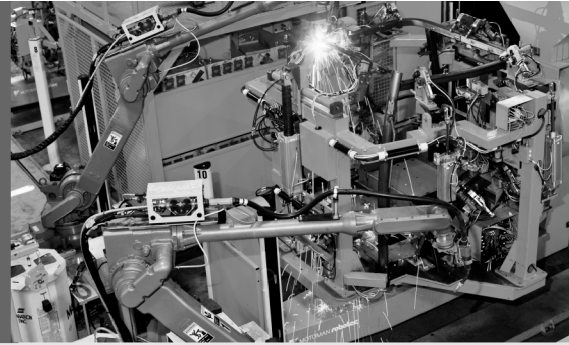


OPERATING INSTRUCTIONS

UE403



Switching amplifier



GB

This document is protected by the law of copyright, whereby all rights established therein remain with the company SICK AG. Reproduction of this document or parts of this document is only permissible within the limits of the legal determination of Copyright Law. Alteration or abridgement of the document is not permitted without the explicit written approval of the company SICK AG.



certified by DQS according to
DIN EN ISO 9001 Reg. No. 462-03

Contents

1	About this document.....	5
1.1	Function of this document.....	5
1.2	Target group	5
1.3	Depth of information.....	5
1.4	Scope	6
1.5	Abbreviations.....	6
1.6	Symbols used	6
2	On safety.....	8
2.1	Specialist personnel.....	8
2.2	Applications of the device.....	8
2.3	Correct use	8
2.4	General safety notes and protective measures	9
2.5	Environmental protection	9
2.5.1	Disposal	9
2.5.2	Separation of materials	10
3	Product description.....	11
3.1	Special features	11
3.2	Operating principle of the device	12
3.2.1	Principle of the device.....	12
3.3	Application example.....	13
3.4	Status indicators	14
4	Mounting	15
4.1	Mounting on the M4000 multiple light beam safety device	15
4.1.1	Mounting on the rear of the M4000.....	15
4.1.2	Mounting on the side of the M4000.....	16
4.2	Mounting on the system	16
5	Electrical installation.....	17
5.1	System connection M12 × 5	18
5.2	Connections for muting sensors M12 × 5	19
5.3	Connection muting lamp M12 × 5	20
5.4	Reset/override/additional signal C1/belt stop connection M12 × 5	21
5.5	Configuration connection M8 × 4 (serial interface).....	22
6	Connection diagrams.....	23
6.1	M4000 Advanced with UE403 and UE10-30S.....	23
6.2	M4000 Advanced A/P with UE403 and UE10-30S	24
6.3	M4000 Advanced A/P with UE403 and relay	25
7	Commissioning	26
8	Configuration	27
8.1	Preparing the configuration	27
8.2	Configuration memory	28
9	Fault diagnosis	29
9.1	In the event of faults or errors.....	29
9.2	SICK support.....	29
9.3	Error displays of the LEDs.....	30
9.4	Extended diagnostics.....	30

10	Technical specifications	31
10.1	Data sheet.....	31
10.2	Dimensional drawings.....	34
10.2.1	UE403	34
10.2.2	Muting lamp, version with incandescent lamp	35
10.2.3	Muting lamp, version with LED	35
11	Ordering information	36
11.1	Part number and delivery.....	36
11.2	Accessories	36
12	Annex.....	38
12.1	Declaration of Conformity	38
12.2	Manufacturer's checklist	39
12.3	List of tables	40
12.4	List of illustrations	41

1 About this document

Please read this chapter carefully before working with this documentation and the UE403 switching amplifier.

1.1 Function of this document

These operating instructions are designed to address *the technical personnel of the machine manufacturer* or the *machine operator* in regards to safe mounting, installation, configuration, electrical installation, commissioning, operation and maintenance of the UE403 switching amplifier in connection with the M4000 Advanced multiple light beam safety device.

These operating instructions do *not* provide instructions for operating machines on which the UE403 switching amplifier or the M4000 Advanced multiple light beam safety device is, or will be, integrated. Information on this is to be found in the appropriate operating instructions for the machine.

1.2 Target group

These operating instructions are addressed to *planning engineers, machine designers* and *operators* of plants and systems which are to be protected by one or several M4000 Advanced multiple light beam safety devices in connection with a UE403 switching amplifier. It also addresses people who integrate the UE403 into a machine, initialise its use, or who are in charge of servicing and maintaining the device.

1.3 Depth of information

These operating instructions contain the following information on the UE403 switching amplifier in connection with the M4000 Advanced multiple light beam safety device:

- mounting
- electrical installation
- commissioning and configuration
- fault, error diagnosis and troubleshooting
- part numbers
- conformity and approval

Planning and using protective devices such as the M4000 Advanced also require specific technical skills which are not detailed in this documentation.

When operating the UE403 in connection with the M4000 Advanced multiple light beam safety device, the national, local and statutory rules and regulations must be observed.

General information on accident prevention using opto-electronic protective devices can be found in the brochure "Safe Machines with opto-electronic protective devices".

Note We also refer you to the SICK homepage on the Internet at

www.sick.com

Here you will find information on:

- sample applications
- a list of Frequently Asked Questions regarding the M4000 in connection with the UE403 switching amplifier
- these operating instructions in different languages for viewing and printing
- EC Declaration of Conformity

1.4 Scope

Note These operating instructions are only applicable to the UE403 switching amplifier with one of the following entries on the type label in the field *Operating Instructions*: 8010851, 8010851_PA54 or 8010851_PE81 or 8010851_Q899. This document is part of SICK part number 8010851 (operating instructions “UE403 – Switching amplifier” in all available languages).

For the configuration and diagnostics of these devices you require CDS (Configuration & Diagnostic Software) version 3.10 or higher. To determine the software version, select the **Module-Info...** option in the **?** menu.

1.5 Abbreviations

- ADO** Application diagnostic output = configurable signal output that indicates a specific status of the protective device
- CDS** SICK Configuration & Diagnostic Software = software for the configuration of your UE403
- EDM** External device monitoring
- EFI** Enhanced function interface = safe SICK device communication
- ESPE** Electro-sensitive protective equipment (e.g. M4000 or C4000)
- M4000** M4000 Advanced multiple light beam safety device
- OSSD** Output signal switching device = switching output that drives the safety circuit
- PLC** Programmable logic controller
- SDL** Safety Data Link = SICK safety interface (connection for OSSD and EFI of an ESPE)

1.6 Symbols used

Recommendation Recommendations are designed to give you some assistance in your decision-making process with respect to a certain function or a technical measure.

Note Refer to notes for special features of the device.



Display indications reflect the state of the 7-segment display on an ESPE connected (e.g. the M4000):



Alternating indication of characters, e.g. t and 2

Please consult the operating instructions of the ESPE for a detailed description of the indicators.



LED symbols describe the status of an LED:

● The LED is constantly illuminated.



The LED is flashing.



The LED is off.

➤ Take action ... Instructions for taking action are shown by an arrow. Read carefully and follow the instructions for action.



WARNING

Warning!

A warning indicates an actual or potential risk or health hazard. They are designed to help you to prevent accidents.



Read carefully and follow the warning notices!

UE403

Software notes show the location in the CDS (Configuration & Diagnostic Software) where you can make the appropriate settings and adjustments.

The software notes contained in the operating instructions for the M4000 Advanced multiple light beam safety device apply accordingly in connection with the UE403.

**Sender and receiver**

In drawings and diagrams, symbol  denotes the sender and symbol  denotes the receiver of an electro-sensitive protective equipment.

The term “dangerous state”

The dangerous state (standard term) of the machine is always shown in the drawings and diagrams of this document as a movement of a machine part. In practical operation, there may be a number of different dangerous states:

- machine movements
- electrical conductors
- visible or invisible radiation
- a combination of several risks and hazards

2 On safety

This chapter deals with your own safety and the safety of the equipment operators.

- Please read this chapter carefully before starting to work with the UE403 or with machinery protected by the M4000 Advanced multiple light beam safety device in connection with the UE403.

2.1 Specialist personnel

The UE403 switching amplifier must only be installed, commissioned and serviced by specialist personnel. Specialist personnel are defined as persons who ...

- have undergone the appropriate technical training

and

- who have been instructed by the responsible machine operator in the operation of the machine and the current valid safety guidelines

and

- have access to the operating instructions of the UE403 and have read and familiarised themselves with them

and

- have access to the operating instructions for the M4000 Advanced multiple light beam safety device connected to the switching amplifier and are familiar with them.

2.2 Applications of the device

The UE403 switching amplifier is an accessory for the SICK M4000 Advanced multiple light beam safety device. It extends the technical application possibilities of the M4000 Advanced.

The UE403 switching amplifier is only intended for use in industrial environments. When used in residential areas it can cause interference.

Additional mechanical protective measures may be required when using the M4000 Advanced in connection with the UE403.

2.3 Correct use

The UE403 switching amplifier must be used only as defined in chapter 2.2 “Applications of the device”. It must be used only by qualified personnel and only on the machine where it has been installed and initialised by qualified personnel in accordance with these operating instructions.

If the device is used for any other purposes or modified in any way — also during mounting and installation — any warranty claim against SICK AG shall become void.



2.4 General safety notes and protective measures

Safety notes

Please observe the following procedures in order to ensure the correct and safe use of the M4000 Advanced multiple light beam safety device in connection with the UE403.

- Please observe the notes in the chapter titled “General safety notes and protective measures” of the M4000 Advanced operating instructions.
- The M4000 Advanced and UE403 operating instructions must be made available to the operator of the machine with which the M4000 Advanced multiple light beam safety device is used in connection with the UE403. The machine operator is to be instructed in the use of the device by specialist personnel and must be instructed to read the operating instructions.
- Changes to the configuration of the devices can degrade the protective function. After every change to the configuration you must therefore check the effectiveness of the protective device.

The person who makes the change is also responsible for the correct protective function of the device. When making configuration changes, please always use the password hierarchy provided by SICK to ensure that only authorised persons make changes to the configuration. The SICK service team is available to provide assistance if required.

- The UE403 switching amplifier is connected directly to the M4000 Advanced multiple light beam safety device and supplied with power from the M4000. Pay attention to the related notes on the voltage supply in the operating instructions for the M4000 Advanced.

2.5 Environmental protection

The UE403 switching amplifier has been designed to minimise environmental impact. It uses only a minimum of power and natural resources.

➤ At work, always act in an environmentally responsible manner.

2.5.1 Disposal

Unusable or irreparable devices should always be disposed as per the applicable national regulations on waste disposal (e.g. European waste code 16 02 14).

- Notes**
- We would be pleased to be of assistance on the disposal of this device. Contact your local SICK representative.
 - Information on the individual materials in the UE403 is given in chapter 10 “Technical specifications” on page 31.

2.5.2 Separation of materials



WARNING

Only appropriately trained personnel are allowed to separate materials!

