SCHREMPP electronic

OPERATING AND INSTALLATION INSTRUCTIONS

SL-1-TRIO-IOLINK-M12
SL-1-TRIO-IOLINK-LC

IO-Link

CE / c UL US LISTED / c UL US

Keep for future reference!

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signal light:	SL-1-TRIO-IOLINK M12: 11352 / GTIN 4262388142840 SL-1-TRIO IOLINK LC: 11354 / GTIN 4262388142864
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This document requires the following approvals:

Name	Title
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1 Introduction

This operating and installation manual provides you with all the information you need for the smooth operation of the signal light .

The operating and installation instructions must be read, understood, and applied by all persons who are responsible for the assembly/installation, transport, commissioning, operation, maintenance, cleaning, troubleshooting, decommissioning, disassembly, and disposal of the signal light . This applies in particular to the safety instructions listed.

After reading the operating and assembly instructions , you will be able to:

- transport the signal light safely,
- install/assemble the signal light safely,
- put the signal light into operation in a safe manner,
- operate the signal light safely,
- take the appropriate measures in the event of a malfunction,
- Maintain the signal light in accordance with the regulations.
- Clean the signal light in accordance with regulations.
- decommission the signal light in a safe manner,
- Dismantle the signal light in accordance with safety regulations.
- Dispose of the signal light in accordance with regulations.

In addition to the , generally applicable, statutory, and other binding regulations on accident prevention and environmental protection in the country of use must be observed.

1.1 Display media

As a note and as a direct warning of hazards, text statements in these operating and installation instructions that require special attention are marked as follows:

1.1.1 Section-related warnings

Section-related warnings apply not only to a specific action, but to all actions within a section.

Structure

⚠ SIGNAL WORD

Symbol for further explanation of the hazard

Type and source of the hazard!

Possible consequence(s) of non-compliance!

► Measures to avoid the hazard.

Hazard levels

⚠ DANGER

High-risk hazard which, if not avoided, will result in death or serious injury.

⚠ WARNING

Medium-risk hazard which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Low-risk hazard which, if not avoided, may result in minor or moderate bodily injury.

NOTE

Low-risk hazard which, if not avoided, may result in property damage.

1.1.2 Embedded warnings

Embedded warnings apply to specific actions and are integrated directly into the action.

Structure

⚠ **SIGNAL WORD** Type and source of the hazard

Possible consequences of non-compliance

► Measures to avoid the hazard

Hazard levels

– ⚠ **DANGER/WARNING/CAUTION**

– ***NOTE*** (without warning triangle)

1.1.3 Other means of representation

The info symbol provides useful information.

– Texts following this symbol are lists.

► Text following this symbol describes measures in warning notices and steps to be taken.

a) Text following this symbol describes activities that must be performed in the specified order.

" " Text in quotation marks refers to other chapters or sections.

1.1.4 Symbols used

In warning notices, special hazards are additionally marked as follows:

Symbol	Description
	Warning sign
	Warning of hand injuries This symbol warns of hand injuries.
	Warning of obstacles on the floor This symbol warns of tripping hazards caused by obstacles on the floor.
	Warning of suspended loads This symbol warns of hazards when standing under suspended loads.
	Warning of electrical voltage This symbol warns of hazards posed by electrical voltage.

Symbol	Description
	Warning of electrostatic-sensitive components This symbol warns of components that can be damaged by electrostatic discharge (ESD).
	Warning of hot surfaces This symbol warns of the risk of burns from hot surfaces.
Mandatory sign	
	Observe the operating and installation instructions This symbol indicates that the operating and installation instructions must be observed.
	Use hearing protection This symbol indicates that hearing protection must be worn in the area of use.
	Wear safety shoes This symbol indicates that safety shoes must be worn in the area of application.
	Use hand protection This symbol indicates that hand protection must be worn in the area of application.
	Wear protective work clothing This symbol indicates that protective work clothing must be worn in the area of application.
	Use head protection This symbol indicates that head protection must be worn in the area of application.
Hazardous substance symbols	
	Warning of environmentally hazardous substances This symbol warns of environmentally hazardous substances.
	Danger - Caution/Systemic health hazard This symbol warns of systemic health hazards if inhaled or swallowed.
	Danger - Caution toxic (harmful to health)/Corrosive or irritant effect/Lower systemic health hazard This symbol warns of substances that are harmful to health.

Symbol	Description
	Other symbols
	Disposal instructions This symbol indicates that the labeled product must not be disposed of with household waste.
	Recycling This symbol indicates that various materials can be returned to the recycling cycle.
	Qualified electrician required This symbol indicates tasks that may only be performed by a qualified electrician.
	Mechanical engineer required This symbol indicates activities that may only be performed by a qualified mechanic.
	CE marking CE marking: Product complies with essential EU requirements.
	UL approval (versions without M12 connectors) Product complies with essential UL requirements
	UL approval (versions with M12 connector) Product complies with essential UL requirements as a component used in a finished product.
	Electrical safety class which ensures protection through ** safety extra-low voltage** (SELV), whereby the supply voltage is a maximum of 50 V AC or 120 V DC.

1.2 Warranty and liability

The obligations agreed in the delivery contract, the general terms and conditions, the delivery conditions of signal light , and the legal regulations valid at the time of conclusion of the contract apply.

All information and instructions in these operating and installation instructions have been compiled taking into the applicable standards and regulations, the state of the art, and our many years of knowledge and experience.

This operating and installation manual is not intended to replace the suitability or reliability of the signal light for specific user applications and must not be used to determine its suitability or reliability.

The signal light may only be used for the applications described by the manufacturer. All other applications are improper and considered dangerous. The manufacturer cannot be held liable for damage caused by errors, unintentional or improper use of the signal light .

Warranty and liability claims for personal injury and property damage are excluded if they are attributable to one or more of the following causes:

- Improper or inappropriate use of the signal light ,
- improper transport, assembly/installation, commissioning, operation, troubleshooting, maintenance/cleaning, decommissioning, disassembly, and disposal of the ,
- Operation of the signal lamp with any defects
- Failure to observe the operating and installation instructions and the information in the operating and installation instructions regarding installation, commissioning, operation, maintenance, and cleaning of the signal lamp ,
- Use of unqualified or untrained personnel,
- structural modifications to the signal light (Modifications or other changes to the signal light may not be made without the prior written consent of Schrempp electronic GmbH . In the event of non-compliance, the signal light loses its suitability.),
- improperly performed repairs,
- use of unauthorized spare parts or spare parts that do not meet the specified technical requirements,
- disasters, foreign object impact, and force majeure.

In addition, Schrempp electronic GmbH reserves the right to revise this publication at any time due to technical changes in the context of improving the usage properties and further development, without being obliged to inform other persons of the revision.

1.3 Copyright protection

This operating and installation manual , including all illustrations, is protected by copyright and is intended exclusively for internal use.

Any transfer to third parties, duplication, translation, reproduction, electronic or photographic archiving, modification, or other use or communication of the content is prohibited without the prior written consent of Schrempp electronic GmbH . Violations will result in liability for damages; further claims remain reserved.

IO-Link is a registered trademark of the IO-Link Community.

We reserve the right to make any changes that serve technical progress.

1.4 Warranty provisions

The warranty provisions are contained in the General Terms and Conditions of Schrempp electronic GmbH .

1.5 Service/Customer

Our customer service team is available to provide technical information:

Phone: +49 6196 802399-0

In addition, our employees are always interested in new information and experiences resulting from the use of our products that may be valuable for improving them.

2 Safety

⚠ WARNING

Failure to observe the following safety instructions can have serious consequences:

Endangerment of persons due to electrical, mechanical, or chemical influences, failure of important functions, and damage to the environment!

- ► Read the safety and hazard warnings listed in this section thoroughly before putting the signal light into operation.
- ► In addition to the instructions in this operating and installation manual , please also observe the generally applicable safety and accident prevention regulations.
- ► In addition to the information in this operating and installation manual , observe the applicable national work, operating, and safety regulations. Also comply with any applicable internal factory regulations.

2.1 Intended use

The operational safety of the signal light is only guaranteed if it is used as intended.

The signal lamp is used exclusively for the visual signalling of machine or system statuses. in industrial, commercial, and building areas. Installation may only be carried out by trained control and automation technology specialists who are familiar with the applicable national, regional, and local safety and accident prevention regulations.

The signal lamp may only be used within the scope of its technical data. Intended use also includes compliance with the specifications in the technical data, compliance with the operating and installation instructions , compliance with the maintenance and servicing regulations, and compliance with the applicable national safety, occupational safety, and accident prevention regulations. Any use beyond this is considered improper.

