

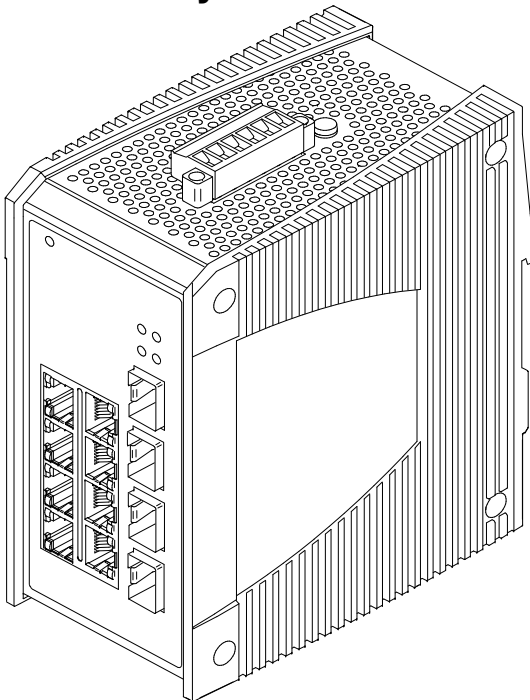


HIRSCHMANN

A **BELDEN** BRAND

User Manual

Installation Industrial Ethernet Lemur Rail Switch LRS Family



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<https://www.doc.hirschmann.com>

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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 “User Manual Installation” that is not supplied with your device as a printout can be found as PDF files for downloading on the Internet at: see <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.

NOTICE

NOTICE provides information about procedures that do not involve the risk of injury.

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.

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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 58](#)

- 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.

See [General data on page 58](#)

- This is an Open Type indoor used 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. Shielding ground

The shielding ground of the connectable twisted pair cables is connected to the ground connection as a conductor.

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

1.6. 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.

1.7. Electrical connections

1.7.1. Grounding the device

The device is grounded via the separate ground screw. The ground screw is located on the top of the device.

See [Dimension drawings on page 60](#)

- Ground the device before connecting any other cables.
- Disconnect the grounding only after disconnecting all other cables.

1.7.2. Requirements for connecting electrical wires

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

The following requirements apply without restrictions:

- The electrical wires are voltage-free.
- 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 cables are made of copper.

1.7.3. Requirements for connecting the supply voltage

Verify compliance with **all** the following requirements:

- The supply voltage corresponds to the voltage specified on the type plate of the device.
- The power supply complies with the requirements for a safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/EN 62368-1.
- The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
- The wire cross-section of the power supply cable is at least 0.75 mm^2 (North America: 18 AWG) on the supply voltage input.
- The wire cross-section of the power supply cable is at least 1 mm^2 (North America: 16 AWG) on the supply voltage input for PoE device variants.
- The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.

Prerequisites:

All of the following requirements are complied with:

- The supply voltage corresponds to the voltage specified on the type plate of the device.
- The power supply complies with the requirements for a safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/EN 62368-1.
- The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
- The wire cross-section of the power supply cable is at least 0.75 mm^2 (North America: 18 AWG) on the supply voltage input.
The wire cross-section of the power supply cable is at least 1 mm^2 (North America: 16 AWG) on the supply voltage input for PoE device variants.
- The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.
- There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse:
See [Supply voltage 24 V DC on page 58](#)
See [Supply voltage 48 V DC \(PoE\) or 54 V DC \(PoE+\) on page 59](#)
- The negative conductors of the voltage inputs are on ground potential.
- For PoE device variants LRS32, LRS42, LRS42-HP, the power sources are electrically isolated from the ground potential. According to specification IEEE 802.3, the insulation voltage must be 1500 V AC or 2250 V DC. For non-PoE device variants LRS30, and LRS40, there is no need of isolated power at the input.

1.8. Supply voltage

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

1.9. LED or laser components

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

CLASS 1 LASER PRODUCT

CLASS 1 LED PRODUCT

1.10. Recycling note

After usage, this device must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state, and country.