Caution is required when dismantling devices. There is a risk of injuries.

Before you send the devices for appropriate recycling, it is necessary to separate the different materials in the UE403.

- Separate the housing from the rest of the parts (in particular the circuit board).
- Send the separated parts for recycling as appropriate (see Tab. 1).

Tab. 1: Overview on disposal by components

Components	Disposal
Product	
Housing	Metal recycling (aluminium)
Circuit boards, cable, connector and electrical connecting pieces	Electronic recycling
Packaging	
Cardboard, paper	Paper/cardboard recycling

3 Product description

This chapter provides information on the special features and properties of the UE403. It describes the construction and the operating principle of the device in connection with the M4000 Advanced multiple light beam safety device.

➤ Please read this chapter before mounting, installing and commissioning the device.

3.1 Special features

Properties UE403

- RS-232 connection: access to the configuration/diagnostics either via M4000 Advanced or UE403
- IP 65 housing: flexible mounting to the M4000 Advanced or directly in the system
- M12 connection sockets with separate LED displays: I/O status display directly on the UE403
- facility for connecting of:
 - 2 to 4 muting sensors
 - muting lamp
 - reset/override control switch/additional external control signal
- 1 EFI connection for connection with the M4000 Advanced
- Storage of the configuration for the M4000 Advanced connected to the EFI in the UE403. Automatic device detection after the replacement of an M4000 and transfer of the saved configuration to the device. This makes easy replacement of an M4000 possible.

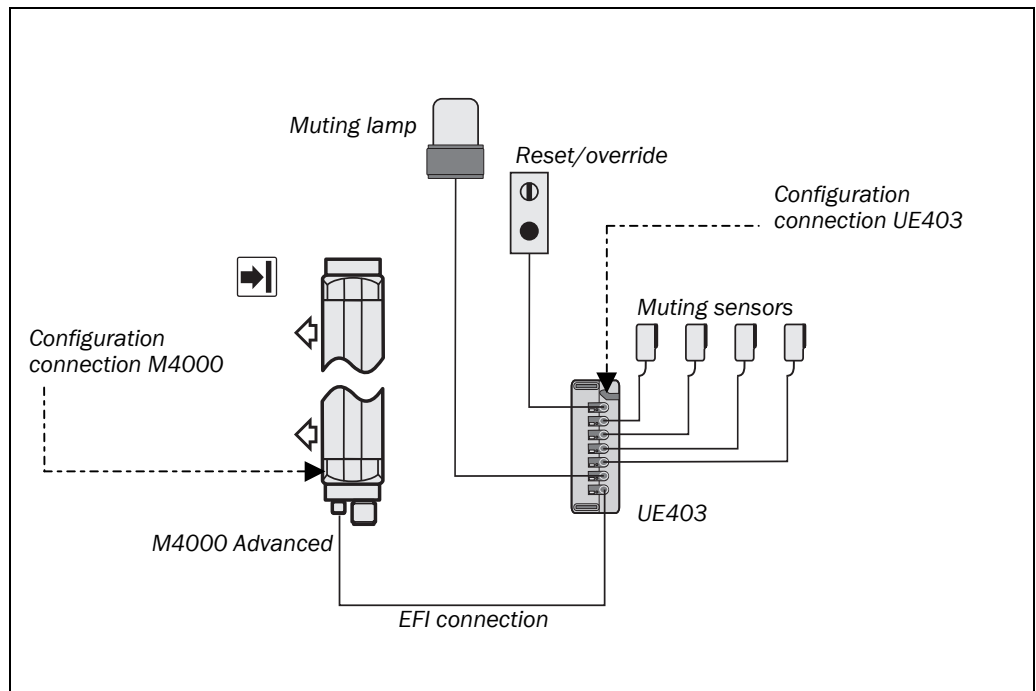
3.2 Operating principle of the device

3.2.1 Principle of the device

The UE403 is a switching amplifier. It processes certain signals from the M4000 Advanced multiple light beam safety device and combines them with signals from the devices/systems that are connected to the UE403. Such signals can come from:

- muting sensors
- muting lamps
- control switches for e.g. reset or override
- external controls, e.g. signal for belt stop

Fig. 1: Principle of the device
UE403

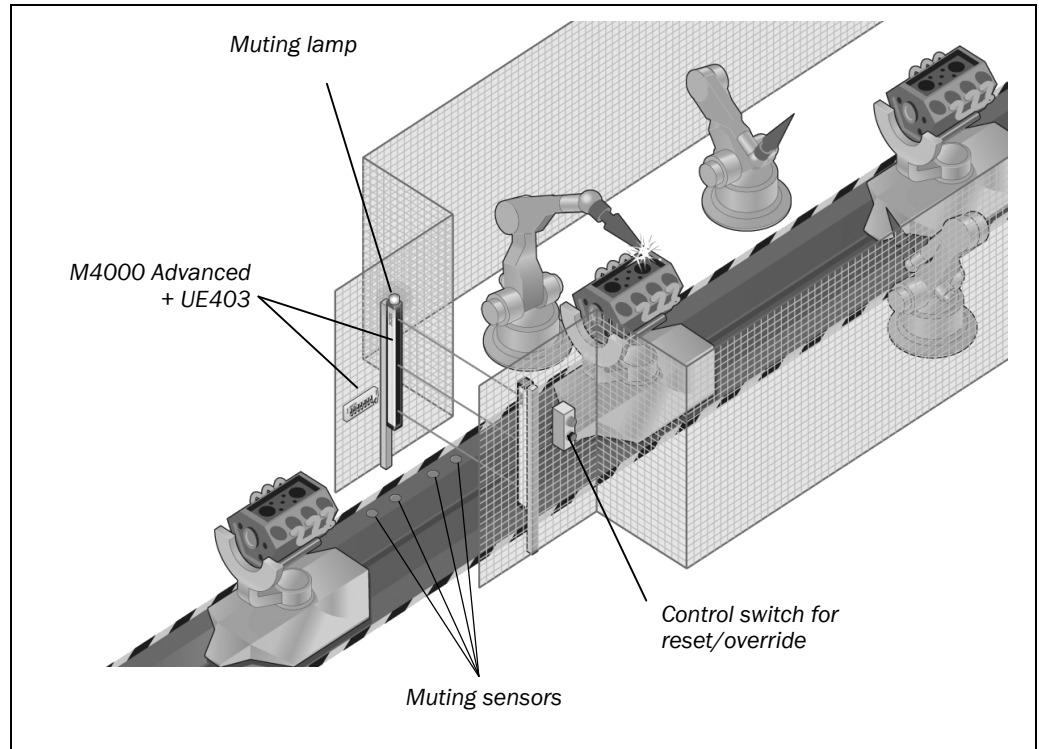


UE403

3.3 Application example

Muting application

Fig. 2: Example for a muting application



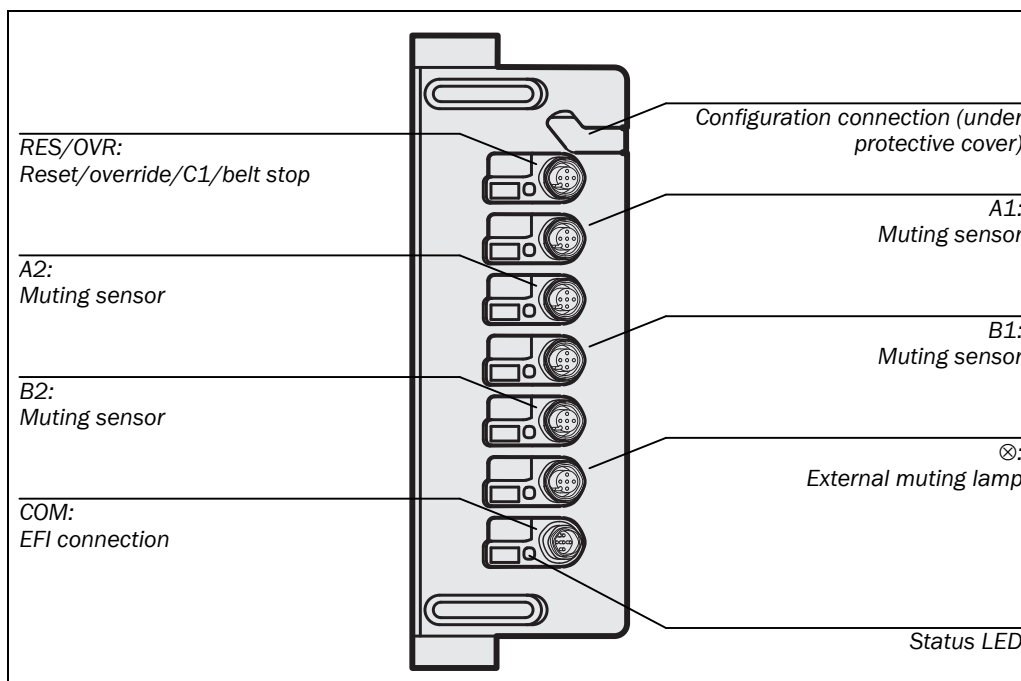
Engine machining station with M4000 Advanced and UE403. The station entrance is safeguarded with a 3-beam multiple light beam safety device together with the UE403 switching amplifier. 2 pairs of inductive muting sensors that are connected locally to the UE403 detect the transport platform and trigger muting. The muting lamp signals the muting state. The control switch for reset and override is also connected locally via the UE403.

3.4 Status indicators

The UE403 has a status LED for the input and output (I/O) on each M12 connection. Other indications during operation are also indicated on the 7-segment display on the M4000 receiver.

Status LED

Fig. 3: Status LED of the UE403



Tab. 2: Meaning of the status LEDs of the UE403

COM connection

Display	Meaning
○ Yellow	LED off: No supply voltage
● Yellow	LED illuminated: Device ready for operation
⦿ Yellow	LED flashing: Error (See chapter 9.3 "Error displays of the LEDs" on page 30ff.)

Connections RES/OVR, A1, A2, B1, B2, ⓧ

Display	Meaning
○ Yellow	LED off: No signal (0 V LOW)
● Yellow	LED illuminated: Signal is present (24 V HIGH)

- Notes**
- The combined RES/OVR connection can process several signals. However, the status LED only indicates whether a signal is present or not. A decision as to which signal is present is not made.
 - The electrical connection is described in chapter 5.4 "Reset/override/additional signal C1/belt stop connection M12 × 5" on page 21.

4 Mounting

This chapter describes the preparation and completion of the installation of the UE403 switching amplifier. The UE403 switching amplifier can either be mounted directly on the M4000 multiple light beam safety device or on the system.

Note The maximum length of the connection cable between the UE403 switching amplifier and the M4000 multiple light beam safety device is 10 m.

