup, you can configure the system to boot automatically and directly start with a previously generated visualization.

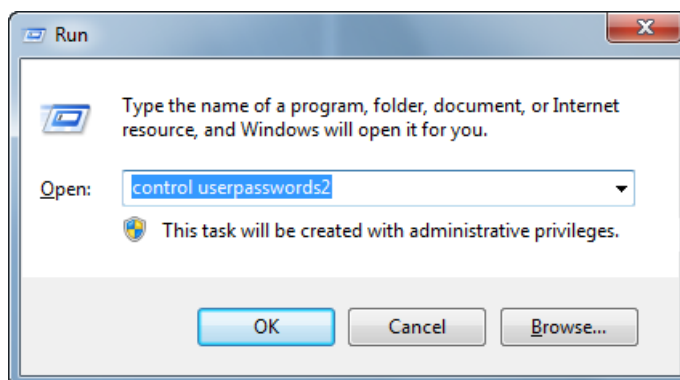
Proceed as follows:

1. In the "Accessories" section in the Windows start menu, select "Run".



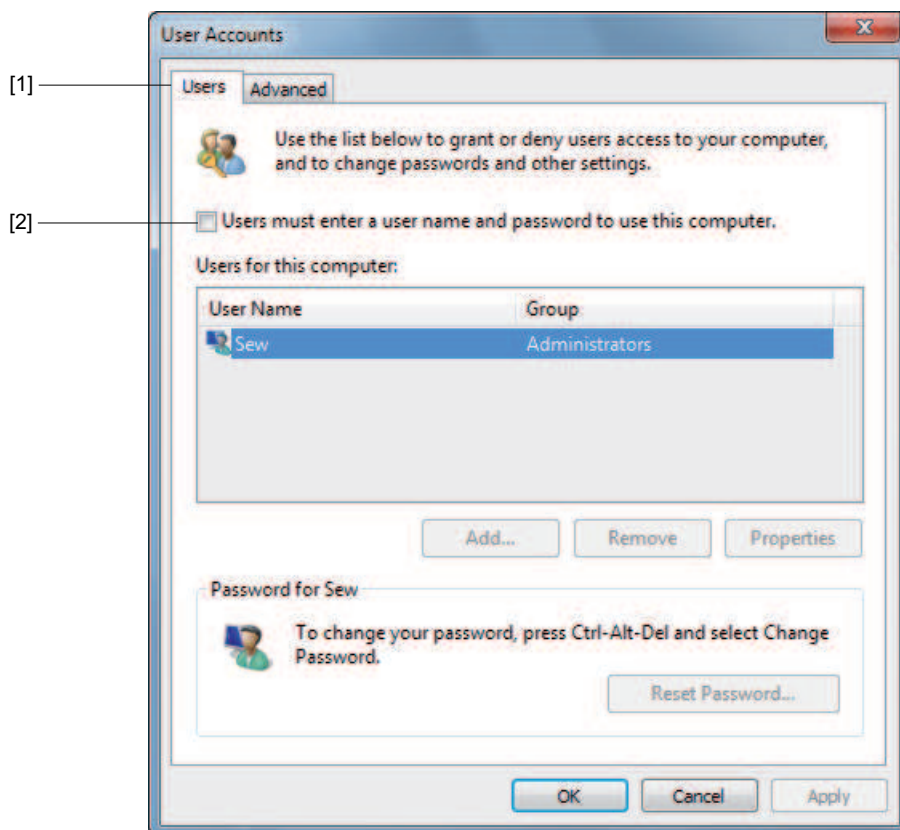
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2. The "Run" window opens. In the "Open" field, enter "control userpasswords2" and click [OK].



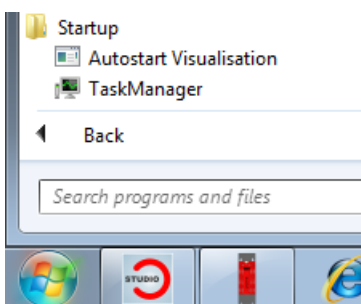
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3. The "User Accounts" window opens. On the "Users" tab [1] select the user that is to log on automatically, and deactivate the option "Users must enter a user name and password to use this computer" [2].