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 find the EU conformity declaration as PDF file for downloading on the Internet 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

You find more information on technical standards here:

See [General data on page 58](#)

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. UKCA marking

The labeled devices comply with the following UK regulations:

- **S.I. 2012 No. 3032**
Restriction of the Use of Certain Hazardous Substances in Electrical and Electronical Equipment Regulations
- **S.I. 2016 No. 1091**
Electromagnetic Compatibility Regulations



The UKCA conformity declaration will be available to the relevant authorities at the following address:

Belden UK Ltd.
1 The Technology Centre, Station Road
Framlingham, IP13 9EZ, United Kingdom

You find the UKCA conformity declaration as PDF file for downloading on the Internet at: <https://www.doc.hirschmann.com/certificates.html>

See [General data on page 58](#)

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.

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

2.3. FCC note

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Lemur Rail Switch

LRS Family

U.S. Contact Information

Belden – 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.

Note: 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 light managed switch with 7 × 10/100/1000 Mbit/s Twisted pair ports, 1 × 10/100/1000 Mbit/s combo port and 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 standard IEEE 802.3.

The device works without a fan.

Mounting the device

- Mounting on the DIN rail

You have the option of choosing various media to connect to the end devices and other network components:

- Twisted pair cable
- Multimode F/O
- Singlemode F/O

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. You find further information on the Internet at the Hirschmann product page: www.belden.com/get-ProvizeExplorer

The device provides you with a large range of functions, which the manuals for the operating software inform you about. You can download these manuals as PDF files from the Internet at: <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/3SFP/1C	Total number of ports: 11 7 × 10/100BASE-TX 1 × Combo port (10/100/1000BASE-TX and 100/1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE+: N/A Power input: 24 V DC at 0.5 A
942328003	LRS40-7TX/3SFP/1C	Total number of ports: 11 7 × 10/100/1000BASE-TX 1 × Combo port (10/100/1000BASE-TX and 100/1000BASE-FX SFP) 3 × 100/1000BASE-FX SFP PoE+: N/A Power input: 24 V DC at 0.5 A
942328006	LRS32-7TX/3SFP/1C	Total number of ports: 11 7 × 10/100BASE-TX 1 × Combo port (10/100/1000BASE-TX and 100/1000BASE-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

Table 1. Device name (continued)

Order number	Product name	Description
		PoE+: 8 × TX port, Typical input voltage 54 V DC, 4.5 A, 30 W/port, max. 180 W
942328004	LRS42-7TX/3SFP/1C	Total number of ports: 11 7 × 10/100/1000BASE-TX 1 × Combo port (10/100/1000BASE-TX and 100/1000BASE-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 100/1000BASE-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 100/1000BASE-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

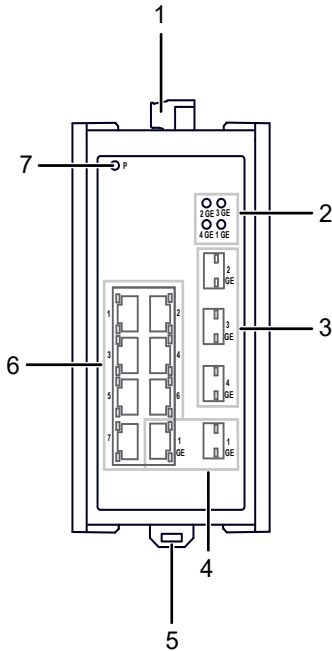


Table 2. Description of device elements: Front view of device variants LRS30, LRS32, LRS32-HP

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 100/1000BASE-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