The specified maximum technical data must not be exceeded. The devices are suitable for indoor and outdoor use within the scope of the specified protection class and are only intended for stationary installation. For installation in aircraft or spacecraft and for any use

other than that specified here, the signal lamp n is not intended and is considered improper use. In particular, it is prohibited to

- to use defective or unsuitable accessories,
- operate the signal lamp in potentially explosive atmospheres,
- operate the signal light if it is not ready for operation or has been modified,
- Place objects on the signal light . Remove all objects from the signal light .
- operate the signal light if the housing is damaged,
- Water entering the equipment of the signal light increases the risk of electric shock and failure of the signal device.
- Open the signal light for maintenance work.
- Operate the signal lamp if the safety and warning notices have been removed or are illegible.
- Operate the signal light if it has been installed incorrectly. Incorrect installation of the mechanical or electrical connection can result in personal injury and property damage.
- operate the signal light if cables are damaged. Damage to cables can result in personal injury and property damage.
- Operating the signal light if the vibration and temperature ranges are not observed. Failure to observe the vibration and temperature ranges can result in personal injury and property damage.
- Failure to store and transport the signal light in accordance with the manufacturer's specifications. Incorrect storage and transport can lead to personal injury and property damage.

Proper use also includes:

- Compliance with all instructions in the operating and installation manual ,
- Compliance with the inspection intervals in accordance with the applicable machine directives, if available
- Compliance with national, regional, and local safety and accident prevention regulations
- Compliance with the operating conditions,

The technical specifications stated in the technical data must be observed without exception.

► Use the signal light only for its intended purpose; otherwise, safe operation cannot be guaranteed.

► Observe the information on the type plate.

The manufacturer is not liable for any personal injury or property damage resulting from improper use; the operator of the signal lamp is responsible!

2.1.1 Note on installing the signal lamp

Installation may only be carried out by trained control and automation technology specialists who are familiar with the applicable national, regional, and local safety and accident prevention regulations.

The signal light is intended for installation in machines, systems, or devices; the control system is therefore specified by the machine, system, or device or is installed in it.

The signal light may only be put into operation once it has been established that the machine, system, or device in which the signal light is to be installed complies with all safety requirements of the Machinery Directive 2006/42/EC and other applicable directives and standards.

It is the responsibility of the manufacturer or distributor to carry out an appropriate and complete risk assessment, evaluation, and testing of the with regarding to the specific application or use.

In emergencies, it is recommended to observe and apply the procedures described in the operating and maintenance instructions for the machine, system, or device on which the signal light is installed.

► During maintenance work, secure the signal light against unexpected restarting on the machine, system, or device in which the signal light is installed.

2.1.2 Structural modifications to the signal light

The design and manufacturer's approval are based on the General Product Safety Regulation. No modifications, additions, or conversions may be made to the signal lamp without the prior written consent of Schrempp electronic GmbH .

Failure to comply will render the signal light unsuitable for use. The manufacturer of the signal light is hereby released from any warranty.

Replace signalling devices that are not in perfect condition immediately.

Only use original spare parts/wear parts/accessories. These parts are specially designed for the signal lamp . There is no guarantee that parts sourced from third parties are designed and manufactured to meet stress and safety requirements.

Parts and special equipment not supplied by Schrempp electronic GmbH are not approved for use with the signal lamp .

2.1.3 Foreseeable misuse

Any use of the signal light that exceeds its intended use and/or is otherwise different may result in serious injury.

- ► Only use the signal light for its intended purpose.
- ► Only use the signal light if it has been properly inspected.
- ► Do not use the signal lamp outside the environmental conditions (temperature, humidity, protection class) specified in Chapter 3.2 "Technical Data" (temperature, humidity, protection class).
- ► Do not operate the signal lamp without proper, secure fastening or with loose fastening elements.
- ► Do not connect the signal light to a power supply that does not meet the specifications. When using in North America, only use a 24V / Class 2 power supply).
- ► Do not operate the signal light in potentially explosive areas unless it has the appropriate ATEX approval.
- ► Do not look directly into the illuminated LED surface from a short distance.
- ► Do not operate the integrated buzzer at a volume setting that could cause hearing damage.
- ► Do not use the signal light as lighting — it is intended solely for visual signalling .
- ► Do not change or manipulate the factory settings if this would alter the defined signal meaning.
- ► Do not carry out any unauthorized repairs, modifications, or alterations to the signal light .

2.2 Requirements for personnel

The signal light may only be transported, assembled, installed, commissioned, maintained, cleaned, repaired, decommissioned, tested, dismantled, or disposed of by persons who are qualified and/or instructed to do so. If the personnel in question do not already have the necessary knowledge and skills, appropriate training and instruction must be provided. All local regulations must be followed.

These persons must be familiar with the operating and assembly instructions and act in accordance with them. The respective responsibilities of the personnel must be clearly defined.

Persons with limited physical, sensory, or mental abilities, or who lack experience and knowledge, must be supervised or instructed in the safe use of the signal light and understand the associated hazards.

The operating and installation instructions specify the following qualifications for different areas of activity:

2.2.1 Trainee personnel

Trainee personnel such as apprentices or temporary workers are not aware of all the hazards that may arise when operating the signal light . They may only carry out work on the signal light under the supervision of qualified or trained personnel.

2.2.2 Trained personnel

Trained personnel have been instructed by the operator or by qualified personnel on the tasks assigned to them and the possible dangers of improper behavior.

2.2.3 Qualified personnel

Qualified personnel are able to carry out the work assigned to them and to independently recognize and avoid potential hazards due to their professional training, knowledge, and experience, as well as their knowledge of the relevant regulations.

2.2.4 Qualified electrician

A qualified electrician is able to carry out work on electrical equipment and independently recognize and avoid potential hazards due to their professional training, knowledge, and experience, as well as their knowledge of the relevant standards and regulations.

The qualified electrician is trained for the specific location in which they work and is familiar with the relevant standards and regulations.

2.2.5 Responsibilities

Improper handling can result in significant personal injury and property damage.

- Only persons who can be expected to perform their work reliably are permitted to work on the equipment. No persons whose responsiveness is impaired by drugs, alcohol, medication, or similar substances may install or connect the signal light .
- All persons who carry out work on the signal light must read the operating and installation instructions and confirm with their signature that they have understood them.
- Trainee personnel may initially only carry out work on the signal light under the supervision of qualified personnel. Completion and successful training must be confirmed in writing.

► Observe the personnel requirements for the various life phases/operating modes.

Personnel requirement	Life phase/operating mode
Qualified specialist personnel, qualified electrician	Transport, assembly, commissioning, malfunction, maintenance, decommissioning, dismantling, disposal

The operator is responsible for training the personnel.

2.2.6 Obligations of personnel

All persons assigned to the assembly and commissioning of the signal lamp undertake to do the following before starting work:

- To observe the basic regulations on occupational safety and accident prevention,
- to read the safety instructions and warnings in these operating and installation instructions and to confirm by signature that they have understood them.

2.2.7 Unauthorized persons

Unauthorized persons who do not meet the qualification requirements for personnel are not familiar with the hazards in the area of application.

- ► Keep unauthorized persons away from the area of operation.
- ► If in doubt, speak to individuals and instruct them to leave the operating area.
- ► Interrupt work as long as unauthorized persons are in the operating area.

2.3 Basic safety instructions

- ► The signal light may only be put into operation after reading these operating and installation instructions .
- ► Use the signal light only for its intended purpose.
- ► When operating the signal light , refrain from any work that could compromise the safety of persons or the signal light .
- ► Always keep the area of use of the clean and tidy.
- ► Only operate the signal light within the limits of its technical performance data.
- ► Keep all safety and hazard warnings on the signal light in a legible condition and replace them if necessary.
- ► Work on the signal light may only be carried out by qualified or trained personnel.
- ► In the event of malfunctions, immediately take the signal light out of operation.
- ► It must be ensured that all persons performing work on the signal light can consult the operating and installation instructions at any time.

2.4 Safety measures for environmental protection

- ► Comply with the regulations on waste prevention and proper waste recycling or disposal during all work.

2.5 Special hazard warnings/residual hazards

2.5.1 Symbols used on the signal light

Symbol	Description	Location
	Warning sign	
	Warning of electrical voltage This symbol warns of hazards due to electrical voltage.	Type plate
	Warning of components at risk from electrostatic discharge This symbol warns of components that can be damaged by electrostatic discharge (ESD).	Type plate
	Warning of hot surfaces This symbol warns of the risk of burns from hot surfaces.	Type plate
	Mandatory sign	
	Observe the operating and installation instructions This symbol indicates that the operating and installation instructions must be observed.	Type plate
	Other symbols	
	Disposal information This symbol indicates that the marked product must not be disposed of with household waste.	Type plate
	CE marking CE marking: Product complies with essential EU requirements.	Type plate
	UL approval (versions without M12 connectors) Product complies with essential UL requirements	Type plate
	UL approval (versions with M12 connectors) Product meets essential UL requirements as a component used in a finished product.	Type plate

► Keep all safety and hazard warnings on the signal light in a legible condition. Renew the warnings if necessary.

2.5.2 Hazards due to electrical energy

DANGER

Touching live parts may result in electric shock!

Failure to observe this warning may result in death or serious injury!

- ► Always keep electrical components closed.
- ► Only allow work on electrical equipment to be carried out by a qualified electrician who is specially trained to work on electrical equipment and can recognize and avoid hazards.
- ► Switch off the power supply to all poles before starting work and check that there is no voltage.
- ► Apply the five safety rules:
  1. Disconnect.
  2. Secure against reconnection.
  3. Verify that there is no voltage.
  4. Ground and short-circuit.
  5. Cover or fence off live parts.

DANGER

In the event of an electric shock, there is a risk of secondary accidents due to shock (e.g., falling)!