The following steps are necessary after mounting and installation:

- completing the electrical connections (chapter 5)
- commissioning (chapter 7)
- configuration (chapter 8)

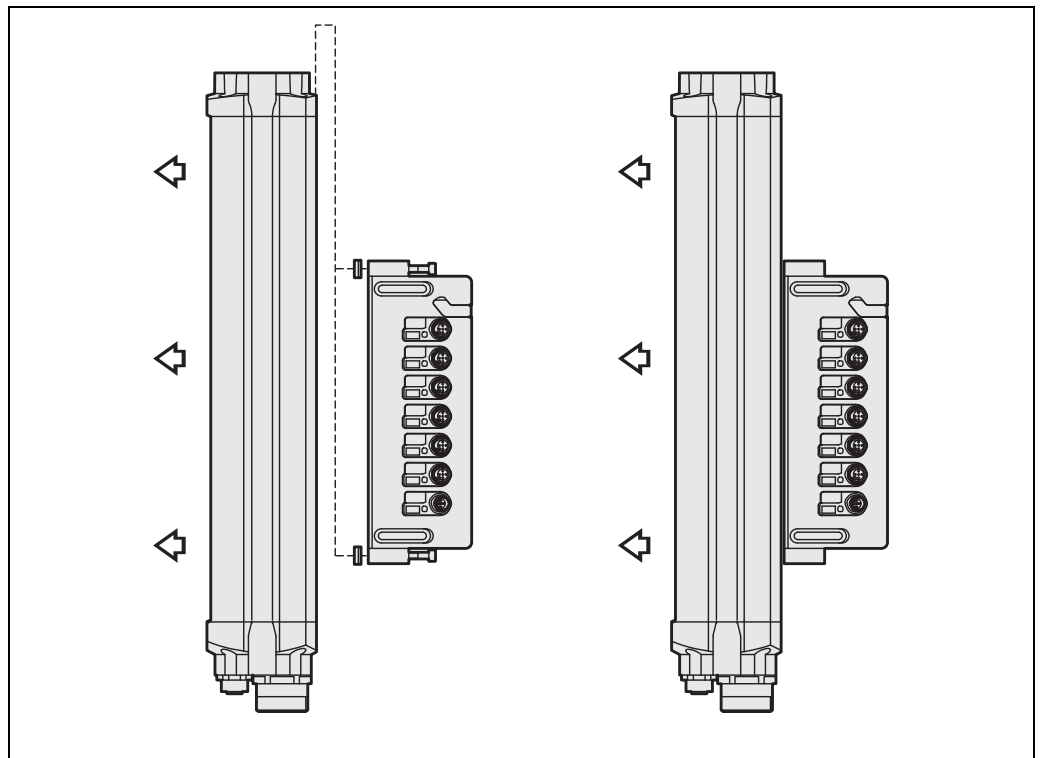
4.1 Mounting on the M4000 multiple light beam safety device

The UE403 switching amplifier can be mounted directly on the M4000 multiple light beam safety device using the mounting kit included with the delivery. A distinction is made between two types of mounting:

- mounting on the rear of the M4000
- mounting on the side of the M4000

4.1.1 Mounting on the rear of the M4000

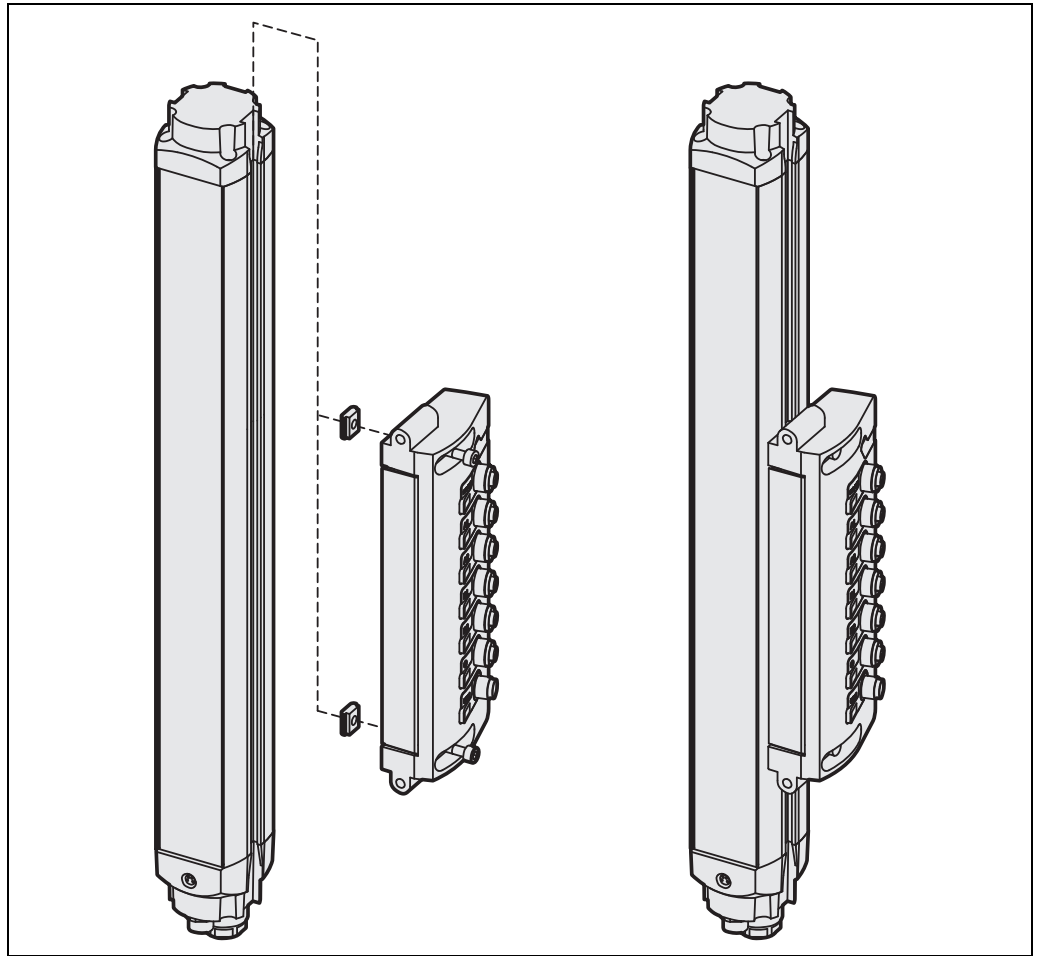
Fig. 4: Mounting on the rear of the M4000



Note The mounting screws and the sliding nuts are included with the delivery.

4.1.2 Mounting on the side of the M4000

Fig. 5: Mounting on the side of the M4000



Note The mounting screws and the sliding nuts are included with the delivery.

4.2 Mounting on the system

Alternatively, the UE403 switching amplifier can also be mounted on a suitable mechanical component on the system. During this process please observe the following notes:

- Notes**
- The maximum length of the connection cable between the UE403 switching amplifier and the M4000 multiple light beam safety device is 10 m.
 - Pay attention to the maximum cable lengths for devices connected (e.g. for muting sensors, control switches, etc.).
 - For the mounting position choose a suitable mechanical component with a flat surface.
 - For the UE403 switching amplifier choose a protected mounting position and in this way prevent damage (e.g. caused by approaching forklift trucks, contamination).
 - Use suitable mounting material.
 - Always mount the UE403 switching amplifier so that the status LEDs can be seen clearly by the operator.

5 Electrical installation



WARNING

Switch the power supply off!

The machine/system could inadvertently start up while you are connecting the devices.

- Ensure that the entire machine/system is disconnected during the electrical installation.

- Notes**
- The UE403 switching amplifier meets the interference suppression requirements (EMC) for industrial use (interference suppression class A). When used in residential areas it can cause interference.
 - The UE403 switching amplifier is connected directly to the M4000 Advanced multiple light beam safety device and supplied with power from the M4000. Pay attention to the related notes on the voltage supply in the operating instructions for the M4000 Advanced.
 - In principle, it is permitted to make all connections only when the power supply is switched off. The configuration connection however, may be connected/disconnected with the system on line.
 - Always protect unused connections by using the protective caps which are included in the delivery. The protective caps also are available as an accessory (see chapter 11.2 “Accessories” on page 36).

Lay all cables for the input and output signals as per the required category as per EN 954-1 (e.g. protected installation):

- A separate plastic-sheathed cable must be used for each M12 connection.
- It must be ensured using the equipotential bonding (pin FE) that cross-circuits between normally isolated and independent components cannot cause a hazardous failure.



WARNING

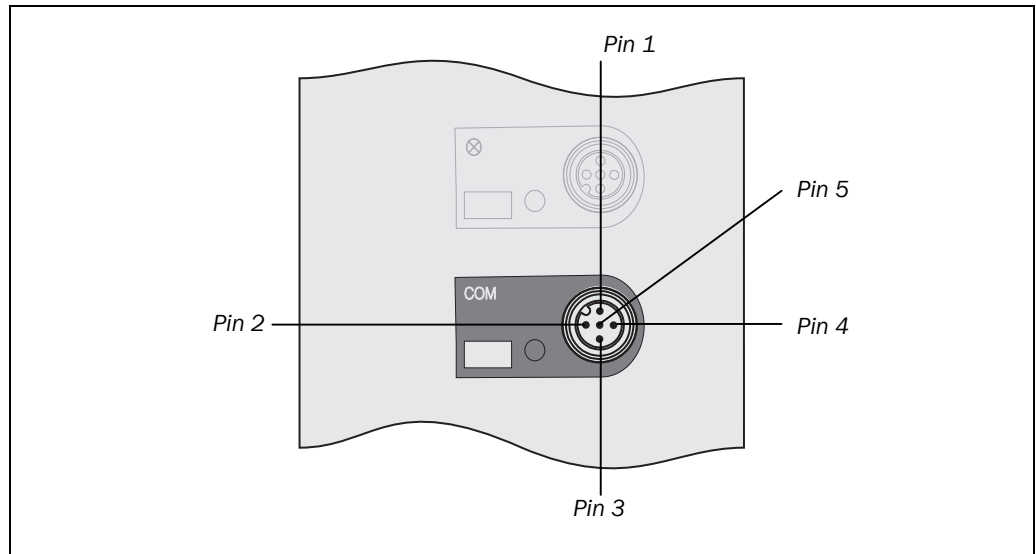
Test the connections after any work has been carried out on the UE403 switching amplifier!

Because the switching amplifier has several connections of a similar structural nature, these may result in incorrect cut-off paths, for example if connection plugs are confused.

- Mark all connecting wires and connection plugs unambiguously to avoid confusion.
- Test the connections again after any maintenance or other activities have been carried out on the UE403 switching amplifier.

