HIRSCHMANN

A **BELDEN** BRAND

User Manual
Installation
Industrial Ethernet Lemur Rail Switch
LRS30/32/40/42

You can get the latest version of this manual on the Internet at:
https://www.doc.hirschmann.com

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Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

About this manual

The "Installation" user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.

Documentation mentioned in the "Installation" user manual that is not supplied with your device as a printout can be found at:
https://www.doc.hirschmann.com

Important information

Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

Warning symbols

This is a general warning symbol. This symbol alerts you to potential personal injury hazards. Observe all safety notes that follow this symbol to avoid possible injury or death.

If this symbol is displayed in addition to a safety instruction of the type "Danger" or "Warning", it means that there is a danger of electric shock and failure to observe the instructions will inevitably result in injury.

This symbol indicates the danger of hot surfaces on the device. In connection with safety instructions, non-observance of the instructions will inevitably result in injuries.

⚠ DANGER
DANGER draws attention to an immediately dangerous situation, which will inevitably result in a serious or fatal accident if not observed.

⚠ WARNING
WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
CAUTION indicates a possible danger which, if not avoided, may result in minor injuries.

Symboles d'avertissement

Il s'agit d'un symbole d'avertissement général. Ce symbole vous avertit des risques potentiels de blessures. Respectez les consignes accompagnant ce symbole afin d'éviter toute blessure ou accident mortel.

La présence de ce symbole sur une étiquette "Danger" ou "Avertissement" signale un risque d'électrocution qui provoquera des blessures physiques en cas de non-respect des consignes de sécurité.

Ce symbole indique le risque de surfaces chaudes sur l'équipement. En relation avec les consignes de sécurité, le non-respect des instructions entraînera inévitablement des blessures.

⚠ DANGER
DANGER indique une situation immédiatement dangereuse qui, si elle n'est pas évitée, entraînera la mort ou des blessures graves.

⚠ AVERTISSEMENT
AVERTISSEMENT indique une situation potentiellement dangereuse et susceptible d'entraîner la mort ou des blessures graves.

⚠ ATTENTION
ATTENTION indique une situation potentiellement dangereuse et susceptible d'entraîner des blessures d'ampleur mineure à modérée.

AVIS
AVIS indique des pratiques n'entraînant pas de risques corporels.

Contents

1. Safety instructions

⚠ WARNING

⚠	**UNCONTROLLED MACHINE ACTIONS** **Failure to follow these instructions can result in death, serious injury, or equipment damage.** To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually. Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

⚠ AVERTISSEMENT

⚠	**ACTIONS INCONTRÔLÉES DE LA MACHINE** **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Pour éviter les actions incontrôlées de la machine causées par la perte de données, configurez tous les équipements de transmission de données individuellement. Avant de démarrer une machine commandée par transmission de données, veillez à terminer la configuration de tous les équipements de transmission de données.

You operate this device with electricity. Improper usage of the device entails the risk of physical injury or significant property damage. The proper and safe operation of this device depends on proper handling during transportation, proper storage and installation, and careful operation and maintenance procedures.

- Verify that the electrical installation meets local or nationally applicable safety regulations.

- Before connecting any cable, read this document, and the safety instructions and warnings.

- Operate the device with undamaged components exclusively.

- The device is free of any service components. In case of a damaged or malfunctioning device, turn off the supply voltage and return the device to Hirschmann for inspection.

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.1. Qualification requirements for personnel

Only allow qualified personnel to work on the device.

Qualified personnel have the following characteristics:

- Qualified personnel are properly trained. Training as well as practical knowledge and experience make up their qualifications. This is the prerequisite for grounding and labeling circuits, devices, and systems in accordance with current standards in safety technology.

- Qualified personnel are aware of the dangers that exist in their work.

- Qualified personnel are familiar with appropriate measures against these hazards in order to reduce the risk for themselves and others.

- Qualified personnel receive training on a regular basis.

1.2. Intended use

- Use the product only for the application cases described in the Hirschmann Automation and Control GmbH product information, including this manual.

- Operate the product only according to the technical specifications, see *General data* on page 59.

- Connect to the product only components suitable for the requirements of the specific application case.

1.3. Installation site requirements

⚠ WARNING
FIRE HAZARD **Failure to follow these instructions can result in death, serious injury, or equipment damage.** If you connect the device to a power supply that does **NOT** meet the requirements for Limited Power Source, NEC Class 2 or PS2 according to IEC/EN 62368-1 and is **NOT** limited to 100 W output power, the device must be installed in either a switch cabinet or other fire enclosure. The fire enclosure can be made of metal or plastic with fire-protection properties of at least V-1 according to IEC 60695-11-10. Bottom openings of the fire enclosure must **NOT** exceed 2 mm in diameter.

⚠ AVERTISSEMENT

RISQUE D'INCENDIE
Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.

Si vous connectez l'équipement à une source d'alimentation qui n'est **PAS** conforme aux exigences d'une source d'alimentation limitée, NEC Classe 2 ou PS2 selon CEI/EN 62368-1 et qui n'est **PAS** limitée à une puissance de sortie de 100 W, l'équipement doit être installé dans une armoire de distribution ou dans une autre enceinte coupe-feu.

L'enceinte coupe-feu peut être en métal ou en plastique avec des propriétés de protection contre le feu d'au moins V-1 conformément à la norme CEI 60695-11-10. Les ouvertures du fond de l'enceinte coupe-feu ne doivent **PAS** dépasser 2 mm de diamètre.

- Install this device only in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.

- When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.

- Use the device in an environment with a maximum pollution degree that complies with the specifications in the technical data. For more information, see *General data* on page 59.

- This is an Open Type Equipment intended to be DIN rail mounted in enclosed cabinets which supplies safety aspects protecting the operator from hazards.

1.4. Device casing

Only technicians authorized by the manufacturer are permitted to open the casing.

1.5. Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

- Relieve the connection points of cables and lines from mechanical stress.

- Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.

- To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

1.6. Electrical connections

1.6.1. Grounding the device

The device is grounded via the separate ground screw. The ground screw is located on the top of the device. For more information, see *Device variants LRS30/32/40/42/32-HP/42-HP* on page 61.

- Ground the device before connecting any other cables.

- Disconnect the grounding only after disconnecting all other cables.

1.6.2. Shielding ground

The overall shield of connectable twisted-pair cables is connected to the ground connection of the device casing as a conductor.

- Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

1.6.3. General requirements for connecting electrical wires

Before connecting the electrical wires, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restriction:

- The electrical wires are voltage-free.

- The device is grounded via the designated ground connection(s).

- The cross-section of the ground conductor is the same size or larger than the cross-section of the power supply cables.

- The connected voltage source is limited by a current limitation device or a fuse.

- The device is only switched on after installation.

- The ground connection is disconnected only after all other cables have been disconnected.

- The cables used are permitted for the temperature range of the application case.

⚠️ Only use power supply cables that are suitable for a temperature of +60 °C (+140 °F). The wires of the power supply cable must be made of copper.

⚠️ N'utilisez que des câbles d'alimentation adaptés à une température de +60 °C (+140 °F). Les fils des câbles d'alimentation sont en cuivre.

1.6.4. General requirements for connecting the supply voltage

Before connecting the supply voltage, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restrictions:

- The supply voltage corresponds to the voltage specified on the type plate of the device.

- The power supply cable is suitable for the required voltage, current, and physical load.

- The cross-section of the ground conductor is the same size as or larger than the cross-section of the power supply cables.

- The power supply conforms to overvoltage category II.

- The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly labelled and identifiable, so that in case of an emergency it is clear which power supply the disconnecting device belongs to.

- The power supply is potential-free.

- The supply voltage is only connected to the device casing using protective elements.

- The power supply complies with the requirements for safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/ EN 62368-1.

- The conductor cross-section of the power supply cable is at least 0.75 mm² (18 AWG) on the supply voltage input of the device.

- For PoE device variants, the conductor cross-section of the power supply cable is at least 1 mm² (16 AWG) at the supply voltage input of the device.

DC voltage power supply:

- The device is rated for DC voltage.

- A back-up fuse suitable for DC voltage is installed in **EVERY** plus conductor of the power supply.

- **EVERY** minus conductor is on ground potential. Otherwise, an additional back-up fuse is installed in **EVERY** minus conductor. Regarding the properties of this back-up fuse, see *General data* on page 59.

1.6.5. Specific requirements for connecting the supply voltage

Before connecting the supply voltage, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restrictions:

Applies to device variants with 48 V DC/54 V DC (PoE/PoE+) rated voltage power supply:

The power sources used are electrically isolated from the ground potential. The insulation voltage must be 1500 V AC or 2250 V DC as specified in IEEE 802.3.

1.7. LED or laser components

LED or LASER components according to IEC 60825-1 (2014):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

1.8. Recycling note

The symbol of a crossed-out wheeled bin shown on the device indicates that the device **MUST NOT** be disposed of with household waste at the end of its service life.

After its service life, the used device must be disposed of properly as electronic waste in accordance with the locally applicable disposal regulations.

End users are responsible for deleting personal data from the used device prior to disposal.

End users are obliged to separate used batteries and accumulators that are not enclosed by the used device from the used device in a non-destructive manner before disposing of the used device. The used batteries and accumulators must be handed in for separate collection. This does not apply if the used device is handed in for reuse.

2. Approvals

2.1. CE marking

The labeled devices comply with the regulations contained in the following European directive(s):

- **2011/65/EU and 2015/863/EU (RoHS)**
  Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

- **2014/30/EU (EMC)**
  Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

In accordance with the above-named EU directive(s), the EU conformity declaration will be available to the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

You can download the PDF file of the EU conformity declaration at: *https://www.doc.hirschmann.com/certificates.html*

The device can be used in industrial environments.

- Interference immunity: EN 61000-6-2

- Emitted Interference: EN 61000-6-4

- Emitted interference: EN 55032

For more information on technical data, see *General data* on page 59.