Failure to comply may result in death or serious injury!

- ► Apply the five safety rules when working on electrical equipment.
- ► Only allow work on electrical equipment to be carried out by a qualified electrician.

- ► Before working on electrical equipment, disconnect the signal lamp from the power supply and secure it against being switched back on.
- ► Only allow work on electrical equipment to be carried out by a qualified electrician, e.g., a company electrician.
- ► Check the electrical equipment regularly for defects such as loose connections or burnt cables. If you detect any defects repaire it immediately.
- ► Have the electrical equipment and stationary electrical equipment checked by a qualified electrician at least every 4 years.
  Fixed electrical equipment is equipment that is permanently installed or equipment that does not have a carrying device and is so heavy that it cannot be easily moved. This also includes electrical equipment that is temporarily fixed in place and operated via movable connection cables.
- ► Have portable electrical equipment, connection cables with plugs, and extension and connection cables with their plugs and sockets checked by a qualified electrician at least every 6 months, if they are used. Equipment is considered portable if it can be moved while live according to its type and normal use.

- ► Any changes made to electrical equipment after inspection must comply with the currently valid standards and guidelines.
- ► Always keep all enclosures containing electrical equipment closed.
- ► Replace damaged signal devices immediately.

2.5.3 Warning about unsuitable power supply

⚠ WARNING

Danger from non-compliant power supplies!

Failure to comply may result in overload or fire hazard!

Only use 24V DC / Class 2 power supplies for use in North America.

There is a risk of short circuit or overload!

Failure to comply may result in damage to the device or fire!

- ► Only use voltage ranges and power ratings in accordance with the device specifications.

2.5.4 Warning of insufficient protection class

⚠ WARNING

There is a risk due to inadequate protection against dust or moisture!

Failure to observe this warning may result in failure!

- ► Observe the operating limits and the specified protection class.

2.5.5 Danger due to inadequate insulation requirements

⚠ DANGER

There is a risk due to insufficient insulation and contact hazard!

Failure to observe this may result in electric shock!

- ► Follow the description of the pin assignment and the relevant VDE guidelines.

2.5.6 Danger due to use in EX zones

DANGER

There is a risk when used in Ex zones without approval!

Failure to comply may result in a risk of explosion!

► Do not use the signal light in potentially explosive areas.

2.5.7 Warning against false assumptions of safety

WARNING

There is a danger of false security!

Failure to observe this warning may result in danger!

► Do not use the signal light as a safety-related shut-off component.

2.5.8 Warning about falling parts during installation

WARNING

Improper fastening poses a hazard!

Failure to observe this warning may result in head, hand, or foot injuries!

► Only fasten the signal light with suitable means and tighten the screws to the specified torque.

► Always wear the personal protective equipment required for the respective work (protective clothing, protective gloves, protective helmet, and safety shoes) while working.

► Use fasteners in accordance with the manufacturer's instructions.

2.5.9 Caution in case of thermal hazard

⚠ CAUTION

There is a risk of burns from surfaces heated to over 50 °C!

Failure to observe this warning may result in burns!

- ► Observe the permissible ambient temperature and ensure adequate ventilation.
- ► Always wear protective clothing and gloves when working near hot components. Components that can become hot are marked with the graphic symbol "Warning of hot surface."
- ► Allow the devices to cool down to ambient temperature before performing maintenance or repair work.

2.5.10 Caution with optical radiation

⚠ CAUTION

There is a risk of glare from LEDs!

Failure to observe this warning may result in visual impairment!

- ► Do not stare at the LED surface due to possible glare.

2.5.11 Caution with noise pollution

⚠ CAUTION

The high volume of the buzzer poses a hazard!

Failure to observe this warning may result in hearing damage!

- ► Set the buzzer frequency so that there is no risk of hearing damage or distraction and use hearing protection if necessary.

2.5.12 Dangers from tripping

⚠ CAUTION

Risk of tripping due to improperly laid power supply cables!

Failure to comply may result in injury!

- ► Always lay cables in the supply shaft in such a way that they do not cause tripping hazards or barriers.
- ► Mark unavoidable tripping hazards with color.

2.5.13 Dangers due to the use of incorrect spare parts

⚠ WARNING

Danger due to the use of incorrect spare parts!

Incorrect or faulty spare parts can lead to damage, malfunctions, or total failure, and can compromise safety!

- ► Only use original spare parts.
- ► Obtain spare parts from Schrempp electronic GmbH or an authorized sales partner.

2.5.14 Dangers associated with insufficient qualifications

⚠ WARNING

Risk of injury if you are not sufficiently qualified!

Improper handling of the signal light can result in serious personal injury and property damage!

- ► Only allow qualified personnel to carry out any work.

2.5.15 Dangers posed by cleaning fluids

⚠ WARNING

The signal light poses hazards due to cleaning fluids !

Failure to observe this warning may result in serious injury!

- ► When handling the product, observe the safety regulations applicable to cleaning fluids .
- ► Always wear the protective equipment required for the respective task (respiratory protection, protective clothing, safety goggles, and protective gloves) while working.

2.5.16 Note on incorrect signalling

NOTE

There is a risk of incorrect parameterization!

Failure to observe this may result in incorrect operation or system downtime!

- ► Configure the signal light only in accordance with the specified color and signal codes and document these in a binding manner.
- ► Use the basic and safety rules for the human-machine interface in accordance with DIN EN 60073.

2.5.17 Note on environmental influences

NOTE

There is a risk from dust or moisture!

Failure to observe this may result in malfunctions!

- ► Operate the signal lamp only within the specified limits and follow the cleaning instructions.

2.5.18 Note on ESD hazard

NOTE

There is a risk of component damage due to electrostatic discharge!

Failure to observe this warning may result in loss of function!

- ► Observe the ESD regulations.

2.5.19 Note on EMC hazard

NOTE

There is a risk from high-energy sources of interference!

Failure to comply may result in malfunctions!

- ► Maintain the EMC environment in accordance with the underlying standard and separate signal and supply lines from sources of interference.

2.5.20 Note on mechanical stress

NOTE

Vibration or shock may cause danger!

Failure to comply may result in loosening or failure!

► Perform regular inspection intervals for the fastenings.

2.5.21 Note on chemical exposure and cleaning

NOTE

There is a risk of improper cleaning!

Failure to comply may result in damage to materials and equipment!

► Only clean the exterior with a mild soap solution without using solvents or acids.

► Do not use sharp-edged tools for cleaning, especially do not scratch the light cover.

► Do not clean with high pressure.

2.5.22 Note on installation errors

NOTE

There is a risk of danger due to incorrect hole pattern or incorrect torque!

Failure to observe this may result in fastening failure!

► Install the signal light according to chapter 5Installation .

2.5.23 Note on incorrect signal coding

NOTE

There is a risk of danger due to incorrect signal coding!

Failure to observe this may result in incorrect operation!

► Only use the defined color and tone codes.

► Follow the basic and safety rules for human-machine interfaces in accordance with DIN EN 60073.

2.5.24 Note on securing IO-Link communication

NOTE

There is a risk of insufficient physical or logical security, which can lead to unauthorized access, reading, or manipulation!

Failure to comply may result in malfunctions, false signals, manipulation, system downtime, or safety-critical misinterpretations!

- ► Only place the device in physically protected security zones (level 0).
- ► Only run IO-Link cables in concealed and protected cable routes.
- ► Use secure connectors, avoid freely accessible transfer points, document the zone plan, and secure parameter settings.
- ► Perform regular security audits and checks.
- ► Set up a process for updates and changes and observe specifications for secure development.

2.6 Personal protective equipment

When operating the signal light , personal protective equipment must be worn to minimize health hazards, regardless of the risk assessment for the area of application. Personal protective equipment must be designed with the specific risk in mind.

- ► Always wear the protective equipment required for the task at hand when working.
- ► Do not wear rings, chains, or other jewelry during transport, assembly, disassembly, and maintenance work.
- ► Follow all instructions regarding personal protective equipment.

The symbols have the following meanings:

Symbol	Description
	Safety shoes Wear non-slip safety shoes to protect yourself from heavy falling objects or slipping on slippery surfaces.
	Work safety clothing Protective work clothing is close-fitting work clothing with low tear resistance, tight sleeves, and no protruding parts. It is primarily used to protect against being caught by moving parts. nteile.
	Protective gloves Wear protective gloves to protect your hands from friction, abrasions, punctures, or deeper injuries, as well as from contact with hot surfaces or chemical substances.
	Safety helmet Wear a protective helmet to protect against falling or flying parts.
	Hearing protection Wear hearing protection to protect your hearing.

Personal protective equipment must be provided by the operator and must comply with the applicable requirements.

In addition, national regulations and specifications from the application area risk assessment and, if applicable, internal instructions from the operator must be observed.

2.7 Information for emergencies

Preventive measures:

- ► Always be prepared for accidents or fire.
- ► Keep first aid equipment (first aid kit, blankets, etc.) and fire extinguishers handy.
- ► Familiarize personnel with accident reporting, first aid, fire extinguishing, and rescue equipment.
- ► Keep access routes clear for emergency vehicles.