5.1 System connection M12 × 5

Fig. 6: Pin assignment
system connection M12 × 5



Tab. 3: Pin assignment
system connection M12 × 5

Pin	Description
1	Input 24 V DC (voltage supply)
2	Device communication (EFL _A)
3	0 V DC (voltage supply)
4	Device communication (EFL _B)
5	Functional earth

- Notes**
- The maximum length of the connection cable between the UE403 switching amplifier and the M4000 multiple light beam safety device is 10 m.
 - Connection cables are available as SICK accessories (see “Accessories” on page 36ff).

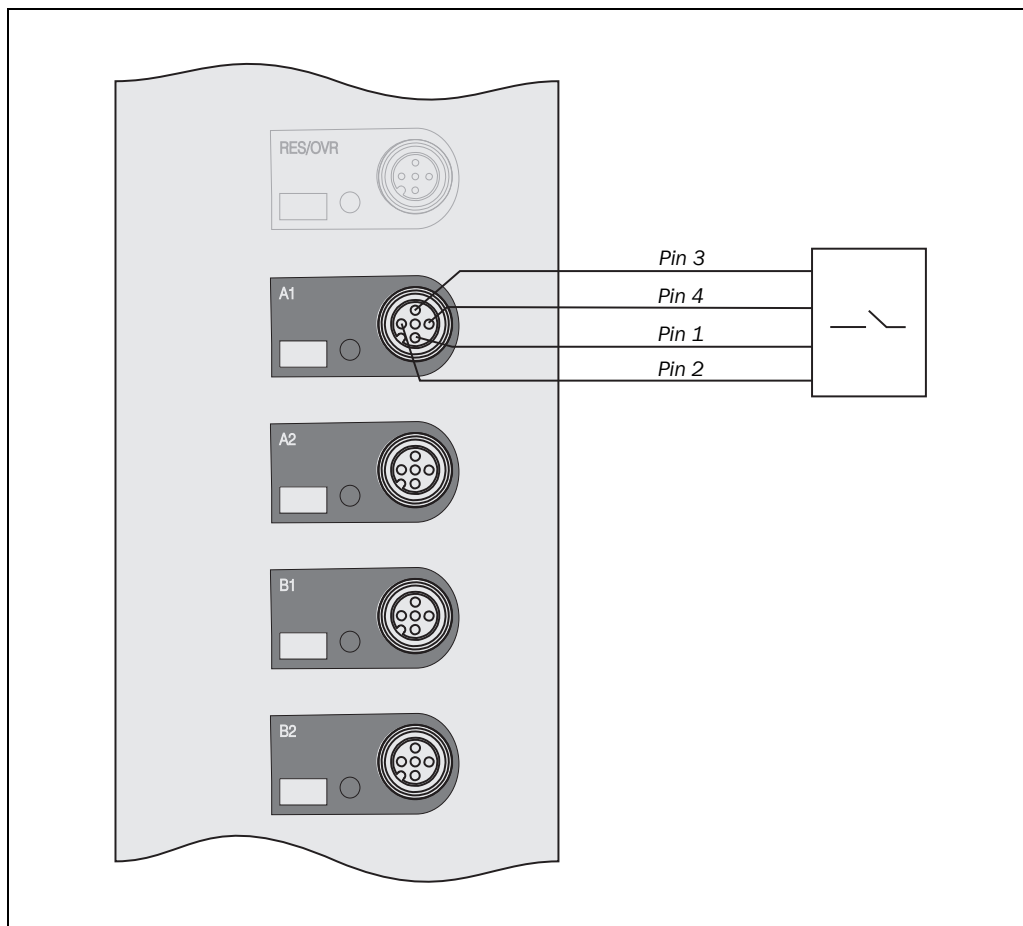
UE403

5.2 Connections for muting sensors M12 × 5

The UE403 switching amplifier has four identical connections for muting sensors.

Note The inputs of the connections for muting sensors are compatible with the Type-1, Type-2 and Type-3 digital inputs described in DIN EN 61 131-2.

Fig. 7: Pin assignment for muting sensors connection M12 × 5



Tab. 4: Pin assignment for muting sensors connection M12 × 5

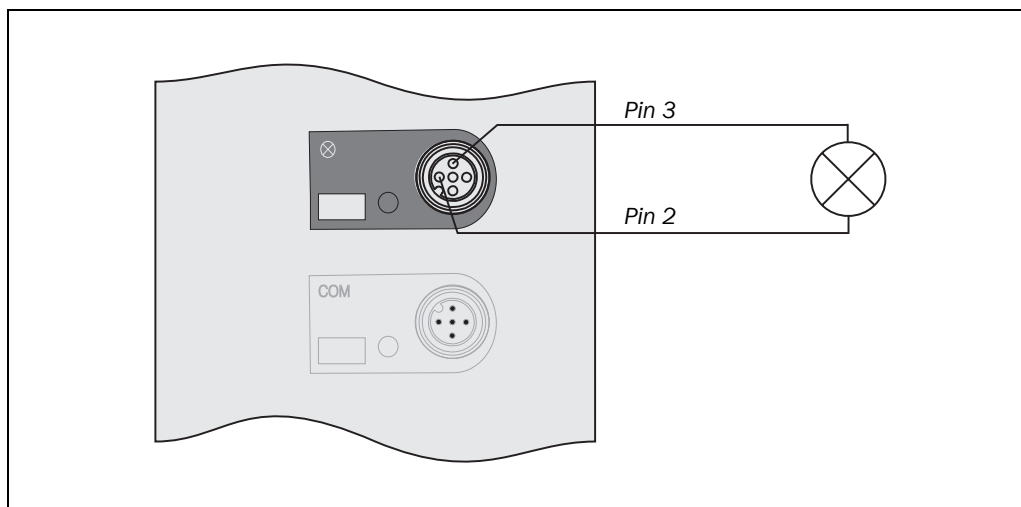
Pin	Wire colour	Description
1	Brown	24 V DC output (voltage supply)
2	White	Muting sensor test output
3	Blue	0 V DC (voltage supply)
4	Black	Muting sensor input
5	Grey	Reserved

- Notes**
- The maximum cable length is 10 m.
 - Connection cables are available as SICK accessories (see “Accessories” on page 36ff).

5.3 Connection muting lamp M12 × 5

The UE403 switching amplifier has a connection for a muting lamp.

Fig. 8: Pin assignment for muting lamp connection M12 × 5



Tab. 5: Pin assignment for muting lamp connection M12 × 5

Pin	Wire colour	Description
1	Brown	Not assigned
2	White	Muting lamp output
3	Blue	0 V DC (voltage supply)
4	Black	Not assigned
5	Grey	Not assigned

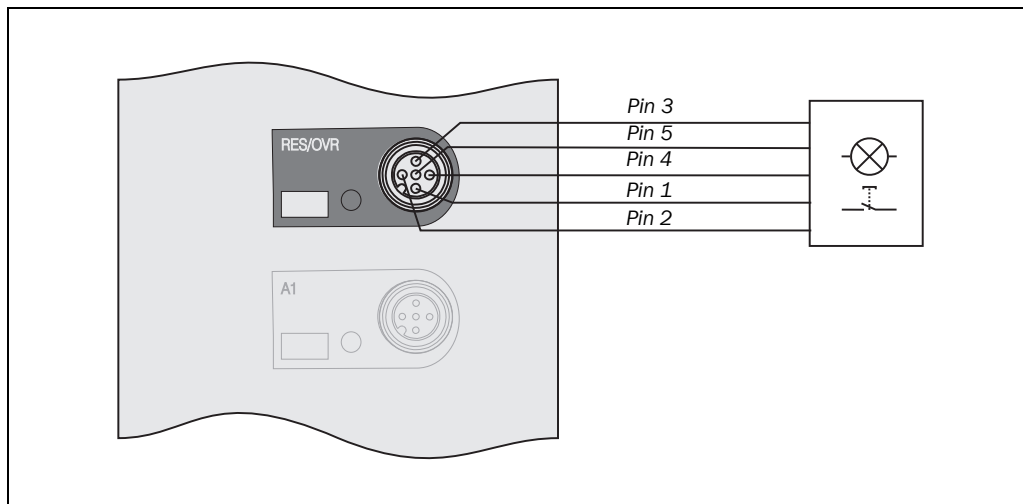
- Notes**
- The maximum cable length is 10 m.
 - Connection cables are available as SICK accessories (see “Accessories” on page 36ff).

UE403

5.4 Reset/override/additional signal C1/belt stop connection M12 × 5

The UE403 switching amplifier has a combined connection for reset/override, for the additional signal C1 or for belt stop.

Fig. 9: Pin assignment reset/override/additional signal C1/belt stop M12 × 5



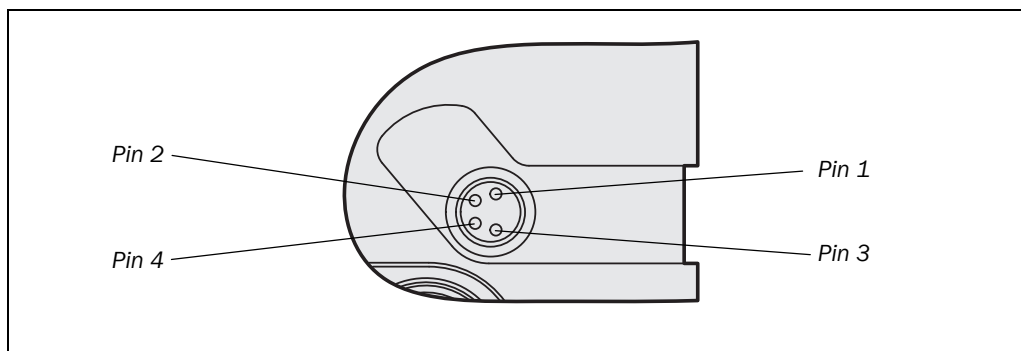
Tab. 6: Pin assignment reset/override/additional signal C1/belt stop M12 × 5

Pin	Wire colour	Description
1	Brown	24 V DC output (voltage supply)
2	White	Output <i>Reset required</i>
3	Blue	0 V DC (voltage supply)
4	Black	Input <ul style="list-style-type: none"> Reset/override (combined) or <ul style="list-style-type: none"> Input reset
5	Grey	Input <ul style="list-style-type: none"> Override or <ul style="list-style-type: none"> Input additional signal C1 or <ul style="list-style-type: none"> Belt stop input

- Notes**
- The maximum cable length is 10 m.
 - Connection cables are available as SICK accessories (see “Accessories” on page 36ff).

5.5 Configuration connection M8 × 4 (serial interface)

Fig. 10: Pin assignment
configuration connection
M8 × 4



Tab. 7: Pin assignment
configuration connection
M8 × 4

Pin	UE403	PC-side RS-232-D-Sub (9-pin)
1	Not assigned	–
2	RxD	Pin 3
3	0 V DC (voltage supply)	Pin 5
4	TxD	Pin 2

- Notes**
- After configuration always remove the connecting cable from the configuration connection!
 - After the configuration of the device has been completed, locate the attached protection cap to cover the configuration connection.