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4. To start a visualization automatically, create a link in the "Startup" section in the Windows® start menu.



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6 Replacing the unit

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



INFORMATION

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

For information on replacing the drives, refer to the manual of the respective inverter.

7 Technical data

7.1 General technical data

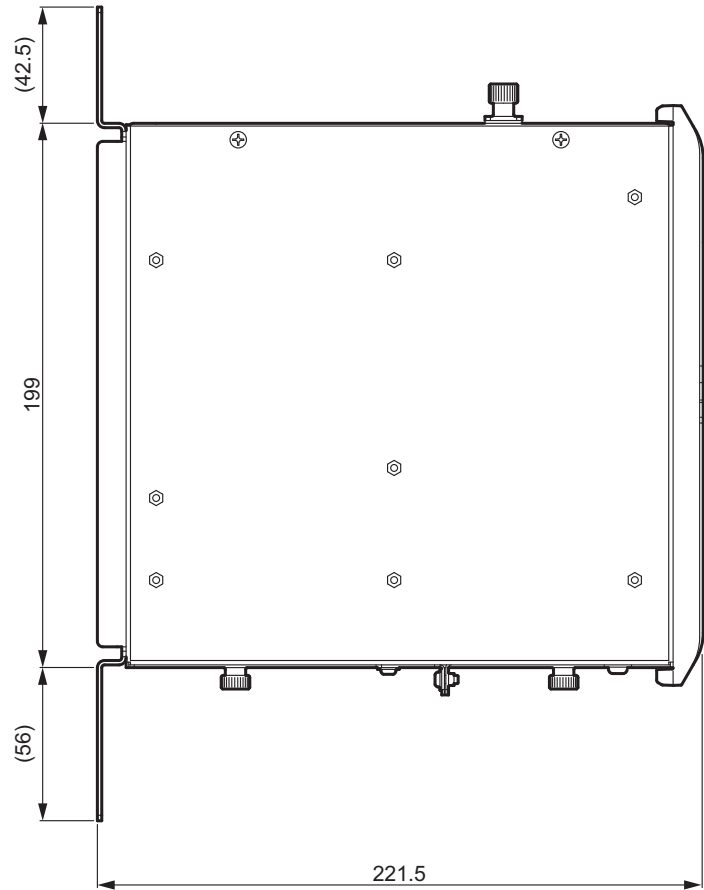
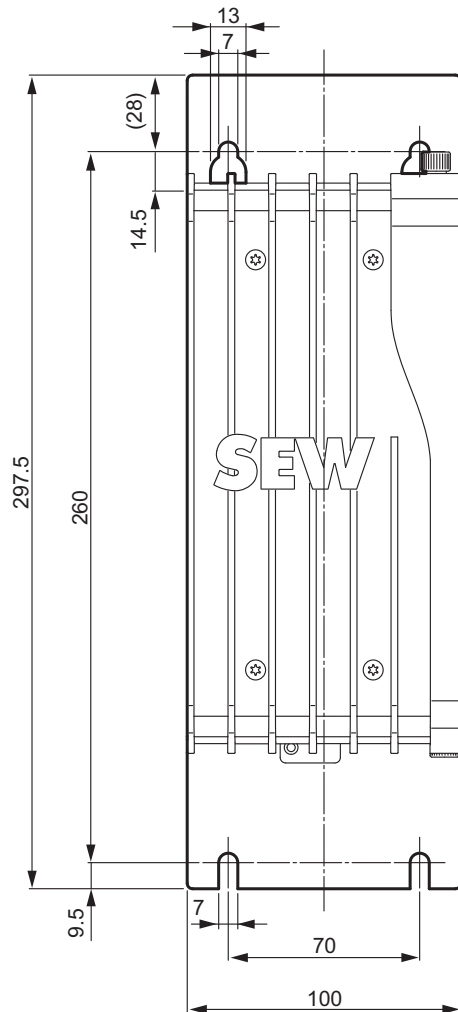
MOVI-C® CONTROLLER power UHX85A / power eco UHX84A	
Interference immunity	complies with EN 61800-3
Ambient temperature	0 °C to +50 °C
Storage temperature	–25 °C to +70 °C
Climate class	EN 60721-3-3; class 3k3
Type of cooling	Convection cooling
Degree of protection	IP20
Operating mode	Continuous operation (see MOVIDRIVE® modular system manual)
Pollution class	2 according to IEC 60664-1 (VDE0110-1)
Installation altitude	max. 3000 m (NN)