Measures in the event of accidents:

- ► Disconnect the power supply to the signal light and the higher-level system.
- ► Rescue people from the danger zone.
- ► In the event of cardiac and/or respiratory arrest, initiate resuscitation immediately.
- ► In the event of personal injury, notify the first aid officer and an emergency doctor or the emergency services.
- ► Clear the access routes for emergency vehicles. If necessary, assign someone to direct the emergency services.
- ► Extinguish any fire in the electrical control system with a CO2 extinguisher.

2.8 Operator's obligations

The signal light is used in commercial applications, and the operator must comply with the statutory occupational safety regulations. In addition to the safety instructions in the operating manual, the applicable safety regulations for the area of application must be observed.

The operator must ensure that the signal light is used properly, that the operating instructions are available on site, and that clear responsibilities for installation, operation, maintenance, and cleaning are defined. Only qualified and trained personnel above the legal minimum age may perform work on the signal light. Regular training, information about hazards, and the provision and use of personal protective equipment are required. The operator must ensure that persons working with the signal light have read and understood the operating and installation instructions. In addition, adequate virus protection/firewall in the IT infrastructure and compliance with maintenance intervals is required. The operator must regularly check the technical condition of the device and ensure that the safety and warning notices are legible.

3 Description of the signal light

3.1 Function description

3.1.1 General

The signal light SL-1-TRIO-IOLINK is an electronic optical and acoustic signalling device for indicating machine or system statuses. It is designed as a permanently fixed assembly for industrial use and is controlled via an IO-Link interface. The device has a robust aluminium housing with a shatterproof, impact-resistant, and UV-stabilized polycarbonate diffuser for even light distribution.

3.1.1.1 Functional principle optical signalling

- Illuminated area: Full-surface, diffuse illumination.
- Color representation: 24-bit color depth.
- Signal types: Continuous light, flashing, flash with adjustable frequency and adjustable flash pulse pause time. Brightness control of the signal area
- LED lights comply with the optical properties specified in the DIN EN 842 standard "Safety of machinery – Visual hazard control signals." The signal color red must have a contrast > 10, while green, blue, yellow, and white signal colors must have a contrast > 5 to ensure reliable visibility against the background.

3.1.1.2 Acoustic signalling

- Signal generator: Integrated piezo buzzer.
- Signals: Configurable frequencies and pulse-pause interval modulations.

3.1.2 Control and communication

- IO-Link interface: Port Class A.
- IO-LINK communication COM 2 (38 kBaud): Cyclical transmission of process data and acyclical parameter changes.
- Integration into the control environment via specific IODD file.
- Configurable functions: Color selection, flashing frequency, brightness, tone frequency, and interval during operation.

3.1.3 Diagnostics and monitoring

- Integrated self-monitoring of LED currents and wire breakage piezo buzzer.
- Error events via IO-LINK: Transmission of operating, fault, and communication status to the control system.
- No manual lamp test required, if applicable.

3.1.4 Safety features

- Protection class: Suitable for harsh industrial environments, shock and vibration resistant.
- Electrical safety: Operation in North America (USA/Canada) permitted exclusively with 24V DC / Class II power supplies.
- Compliance with standards: Meets the requirements of Directive 2014/30/EU (EMC) and Directive 2011/65/EU (RoHS) including extension 2015/863/EU.

3.1.5 Typical areas of application

- Display of operating, warning, and fault states on machines and systems.
- Process visualization in production and assembly lines.
- Signalling in conveyor technology, packaging systems, and testing equipment.

3.1.6 Features of SL-1-TRIO IOLINK signalling devices

Unlike conventional signal towers, the SL-1-TRIO IOLINK signal light series is designed for front mounting with two M6 hexagon socket cylinder screws (DIN ISO 4762). These signal lights can therefore be easily integrated into profile systems with T-slots. A sturdy aluminium housing and impact-resistant polycarbonate optics withstand harsh industrial environments. The polycarbonate diffuser, specially developed for LED applications, ensures a homogeneous light surface with high efficiency. The signal lights are available with M12 connectors or 3m PVC/PVC cable. With these intelligent signal lights n with IO-Link interface and integrated self-diagnosis, you always know the functional status of the signal transmitter. In addition, you can parameterize this signal light n in a variety of ways in terms of color (24-bit color depth) and flashing function, as well as the frequency and tone intervals of the integrated piezo buzzer via the IO-Link interface at any time, even during operation.

3.1.7 IO-Link description

IO-Link is a digital point-to-point connection for use in industrial automation applications. IO-Link-enabled sensors and actuators can be expanded, adjusted, and operated via the IO-Link interface. Cyclic process data and acyclic data can be exchanged between an IO-Link master and an IO-Link device, and energy can also be transferred.

3.1.8 System overview

An IO-Link system basically consists of the following components:

- IO-Link master
- IO-Link device (e.g., sensors, valves, I/O modules, signalling devices)
- Unshielded standard cables
- Configuration tool for project planning and parameterization of IO-Link

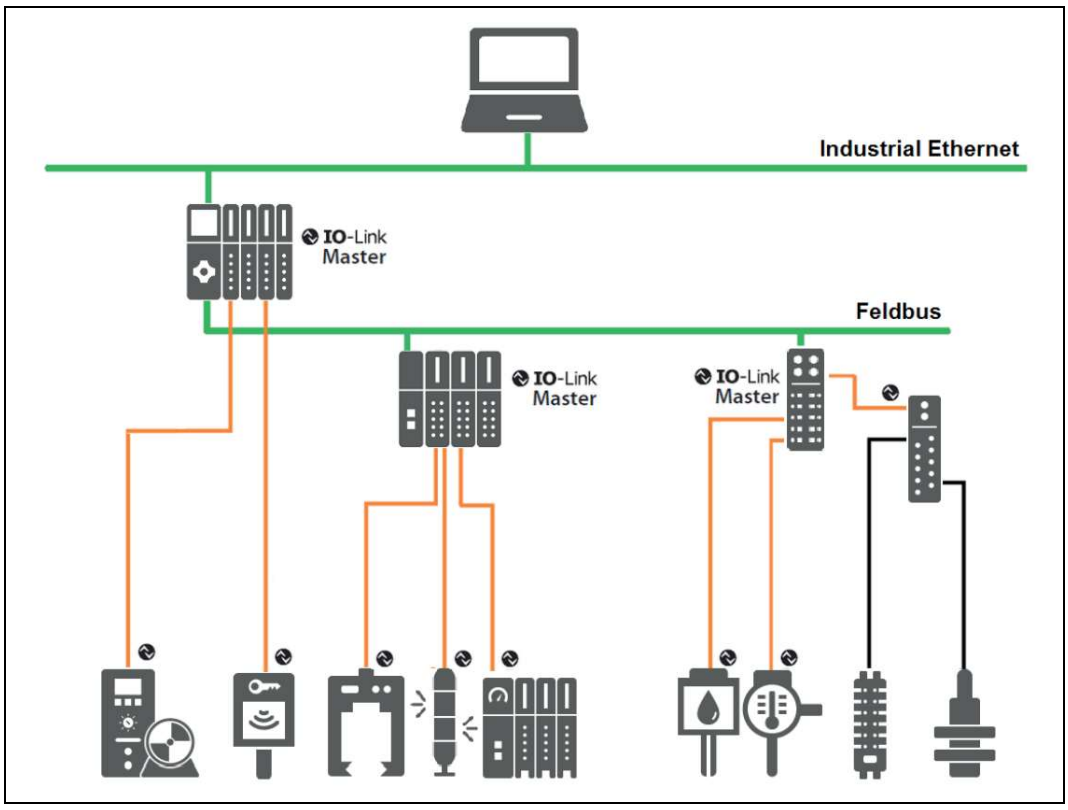


Figure1 : System overview

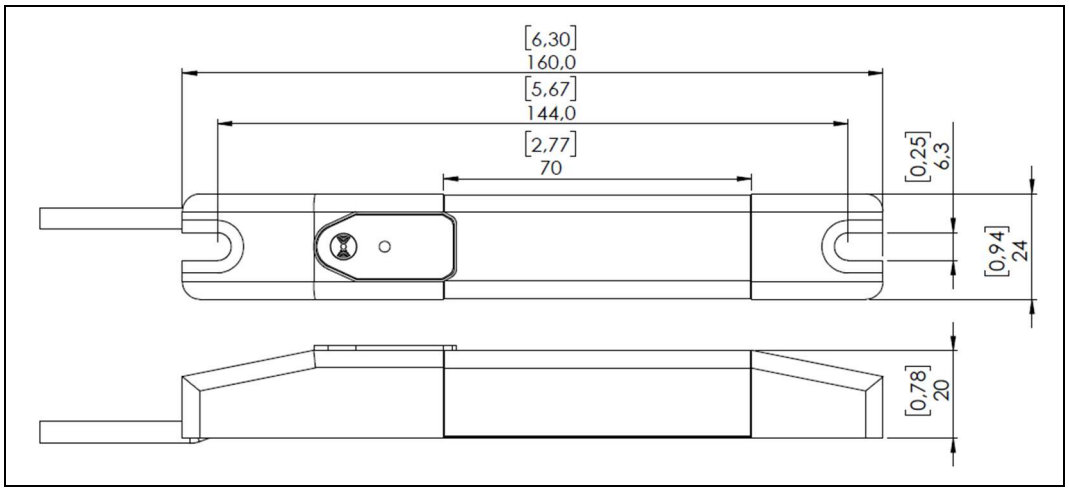
The IO-Link master establishes the connection between the IO-Link devices and the automation system. As part of a peripheral system, the IO-Link master is installed either in the control cabinet or as a remote I/O directly in the field. The IO-Link master communicates via various fieldbuses or product-specific backplane buses. An IO-Link master can have several IO-Link ports (channels). An IO-Link device can be connected to each port (point-to-point communication). IO-Link is therefore a point-to-point communication system and not a fieldbus. The devices are also powered via the output socket or terminals of the IO-Link master.