6 Connection diagrams

You can realise numerous applications on the field-signal connections. This chapter describes some typical installations.

6.1 M4000 Advanced with UE403 and UE10-30S

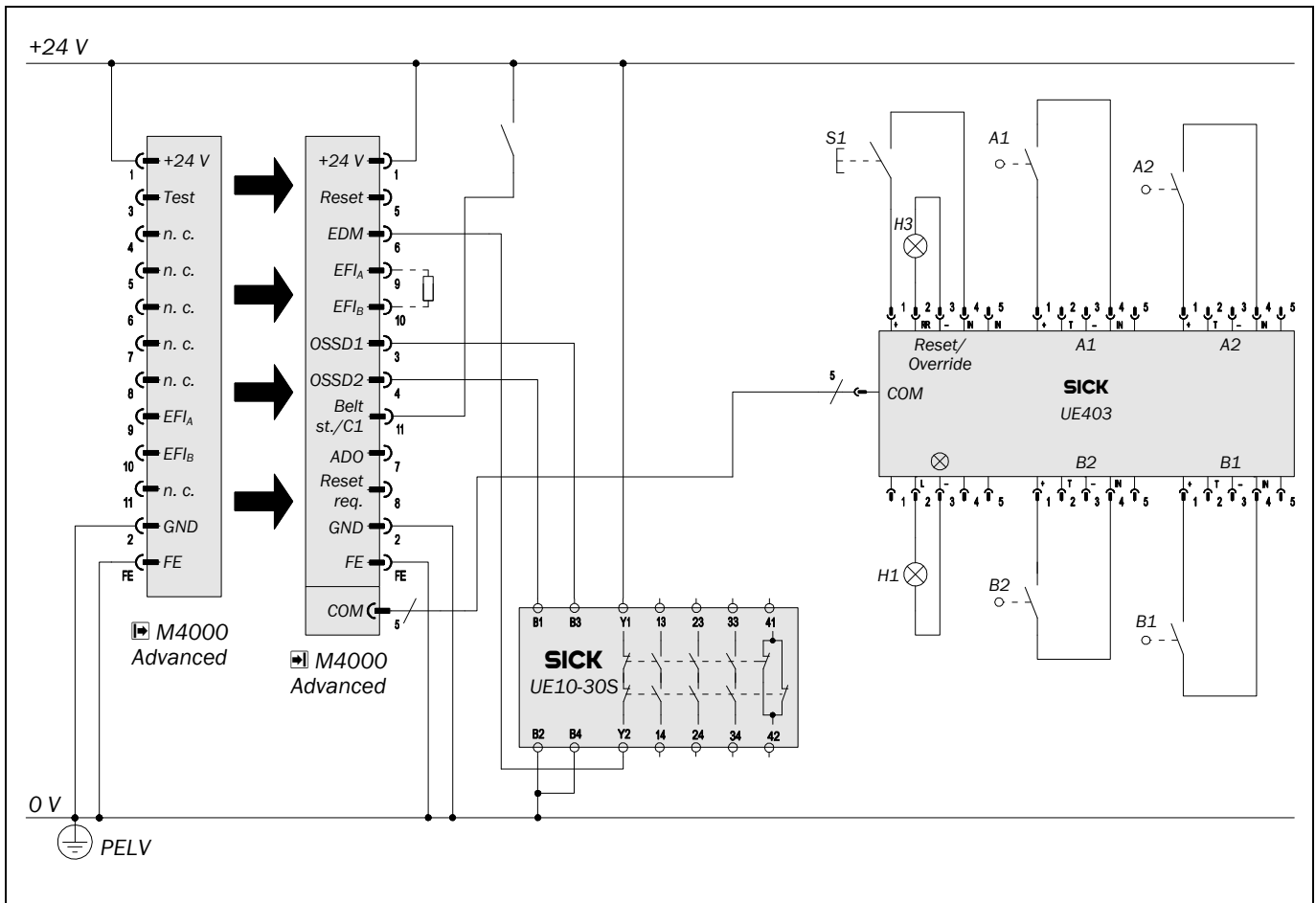


Fig. 11: Connection diagram M4000 Advanced with UE403 and UE10-30S

6.2 M4000 Advanced A/P with UE403 and UE10-30S

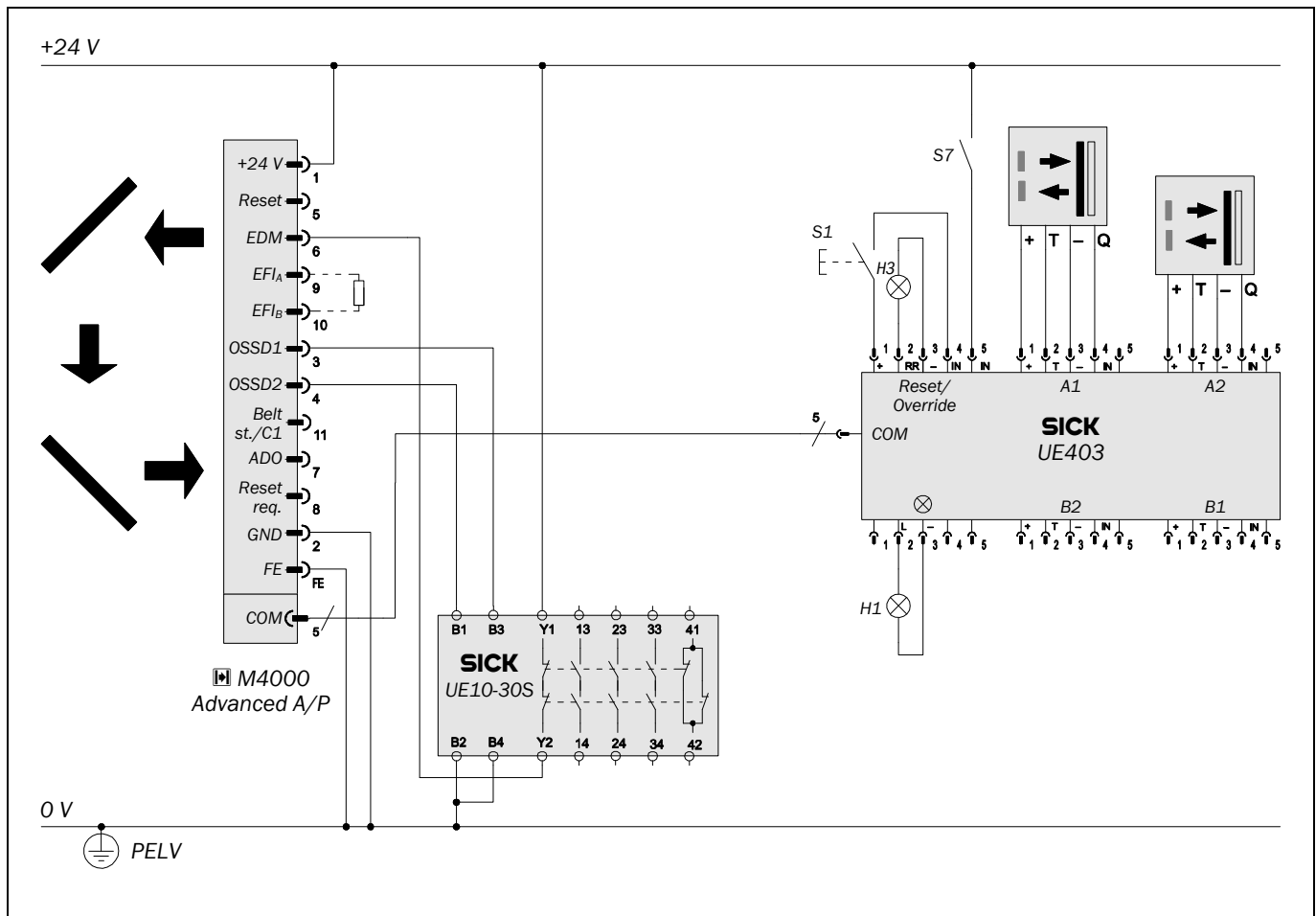


Fig. 12: Connection diagram M4000 Advanced A/P with UE403 and UE10-30S

UE403

6.3 M4000 Advanced A/P with UE403 and relay

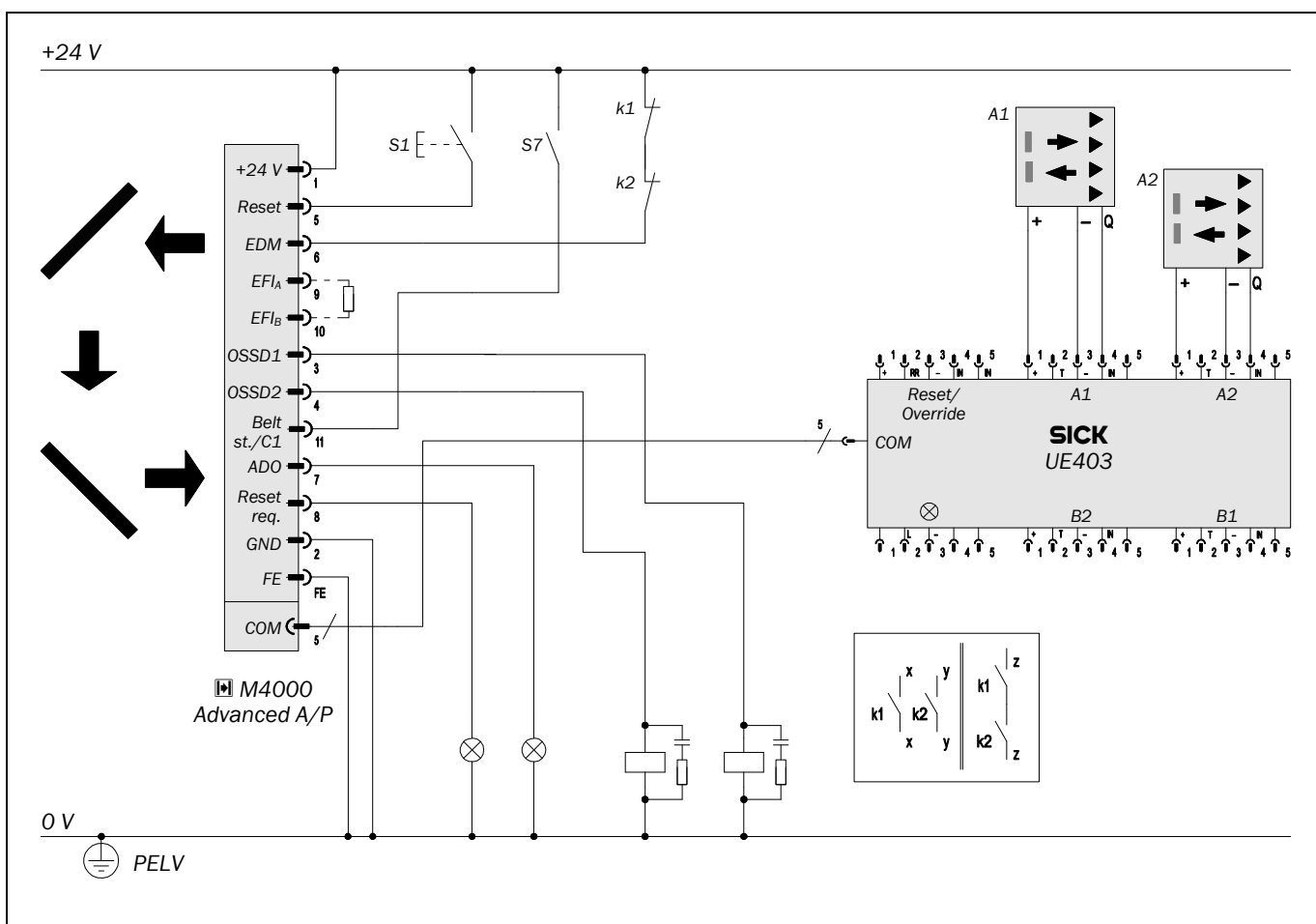


Fig. 13: Connection diagram M4000 Advanced A/P with UE403 and relay

7 Commissioning

- Deploy the protective device in accordance with the instructions contained in the chapter titled “Commissioning” of the M4000 Advanced multiple light beam safety device operating instructions.