The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

Warning: This is a Class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

2.2. FCC note

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Lemur Rail Switch

U.S. Contact Information

Belden Inc. – St. Louis
1 N Brentwood Blvd. 15th Floor
St. Louis, Missouri 63105,
United States
Phone: 314.854.8000

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

3. Description

The device is designed for the special requirements of industrial automation. The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The device is a lite managed switch with the following connections:

- 7 × 10/100/1000 Mbit/s twisted-pair ports

- 1 × 10/100/1000 Mbit/s twisted-pair and 1 × 1000 Mbit/s SFP combo port

- 3 × 100/1000 Mbit/s SFP optical ports

The device is ideally suited for use in smaller networks or on the edge of larger installations.

The device allows you to set up switched Industrial Ethernet networks according to the standard IEEE 802.3.

The device works without a fan.

The device is mounted on the DIN rail.

You can choose various media to connect to the end devices and other network components:

- Twisted-pair cable

- Multimode F/O (Fiber Optic)

- Singlemode F/O (Fiber Optic)

There are convenient options for managing the device. Manage your devices via:

- Web browser

- SSH

- Telnet

- Network management software (for example Provize Explorer)

  The Network Management Software Provize Explorer provides you with options for smooth configuration and monitoring. For more information, see *www.belden.com/get-ProvizeExplorer*.

The device provides you with a large range of functions, which the Manual Collection (User and Reference Manuals) for the operating software informs you about. For more information, see *https://www.doc.hirschmann.com*.

3.1. Device name

The following device variants are available in the Belden Online Catalog. See *https://catalog.belden.com* on the web page of the device.

Table 1. Device name

Order number	Product name	Description
942328005	LRS30-7TX/3SF-P/1C	Total number of ports: 11 7 × 10/100BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE+: N/A Power input: 24 V DC at 0.5 A
942328003	LRS40-7TX/3SF-P/1C	Total number of ports: 11 7 × 10/100/1000BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE+: N/A Power input: 24 V DC at 0.5 A
942328006	LRS32-7TX/3SF-P/1C	Total number of ports: 11 7 × 10/100BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE: 8 × TX port, Typical input voltage 48 V DC, 4.5 A, 15 W/port, max. 120 W PoE+: 8 × TX port, Typical input voltage 54 V DC, 4.5 A, 30 W/port, max. 180 W
942328004	LRS42-7TX/3SF-P/1C	Total number of ports: 11 7 × 10/100/1000BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE: 8 × TX port, Typical input voltage 48 V DC, 4.5 A, 15 W/port, max. 120 W PoE+: 8 × TX port, Typical input voltage 54 V DC, 4.5 A, 30 W/port, max. 180 W
942328106	LRS32-7TX/3SF-P/1C-HP	Total number of ports: 11 7 × 10/100BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE: 8 × TX port, Typical input voltage 48 V DC, 6 A, 15 W/port, max. 120 W PoE+: 8 × TX port, Typical input voltage 54 V DC, 6 A, 30 W/port, max. 240 W
942328104	LRS42-7TX/3SF-P/1C-HP	Total number of ports: 11 7 × 10/100/1000BASE-TX 1 × Combo port (10/100/1000BASE-TX and 1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE: 8 × TX port, Typical input voltage 48 V DC, 6 A, 15 W/port, max. 120 W PoE+: 8 × TX port, Typical input voltage 54 V DC, 6 A, 30 W/port, max. 240 W

3.2. Device views

3.2.1. Front view

Figure 1. Front view of device variants LRS30, LRS32, LRS32-HP
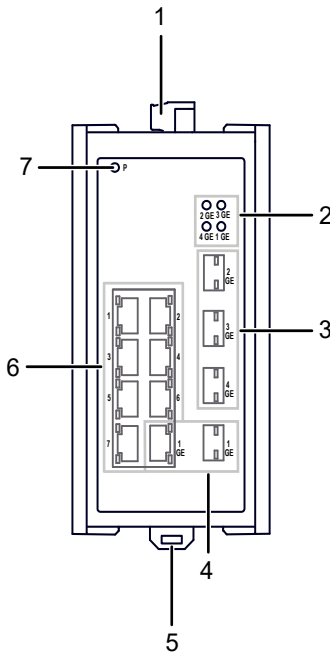
Table 2. Description of device elements: Front view of device variants LRS30, LRS32, LRS32-HP

1	6-pin terminal block with screw lock for redundant power supply
2	LED display elements for port status
3	3 × SFP slot for 100/1000BASE-FX connections
4	1 × Combo port for 10/100/1000BASE-TX and 1000BASE-FX SFP
5	Rail lock slide for DIN rail mounting
6	7 × RJ45 socket for 10/100BASE-TX
7	LED display element for device status

Figure 2. Front view of device variants LRS40, LRS42, LRS42-HP
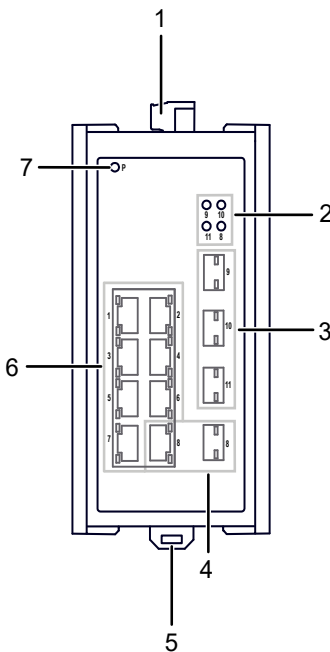
Table 3. Description of device elements: Front view of device variants LRS40, LRS42, LRS42-HP

1	6-pin terminal block with screw lock for redundant power supply
2	LED display elements for port status
3	3 × SFP slot for 100/1000BASE-FX connections
4	1 × Combo port for 10/100/1000BASE-TX and 1000BASE-FX SFP
5	Rail lock slide for DIN rail mounting
6	7 × RJ45 socket for 10/100/1000BASE-TX
7	LED display element for device status

3.2.2. Rear view

Figure 3. Device variants LRS30/32/40/42/32-HP/42-HP
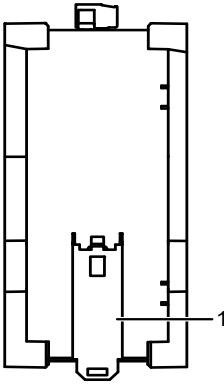
1	Rail lock slide for DIN rail mounting

3.3. Power supply

The following options for power supply are available:

3.3.1. Supply voltage 24 V DC

The device variants LRS30 and LRS40 come with the following supply voltage connection:

24 V DC with 6-pin terminal block

For more information on connecting the supply voltage, see *Connecting the supply voltage* on page 43.

3.3.2. Supply voltage 48 V DC (PoE) or 54 V DC (PoE+)

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP come with the following supply voltage connection:

48 V DC (PoE) or 54 V DC (PoE+) with 6-pin terminal block

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP support Power over Ethernet Plus according to IEEE 802.3at (PoE+), and allow you to supply end devices with power via twisted-pair cable, like for example IP telephones. In delivery state, the Power over Ethernet Plus function is activated on every port capable of PoE+.

You will find information on connecting the supply voltage here:

3.4. Ethernet ports

You can connect end devices and other segments to the device ports using twisted-pair cables or optical fibers (F/O).

3.4.1. Twisted-pair port 10/100 Mbit/s

This port is an RJ45 socket.

The 10/100 Mbit/s twisted-pair port allows you to connect network components according to IEEE 802.3 10BASE-T/100BASE-TX.
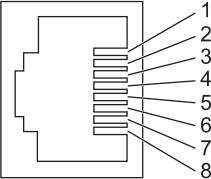
This port supports:

- Auto-Negotiation

- Autopolarity

- Auto-Crossover (if Auto-Negotiation is enabled)

- 100 Mbit/s half duplex mode, 100 Mbit/s full duplex mode

- 10 Mbit/s half duplex mode, 10 Mbit/s full duplex mode

Delivery state: Auto-Negotiation activated

The pin assignment corresponds to MDI-X.

Table 4. Pin assignment 10/100 Mbit/s twisted-pair port, RJ45 socket, MDI and MDI-X mode

RJ45	Pin	10/100 Mbit/s	PoE
	MDI mode		
	1	TX+	Negative V^{PSE}
	2	TX−	Negative V^{PSE}
	3	RX+	Positive V^{PSE}
	4	–	–
	5	–	–
	6	RX−	Positive V^{PSE}
	7	–	–
	8	–	–
	MDI-X mode		
	1	RX+	Negative V^{PSE}
	2	RX−	Negative V^{PSE}
	3	TX+	Positive V^{PSE}
	4	–	–
	5	–	–
	6	TX−	Positive V^{PSE}
	7	–	–
	8	–	–

3.4.2. Twisted-pair port 10/100/1000 Mbit/s

This port is an RJ45 socket.

The 10/100/1000 Mbit/s twisted-pair port allows you to connect network components according to the standard IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T.

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP also allow IEEE 802.3at and IEEE 802.3af (Power over Ethernet on data lines).

This port supports:

- Autonegotiation

- Autopolarity

- Autocrossing (if autonegotiation is activated)

- 10 Mbit/s half duplex mode, 10 Mbit/s full duplex mode

- 100 Mbit/s half duplex mode, 100 Mbit/s full duplex mode

- 1000 Mbit/s full duplex mode

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI and MDI-X mode.