3.2 Technical data

Technical data SL-1-TRIO-IOLINK M12/LC	
Electrical	
Supply voltage	24 V DC (21 - 30 V DC)
Nominal current consumption	< 135 mA
Protection class	
Permissible power supply	Class 2 (for use in the USA/Canada)
Connection	SL-1-TRIO-IOLINK M12: M12 connector / PVC/PVC 0.25 m SL-1-TRIO-IOLINK LC: PVC/PVC cable 3 m
Reverse polarity protection	Internal
Operating mode	Continuous
Mechanical	
Dimensions	SL-1-TRIO-IOLINK M12 (L × B × H): 210 x 24 x 20 [mm] / 8,3'' x 0,95'' x 0,79'' SL-1-TRIO-IOLINK LC (L × B × H): 160 x 24 x 20 [mm] 210 x 24 x 20 [mm] / 8,3'' x 0,95'' x 0,79''
Weight	SL-1-TRIO-IOLINK M12: 160 g SL-1-TRIO-IOLINK LC: 250 g
Shock resistance	IK07
Vibration/shock characteristics	No internal shock-sensitive oscillators and inductors
Installation position	Any
Mounting	Front mounting with 2× M6 hexagon socket cylinder screws (DIN ISO 4762). Not included in delivery!
Optical diffuser	Polycarbonate (UV-stabilized)

Technical data SL-1-TRIO-IOLINK M12/LC	
Housing material	Aluminum
Protection and environmental conditions	
Protection class / NEMA	IP54 / Type 3
Ambient temperature	-20 °C to +50 °C
Storage temperature	-40 °C to +70 °C
Permissible humidity	40 - 60% (non-condensing)
Meters above sea level	2000 m (6582 ft)
Degree of cleanliness	Clean and dry industrial environment
Earthquake class	No earthquake zone
Chemical composition	Halogen-free, silicone-free, REACH/ROHS
Optical/acoustic data	
Illuminated area	120 mm x 24 mm (4.7" x 0.94")
RGB color table	24-bit (16.7 million colors)
Light operating mode	Continuous light, flashing light, pulsing light
Flashing frequency	0.5 - 10 Hz
Pulse/pause time Light	10 - 1,000 ms
Light dimming	0 – 100 %
Signal color	24-bit RGB
light intensity	Red 10,2 [cd], Green [26.2 cd], Blue 4,7 [cd]
Luminance	Red 1000 [cd/m^2], Green 2300 [cd/m^2], Blue 325 [cd/m^2]
Maximum background brightness according to DIN EN 842	Red 2000 [lx], Green 10800 [lx], Blue 2000 [lx]
Buzzer frequency	2,500 - 4,000 Hz
Operating mode Buzzer	Continuous tone, pulse-pause mode
Buzzer pulse/pause time	10 - 1,000 ms

3.2.1 Dimensions



2 : Dimensions

4 Transport and storage

4.1 Delivery by an authorized transport company

The signal light is delivered to the customer by a transport company authorized by Schrempp electronic GmbH .

4.2 Inspection upon receipt by the recipient

Upon arrival of the signal light at the customer's premises, it must be inspected for visible transport damage.

► Report any transport damage immediately to the delivery company.

4.3 Packaging

The mode of transport is a decisive factor in determining the type of packaging. Unless otherwise agreed in the contract, the packaging complies with the HPE packaging guidelines, which were established by the Federal Association of Wood Products, Pallets, and Export Packaging (Bundesverband Holzmittel, Paletten, Exportverpackung e. V.) and the Association of German Engineering Companies (Verein Deutscher Maschinenbauanstalten).

► Please observe the pictograms on the packaging.

4.3.1 Unpacking

When unpacking the signal light , proceed as follows:

► Remove the packaging. Dispose of packaging materials such as plastic film and adhesive tape in the appropriate manner.

► Always remove all packaging before installing the signal light .

► Keep the original packaging for return/further transport.

► Check the delivery against your order to ensure it is complete.

► Be sure to keep the documents supplied, as they contain important information on how to use the signal light .

► Check the packaging contents for visible transport damage.

► If you notice any transport damage or discrepancies between the contents of the package and your order, please inform the manufacturer or supplier.

4.3.2 Repackaging

See chapter "4.3.1 Unpacking ".

4.4 Information on hazards during transport

⚠ WARNING

When transporting the signal light , the following specific hazards must be taken into account:

Suspended loads may fall, posing a risk of death!

Protruding edges can cause crushing or cutting injuries!

- ► Only use approved load-bearing equipment.
- ► Always wear the personal protective equipment required for the respective task (protective clothing, protective gloves, protective helmet, and safety shoes) while working.
- ► Ensure that you and other people do not stand under suspended loads.
- ► Do not use cables or attachments as attachment points. Only lift the signal light at the designated points.

4.5 Scope of delivery signal light

The scope of delivery of the signal light consists of the following components:

- SL-1-TRIO-IOLINK signal light (M12 or LC)
- Quick guide with link to the manuals and IODD-files

4.6 Temporary storage

If the signal light is not installed immediately after delivery, it must be stored carefully in a protected location. The signal light must be stored in such a way that it is protected from cold, moisture, contamination, chemical and mechanical influences. The recommended storage conditions for the signal light can be found in the chapter "Ambient conditions".

We accept no liability for damage resulting from improper storage!

5 Installation

The signal light is intended for permanent, stationary installation in industrial areas. It is installed on the front of a suitable mounting surface and must be positioned so that the signals are clearly visible to operating and maintenance personnel.

Check the signal light for damage before installation. If there is visible damage, the signal light must not be installed and the manufacturer must be contacted.

5.1 Pre-assembly by Schrempp electronic GmbH

The signal lamp is completely pre-assembled by Schrempp electronic GmbH . Connection to the machine/system is carried out by the machine/system supplier.

5.2 Information on hazards during installation

⚠ WARNING

Improper mounting poses a hazard!

Failure to observe this warning may result in head, hand, or foot injuries!

- ► Only fasten the signal light with suitable means and tighten the screws to the specified torque.
- ► Exceeding the permissible ambient conditions (temperature, humidity, vibration load) can lead to failure. Check the installation location in advance.
- ► Always wear the personal protective equipment required for the respective work (protective clothing, protective gloves, protective helmet, and safety shoes) while working.
- ► Use fasteners in accordance with the manufacturer's instructions and tighten them to the specified torque.
- ► Do not use the signal light as a climbing aid. Misuse may cause the signal light to break off or be damaged in other ways.
- ► Install the signal light so that it cannot be used as a climbing aid.

⚠ CAUTION

Risk of tripping due to improperly laid power supply cables!

Failure to comply may result in injury!

- ► Always lay cables in such a way that they do not cause a tripping hazard and are barrier-free.
- ► Mark unavoidable tripping hazards with color.

⚠ CAUTION

Risk of injury due to unsuitable mounting materials!

Unsuitable mounting materials can result in injury during operation!

5.3 Preparatory measures

5.3.1 General

Before installing the signal lamp , ensure that:

- additional lighting equipment (e.g., hand lamps) is available for installation (if necessary),
- the installation surface at the installation site is clean and free of dust,
- the necessary tools for installation are available:
  - Suitable Allen key
  - Torque wrench (adjustable)
  - Screwdriver for electrical connections (qualified personnel only)

5.3.2 Preparatory measures for electrical installation

Before installing the signal light , ensure that:

- The connections for the power supply are prepared.
- The work area is secured and de-energized.
- The installation position has been determined (clear view, protection against damage).
- The mounting holes or T-slot nuts for M6 screws are prepared.
- Switch off the power supply before making any changes to the lighting system.

5.4

⚠ WARNING

Risk of injury due to instability!

There is a risk of serious injury due to instability of the individual assemblies when mounting the signal light as a result of incorrect installation!

- ► Please note that the mounting surface must be:
  - flat, level, horizontal,
  - has the necessary load-bearing capacity,
  - is temperature-resistant, non-flammable, and
  - vibration-free

  .

- ► Only allow authorized and trained personnel to carry out the installation work.
- ► Observe the tightening torques for all screw connections during installation.
- ► Always wear the protective equipment required for the work in question (e.g., protective clothing and safety shoes) while working.
- ► Avoid locations for the signal light that are close to impermissible electromagnetic fields.
- ► Do not install the signal light in locations where there is a corrosive or explosive atmosphere.
- ► Please note that the signal light is only intended for indoor use.
- ► Do not use the signal light in EX areas.
- ► Observe the ambient conditions.
- ► Please note that the signal light must be protected against accidental impact.
- ► Please note that with regard to order and cleanliness, care must be taken to ensure that: all wires and cables are neatly laid and covered if necessary, tools in the vicinity of the signal light are tidied away, and any parts lying around and waste (if any) are removed regularly.