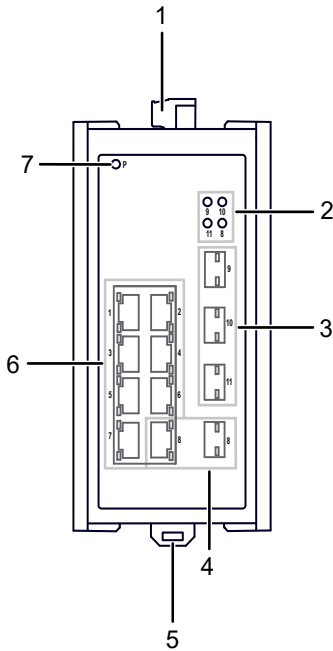
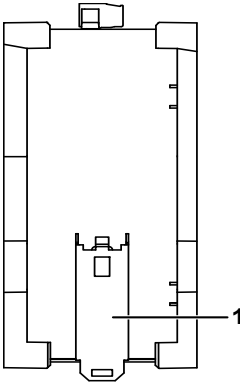


Table 3. Description of device elements: Front view of device variants LRS40, LRS42, LRS42-HP

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 100/1000BASE-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

You will find information on connecting the supply voltage here:

See [Connecting the supply voltage on page 42](#)

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 supports Power over Ethernet Plus according to IEEE 802.3at (PoE+) and allows you to supply end devices with power via the twisted pair cable, like for example IP telephones. In the delivery state, the function Power over Ethernet Plus is activated on every port capable of PoE+.

You will find information on connecting the supply voltage here:

See [Connecting the supply voltage on page 42](#)

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

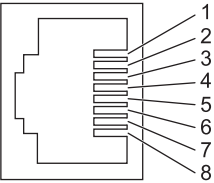
This port is an RJ45 socket.

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

This port supports:

- Autonegotiation
- Autopolarity
- Autocrossing
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

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

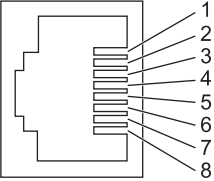
RJ45	Pin	10/100 Mbit/s	1000 Mbit/s	PoE/PoE+
	MDI mode			
	1	TX+	BI_DA+	Negative V^{PSE}
	2	TX-	BI_DA-	Negative V^{PSE}
	3	RX+	BI_DB+	Positive V^{PSE}
	4	-	BI_DC+	-
	5	-	BI_DC-	-
	6	RX-	BI_DB-	Positive V^{PSE}
	7	-	BI_DD+	-
	8	-	BI_DD-	-
	MDI-X mode			
	1	RX+	BI_DB+	Negative V^{PSE}
	2	RX-	BI_DB-	Negative 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. Combo port 10/100/1000 Mbit/s

The device provides 1 combo port for transmission speeds of up to 1000 Mbit/s.

You have the option of alternatively connecting a twisted pair cable via an RJ45 socket or an optical fiber via an SFP transceiver to a combo port. See [Device views on page 27](#).

By inserting an SFP transceiver, you automatically deactivate the corresponding twisted pair interface.

Use only Hirschmann SFP transceivers which are suitable for usage with the device. See [Accessories on page 71](#).

3.4.4. 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. 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 device 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.

See [Supply voltage 48 V DC \(PoE\) or 54 V DC \(PoE+\)](#) on page 59

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.

3.4.5. 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.

The port allows you to connect network components according to standard IEEE 802.3 1000BASE-SX/1000BASE-LX.

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

These LEDs provide information about conditions which affect the operation of the whole device.

Figure 4. LED display elements for device status

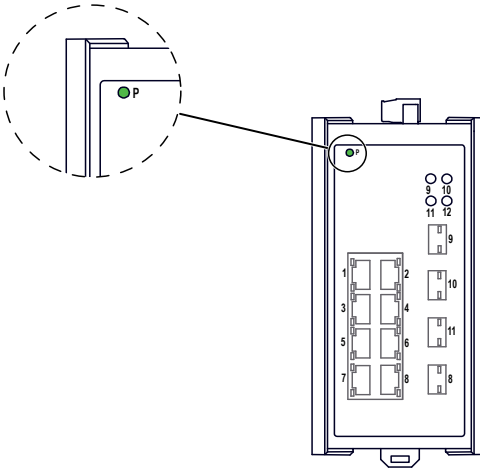


Table 6. Power supply LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Supply voltage is too low
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 8: 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