Table 5. Pin assignment 10/100/1000 Mbit/s twisted-pair port, RJ45 socket, MDI and MDI-X mode
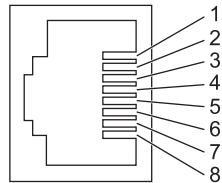
RJ45	Pin	10/100 Mbit/s	1000 Mbit/s	PoE/PoE+
	MDI mode			
1	1	TX+	BI_DA+	Negative V^{PSE}
2	2	TX−	BI_DA−	Negative V^{PSE}
3	3	RX+	BI_DB+	Positive V^{PSE}
4	4	–	BI_DC+	–
5	5	–	BI_DC−	–
6	6	RX−	BI_DB−	Positive V^{PSE}
7	7	–	BI_DD+	–
8	8	–	BI_DD−	–
	MDI-X mode			
	1	RX+	BI_DB+	Negative V^{PSE}
	2	RX−	BI_DB−	Negative V^{PSE}
	3	TX+	BI_DA+	Positive V^{PSE}
	4	–	BI_DD+	–
	5	–	BI_DD−	–
	6	TX−	BI_DA−	Positive V^{PSE}
	7	–	BI_DC+	–

Table 5. Pin assignment 10/100/1000 Mbit/s twisted-pair port, RJ45 socket, MDI and MDI-X mode (continued)

RJ45	Pin	10/100 Mbit/s	1000 Mbit/s	PoE/PoE+
	8	–	BI_DC−	–

3.4.3. Support of PoE(+)

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP support Power over Ethernet (PoE) and Power over Ethernet Plus (PoE+).

PoE-capable Ethernet ports are designed as 8 × RJ45 sockets. For more information, see *Device views* on page 27.

The port allows you to connect network components via a PoE voltage source according to the standard IEEE 802.3af/at.

With the presence of the PoE power supply, a separate power supply for the connected devices is unnecessary.

The PoE power is supplied via the wire pairs transmitting the signal (phantom voltage).

The individual ports are not electrically insulated from each other (common PoE voltage).

For the maximum power available to PoE end devices in total, refer to technical data.

For more information, see *Supply voltage 48 V DC (PoE) or 54 V DC (PoE+)* on page 60.

> **Note:** Connect only PoE-powered devices whose data connections are located in the interior of the building and are specified as SELV circuits according to IEC 60950-1 or ES1 circuits according to IEC/EN 62368-1.

3.4.4. Combo port 10/100/1000 Mbit/s twisted-pair and 1000 Mbit/s F/O

The device provides 1 combo port with a 10/100/1000 Mbit/s twisted-pair port and a 1000 Mbit/s F/O port.

You can alternatively connect a twisted-pair cable via an RJ45 socket according to IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T, or connect an optical fiber via a Gigabit Ethernet SFP transceiver according to IEEE 802.3 1000BASE-FX.

The combo port has a fixed data rate of 1000 Mbit/s and does not support Fast Ethernet SFP transceivers. For more information, see *Device views* on page 27.

By inserting an SFP transceiver, you automatically deactivate the corresponding RJ45 socket.

Exclusively use Hirschmann SFP transceivers which are suitable to be used with the device. For more information, see *Accessories* on page 78.

3.4.5. F/O port 100/1000 Mbit/s

This port is an SFP slot.

The 100/1000 Mbit/s F/O port allows you to connect network components according to the standard IEEE 802.3 100BASE-FX/1000BASE-FX.

This port supports:

- 100 Mbit/s full duplex mode

- 1000 Mbit/s full duplex mode

Delivery state:

- 100 Mbit/s full duplex mode when using a Fast Ethernet SFP transceiver

- 1000 Mbit/s full duplex mode when using a Gigabit Ethernet SFP transceiver

3.5. Display elements

3.5.1. Device status

This LED provides information about conditions which affect the operation of the whole device.

Figure 4. LED display element for device status
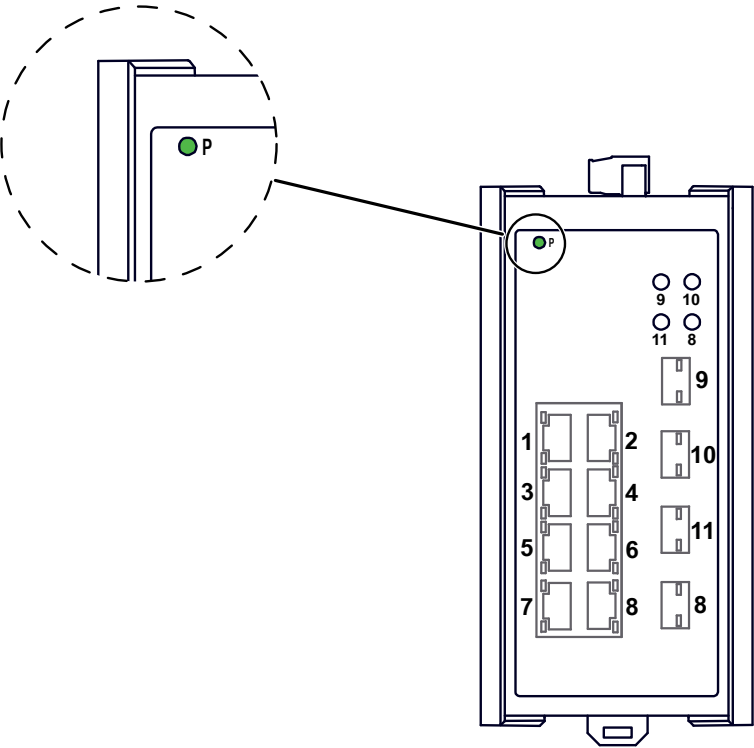
Table 6. Power LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Supply voltage is too low or not available
green	lights up	Supply voltage is on

3.5.2. Port status

These LEDs display port-related information.

For the position of the port display elements on the device variants with 8 × RJ45 sockets and 4 × F/O sockets including 1 combo port, see *Figure 5: Port status: Location of the port display elements on the device LRS30, LRS32, LRS32-HP* on page 36.

For the meaning of the port display elements, see *Table 7: F/O port LED: Color, activity and meaning* on page 37.

Figure 5. Port status: Location of the port display elements on the device LRS30, LRS32, LRS32-HP
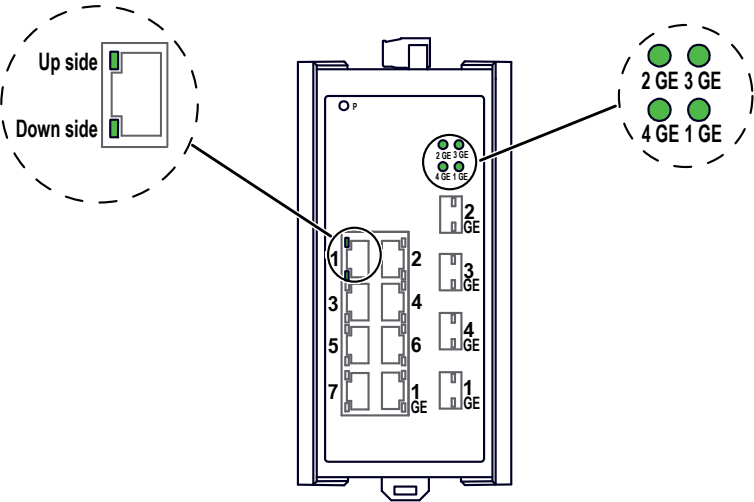
Figure 6. Port status: Location of the display elements on the device LRS40, LRS42, LRS42-HP
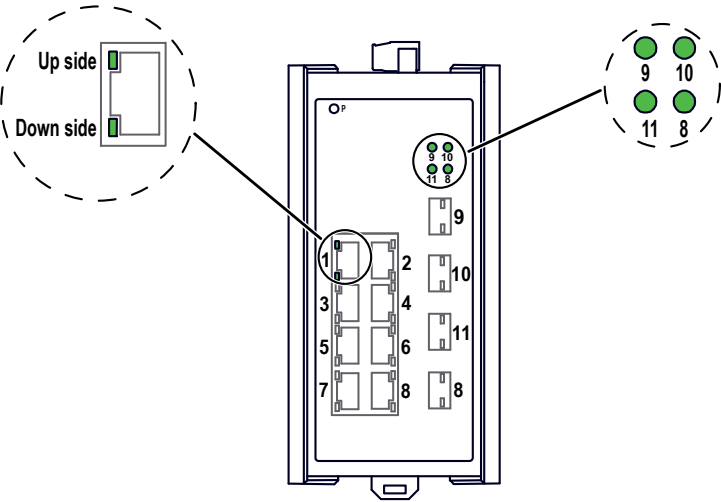
Table 7. F/O port LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Device detects an invalid or missing link
green	lights up	Device detects a valid link
green	flashing	Device is transmitting and/or receiving data

Table 8. RJ45 port LED: Color, activity and meaning

Color	Activity	Meaning
none	Up side, LED is off	No link detected
none	Down side, LED is off	PoE voltage is off
green	Up side, LED lights up	Link detected
green	Up side, LED is flashing	Device is transmitting and/or receiving data
green	Down side, LED lights up	PoE voltage is on

4. Installation

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.

To install the device, perform the following work steps:

- *Checking the package contents* on page 38

- *Mounting the device* on page 39

- *Grounding the device* on page 41

- *Installing an SFP transceiver (optional)* on page 42

- *Connecting the supply voltage* on page 43

- *Operating the device* on page 46

- *Connecting data cables* on page 46

4.1. Checking the package contents

- Check whether the package includes all items named in *Scope of delivery* on page 77.

- Check the individual parts for transport damage.

4.2. Mounting the device

⚠ CAUTION
BURN HAZARD   **Failure to follow these instructions can result in injury or equipment damage.**   The surfaces of the device casing may become hot. Avoid touching the device while it is operating.   If ambient temperatures are ≥45 °C (≥113 °F), exclusively install the device in "restricted access locations" according to EN 62368-1.

⚠ ATTENTION
RISQUE DE BRÛLURE   **Le non-respect de ces instructions peut entraîner des blessures ou des dommages matériels.**   Les surfaces du boîtier de l'équipement peuvent devenir chaudes. Évitez de toucher l'équipement lorsqu'il fonctionne.   Si les températures ambiantes sont ≥45 °C (≥113 °F), installez l'équipement exclusivement dans des « emplacements à accès restreint » conformément à la norme EN 62368-1.