7.2 Technical data

MOVI-C® CONTROLLER power UHX85A / power eco UHX84A	
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 controller has to be supplied by an external voltage source.
Memory	<ul style="list-style-type: none"> Retain data: 32 kByte System variables (retain): 24 kByte Program memory: <ul style="list-style-type: none"> – 16 MByte for user 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	EtherCAT®/SBus ^{PLUS} : fast system bus SBus ^{PLUS} based on EtherCAT®
USB	7 × USB 2.0

MOVI-C® CONTROLLER power UHX85A / power eco UHX84A	
CFast memory card OMH85A	<ul style="list-style-type: none"> • PC readable • Includes: <ul style="list-style-type: none"> – Firmware – IEC application program – Application data • 2 GB memory
CFast memory cards: OMW71B (16 GB) OMW72B (32 GB)	<ul style="list-style-type: none"> • Software package: <ul style="list-style-type: none"> – Windows 7 Embedded 32 bit operating system
Engineering	<p>Engineering is performed via the LAN 3 Ethernet interface</p> <p>Engineering for all SEW components connected to the controller can be performed via the controller.</p>
Fieldbus interfaces for slave connection	<ul style="list-style-type: none"> • MOVI-C® CONTROLLER power UHX85A – P / power eco UHX84A – P: <ul style="list-style-type: none"> – PROFIBUS • MOVI-C® CONTROLLER power UHX85A – R / power eco UHX84A – R: <ul style="list-style-type: none"> – EtherNet/IP™ – Modbus/TCP – PROFINET

8 Dimension drawing MOVI-C® CONTROLLER power UHX85A / power eco UHX84A



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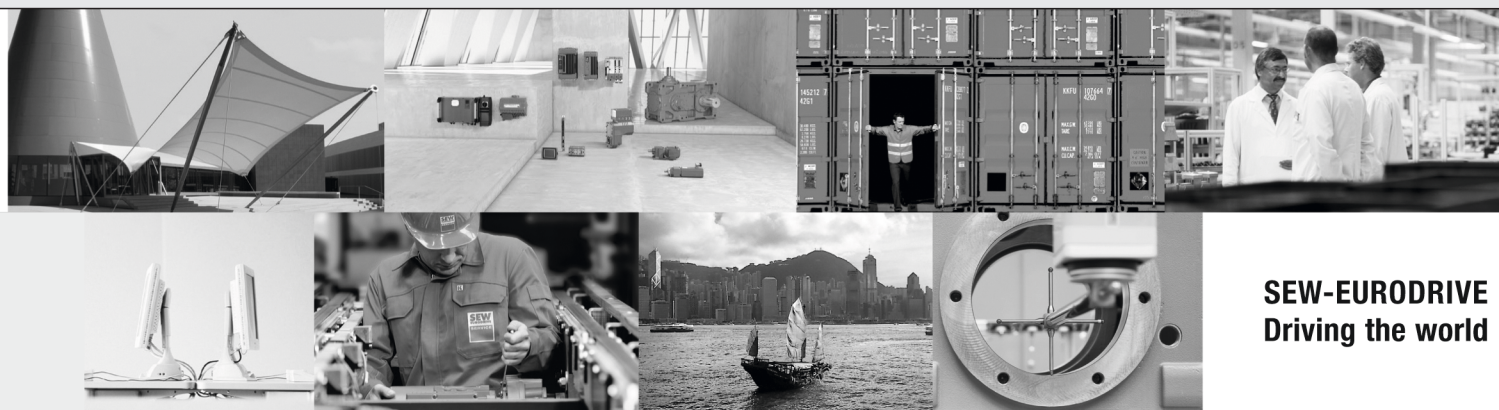
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