WARNING

Commissioning requires a thorough check by qualified personnel!

Before you operate a system protected by the M4000 Advanced multiple light beam safety device in connection with the UE403 for the first time, make sure that the system is first checked and released by qualified personnel. On this issue pay attention to the notes in chapter “On safety” on page 8 and the test notes in the operating instructions for the ESPE connected.

8 Configuration

The UE403 switching amplifier and the M4000 Advanced are being configured using the CDS (Configuration & Diagnostic Software). Access to the configuration is via the M4000 Advanced multiple light beam safety device.

- Notes**
- Direct access to the configuration is also possible via the configuration connection on the UE403 switching amplifier.
 - The UE403 switching amplifier cannot be configured independently (without correctly functioning connection to the M4000 Advanced).

8.1 Preparing the configuration

How to prepare the configuration:

- Ensure the following points are met:
 - The UE403 switching amplifier has been correctly mounted.
 - The UE403 switching amplifier has been connected to the extension connection for UE403 on the M4000 Advanced.
 - The status LED for the system connection is illuminated on the UE403 switching amplifier.
- Plan all necessary settings (placement of the sensors, monitoring of the muting cycle, etc.) and document them.

To configure the UE403 switching amplifier, you need:

- CDS (Configuration & Diagnostic Software) on CD-ROM
- user manual for CDS on CD-ROM
- PC/Notebook with Windows 98/NT 4/2000 Professional/XP and a serial interface (RS-232). PC/Notebook not included
- connecting cable for connecting PC and UE403 or M4000 (SICK part number. 6021195)
- To configure the device, please read the user manual for the CDS (Configuration & Diagnostic Software) and use the online help function of the programme.

8.2 Configuration memory


The UE403 switching amplifier has a configuration memory in which it saves the configuration of the M4000 Advanced receiver or the M4000 Advanced A/P connected.

- Notes**
- The configuration data for the M4000 Advanced receiver or the M4000 Advanced A/P **and** the UE403 switching amplifier are saved both in the multiple light beam safety device and also in the switching amplifier.
 - The configuration data for the M4000 Advanced sender are only saved in the sender. After a device replacement, the M4000 Advanced sender must be re-configured using CDS.

Device replacement

On the replacement of the M4000 Advanced receiver or the M4000 Advanced A/P, the configuration is automatically restored if the receiver or the A/P device is in the delivery status (new device or reset device).

On the replacement of the UE403 switching amplifier, the configuration is automatically saved in the switching amplifier if the UE403 switching amplifier is in the status as delivered (new device or reset device).

- Notes**
- If, on a device replacement, the configuration of the M4000 Advanced receiver or the M4000 Advanced A/P **and** the UE403 switching amplifier are 100 % identical, the system automatically changes to normal operation.
 - If the replacement device is **not** in the status as delivered (new device or reset device), then the error message  (configuration incomplete, see “Error displays of the 7-segment display” in the operating instructions for the M4000 Advanced multiple light beam safety device) appears on the 7-segment display on the M4000 Advanced receiver or the M4000 Advanced A/P. The replaced device must be reset with the aid of the CDS, or both devices must be re-configured together.

How to reset the M4000 Advanced:

- Connect the voltage supply to the M4000 Advanced receiver or the M4000 Advanced A/P.
- Connect the device **without** connected switching amplifier UE403 to the CDS.
- Leave the CDS to detect the device, but do **not** receive the current configuration draft. The CDS generates the configuration for the status as delivered.
- Transfer the configuration for the status as delivered to the device.

How to reset the UE403:

- Connect a voltage supply to pin 1 and pin 3 on the UE403 switching amplifier (see Tab. 3 “Pin assignment system connection M12 × 5” on page 18).
- Connect the UE403 switching amplifier **without** connected M4000 Advanced to the CDS.
- Reset the switching amplifier UE403 using the CDS.



Device symbol **UE403**, context menu **Open device window**, parameter node **Reset**.

9 Fault diagnosis

This chapter describes how to identify and remedy errors and malfunctions during the operation of the UE403 switching amplifier.

9.1 In the event of faults or errors




WARNING

Cease operation if the cause of the malfunction has not been clearly identified!

Stop the machine if you cannot clearly identify or allocate the error and if you cannot safely remedy the malfunction.

The lock-out status

In case of certain faults or an erroneous configuration, the system can go into the lock-out status. The 7-segment display on the connected multiple light beam safety device then indicates  or a defined error message (see M4000 operating instructions, section “Error displays of the 7-segment display”).

- First check whether the lock-out status is still present after switching on and off the UE403 and, if necessary, the connected multiple light beam safety device (e.g. by disconnecting the system plug and re-connecting).

To place the device back in operation:

- Rectify the cause of the fault following the notes in the M4000 operating instructions.
- Switch the power supply of the connected M4000 off and back on again (e.g. by unplugging the system plug and reinserting it).

Note The lock-out status has the highest priority above all other indications on the 7-segment display.

9.2 SICK support

If you cannot remedy an error with the help of the information provided in this chapter, please contact your local SICK representative.

9.3 Error displays of the LEDs

This chapter explains the meaning of the error displays of the LEDs and how to respond. Please refer to chapter 3.4 "Status indicators" on page 14.

Tab. 8: Error displays of the LEDs

Display	Possible cause	Remedying the error
○ Yellow The yellow LED on the COM connection is not illuminated.	No operating voltage, or voltage too low	➤ Switch the connected M4000 off for at least 1 minute and back on again. If the error continues to occur: ➤ Check the connection to the M4000 connected. The UE403 switching amplifier receives its voltage supply from the ESPE connected.
☀ Yellow The yellow LED on the COM connection is flashing.	Connection error or	➤ Check the connection to the M4000 connected for short-circuits or cross-circuits. ➤ Check the voltage supply for overcurrent. ➤ Switch the connected M4000 off for at least 1 minute and back on again. If the error continues to occur: ➤ Replace the UE403 switching amplifier.
	Internal error of the UE403	➤ Carry out an extended diagnostics with the aid of the CDS. If an internal error is diagnosed: ➤ Replace the UE403 switching amplifier.

9.4 Extended diagnostics



The CDS software (Configuration & Diagnostic Software) supplied with the M4000 Advanced multiple light beam safety device contains extensive diagnostic facilities. It allows you to narrow down the problem if the error is non-specific or if you experience usage downtime problems. Detailed information to be found ...

- in the online help function of the CDS (Configuration & Diagnostic Software).
- in the user manual for the CDS.

How to conduct an extended diagnostics of the UE403:

- Connect the PC/Notebook in which the CDS has been installed to the UE403 switching amplifier or to the M4000 Advanced.
- Carry out a diagnostics on the M4000 Advanced receiver.



Device symbol **M4000 Advanced (receiver)** or **M4000 Advanced (A/P)**, context menu **Diagnostics, Display**.

10 Technical specifications

10.1 Data sheet

Tab. 9: Data sheet UE403

	Minimum	Typical	Maximum
General system data			
Protection class (EN 50 178:1998)	III		
Enclosure rating (IEC 60 529)	IP 65		
Supply voltage U_V at the UE403 (via connected ESPE)	19.2 V	24 V	28.8 V
Power consumption			2 A
Type acc. to IEC 61 496	Type 4		
Housing dimensions	See dimensional drawing on page 34.		
Weight		0.6 kg	
RES/OVR connection			
Inputs¹⁾: Override, reset, C1, belt stop			
Switching voltage HIGH	11 V	24 V	30 V
Input current HIGH	6 mA	10 mA	15 mA
Switching voltage LOW	-30 V	0 V	5 V
Input current LOW	-0.5 mA	0 mA	1.5 mA
Actuation time for the control switch reset or override	200 ms		
Output: Reset required			
Switching voltage HIGH	15 V	24 V	28.8 V
Output power/current HIGH (short-circuit protected)			4 W/0.2 A
Switching voltage LOW (high resistance)		0 V	1 V
Flashing frequency		1/s	
Output: 24 V DC voltage supply			
Supply voltage for reset, override or C1	15 V	24 V	28.8 V
Supply current for reset, override or C1			400 mA ²⁾

¹⁾ As per IEC 61 131-2.

²⁾ Total of all supply currents from the connections RES/OVR, A1, A2, B1 and B2 (pin 1 in each case):
max. 1000 mA.

Minimum	Typical	Maximum
---------	---------	---------

Connections A1, A2, B1, B2**Outputs: 24 V DC Voltage supply**

Supply voltage for muting sensors	15 V	24 V	28.8 V
Supply current for muting sensors			500 mA (per sensor) ³⁾

Outputs⁴⁾: Sensor test

Switching voltage HIGH	15 V	24 V	28.8 V
Output current HIGH			20 mA
Switching voltage LOW	0 V	0 V	5.0 V
Output current LOW/leakage current			100 µA
Sensor test duration			1 ms

Inputs⁴⁾: Muting sensors

Switching voltage HIGH	11 V	24 V	30 V
Input current HIGH	6 mA	10 mA	15 mA
Switching voltage LOW	-30 V	0 V	5 V
Input current LOW	-0.5 mA	0 mA	1.5 mA
Input delay (configurable)	50 ms		

Connection (muting lamp)**Output: Muting lamp**

Switching voltage HIGH	15 V	24 V	28.8 V
Output current HIGH (monitored)	20 mA		5 W/0.4 A
Output current HIGH (not monitored)	0 mA		5 W/0.4 A
Switching voltage LOW (high resistance)		0 V	1 V
Flashing frequency (status Override required)		2/s	

³⁾ Total of all supply currents from the connections RES/OVR, A1, A2, B1 and B2 (pin 1 in each case): max. 1000 mA.