• When selecting the installation location, verify that you observe the climatic threshold values of the device specified in the technical data. Take measures to prevent ambient conditions such as heat from affecting the device.

4.2.1. Mounting the device onto the DIN rail

Prerequisites:

Mount the device at a maximum height of 2 m (78.74 in).

Verify that the minimum clearance at the ventilation slots of 5 cm (2 in) is maintained to meet the climatic conditions during operation.

Verify that the device maintains the minimum clearance to meet the climatic conditions during operation:

> • Top and bottom sides of device: 5 cm (2 in)

> • Left and right device side: 2 cm (0.79 in)

Perform the following work steps:
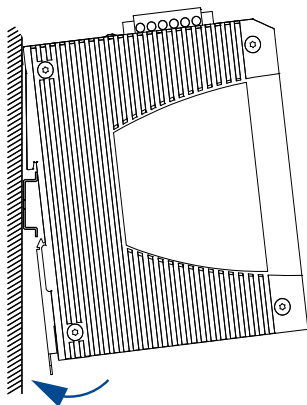
> • Slide the upper snap-in guide of the device onto the DIN rail.

> • Push the device downwards and onto the DIN rail.

> • Snap in the device.

4.3. Grounding the device

⚠ CAUTION
⚠ **ELECTRIC SHOCK** **Failure to follow these instructions can result in minor injury, or equipment damage.** Ground the device before connecting any other cables.

⚠ ATTENTION
⚠ **CHOC ÉLECTRIQUE** **Le non-respect de ces instructions peut entraîner des blessures légères ou des dommages matériels.** Mettez l'équipement à la terre avant de connecter tout autre câble.

All device variants have a functional ground connection.

Figure 7. Location of the ground connection on the device; tightening torque.
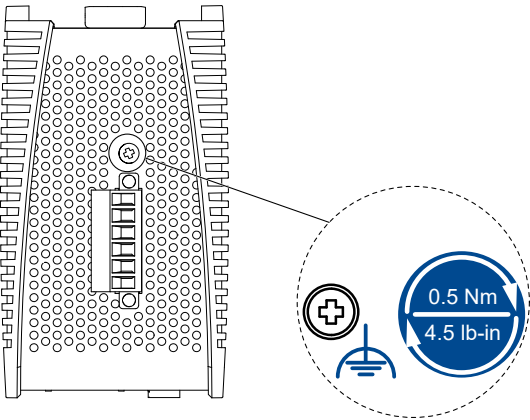
Perform the following work steps:

- Ground the device via the ground screw with a tightening torque of
  0.5 Nm (4.5 lb-in).

The cross-section of the ground conductor must be the same size as or bigger
than the cross-section of the power supply cables.

4.4. Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers. Transceivers are available as
accessories, see *Accessories* on page 78.

Figure 8. Installing SFP transceivers: Installation sequence
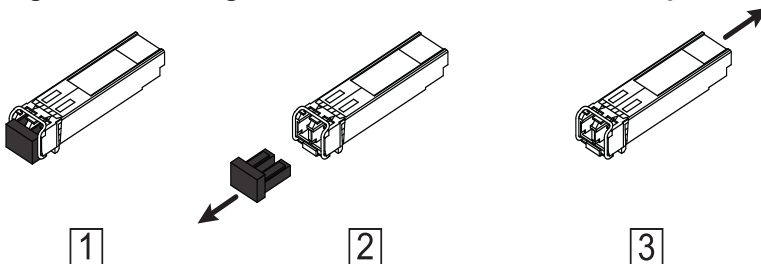
Perform the following work steps:

- Take the SFP transceiver out of the transport packaging (1).

- Remove the protection cap from the SFP transceiver (2).

- Push the SFP transceiver with the lock closed into the slot until it
  latches in (3).

4.5. Connecting the supply voltage

The supply voltage is exclusively connected to the device casing through protective elements.

⚠ WARNING

	ELECTRIC SHOCK **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Exclusively connect the supply voltage that corresponds with the type plate of your device.

⚠ AVERTISSEMENT

	CHOC ÉLECTRIQUE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Ne branchez qu'une tension d'alimentation correspondant à la plaque signalétique de votre équipement.

4.5.1. Supply voltage 24 V DC

The device variants LRS30 and LRS40 come with a 24 V DC supply voltage connection.

Figure 9. Supply voltage connection and terminal block mounting
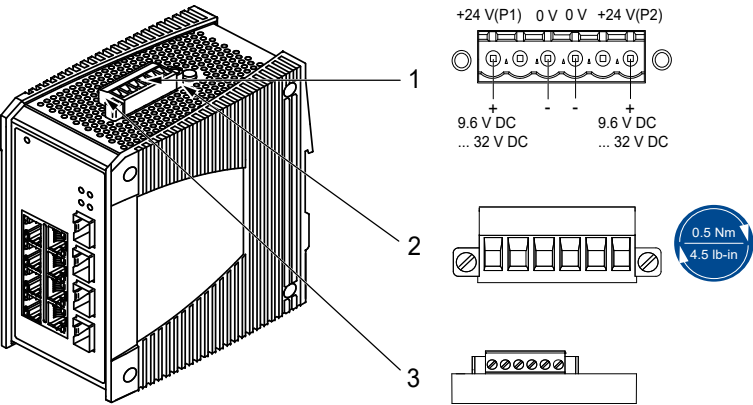
Position	Description
1	DC voltage connection on the device.
2	Terminal block mounted on the device (top view) and tightening torque.
3	Terminal block mounted on the device (side view).

Table 9. Type and specification of the supply voltage, pin assignment

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage DC: 24 V DC Voltage range DC incl. maximum tolerances: 9.6 V DC ... 32 V DC	+24 V	Plus terminal of the supply voltage
		0 V	Minus terminal of the supply voltage

For the supply voltage to be connected, perform the following steps:

- Remove the terminal connector from the device.

- Connect the wires according to the pin assignment on the device with the clamps.

- Fasten the wires in the terminal block by tightening the terminal screws.

- Mount the terminal block on the device using screws.

4.5.2. Supply voltage 48 V DC (PoE) or 54 V DC (PoE+)

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP come with a 48 V DC (PoE) or a 54 V DC (PoE+) supply voltage connection.

Figure 10. Supply voltage connection and terminal block mounting
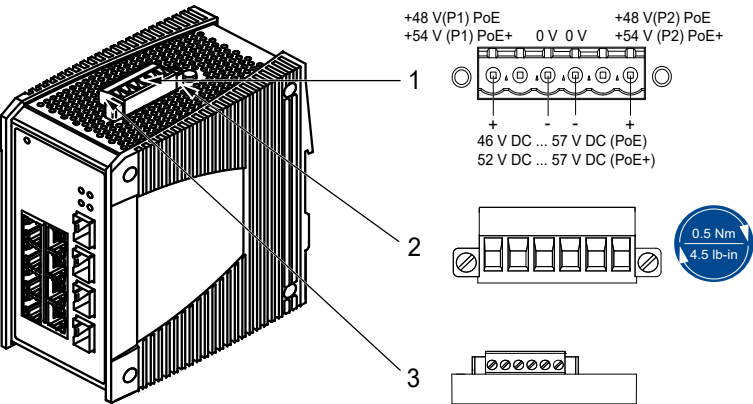
Position	Description
1	DC voltage connection on the device.
2	Terminal block mounted on the device (top view) and tightening torque.
3	Terminal block mounted on the device (side view).

Table 10. Type and specification of the supply voltage, pin assignment

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage (PoE)	Rated voltage DC: 48 V DC Voltage range DC incl. maximum tolerances: 46 V DC ... 57 V DC	+48 V	Plus terminal of the supply voltage
		0 V	Minus terminal of the supply voltage
DC voltage (PoE+)	Rated voltage DC: 54 V DC Voltage range DC incl. maximum tolerances: 52 V DC ... 57 V DC	+54 V	Plus terminal of the supply voltage
		0 V	Minus terminal of the supply voltage

To connect the supply voltage, perform the following steps:

- Remove the terminal connector from the device.

- Connect the wires according to the pin assignment on the device with the clamps.

- Fasten the wires in the terminal block by tightening the terminal screws.

- Mount the terminal block on the device using screws.

4.6. Operating the device

When you connect the supply voltage, you start up the device.

4.7. Connecting data cables

Note the following general recommendations for data cable connections in environments with high electrical interference levels:

- Keep the length of the data cables as short as possible.

- Use optical data cables for the data transmission between buildings.

- When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable ducts.

- Verify that power supply cables and data cables do not run parallel over longer distances. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle.

- Use shielded data cables for gigabit transmission via copper cables. Only use shielded data cables to meet EMC requirements according to EN 50121-4. For more information, see *Electromagnetic compatibility (EMC)* on page 66.

- Connect the data cables according to your requirements. For more information, see *Ethernet ports* on page 30.

- Use CAT5e cable or higher for twisted-pair connections.

Perform the following work steps:

- Connect the data cables.

5. Basic settings

2 or more devices configured with the same IP address can cause unpredictable operation of your network.

Perform the following work step:

Install and maintain a process that assigns a unique IP address to every device in the network.

The IP parameters must be entered when the device is installed for the first time. The device provides the following options for configuring IP addresses:

- Configuration via DHCP (state on delivery)

- Input via the Provize Explorer. You find further information about Provize Explorer at *www.belden.com/get-ProvizeExplorer*.

5.1. Default settings

- IP address: The device looks for its IP address parameters using DHCP

- Optical ports: Full duplex

- Twisted-pair ports: Autonegotiation

- Rapid Spanning Tree Protocol (RSTP): enabled

- Management: VLAN 1

5.2. First login (Password change)

To help prevent undesired access to the device, it is imperative that you change the default password during initial setup.