5.4.1 Mechanical fastening

Proceed as follows during installation:

- ► Align the signal light in the intended position.
- ► Insert two M6 hexagon socket cylinder screws through the mounting holes.
- ► Tighten the screws evenly and crosswise (tightening torque: 5–6 Nm, unless otherwise specified by the manufacturer).
- ► Check that the light is securely fastened (no play, no twisting).
- ► Do not install luminaires closer than 15.25 cm to curtains or similar combustible materials.

5.4.2 Electrical connection

- ► Select the appropriate connection (M12 or LC).
- ► Do not cover or route exposed conductors through a building wall.
- ► Do not install this system in damp environments.
- ► To reduce the risk of fire and burns, do not install this lighting system in locations where exposed conductors may be short-circuited or come into contact with conductive materials.
- ► Check the assignment according to the technical documentation.
- ► Use only a Class 2 power supply in North American applications.

5.4.3 Installation instructions

- ► Ensure direct visibility in the intended observation area.
- ► Avoid installation locations with strong external lighting or direct sunlight.
- ► Protect the light from mechanical impact, vibration, and chemical influences.

6 Commissioning

6.1 Safety measures before commissioning

⚠ WARNING

Risk of injury during commissioning!

There are various risks of injury during commissioning.

- ► Only allow qualified personnel to perform commissioning.
- ► Cordon off the danger area and keep unauthorized persons away.
- ► Lay power supply cables so that they do not cause a tripping hazard and are barrier-free (e.g., under covers).

► Familiarize yourself sufficiently with:

- the features of the signal light ,
- the operation of the signal light ,
- the measures to be taken in an emergency.

► Before initial commissioning, perform the following tasks:

► Check the signal light for visible damage; remedy any defects immediately – the signal light may only be operated if it is in perfect condition.

6.2 Electrical connection

IO-Link masters always have 5-pin sockets. There are two types of connections on the IO-Link master (ports):

Pin	Signal	Designation	Comment
1	L	Power supply (+)	
2	I/Q P24	NC/DI/DO (Port Class A) P24 (Port Class B)	Option 1: NC (not connected) Option 2: DI Option 3: DI, then configured as DO Option 4: Additional power supply for power devices (port class B)
3	L-	Power supply (-)	

Pin	Signal	Designation	Comment
4	C/Q	SIO/SDCI	Standard I/O mode (DI/DO) or SDCI (see Table 6 for electrical characteristics of DO).
5	NC N24	NC (Port Class A) N24 (Port Class B)	Option 1: Must not be connected on the master side (port class A) Option 2: Reference to the additional power supply (port class B)

NOTE

M12 is always a 5-pin version on the master side (socket).

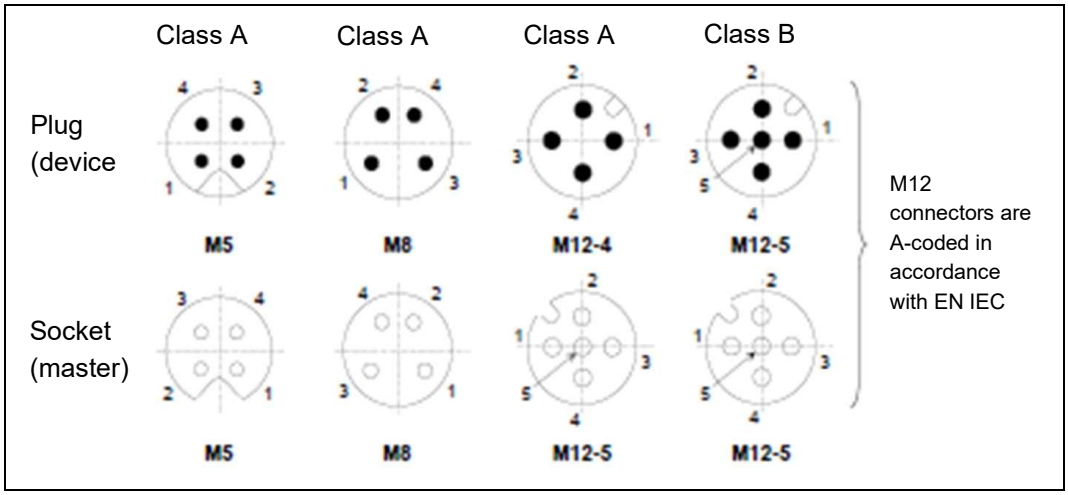


Figure3 : Pin assignment front view

Port Class A (Type A): With this type, the functions of pins 2 and 5 are not specified; these are defined by the manufacturer. Pin 2 can be assigned to an additional digital channel.

Port Class B (Type B): This type offers an additional supply voltage and is suitable for connecting devices that have increased power requirements. An additional, galvanically isolated supply voltage is provided via pins 2 and 5. A 5-pin standard cable is required to use the additional supply voltage.

6.3 Pin assignment Port Class A

SL-1-TRIO-IOLINK LC:

Brown: L+

Black: C/Q

Blue: L-

SL-1-TRIO-IOLINK M12:

PIN 1: L+

PIN 4: C/Q

PIN 3: L-

For the **SL-1-TRIO-IOLINK M12** / **SL-1-TRIO-IOLINK LC** variants, the current consumption is ≤ 85 mA. An external auxiliary voltage is not required. The series **SL-1-TRIO-IOLINK** devices can be operated on both Port Class A and Port Class B with a 4-pin cable.

6.4 Status LED

Figure4 : Status LED

A status LED is clearly visible on the signal device. During normal operation, this status LED indicates the IO-LINK status in **green**. If device errors are detected by the integrated self-diagnosis, the status LED changes to **red**. See also chapter 8.1Device status LED .

6.5 Import IODD file

All device functions relevant to machine control are described in a uniform device description file (IODD - IO-Link Device Definition). This is available on our homepage at the following link.

https://led-industrial-illumination.com/produkt/sl-x-trio-iolink/

Or use the IODD Finder from the IO-LINK Community.

https://ioddfinder.io-link.com/

After importing the IODD into the engineering tool for configuring the control system, you can search for new devices. The **SL-1-TRIO IOLINK** signal devices are then automatically detected.

The procedure for importing the IODD and searching for devices depends on the control manufacturer and the configuration tool. For detailed information, please refer to the manufacturer's documentation for the IO-Link master.

6.6 Communication parameters

The following communication parameters are used:

IO-Link revision:	V1.1
Bit rate:	COM2 38400Bps
Min. cycle time	8.4ms
SIO-Mode	No
Block parameterization	Yes
Data storage	Yes

NOTE

If you encounter communication problems, please check the settings and correct them if necessary.

6.7 Device identification and startup IO-LINK

Each IO-Link device has a device identification. It consists of a company identifier, the VendorID, and a manufacturer-specific part, the DeviceID. The VendorID is assigned by the PNO and has the value 0x04F6 for the company Schrempp electronic GmbH ; the DeviceID is device-specific. During startup, the configured device identification is checked and any errors in the configuration are detected.

If the signal device is connected to an IO-Link master and the IO-Link operating mode is set, the IO-Link master attempts to communicate with the connected device. To do this, the IO-Link master sends a wake-up request and waits for a response from the measuring system. After receiving the response, the IO-Link master sets the data transfer rate **COM 2 = 38.4 kbit/s** and starts communication. First, the necessary communication and identification parameters are read from the DirectParameterPage1 (index 0x00, subindex

0x00…0x0F) via the page communication channel. Then, the cyclical exchange of process data and value status begins.

7 SL-1-TRIO IOLINK configuration

7.1 Description of the cyclic process device data

Name	Index	Rights	Size
Input data (PDI):		ro	2 bytes
Diagnostic LED red	subindex=1		1 bit
Diagnostic LED green	subindex=2		1 bit
Diagnostic LED blue	subindex=3		1 bit
Diagnostic buzzer	subindex=4		1 bit
Diagnostic temperature	subindex=5		1 bit
Output data (PDO)		where	4 bytes
Color	subindex=1		1 byte unsigned integer
Off	0		
Red	1		
Green	2		
Blue	3		
Yellow	4		
Orange	5		
Pink	6		
White	7		
Custom 1	8		
Custom 2	9		
Custom 3	10		
Custom 4	11		
Custom 5	12		
Custom 6	13		
Custom 7	14		
Custom 8	15		

Name	Index	Rights	Size
Intensity	subindex=2	where	1 byte unsigned integer
Flashing	subindex=3	where	1 byte unsigned integer
off	0		
Blink very slowly	1		
Blink slow	2		
Blink fast	3		
Blink very fast	4		
Flash very slowly	5		
Flash slowly	6		
Flash fast	7		
Flash very fast	8		
Buzzer	subindex=4	where	1 byte unsigned integer
Sound off	0		
Sound 1	1		
Sound 2	2		
Sound 3	3		
Sound 4	4		
Sound 5	5		
Sound 6	6		
Sound 7	7		
Sound 8	8		
Sound 9	9		
Sound 10	10		

7.2 Description of the identification parameters

The identification parameters contain device data that the IO-Link master uses to identify the connected device more precisely. This device data can be read from or written to the device via its index with subindex = 0x00. Objects with index 0x0040 are optional objects added by the manufacturer.