⁴⁾ As per IEC 61131-2.

UE403

Minimum	Typical	Maximum
---------	---------	---------

Operating data

Cable length between ESPE and UE403			10 m
Wire cross-section	0.34 mm ²		
Cable resistance/per cable			0.5 Ω
Ambient operating temperature	0 °C		+55 °C
Air humidity (non-dewing)	15 %		95 %
Storage temperature	–25 °C		+70 °C
Vibration resistance	5 g, 10–55 Hz acc. to IEC 60 068-2-6		
Shock resistance	10 g, 16 ms acc. to IEC 60 068-2-29		

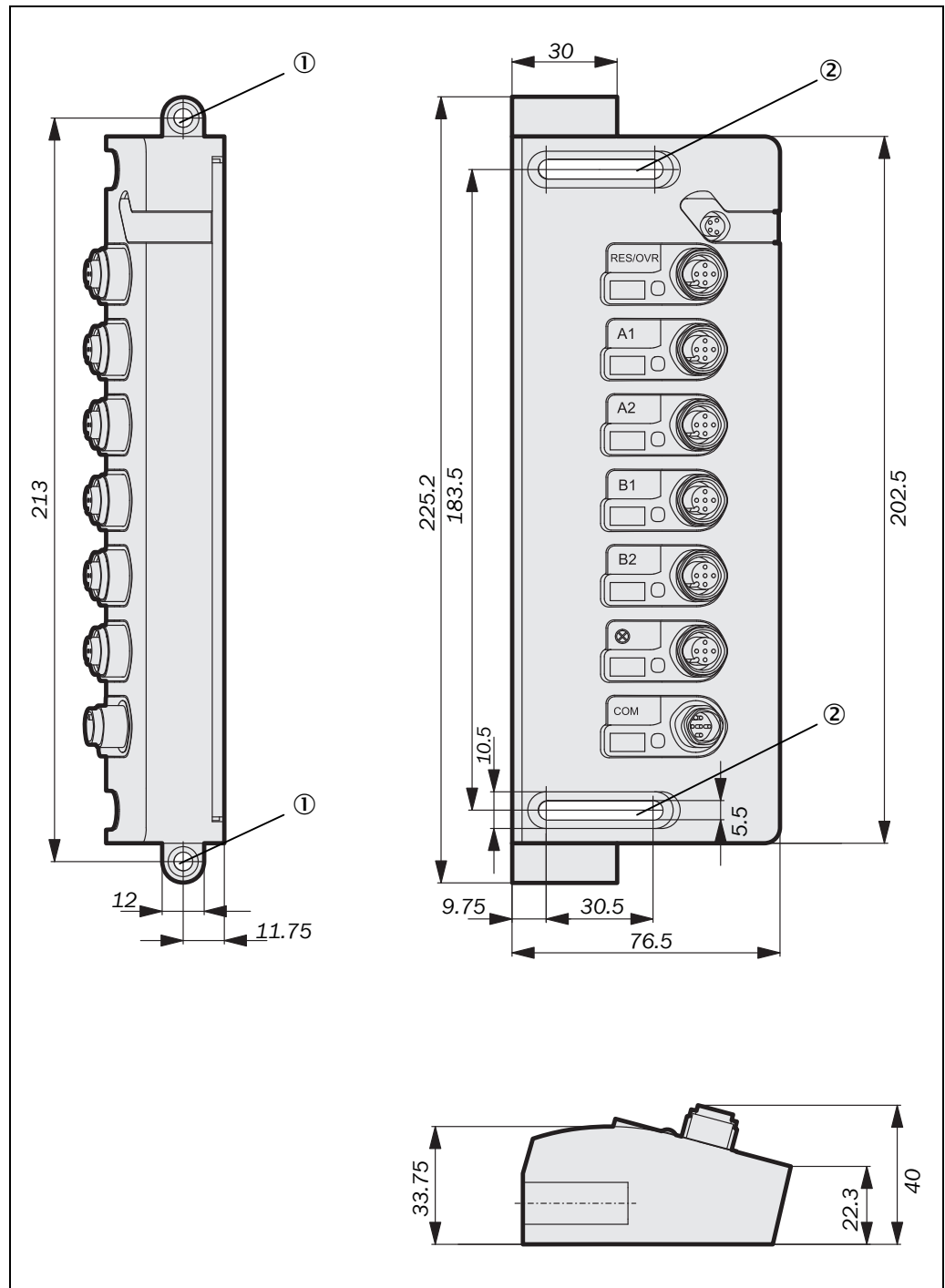
Environmental data

Housing	Aluminium die-cast (powder coated)
Connector strip	Polyamide
Packaging	Corrugated cardboard
Circuit boards	Glass-fibre reinforced epoxy resin with flame retarding agent TBBPA

10.2 Dimensional drawings

10.2.1 UE403

Fig. 14: Dimensional drawing
UE403 switching amplifier
(mm)

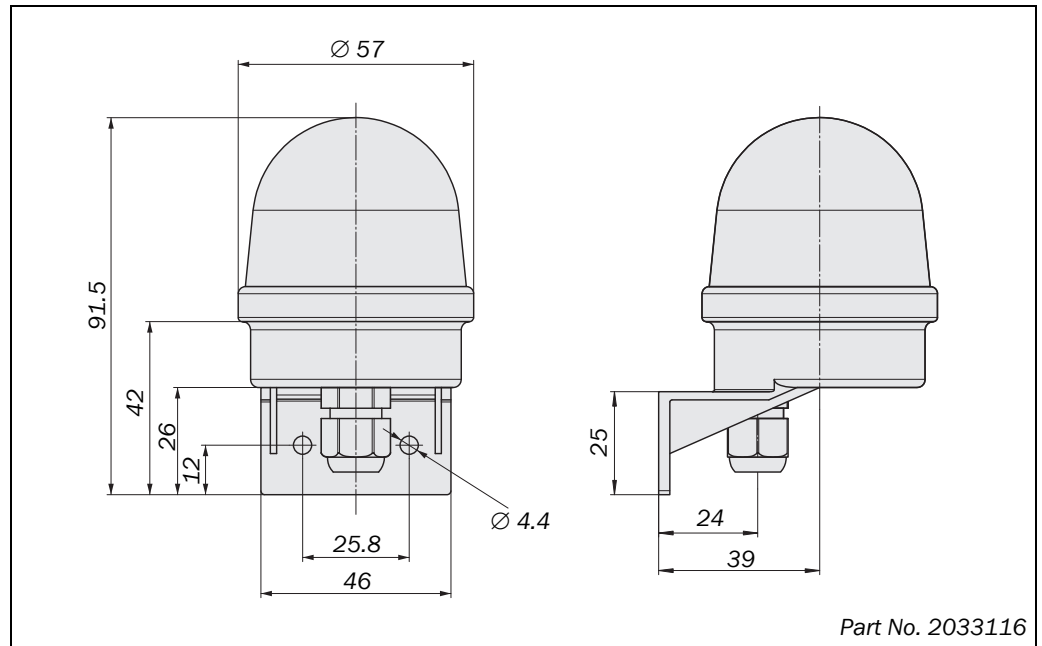


Note The fixing holes ① and slots ② are suitable for cheese head screws M5 × 30 as per DIN EN ISO 4762.

UE403

10.2.2 Muting lamp, version with incandescent lamp

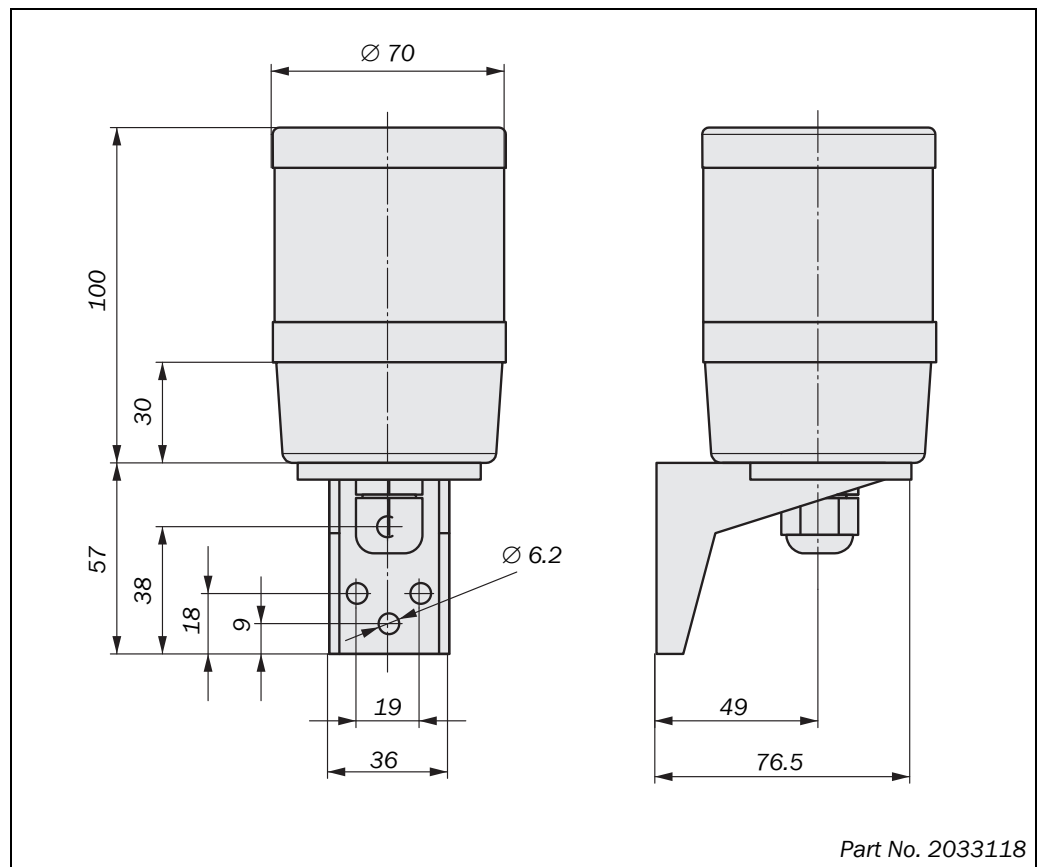
Fig. 15: Dimensional drawing muting lamp, version with incandescent lamp (mm)



Note You will find detailed information on the muting lamp delivery in chapter 11.2, "Accessories" from page 36.

10.2.3 Muting lamp, version with LED

Fig. 16: Dimensional drawing muting lamp, LED version (mm)



Note You will find detailed information on the muting lamp delivery in chapter 11.2 "Accessories" from page 36.