During the first login to the new device, after a factory reset, and after you run the command clear config, you bring the device to an operational state. To do this, you need to change the default password of the default administrator account. Until then, the device only has limited availability to the network:

- The protocols Telnet, Hypertext Transfer Protocol (HTTP), and the Simple Network Management Protocol (SNMP), are disabled on the device by default. After you have changed the default password, enable the needed protocols.

- The Provize Explorer application lets you change the default password using the protocol Hypertext Transfer Protocol Secure (HTTPS).

- Hirschmann recommends setting a password that is different from the default password.

Perform the following work steps:

- Open the Graphical User Interface, the Command Line Interface, or Provize Explorer the first time you log on to the device.

- Log on to the device with the default user name "admin" and the default password "private". On successful login, the device prompts you to type in a new password.

- Type in your new password.

  To help increase security, choose a password that contains at least 8 characters which includes upper-case characters, lower-case characters, numerical digits, and special characters.

- When you log on to the device with the Command Line Interface, the device prompts you to confirm your new password.

  The device displays an error when the new password entered and the password confirmed do not match.

- Log on to the device again with your new password.

Note: If you lost your password, use the device recovery (*Device recovery on page 51*) to reset the password.

6. Recovery

You have 2 options for restoring the device:

- *Firmware recovery* on page 50

- *Device recovery* on page 51

6.1. Firmware recovery

A firmware recovery might be necessary, for example, if the device does not respond to your commands due to a detected failure in the current software. In this case, you can activate the backup software by restarting the device manually 4 times. After the 4 manual restarts are completed, the device starts up normally, using the backup software to let you set up the device again and be able to use the features.

1. Disconnect or disable the power supply to the device. When the device status LED stops glowing, the POWER OFF is completed.
2. After you have POWERED OFF the device, begin the consecutive restart cycle.
3. Connect or enable the power supply to the device. Wait until each of the device LEDs have been glowing for about 3 .. 5 seconds, indicating that the device is POWERED ON and booted. 1 cycle of the system restart is now completed.
4. Repeat the steps described above 3 more times. The prerequisite is that the consecutive restart cycle is started within a time interval of less than 2 minutes after the device LEDs have been glowing for about 3 .. 5 seconds and then have stopped glowing.

When the manual recovery is successful, the device starts up during the fourth restart by loading the version of the device software stored in the backup partition to help provide the device access.

After successful manual recovery, before setting up the device, Hirschmann advises to upload the latest version of the device software. To upload the new device software, refer to the software documentation at *https://www.doc.hirschmann.com*.

If the device has detected a failure during boot up with the new software version, then the device tries to recover automatically. If 3 automatic restart attempts do not help recover the current software version, then the device aborts the current software upload. Finally, the device starts up with the previous device software stored in the backup partition.

6.2. Device recovery

The device recovery mechanism lets you recover the device when the device is inaccessible or has an unstable configuration due to one of the following reasons:

- The default Administrator password is lost and the password recovery is needed.

- The device is locked out using the management access filtering.

- The device is locked out using the AAA feature.

- The VLAN 1 gets deleted or is inaccessible.

6.2.1. Disabling or enabling device recovery

The device recovery feature is enabled on the device by default. Users have the following options using the command line interface:

- Checking the current settings of the device recovery feature.

- Toggling between the disabled and enabled status if needed.

Note: In case you have forgotten the password while the device recovery is in disabled status, or if there is an error detected in the startup configuration, you might have lost access to the device. In this case, you are not able to recover the device on your own. To help avoid this situation, it is recommended to keep the device recovery feature enabled. If you still need assistance, please make use of our support: *https://my.belden.com*

Table 11. Device recovery settings: CLI options

CLI command	Action
show device-recovery	check the current settings of the device recovery feature
configure terminal	change the configuration mode
no device-recovery	disable the device recovery feature on the device
device-recovery	enable the device recovery feature on the device

6.2.2. Performing device recovery

When the device is neither accessible nor the configuration is stable, perform the following work steps:

• Create a physical loopback by connecting a cable between port 1 and port 2.

• Reboot the device.

Figure 11. Device recovery, loopback between port 1 and port 2.
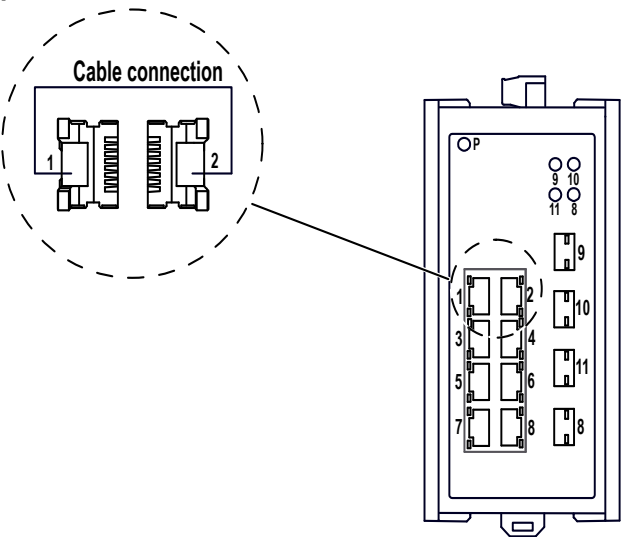
Note: A successful reboot is required for the execution of the manual recovery.

The reboot is successful, when the device software is booting up normally with the startup configuration stored in the non-volatile memory. This will take up to 70 seconds.

The completion of the device software boot up is identified by the following:

- The power LED is on.

- Flashing of the connected port LEDs.

After the boot up is completed, the device detects the physical loopback connected between the port 1 and port 2, and transmits a loopback packet from the port 2. When the port 1 receives and validates the loopback packet, the device performs the `clear config` operation.

As a result, the following happens on the device:

- The active configuration is cleared, including the IPv4 address configured on the management VLAN.

- The device loads the default configuration, which uses a DHCP client to set the management IPv4 address. Alternatively, you can use the Provize Explorer application to find and administrate the device.

- The password of the default administrator user is restored to default.

- Existing user configurations are removed.

- When the `clear config` operation is completed, the device triggers the Force Password Change (FPC) to let you change the default password of the device.

After the device has triggered the Force Password Change (FPC), perform the following work steps:

- Remove the loopback cable from the device.

- Change the default password of the device. For more information, see *First login (Password change)* on page 48.

Note: If required, take the back-up of the startup configuration and overwrite the startup configuration using the command `copy running-config startup-config`. Else, on the next reboot, the device will boot up with the older settings stored in startup configuration.

Once you have performed the steps for device recovery, you will get access to the device.

7. Monitoring ambient conditions

7.1. Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.

For more information, see *Climatic conditions during operation* on page 62.

The ambient air temperature is the temperature of the air at a distance of 5 cm (2 in) from the device. It depends on the installation conditions of the device, for example the distance from other devices or other objects, and the output of neighboring devices.

8. Maintenance and service

- When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.

- Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.

- Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads at:
  https://www.belden.com

- Depending on the pollution degree in the operating environment, check regularly that the ventilation slots in the device are not obstructed.

You find information on settling complaints at:
https://my.belden.com

9. Disassembly

9.1. Removing an SFP transceiver (optional)

Figure 12. De-installing SFP transceivers: De-installation sequence
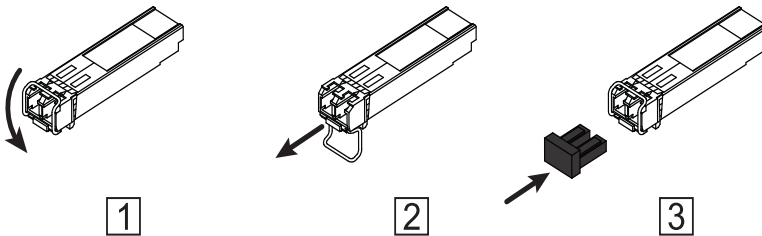
Perform the following work steps:

- Open the locking mechanism of the SFP transceiver (1).

- Pull the SFP transceiver out of the slot via the open locking mechanism (2).

- Close the SFP transceiver with the protection cap (3).

9.2. Removing the device

⚠ WARNING
⚠ **ELECTRIC SHOCK**   **Failure to follow these instructions can result in death, serious injury, or equipment damage.**   Disconnect the grounding only after disconnecting all other cables.

⚠ **AVERTISSEMENT**
⚠ **CHOC ÉLECTRIQUE** **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Ne débranchez la mise à la terre qu'après avoir débranché tous les autres câbles.

Perform the following work steps:
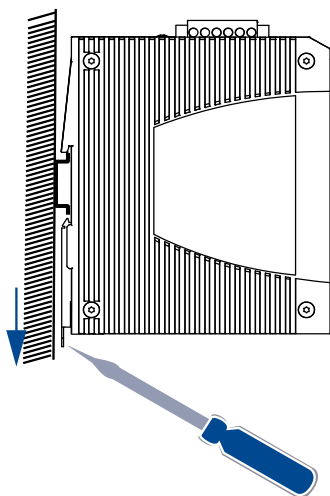
• Disconnect the data cables.

• Disable the supply voltage.

• Disconnect the terminal blocks.

• Disconnect the grounding.

• Insert a screwdriver horizontally below the casing into the locking gate.

• Pull the rail lock slide down using a screwdriver and fold the device up.

10. Technical data

10.1. General data

Table 12. General data: Lemur Rail Switch

LRS30/32/40/42/32-HP/42-HP		
Dimensions W × H × D	See *Device variants LRS30/32/40/42/32-HP/42-HP* on page 61.	
Weight (values vary depending on device variants)	LRS30	0.68 kg (1.49 lb)
	LRS40	
	LRS32	0.72 kg (1.58 lb)
	LRS42	
	LRS32-HP	
	LRS42-HP	
Mounting	See *Mounting the device onto the DIN rail* on page 40.	
Pollution degree	2	
Degree of protection	IP30	

10.2. Supply voltage

10.2.1. Supply voltage 24 V DC

The device variants LRS30 and LRS40 come with a 24 V DC supply voltage connection.