Index	Parameter SL-1-TRIO-IOLINK M12	Access	Byte/Length	Value
16	Vendor Name	ro	64	Schrempp electronic GmbH
17	Vendor Text	ro	64	www.schrempp-electronic.de
18	Product Name	ro	64	SL-1-TRIO-M12
19	Product ID	ro	64	11352
20	Product Text	ro	64	Cable connection 0.25m PUR/PVC with M12 connector
21	Serial number	ro	16	consecutive
22	Hardware revision	ro	64	Vx
23	Firmware Version	ro	64	1.x
24	Application Text	rw	32	
25	Function Tag	rw	32	
26	Location Tag	rw	32	

Index	Parameter SL-1-TRIO-IOLINK LC	Access	Byte/Length	Value
16	Vendor Name	ro	64	Schrempp electronic GmbH
17	Vendor Text	ro	64	www.schrempp-electronic.de
18	Product Name	ro	64	SL-1-TRIO LC
19	Product ID	ro	64	11354
20	Product Text	ro	64	Open wired cable connection 3m PVC/PVC
21	Serial	ro	16	Consecutive
22	Hardware revision	ro	64	Vx
23	Firmware Version	ro	64	1.x
24	Application Text	rw	32	
25	Function Tag	rw	32	
26	Location Tag	rw	32	

7.3 Color Settings

With RGB LEDs, the colors of the RGB color palette can be set using the three primary colors red, green, and blue. Color value, color intensity, and flashing function can be set separately. Eight preset colors and eight customer-specific colors can be set. The preset colors can also be configured as desired.

Parameter	Index	Access	Byte/Length	Range	Default
Off	index= 64	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
RED	index= 65	rw			
Red	subindex = 1		1 byte unsigned integer	0…255	255
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
GREEN	index= 66	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0…255	255
Blue	subindex = 3		1 byte unsigned integer	0	0
BLUE	index= 67	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0…255	255
YELLOW	index= 68	rw			
Red	subindex = 1		1 byte unsigned integer	0…255	255
Green	subindex = 2		1 byte unsigned integer	0…255	200
Blue	subindex = 3		1 byte unsigned integer	0	0
ORANGE	index= 69	rw			
Red	subindex = 1		1 byte unsigned integer	0…255	255
Green	subindex = 2		1 byte unsigned integer	0…255	50
Blue	subindex = 3		1 byte unsigned integer	0	0
PINK	index= 70	rw			
Red	subindex = 1		1 byte unsigned integer	0…255	255
Green	subindex = 2		1 byte unsigned integer	0	0

Parameter	Index	Access	Byte/Length	Range	Default
Blue	subindex = 3		1 byte unsigned integer	0	100
WHITE	index= 71	rw			
Red	subindex = 1		1 byte unsigned integer	0…255	255
Green	subindex = 2		1 byte unsigned integer	0…255	255
Blue	subindex = 3		1 byte unsigned integer	0…255	230

Parameter	Index	Access	Byte/Length	Range	Default
CUSTOM1	index= 72	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
CUSTOM2	index= 73	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
CUSTOM3	index= 74	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
CUSTOM4	index= 75	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
CUSTOM5	index= 76	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0
CUSTOM6	index= 77	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0

Parameter	Index	Access	Byte/Length	Range	Default
CUSTOM7	index= 78	rw			
Red	subindex = 1		1 byte unsigned integer	0	0
Green	subindex = 2		1 byte unsigned integer	0	0
Blue	subindex = 3		1 byte unsigned integer	0	0

7.4 LED intensity settings

The intensity from 0 to 100% is set using process data.

Parameter	Index	Access	Byte/Length	Range	Default
Intensity	subindex=2	where	1 byte unsigned integer	0	0

7.5 LED flashing settings

The "flashing settings" can be used to set the flashing frequency in the range 100 ... 3000 ms and the pulse/pause ratio in the range 10 ... 90%.

Parameter	Index	Access	Byte/Length	Range		Default
Blink very slowly	index=110	rw				
Pulse period	subindex=1		2-byte integer	100	3000	2000
Pulse rate	subindex=2		2-byte integer	10	90	50
Blink slow	index=111	rw				
Pulse period	subindex=1		2-byte integer	100	3000	100
Pulse rate	subindex=2		2-byte integer	10	90	50
Blink fast	index=112	rw				
Pulse period	subindex=1		2-byte integer	100	3000	50
Pulse rate	subindex=2		2-byte integer	10	90	50
Flash very fast	index=113	rw				
Pulse period	subindex=1		2-byte integer	100	3000	250
Pulse rate	subindex=2		2-byte integer	10	90	50
Flash very slow	index=114	rw				
Pulse period	subindex=1		2-byte integer	100	3000	2000
Pulse rate	subindex=2		2-byte integer	10	90	10

Parameter	Index	Access	Byte/Length	Range		Default
Flash slow	index=115	rw				
Pulse period	subindex=1		2-byte integer	100	3000	100
Pulse rate	subindex=2		2-byte integer	10	90	10
Flash fast	index=116	rw				
Pulse period	subindex=1		2-byte integer	100	3000	50
Pulse rate	subindex=2		2-byte integer	10	90	10
Flash very fast	index=117	rw				
Pulse period	subindex=1		2-byte integer	100	3000	250
Pulse rate	subindex=2		2-byte integer	10	90	10

7.6 Sound Settings

The "Sound Settings" are used to set the buzzer tone pitch in the range from 2.5 kHz to 4 kHz, the pulse duration of the alarm tone from 100 to 3000 ms, and the pulse/pause ratio in the range from 10 to 90%.

Parameter	Index	Access	Byte/Length	Range		Default
Sound_1	index= 80	rw				
Frequency	subindex=1		2-byte integer	2500	4000	2500
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_2	index= 81	rw				
Frequency	subindex=1		2-byte integer	2500	4000	2650
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_3	index= 82	rw				
Frequency	subindex=1		2-byte integer	2500	4000	2950
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_4	index= 83	rw				
Frequency	subindex=1		2-byte integer	2500	4000	310
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50

Parameter	Index	Access	Byte/Length	Range		Default
Sound_5	index= 84	rw				
Frequency	subindex=1		2-byte integer	2500	4000	325
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_6	index= 85	rw				
Frequency	subindex=1		2-byte integer	2500	4000	340
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_7	index= 86	rw				
Frequency	subindex=1		2-byte integer	2500	4000	355
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_8	index= 87	rw				
Frequency	subindex=1		2-byte integer	2500	4000	370
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_9	index= 88	rw				
Frequency	subindex=1		2-byte integer	2500	4000	385
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50
Sound_10	index= 89	rw				
Frequency	subindex=1		2-byte integer	2500	4000	4000
Pulse period	subindex=2		2-byte integer	100	3000	0
Pulse rate	subindex=3		2-byte integer	10	90	50

7.7 System commands

Restore factory settings: This command resets the parameters to their default values. The error counter and alarm messages are deleted.

Index	Parameters	Access	Byte/Length	Value
02	System Command	w/o	1	Reset Factory Settings

8 Troubleshooting and diagnostic options

⚠ WARNING

There are hazards associated with troubleshooting the signal light !

Failure to observe the instructions may result in damage, malfunction, or total failure of the signal light , as well as compromising the safety of the signal light !

► Only qualified personnel should perform troubleshooting.

8.1 Device status LED

Status LED	Cause	Remedy
OFF	Power supply is missing or has fallen below the minimum level. Connection plug not wired correctly or screwed tight. Hardware error.	Check the power supply and wiring. Is the power supply within the permissible range? Check the wiring and connector seat. Replace the device.
ON (red)*	Device in data exchange. Device has triggered an internal error event.	Switch off the supply voltage, then switch it back on again. The transmitted error must be analyzed and rectified. If these measures are unsuccessful, the device must be replaced.
ON (green)*	Normal operation, device in data exchange.	-

NOTE

*IO-Link communication is available according to the IO-Link specification: Status LED flashing, period 1 s, pulse/pause ratio 85%.

8.2 Error counter

The error counter increases with each error event in the device self-diagnosis.

Parameters	Index	Access	Byte/Length
ErrorCount	index=32	Ro	2-byte unsigned integer

The system command "Factory Reset" resets the parameters "DeviceStatus" and "ErrorCount".

8.3 Device status / Detailed device status

The **Detailed Device Status** parameter contains the events currently pending in the device and can be displayed via the PLC program or via corresponding IO-Link tools. Every error or warning that occurs is entered in the device status list. In this way, these parameters always show the current diagnostic status of the device.

Parameter	Index	Access	Byte/Length
DeviceStatus	index=36	Ro	1 byte unsigned integer
DetailedDeviceStatus	index=37	Ro	4x 3 bytes
ErrorCount	index=32	Ro	2 bytes unsigned integer
StoreCount	index=104	Ro	4-byte integer

If an error or warning no longer exists, the device status remains at "Error." The "Factory Reset" system command resets the "DeviceStatus" and "ErrorCount" parameters.