11 Ordering information

11.1 Part number and delivery

Tab. 10: Part number UE403 switching amplifier

Device type	Part	Part number
UE403-A0930	UE403 switching amplifier	1026287

Delivery

- UE403 switching amplifier
- 2 fixing screws with sliding nuts
- CDS (Configuration & Diagnostic Software) on CD-ROM including online documentation and operating instructions UE403

11.2 Accessories

Tab. 11: Part numbers accessories

Part	Part number
Connection cables for UE403 and M4000 Advanced	
Wire cross-section 0.34 mm ² , 5-pin M12 plug, 5-pin M12 socket, PUR halogen-free	
Plug straight/socket straight, 0.6 m	6025930
Plug straight/socket straight, 1.0 m	6029280
Plug straight/socket straight, 1.5 m	6029281
Plug straight/socket straight, 2.0 m	6025931
Plug straight/socket straight, 5.0 m	6029282
Connection cables for muting sensors	
For WL24, WT24	
Wire cross-section 0.34 mm ² , 4-pin M12 plug, 4-pin M12 socket, PUR halogen-free	
Plug straight/socket angled, 1.0 m	6025974
Plug straight/socket angled, 2.0 m	6025975
Plug straight/socket angled, 5.0 m	6025087
For WL12, WL14, WL18, WL23, WL27	
Wire cross-section 0.34 mm ² , 4-pin M12 plug, 4-pin M12 socket, PUR-halogenfree, pin 4 (plug) rotated to pin 2 (socket), pin 2 (plug) not connected	
Plug straight/socket angled, 1.0 m	6025944
Plug straight/socket angled, 2.0 m	6025945
Plug straight/socket angled, 5.0 m	6025116
For WT27, WL260, WT260	
Wire cross-section 0.34 mm ² , 3-pin M12 plug, 4-pin M12 socket, PUR halogen-free, pin 2 (plug) not connected	
Plug straight/socket angled, 1.0 m	6026106
Plug straight/socket angled, 2.0 m	6026107
Plug straight/socket angled, 5.0 m	6025118

UE403

Part	Part number
For muting sensors with connection terminals	
Wire cross-section 0.34 mm ² , 5-pin M12 plug, PUR halogen-free	
Plug straight, 2.0 m	6026133
Plug straight, 5.0 m	6026134
Plug straight, 10.0 m	6026135
Connection plugs and sockets	
M12 plug, 4-pin, straight, can be preformed	6009932
M12 socket, 4-pin, angled, can be preformed	6007303
Connection cable for PC	
For the connection of the PC with the UE403 or M4000 (2.0 m)	6021195
Connecting cables for control switches	
For reset/override control switch on UE403	
Wire cross-section 0.34 mm ² , 5-pin M12 plug, PUR halogen-free	
Plug straight, 2.0 m	6026133
Plug straight, 5.0 m	6026134
Muting lamps	
Muting lamp, version with incandescent lamp, incl. 2 m cable with M12 plug for connection to UE403, mounting bracket and mounting kit	2033116
Muting lamp, version with incandescent lamp, incl. 10 m cable with M12 plug for connection to UE403 and mounting bracket	2033117
Muting lamp, version with LED, incl. 2 m cable with M12 plug for connection to UE403, mounting bracket and mounting kit	2033118
Muting lamp, version with LED, incl. 10 m cable with M12 plug for connection to UE403 and mounting bracket	2033119
Software	
CDS (Configuration & Diagnostic Software) on CD-ROM including online documentation and operating instructions in all available languages ⁵⁾	2032314
Mountings	
2 fixing screws with sliding nuts for mounting UE403 to M4000 ⁵⁾	2033250
Mounting bracket UE403 for device column for mounting on base plate, incl. screw	2032035
Protective caps	
For M12 sockets	6011170

⁵⁾ Included in the delivery.

12 Annex

12.1 Declaration of Conformity

SICK

EC Declaration of conformity

en Ident-No. : 9097431

The undersigned, representing the following manufacturer


SICK AG
Industrial Safety Systems
Sebastian-Kneipp-Straße 1
79183 Waldkirch
Germany


herewith declares that the product

UE403

is in conformity with the provisions of the following EC directive(s) (including all applicable amendments), and that the standards and/or technical specifications referenced overleaf have been applied.

Waldkirch, 19.2.05


ppa Dr. Plasberg
(Industrial Safety Systems)


i.V. Knobloch
(Industrial Safety Systems)

8006 440,0499 BK-BK
II - 10566

Note You can obtain the complete EC declaration of conformity via the SICK homepage on the Internet at: www.sick.com

12.2 Manufacturer's checklist

SICK

Checklist for the manufacturer/installer for the installation of electro-sensitive protective equipment (ESPE)

Details about the points listed below must be present at least during initial commissioning — they are, however, dependent on the respective application, the specifications of which are to be controlled by the manufacturer/installer. This checklist should be retained and kept with the machine documentation to serve as reference during recurring tests.

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------|
| 1. Have the safety rules and regulations been observed in compliance with the directives/standards applicable to the machine? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 2. Are the applied directives and standards listed in the declaration of conformity? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 3. Does the protective device comply with the required category according to EN 954-1? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 4. Is access to the hazardous area/hazardous point only possible through the light path/the protective field of the ESPE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 5. Have appropriate measures been taken to prevent (mechanical point-of-operation guarding), or monitor unprotected presence in the hazardous area when protecting a hazardous area/hazardous point, and have these been secured against removal? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 6. Are additional mechanical protective measures fitted and secured against manipulation which prevent reaching under, over or around the ESPE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 7. Has the maximum stopping and/or stopping/run-down time of the machine been measured, specified and documented (at the machine and/or in the machine documentation)? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 8. Has the ESPE been mounted such that the required safety distance from the nearest hazardous point has been achieved? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 9. Are the ESPE devices correctly mounted and secured against manipulation after adjustment? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 10. Are the required protective measures against electric shock in effect (protection class)? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 11. Is the control switch for resetting the protective equipment (ESPE) or restarting the machine present and correctly installed? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 12. Are the outputs of the ESPE (OSSDs) integrated in compliance with the required category according to EN 954-1 and does the integration comply with the circuit diagrams? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 13. Has the protective function been checked in compliance with the test notes of this documentation? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 14. Are the given protective functions effective at every setting of the operating mode selector switch? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 15. Are the switching elements activated by the ESPE, e.g. contactors, valves, monitored? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 16. Is the ESPE effective over the entire period of the dangerous state? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 17. Once initiated, will a dangerous state be stopped when switching the ESPE on or off and when changing the operating mode, or when switching to another protective device? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 18. Has the information label "Important Information" for the daily check been attached so that it is easily visible for the operator? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

This checklist does not replace the initial commissioning, nor the regular inspection by specialist personnel.

12.3 List of tables

Tab. 1:	Overview on disposal by components.....	10
Tab. 2:	Meaning of the status LEDs of the UE403	14
Tab. 3:	Pin assignment system connection M12 × 5.....	18
Tab. 4:	Pin assignment for muting sensors connection M12 × 5	19
Tab. 5:	Pin assignment for muting lamp connection M12 × 5	20
Tab. 6:	Pin assignment reset/override/additional signal C1/belt stop M12 × 5	21
Tab. 7:	Pin assignment configuration connection M8 × 4	22
Tab. 8:	Error displays of the LEDs.....	30
Tab. 9:	Data sheet UE403.....	31
Tab. 10:	Part number UE403 switching amplifier.....	36
Tab. 11:	Part numbers accessories	36

12.4 List of illustrations

Fig. 1:	Principle of the device UE403	12
Fig. 2:	Example for a muting application	13
Fig. 3:	Status LED of the UE403	14
Fig. 4:	Mounting on the rear of the M4000	15
Fig. 5:	Mounting on the side of the M4000	16
Fig. 6:	Pin assignment system connection M12 × 5	18
Fig. 7:	Pin assignment for muting sensors connection M12 × 5	19
Fig. 8:	Pin assignment for muting lamp connection M12 × 5	20
Fig. 9:	Pin assignment reset/override/additional signal C1/belt stop M12 × 5	21
Fig. 10:	Pin assignment configuration connection M8 × 4	22
Fig. 11:	Connection diagram M4000 Advanced with UE403 and UE10-30S	23
Fig. 12:	Connection diagram M4000 Advanced A/P with UE403 and UE10-30S	24
Fig. 13:	Connection diagram M4000 Advanced A/P with UE403 and relay	25
Fig. 14:	Dimensional drawing UE403 switching amplifier (mm)	34
Fig. 15:	Dimensional drawing muting lamp, version with incandescent lamp (mm)	35
Fig. 16:	Dimensional drawing muting lamp, LED version (mm)	35

Australia

Phone +61 3 9497 4100
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Belgium/Luxembourg

Phone +32 (0)2 466 55 66
E-Mail info@sick.be

Brasil

Phone +55 11 5091-4900
E-Mail sac@sick.com.br

Ceská Republika

Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

China

Phone +852-2763 6966
E-Mail ghk@sick.com.hk

Danmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Deutschland

Phone +49 (0)2 11 53 01-260
E-Mail info@sick.de

España

Phone +34 93 480 31 00
E-Mail info@sick.es

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Great Britain

Phone +44 (0)1727 831121
E-Mail info@sick.co.uk

India

Phone +91-22-2822 7084
E-Mail info@sick-india.com

Italia

Phone +39 02 27 43 41
E-Mail info@sick.it

Japan

Phone +81 (0)3 3358 1341
E-Mail support@sick.jp

Nederlands

Phone +31 (0)30 229 25 44
E-Mail info@sick.nl

Norge

Phone +47 67 81 50 00
E-Mail austefjord@sick.no

Österreich

Phone +43 (0)22 36 62 28 8-0
E-Mail office@sick.at

Polska

Phone +48 22 837 40 50
E-Mail info@sick.pl

Republic of Korea

Phone +82-2 786 6321/4
E-Mail kang@sickkorea.net

Republika Slovenija

Phone +386 (0)1-47 69 990
E-Mail office@sick.si

Russia

Phone +7 495 775 05 34
E-Mail denis.kesaev@sick-automation.ru

Schweiz

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Singapore

Phone +65 6744 3732
E-Mail admin@sicksgp.com.sg

Suomi

Phone +358-9-25 15 800
E-Mail sick@sick.fi

Sverige

Phone +46 8 680 64 50
E-Mail info@sick.se

Taiwan

Phone +886 2 2365-6292
E-Mail sickgrc@ms6.hinet.net

Türkiye

Phone +90 216 587 74 00
E-Mail info@sick.com.tr

USA/Canada/México

Phone +1(952) 941-6780
1 800-325-7425 – tollfree
E-Mail info@sickusa.com

More representatives and agencies
in all major industrial nations at
www.sick.com