Table 13. Supply voltage LRS30 and LRS40

Rated voltage DC:	24 V DC	
Voltage range DC incl. maximum tolerances:	9.6 V DC ... 32 V DC	
Connection type	6-pin terminal block with screw lock	
	Tightening torque	0.5 Nm (4.5 lb-in)
	min. conductor cross-section	0.75 mm² (18 AWG)
	max. conductor cross-section	2.5 mm² (12 AWG)

Table 13. Supply voltage LRS30 and LRS40 (continued)

Power loss buffer	>10 ms at 20.4 V DC	
Overload current protection on the device	Non-replaceable fuse	
Back-up fuse for each voltage input	Nominal rating:	10 A
	Characteristic:	fast-acting fuse
Current integral I²t	<1 A²s	
Connection for functional ground	See *Grounding the device* on page 41	

10.2.2. Supply voltage 48 V DC (PoE) or 54 V DC (PoE+)

The device variants LRS32, LRS42, LRS32-HP and LRS42-HP come with a 48 V DC (PoE) or a 54 V DC (PoE+) supply voltage connection.

Table 14. Supply voltage of LRS32, LRS42, LRS32-HP and LRS42-HP

Rated voltage DC	PoE	48 V DC
	PoE+	54 V DC
Voltage range DC including maximum tolerances	PoE	46 V DC ... 57 V DC
	PoE+	52 V DC ... 57 V DC
Connection type	6-pin terminal block with screw lock	
	Tightening torque	0.5 Nm (4.5 lb-in)
	min. conductor cross-section	1.0 mm² (16 AWG)
	max. conductor cross-section	2.5 mm² (12 AWG)
Power loss buffer	>10 ms at 41.4 V DC	
Overload current protection on the device	Non-replaceable fuse	
Back-up fuse for each voltage input	Nominal rating:	10 A
	Characteristic:	fast-acting fuse
Connection for functional ground	See *Grounding the device* on page 41	
Current integral I²t	<1 A²s	
Max. PoE power	Nominally	180 W

10.3. Power consumption/power output

Table 15. Power consumption/power output

Device name	Total power consumption	Thermal power output	PoE power output
LRS30-7TX/3SFP/1C	7.2 W	25 Btu (IT)/h	0 W
LRS40-7TX/3SFP/1C	8.2 W	28 Btu (IT)/h	0 W
LRS32-7TX/3SFP/1C	195.2 W	52 Btu (IT)/h	180 W
LRS42-7TX/3SFP/1C	196.3 W	56 Btu (IT)/h	180 W
LRS32-7TX/3SFP/1C-HP	259.5 W	67 Btu (IT)/h	240 W
LRS42-7TX/3SFP/1C-HP	260.4 W	70 Btu (IT)/h	240 W

10.4. Dimension drawings

10.4.1. Device variants LRS30/32/40/42/32-HP/42-HP

Figure 13. Dimension drawing
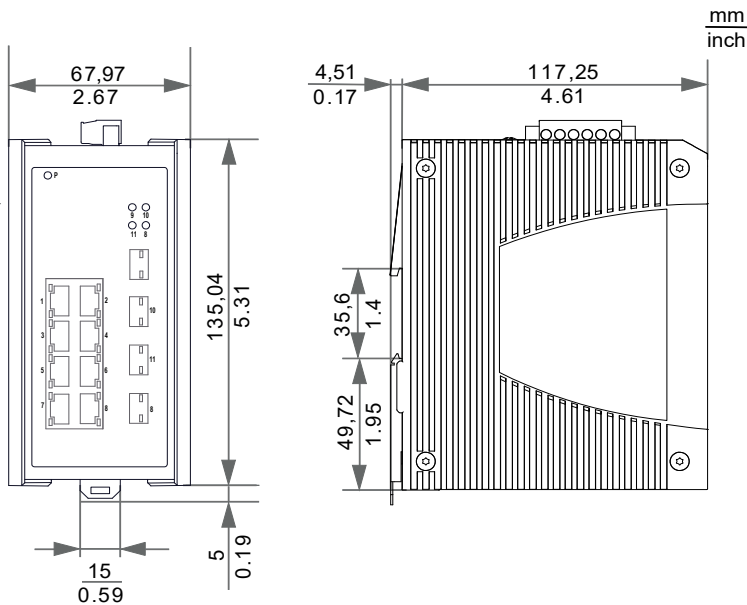
10.5. Climatic conditions during operation

Table 16. Climatic conditions during operation

Climatic conditions during operation	
Minimum clearance around the device	Top and bottom device side: 10 cm (3.94 in) Left and right device side: 2 cm (0.79 in)
Ambient air temperature	-40 °C ... +60 °C (-40 °F ... +140 °F)
Humidity	5 % ... 95 % (non-condensing)
Air pressure	min. 795 hPa (+2000 m ASL; +6562 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

10.6. Climatic conditions during storage

Table 17. Climatic conditions during storage

Climatic conditions during storage	
Ambient air temperature	-40 °C ... +85°C (-40 °F ... +185 °F)
Humidity	5 % ... 95 % (non-condensing)
Air pressure	min. 540 hPa (+5000 m ASL; +16404 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

10.7. Maximum ambient air temperature

Note the values for installation, altitude and when using an SFP transceiver.

10.7.1. Device variants without PoE

Table 18. Maximum ambient air temperature of the LRS device variants without PoE

Product name	Temperature range
LRS30-7TX/3SFP/1C	-40 °C ... +60 °C (-40 °F ... +140 °F)
LRS40-7TX/3SFP/1C	-40 °C ... +60 °C (-40 °F ... +140 °F)

10.7.2. Device variants with PoE

Table 19. Maximum ambient air temperature of the LRS device variants with PoE

Product name	Temperature range
LRS32-7TX/3SFP/1C	-40 °C ... +60 °C (-40 °F ... +140 °F) at maximum 180 W PoE power
LRS42-7TX/3SFP/1C	-40 °C ... +60 °C (-40 °F ... +140 °F) at maximum 180 W PoE power
LRS32-7TX/3SFP/1C-HP	-40 °C ... +60 °C (-40 °F ... +140 °F) at maximum 240 W PoE power
LRS42-7TX/3SFP/1C-HP	-40 °C ... +60 °C (-40 °F ... +140 °F) at maximum 240 W PoE power

10.8. Derating

Add the deratings if more than one of the following conditions apply.

Note: Derating is not evaluated by UL (Underwriter Laboratories).

10.8.1. Derating depending on the mounting position

Table 20. Derating depending on the mounting position

Mounting	Minimum clearance at the ventilation slots	Derating
LRS30/LRS40 Standard mounting (vertical)	Top and bottom device side: 5 cm (2 in) Left and right device side: 0 cm (0 in)	0 K
	Top and bottom device side: 2 cm (0.8 in) Left and right device side: 0 cm (0 in)	0 K
	Top and bottom device side: 0 cm (0 in) Left and right device side: 0 cm (0 in)	10 K
LRS32/LRS42 Standard mounting (vertical)	Top and bottom device side: 5 cm (2 in) Left and right device side: 1 cm (0.4 in)	0 K
	Top and bottom device side: 2 cm (0.8 in) Left and right device side: 1 cm (0.4 in)	3 K
	Top and bottom device side: 0 cm (0 in) Left and right device side: 1 cm (0.4 in)	15 K
LRS32-HP/LRS42-HP	Top and bottom device side: 5 cm (2 in)	0 K

Table 20. Derating depending on the mounting position (continued)

Mounting	Minimum clearance at the ventilation slots	Derating
Standard mounting (vertical)	Left and right device side: 5 cm (2 in)	
	Top and bottom device side: 2 cm (0.8 in) Left and right device side: 5 cm (2 in)	5 K

10.8.2. Derating depending on the altitude above sea level

Table 21. Derating depending on the altitude above sea level

Altitude above sea level	Derating
-400 m ASL ... 2000 m ASL (-1312 ft ASL ... 6560 ft ASL)	0 K

10.8.3. Derating depending on SFP transceiver class

Table 22. Fast Ethernet SFP transceiver

Product code	Derating Non-PoE variants LRS30-7TX/3SFP/1C LRS40-7TX/3SFP/1C	Derating 180 W PoE variants LRS32-7TX/3SFP/1C LRS42-7TX/3SFP/1C	Derating 240 W PoE variants LRS32-7TX/3SFP/1C-HP LRS42-7TX/3SFP/1C-HP
M-FAST SFP-MM/LC	0 K	15 K	15 K
M-FAST SFP-MM/LC EEC	0 K	0 K	0 K
M-FAST SFP-SM/LC	0 K	15 K	15 K
M-FAST SFP-SM/LC EEC	0 K	0 K	0 K
M-FAST SFP-SM+/LC	0 K	15 K	15 K
M-FAST SFP-SM+/LC EEC	0 K	0 K	0 K
M-FAST SFP-LH/LC	0 K	15 K	15 K
M-FAST SFP-LH/LC EEC	0 K	0 K	0 K
SFP-FAST-MM/LC	0 K	15 K	15 K
SFP-FAST-MM/LC EEC	0 K	0 K	0 K
SFP-FAST-SM/LC	0 K	15 K	15 K
SFP-FAST-SM/LC EEC	0 K	0 K	0 K