The "StoreCount" parameter indicates how many write cycles have been performed on the internal EEPROM. The internal non-volatile EEPROM memory has a guaranteed number of 100,000 write cycles.

8.4 LED current monitoring

An internal LED test is performed for each LED color at intervals of approximately 1 minute. If there are deviations from the setpoint, an error event is triggered and the "DeviceStatus" parameter changes to "Error". The "DetailedDeviceStatus" parameter outputs error 0x7700 "Wire break of a subordinate device". The status LED changes to red during IO-Link communication. The error counter (parameter "ErrorCount") is incremented.

8.5 Buzzer monitoring

When the buzzer is activated, a wire break check is performed on the buzzer connections. If there are deviations from the setpoint, an error event is triggered and the "DeviceStatus" parameter changes to "Error". The "DetailedDeviceStatus" parameter outputs error 0x7700 "Wire break of a subordinate device". The status LED changes to red during IO-Link communication. The error counter (parameter "ErrorCount") is incremented.

8.6 Operating hours counter

This parameter contains the time in [hours] during which the measuring system was supplied with power.

Parameter	Index	Access	Byte/Length
OperatingHours	index=103	ro	4 byte integer

8.7 Temperature monitoring

The device performs internal temperature monitoring. If the housing temperature exceeds 50 °C, an error event is triggered and the "DeviceStatus" parameter changes to "Error". The "DetailedDeviceStatus" parameter outputs error 0x4210 "Device temperature over-run". The status LED changes to red during IO-Link communication.

The error counter (parameter "ErrorCount") is incremented. The current, average, and maximum temperatures of the controller can be read using the following parameters:

Parameter	Index	Access	Byte/Length
TemperatureActual	index=100	ro	2-byte integer
TemperatureAverage	index=101	ro	2-byte integer
TemperatureMaximum	index=102	ro	Byte Integer

8.8 Device replacement

In accordance with IO-Link specification V1.1, the device and the IO-Link master support the backup of device settings in the IO-Link master. Some IO-Link masters also provide a wizard specifically for device replacement.

9 Mainten en, and cleaning

9.1 Safety measures during maintenance work

9.1.1 General safety measures during maintenance work

- ► Observe the safety instructions for all work on the device. (Chapter "2 Safety ").
- ► Block access to the area where the signal light is in use. Ensure that only authorized persons are in the area where the signal light is in use.
- ► Replace any defective signal lights immediately.
- ► Use only original accessories. The use of other parts will void the warranty and suitability and may result in injury.

After completing maintenance work and before using the signal light , perform the following tasks:

- ► Check all previously loosened screw connections again to ensure they are tight.
- ► Check that all previously removed protective devices, covers, housing covers and, if applicable, other components have been reinstalled correctly.
- ► Ensure that all tools, materials, and other equipment used have been removed from the work area.
- ► Clean the work area.

Modifications, alterations, incorrect and improper use, and failure to observe the instructions in this operating manual will void the warranty.

9.2 Inspection and maintenance work

9.2.1 Maintenance intervals

Maintenance point	Maintenance work	See section
Monthly		
Entire Signal light	Visual inspection for damage, secure fit, and contamination.	9.2.3
Semi-annual		
Entire signal light	Function test of all signal and sound functions.	9.2.4
Annually		
Entire signal light	Check electrical connections, mounting screws, and seals.	9.2.5

9.2.2 Preparatory measures for the electrical system of the " "

DANGER

Danger of death from electric shock!

Live components can cause fatal electric shock or serious injury if touched!

- ► Only allow work on electrical equipment to be carried out by a qualified electrician who is specially trained to work on electrical equipment and can recognize and avoid hazards.
- ► Before performing maintenance and inspection work on the signal light , disconnect the signal light from the power supply.
- ► Secure the signal light against unexpected restarting by locking the main switch with a lock.
- ► Attach a warning sign to the main switch to prevent it from being switched back on.
- ► Please note that electrical and electronic components must not be cleaned.

NOTE

- ► Take appropriate ESD precautions before opening the device.
- ► Use ESD protection measures during maintenance (e.g., grounding wrist strap, conductive work mat).

9.2.3 Maintenance - monthly

9.2.3.1 Visual inspection

- ► Check the light surface for scratches, cracks, cloudiness, or damage.
- ► Check that the light is securely fixed (no play, no twisting).
- ► Check cables and plug connections for damage, corrosion, or loose connections.

9.2.3.2 Cleaning

- ► Use a soft, non-abrasive cloth.
- ► Clean the light surface with a mild, non-abrasive cleaning agent.
- ► Avoid aggressive solvents (e.g., acetone, gasoline) that can damage the diffuser.
- ► Ensure that no moisture penetrates the housing.

9.2.4 Maintenance - every six months

9.2.4.1 Function test

- ► Restore the power supply.
- ► Activate all light and sound functions one after the other via IO-Link.
- ► Check that colors, flashing frequencies, and signal tones are displayed correctly.
- ► Document any abnormalities in a maintenance log.

9.2.5 Maintenance - annually

9.2.5.1 Electrical Check

⚠ DANGER

Danger of death from electric shock!

Live components can cause fatal electric shock or serious injury if touched!

- ► Only allow a qualified electrician to carry out work on the electrical equipment.
- ► Before performing any maintenance or inspection work, disconnect the signal lamp from the power supply.

- ► Check all connectors to ensure they are securely fastened and locked.

- ► Check the cables for chafing or crushing.
- ► If necessary, tighten the terminal fastening screws (torque according to manufacturer's specifications).

9.2.6 Replacement of components

- ► Not possible. Only replacement of the complete device

10 Decommissioning and dismantling

⚠ WARNING

Risk of serious injury due to improper decommissioning or disposal of the signal light !

Failure to comply may result in serious injury!

- ► All work on the electrical system must be carried out by qualified electricians. Qualified electricians are specially trained to work on electrical systems, are aware of the dangers of electrical voltage, and can independently avoid potential hazards by taking the correct action.
- ► Only allow qualified or appropriately trained personnel who are experienced in dismantling electrical equipment to dismantle the signal light .
- ► Switch off the signal lamp completely before starting any dismantling work and disconnect it from the power supply at all poles.
- ► Always wear the necessary personal protective equipment during work, e.g., protective work clothing, safety shoes, protective gloves, and a protective helmet.
- ► If in doubt, contact the manufacturer or supplier for technical support or advice on safe decommissioning and disposal.

10.1 Disposal gen

⚠ WARNING

Risk of environmental pollution/waste of resources!

Failure to comply may result in environmental damage!

- ► Only allow trained and authorized personnel to carry out disposal work.
- ► Separate electrical and electronic components in accordance with Directive 2012/19/EU. Separate materials and packaging waste by type and send them for recycling. Recycle materials marked with a recycling symbol. The packaging is made of various materials that can be disposed of at your local recycling facility. By disposing of the packaging properly, you help to avoid potential hazards to the environment and public health.
- ► Observe local recycling regulations.

11 Appendix

11.1 EU Declaration of Conformity

On the following pages, you will find the EU Declaration of Conformity for this signal light and the attached documents.

EU Declaration of Conformity

(Original Declaration of Conformity)

Manufacturer/authorized representative:	Schrempp electronic GmbH , Wiesenstrasse 5 , D-65843 Sulzbach/Ts.
Authorized representative for compiling the technical documentation:	Schrempp electronic GmbH , Wiesenstrasse 5 , D-65843 Sulzbach/Ts.
Product:	SL-1-TRIO-IOLINK M12: 11352 / GTIN 4262388142840 SL-1-TRIO IOLINK LC: 11354 / GTIN 4262388142864
Serial number:	See type plate
Function:	The signal light is used exclusively for the visual signalling of machine or system statuses.

The manufacturer bears sole responsibility for issuing this declaration of conformity. The object of the declaration described above complies with the relevant Union harmonization legislation, depending on the components used, as described in the annexes to the directives, which form an integral part of this declaration of conformity:

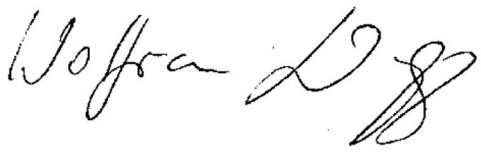
- 2014/30/EU - EMC Directive, including the essential requirements of Annex I
- 2011/65/EU + (EU) 2015/863 - RoHS EU Directive, including the essential requirements of Annex II

These products comply with the current requirements of the RoHS Directive for all 10 designated materials (max. 0.1% by weight in homogeneous material for lead, mercury, hexavalent chromium (Cr6+), polybrominated biphenyl (PBB), polybrominated diphenyl ether (PBDE), diphthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP), and diisobutyl phthalate (DIBP), and max. 0.01% by weight for cadmium).

Indication of the relevant harmonized standards (or parts thereof) that have been applied, including the date of the standard, or indication of other technical specifications for which conformity is declared, including the date of the specification:

- EN 60947-5-1:2017
- EN IEC 61131-9:2022
- EN IEC 61000-6-2:2019
- EN IEC 61000-6-4:2019
- EN IEC 63000:2018

D-65843 Sulzbach/Ts. , 11.02.2026



Dipl.-Ing. Wolfram Schrempp, Managing Director