Table 23. Gigabit Ethernet SFP transceiver

Product code	Derating Non-PoE variants LRS30-7TX/3SFP/1C LRS40-7TX/3SFP/1C	Derating 180 W PoE variants LRS32-7TX/3SFP/1C 180 W PoE variants LRS32-7TX/3SFP/1C LRS42-7TX/3SFP/1C	Derating 240 W PoE variants LRS32-7TX/3SFP/1C-HP LRS42-7TX/3SFP/1C-HP
M-SFP-SX/LC	0 K	15 K	15 K
M-SFP-SX/LC EEC	0 K	0 K	0 K
M-SFP-LX/LC	0 K	15 K	15 K
M-SFP-LX/LC EEC	0 K	0 K	0 K
M-SFP-LH/LC	2 K per SFP transceiver	1 K per SFP transceiver + 15 K	1 K per SFP transceiver + 15 K
M-SFP-LH/LC EEC	0 K	1 K per SFP transceiver	1 K per SFP transceiver
M-SFP-LH+/LC	3 K per SFP transceiver	1 K per SFP transceiver + 15 K	2 K per SFP transceiver + 15 K
SFP-GIG-LX/LC	0 K	15 K	15 K
SFP-GIG-LX/LC EEC	0 K	0 K	0 K
M-SFP-LX+/LC	2 K per SFP transceiver	15 K	15 K
M-SFP-LX+/LC EEC	0 K	0 K	0 K
M-SFP-LH+/LC EEC	0 K	1 K per SFP transceiver	2 K per SFP transceiver
M-SFP-MX/LC EEC	0 K	1 K per SFP transceiver	1 K per SFP transceiver

Table 24. Bidirectional Fast Ethernet SFP transceiver

Product code	Derating Non-PoE variants LRS30-7TX/3SFP/1C LRS40-7TX/3SFP/1C	Derating 180 W PoE variants LRS32-7TX/3SFP/1C LRS42-7TX/3SFP/1C	Derating 240 W PoE variants LRS32-7TX/3SFP/1C-HP LRS42-7TX/3SFP/1C-HP
SFP-FAST-BA SM+/LC EEC	0 K	0 K	0 K
SFP-FAST-BB SM+/LC EEC	0 K	0 K	0 K
SFP-FAST-BA MM/LC EEC	0 K	0 K	0 K
SFP-FAST-BB MM/LC EEC	0 K	0 K	0 K

Table 25. Bidirectional Gigabit Ethernet SFP transceiver

Product code	Derating Non-PoE variants LRS30-7TX/3SFP/1C LRS40-7TX/3SFP/1C	Derating 180 W PoE variants LRS32-7TX/3SFP/1C LRS42-7TX/3SFP/1C	Derating 240 W PoE variants LRS32-7TX/3SFP/1C-HP LRS42-7TX/3SFP/1C-HP
SFP-GIG-BA LH/LC EEC	0 K	1 K per SFP transceiver	1 K per SFP transceiver
SFP-GIG-BB LH/LC EEC	0 K	1 K per SFP transceiver	1 K per SFP transceiver
GIG-BA LX/LC EEC	0 K	0 K	0 K
SFP-GIG-BB LX/LC EEC	0 K	0 K	0 K

10.9. Immunity

Table 26. Immunity: Standard applications

EN 61131-2, CE, FCC – applies to all devices

Applicable standard	Behavior	Frequency
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm, 10 cycles, 1 octave/min
IEC 60068-2-6, test Fc	Vibration	8.4 Hz ... 200 Hz with 1 g, 10 cycles, 1 octave/min
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms

10.10. Electromagnetic compatibility (EMC)

Note: Use shielded data cables for gigabit transmission via copper cables. Use shielded data cables for all transmission rates to meet the requirements according to EN 50121-4 and marine applications.

10.10.1. EMC interference emission

Table 27. EMC interference emission: Standard applications
EN 61131-2, CE, FCC – applies to all devices

Applicable standard	Connection type	Specification
FCC 47 CFR Part 15		Class A
EN 55032		Class A
EN 61000-6-4		Fulfilled

Table 28. EMC interference emission: Railway applications (trackside)
According to EN 50121-4

Applicable standard	
EN 61000-6-4	Fulfilled

10.10.2. EMC interference immunity

Table 29. EMC interference immunity: Standard applications
EN 61131-2, CE, FCC – applies to all devices

Applicable standard	Connection type	Voltage
Electrostatic discharge		
EN 61000-4-2	Contact discharge	±4 kV
EN 61000-4-2	Air discharge	±8 kV
Electromagnetic field		
EN 61000-4-3	80 MHz ... 1000 MHz	max. 10 V/m
EN 61000-4-3	1000 MHz ... 6000 MHz	max. 3 V/m
Fast transients (burst)		
EN 61000-4-4	Power supply connection	±2 kV
EN 61000-4-4	Data line	±2 kV
Voltage surges - power supply connection		
EN 61000-4-5	line/ground	±2 kV
EN 61000-4-5	line/line	±1 kV

Table 29. EMC interference immunity: Standard applications

EN 61131-2, CE, FCC – applies to all devices
(continued)

Applicable standard	Connection type	Voltage
Voltage surges - data line		
EN 61000-4-5	line/ground	±1 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

Table 30. EMC interference immunity: Railway applications (trackside)

According to EN 50121-4

Applicable standard		
Electrostatic discharge		
EN 61000-4-2	Contact discharge	±6 kV
EN 61000-4-2	Air discharge	±8 kV
Electromagnetic field		
EN 61000-4-3	80 MHz ... 1000 MHz	max. 20 V/m
EN 61000-4-3	1000 MHz ... 6000 MHz	max. 10 V/m
Fast transients (burst)		
EN 61000-4-4	Power supply connection	±2 kV
EN 61000-4-4	Data line	±2 kV
Voltage surges - power supply connection		
EN 61000-4-5	line/ground	±2 kV
EN 61000-4-5	line/line	±1 kV
Voltage surges - data line		
EN 61000-4-5	line/ground	±2 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

10.11. Network range

The cable lengths specified for the transceivers apply for the respective fiber data (fiber attenuation and Bandwidth Length Product BLP/Dispersion).

10.11.1. Twisted-pair port 10/100/1000 Mbit/s

Table 31. Network range: 10/100/1000 Mbit/s twisted-pair port

10/100/1000 Mbit/s twisted-pair port	
Length of a twisted-pair segment	max. 100 m (328 ft) (for Cat5e cable)

10.11.2. Gigabit Ethernet SFP transceiver

Table 32. F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode[1]	Wave length	Fiber	System attenuation	Example for F/O cable length[2]	Fiber attenuation	BLP[3]/Dispersion
M-SFP-SX/LC...	MM	850 nm	50/125 µm	0 dB ... 7.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	3.0 dB/km	400 MHz×km
M-SFP-SX/LC...	MM	850 nm	62.5/125 µm	0 dB ... 7.5 dB	0 km ... 0.275 km (0 mi ... 0.17 mi)	3.2 dB/km	200 MHz×km
M-SFP-MX/LC...	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
M-SFP-MX/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.50 km (0 mi ... 0.31 mi)	1,0 dB/km	500 MHz×km
M-SFP-MX/LC EEC	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
M-SFP-MX/LC EEC	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	MM	1310 nm[4]	50/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km
M-SFP-LX/LC...	MM	1310 nm[4]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	SM	1310 nm	9/125 µm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[5]	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-LX+/LC...	SM	1310 nm	9/125 µm	5 dB ... 20 dB	14 km ... 42 km (8.70 mi ... 26.10 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-LH/LC...	LH	1550 nm	9/125 µm	5 dB ... 22 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

1. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

2. Including 3 dB system reserve when compliance with the fiber data is observed.

3. Using the bandwidth-length product is inappropriate for expansion calculations.

4. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

5. Including 2.5 dB system reserve when compliance with the fiber data is observed.

Table 33. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode[6]	Wave length	Fiber	System attenua-tion	Example for F/O cable length[7]	Fiber attenu-ation	BLP[8]/Dispersion
M-SFP-SX/LC...	MM	850 nm	50/125 µm	0 dB ... 7.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	3.0 dB/km	400 MHz×km
M-SFP-SX/LC...	MM	850 nm	62.5/125 µm	0 dB ... 7.5 dB	0 km ... 0.275 km (0 mi ... 0.17 mi)	3.2 dB/km	200 MHz×km
M-SFP-MX/LC...	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
M-SFP-MX/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.50 km (0 mi ... 0.31 mi)	1,0 dB/km	500 MHz×km
M-SFP-MX/LC EEC	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
M-SFP-MX/LC EEC	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	MM	1310 nm[9]	50/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km
M-SFP-LX/LC...	MM	1310 nm[10]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km

6. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

7. Including 3 dB system reserve when compliance with the fiber data is observed.

8. Using the bandwidth-length product is inappropriate for expansion calculations.

9. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

10. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

Table 33. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode[6]	Wave length	Fiber	System attenuation	Example for F/O cable length[7]	Fiber attenuation	BLP[8]/Dispersion
M-SFP-LX/LC...	SM	1310 nm	9/125 μm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[11]	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-LX+/LC...	SM	1310 nm	9/125 μm	5 dB ... 20 dB	14 km ... 42 km (8.70 mi ... 26.10 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-LH/LC...	LH	1550 nm	9/125 μm	5 dB ... 22 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC	LH	1550 nm	9/125 μm	15 dB ... 30 dB	71 km ... 108 km (44.12 mi ... 67.11 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC	LH	1550 nm	9/125 μm	15 dB ... 30 dB	71 km ... 128 km (44.12 mi ... 79.54 mi)	0.21 dB/km (typically)	19 ps/(nm×km)
M-SFP-LH+/LC...	LH	1550 nm	9/125 μm	13 dB ... 32 dB	62 km ... 116 km (38.52 mi ... 72.07 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC...	LH	1550 nm	9/125 μm	13 dB ... 32 dB	62 km ... 138 km (38.52 mi ... 85.75 mi)	0.21 dB/km (typically)	19 ps/(nm×km)
SFP-GIG-LX/LC...	MM	1310 nm[12]	50/125 μm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km

6.   MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

7.   Including 3 dB system reserve when compliance with the fiber data is observed.

8.   Using the bandwidth-length product is inappropriate for expansion calculations.

11.   Including 2.5 dB system reserve when compliance with the fiber data is observed.

12.   With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

Table 33. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode[6]	Wave length	Fiber	System attenuation	Example for F/O cable length[7]	Fiber attenuation	BLP[8]/Dispersion
SFP-GIG-LX/LC...	MM	1310 nm[13]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
SFP-GIG-LX/LC...	SM	1310 nm	9/125 µm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[14]	0.4 dB/km	3.5 ps/(nm×km)

10.11.3. Fast Ethernet SFP transceiver

Table 34. F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver)

Product code	Mode[15]	Wave length	Fiber	System attenuation	Example for F/O cable length[16]	Fiber attenuation	BLP/Dispersion
M-FAST-SFP-MM/LC...	MM	1310 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz×km
M-FAST-SFP-MM/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km

6.   MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

7.   Including 3 dB system reserve when compliance with the fiber data is observed.

8.   Using the bandwidth-length product is inappropriate for expansion calculations.

13.   With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

14.   Including 2.5 dB system reserve when compliance with the fiber data is observed.

15.   MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

16.   Including 3 dB system reserve when compliance with the fiber data is observed.

Table 34. F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver) (continued)

Product code	Mode[15]	Wave length	Fiber	System attenuation	Example for F/O cable length[16]	Fiber attenuation	BLP/Dispersion
M-FAST-SFP-SM/L-C...	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-FAST-SFP-SM +/LC...	SM	1310 nm	9/125 µm	10 dB ... 29 dB	25 km ... 65 km (15.53 mi ... 40.39 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-FAST-SFP-LH/L-C...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	47 km ... 104 km (29.20 mi ... 64.62 mi)	0.25 dB/km	19 ps/(nm×km)
M-FAST-SFP-LH/L-C...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	55 km ... 140 km (14.29 mi ... 86.99 mi)	0.18 dB/km[17]	18 ps/(nm×km)
SFP-FAST-MM/LC	MM	1310 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz
SFP-FAST-MM/L-C EEC	MM	1310 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km
SFP-FAST-SM/LC	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
SFP-FAST-SM/L-C EEC	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)

15. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

16. Including 3 dB system reserve when compliance with the fiber data is observed.

17. With ultra-low-loss optical fiber.

10.11.4. Bidirectional Fast Ethernet SFP transceiver

Table 35. F/O port (bidirectional Fast Ethernet SFP transceiver)

Product code SFP-FAST-B...	Mode	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[19]	Fiber attenuation	Dispersion
SFP-FAST-BA MM/LC EEC	MM	1310 nm	1550 nm	50/125 μm 62.5/125 μm	0 dB ... 16 dB	0 km ... 2 km (0 mi ... 1.24 mi)	1.0 dB/km	800 MHz×km 500 MHz×km
SFP-FAST-BB MM/LC EEC	MM	1550 nm	1310 nm	50/125 μm 62.5/125 μm	0 dB ... 16 dB	0 km ... 2 km (0 mi ... 1.24 mi)	1.0 dB/km	800 MHz×km 500 MHz×km
SFP-FAST-BA SM+/LC EEC	SM	1310 nm	1550 nm	9/125 μm	0 dB ... 29 dB	0 km ... 60 km (0 mi ... 37.29 mi)	0.4 dB/km	3.5 ps/ (nm×km)
SFP-FAST-BB SM+/LC EEC	SM	1550 nm	1310 nm	9/125 μm	0 dB ... 29 dB	0 km ... 60 km (0 mi ... 37.29 mi)	0.25 dB/km	19 ps/ (nm×km)

18.   MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

19.   Including 3 dB system reserve when compliance with the fiber data is observed.

10.11.5. Bidirectional Gigabit Ethernet SFP transceiver

Table 36. F/O port (bidirectional Gigabit Ethernet SFP transceiver)

Product code	Mode[20]	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[21]	Fiber attenuation	BLP/Dispersion
SFP-GIG-BA LX/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 15 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.4 dB/km	3.5 ps/(nm×km)
SFP-GIG-BB LX/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 15 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BA LH/LC EEC	LH	1490 nm	1550 nm	9/125 µm	4 dB ... 24 dB	19 km ... 80 km (11.80 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BB LH/LC EEC	LH	1550 nm	1490 nm	9/125 µm	4 dB ... 24 dB	19 km ... 80 km (11.80 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

20.   MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

21.   Including 3 dB system reserve when compliance with the fiber data is observed.

11. Scope of delivery

Table 37. Scope of delivery

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 ×	Terminal block for the supply voltage
1 ×	Open Source Information

12. Order numbers

12.1. Accessories

You find more information on available accessories in the Belden Online Catalog at *https://catalog.belden.com*.

Note: Some products recommended as accessories do not support the entire temperature range specified for the device and can thus restrict the possible range of usage for the overall system.

Table 38. General accessories

Article	Order number
6-pin terminal block Type 3 (10 pieces)	942272303

12.1.1. Fast Ethernet SFP transceiver

Table 39. Accessories: Fast Ethernet SFP transceivers

Fast Ethernet SFP transceiver	Certification type[22]	Order number

The following operating conditions apply to twisted-pair transceivers:

- Longer RSTP switching times and link loss detection times compared to twisted-pair ports provided by the device directly.
- It is currently not possible to set autocrossing manually.

M-FAST SFP-MM/LC	Standard level	943865001
M-FAST SFP-MM/LC EEC	Standard level	943945001
M-FAST SFP-SM/LC	Standard level	943866001
M-FAST SFP-SM/LC EEC	Standard level	943946001
M-FAST SFP-SM+/LC	Standard level	943867001
M-FAST SFP-SM+/LC EEC	Standard level	943947001
M-FAST SFP-LH/LC	Standard level	943868001

22. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL 121201 (Hazardous Locations), IEC 61850-3, EN 50121-4, ATEX or IECEx. For further information on certifications, see https://www.belden.com.

Table 39. Accessories: Fast Ethernet SFP transceivers (continued)

Fast Ethernet SFP transceiver	Certification type[22]	Order number
M-FAST SFP-LH/LC EEC	Standard level	943948001
SFP-FAST-MM/LC	Entry level	942194001
SFP-FAST-MM/LC EEC	Entry level	942194002
SFP-FAST-SM/LC	Entry level	942195001
SFP-FAST-SM/LC EEC	Entry level	942195002

12.1.2. Gigabit Ethernet SFP transceiver

Table 40. Accessories: Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Certification type[23]	Order number

The following operating conditions apply to twisted-pair transceivers:

- Longer RSTP switching times and link loss detection times compared to twisted-pair ports provided by the device directly.
- Cannot be used with Fast Ethernet ports.
- Exclusively supports the autonegotiation mode including autocrossing.

M-SFP-SX/LC	Standard level	943014001
M-SFP-SX/LC EEC	Standard level	943896001
M-SFP-MX/LC EEC	Standard level	942108001
M-SFP-LX/LC	Standard level	943015001
M-SFP-LX/LC EEC	Standard level	943897001
M-SFP-LX+/LC	Standard level	942023001
M-SFP-LX+/ LC EEC	Standard level	942024001
M-SFP-LH/LC	Standard level	943042001
M-SFP-LH/LC EEC	Standard level	943898001
M-SFP-LH+/LC	Standard level	943049001

22. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL 121201 (Hazardous Locations), IEC 61850-3, EN 50121-4, ATEX or IECEx. For further information on certifications, see https://www.belden.com.

23. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL 121201 (Hazardous Locations), IEC 61850-3, EN 50121-4, ATEX or IECEx. For further information on certifications, see https://www.belden.com.

Table 40. Accessories: Gigabit Ethernet SFP transceiver (continued)

Gigabit Ethernet SFP transceiver	Certification type[23]	Order number
M-SFP-LH+/LC EEC	Standard level	942119001
SFP-GIG-LX/LC	Entry level	942196001
SFP-GIG-LX/LC EEC	Entry level	942196002

12.1.3. Bidirectional Fast Ethernet SFP transceiver

Table 41. Accessory: Bidirectional Fast Ethernet SFP transceiver

Bidirectional Fast Ethernet SFP transceiver	Certification type[24]	Order number
SFP-FAST-BA MM/LC EEC	Entry level	942204001
SFP-FAST-BB MM/LC EEC	Entry level	942204002
SFP-FAST-BA SM+/LC EEC	Entry level	942206001
SFP-FAST-BB SM+/LC EEC	Entry level	942206002

12.1.4. Bidirectional Gigabit Ethernet SFP transceiver

Table 42. Accessory: Bidirectional Gigabit Ethernet SFP transceiver

Bidirectional Gigabit Ethernet SFP transceiver	Certification type[25]	Order number
SFP-GIG-BA LX/LC EEC	Entry level	942207001
SFP-GIG-BB LX/LC EEC	Entry level	942207002
SFP-GIG-BA LH/LC EEC	Entry level	942209001
SFP-GIG-BB LH/LC EEC	Entry level	942209002

23. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
    Use Standard level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL 121201 (Hazardous Locations), IEC 61850-3, EN 50121-4, ATEX or IECEx. For further information on certifications, see https://www.belden.com.

24. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-20.

25. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-20.

13. Underlying technical standards

The device has an approval based on a specific standard exclusively if the approval indicator appears on the device casing.

The device generally fulfills the technical standards named in their current versions.

If your device has a shipping approval according to DNV, you find the approval mark printed on the device label. You will find out whether your device has other shipping approvals at *https://www.belden.com* in the product information.

Table 43. List of technical standards

EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emitted interference in industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	Code of Federal Regulations
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: Safety requirements
IEEE 802.3	Ethernet
UL 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
UL 61010-2-201	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment

A. Further support

Technical questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You find the addresses of our partners on the Internet at:
https://www.belden.com

A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at:
https://my.belden.com

This site also includes a free of charge knowledge base and a software download section.

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