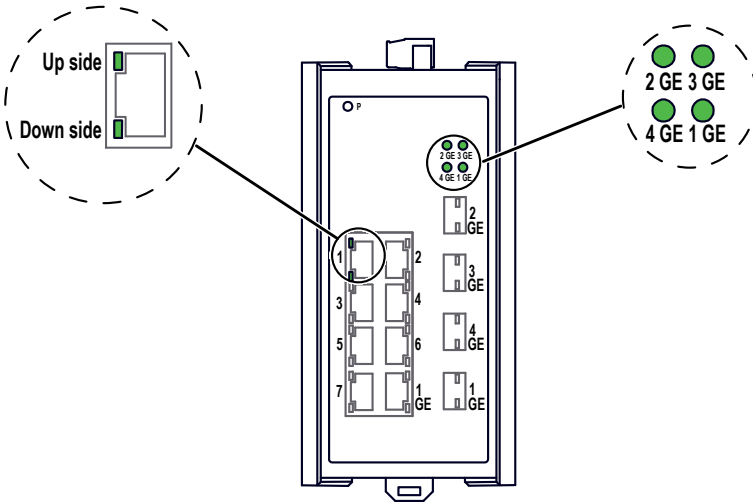


Figure 6. Port status: Location of the display elements on the device LRS40, LRS42, LRS42-HP

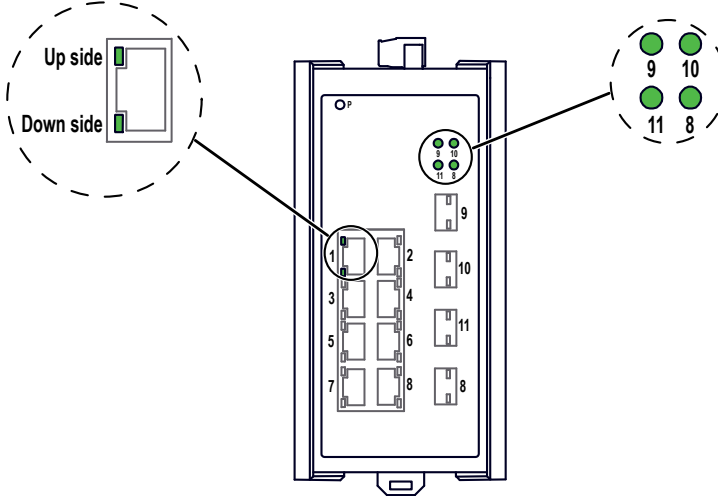


Table 8. F/O port LED: Color, activity and meaning

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 9. 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.

Perform the following steps to install and configure the device:

- [Checking the package contents on page 38](#)
- [Mounting the device on page 38](#)
- [Grounding the device on page 40](#)
- [Installing an SFP transceiver \(optional\) on page 42](#)
- [Connecting the supply voltage on page 42](#)
- [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 the section
See [Scope of delivery on page 73](#).
- Check the individual parts for transport damage.

4.2. Mounting the device

You have the following option(s) for mounting your device:

- [Mounting the device onto the DIN rail on page 40](#)

 **WARNING**
**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 $\geq 45\text{ }^{\circ}\text{C}$ ($\geq 113\text{ }^{\circ}\text{F}$), exclusively install the device in "restricted access locations" according to EN 62368-1.

 **AVERTISSEMENT**
**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 $\geq 45\text{ }^{\circ}\text{C}$ ($\geq 113\text{ }^{\circ}\text{F}$), installez l'équipement exclusivement dans des "emplacements à accès restreint" conformément à la norme EN 62368-1.

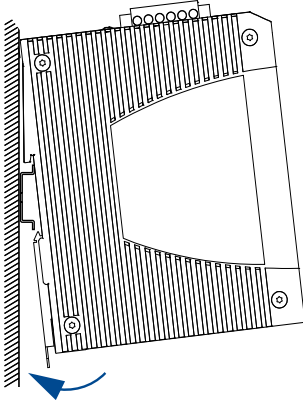
- When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data. Prevent heat from the surroundings from affecting the device.

4.2.1. Mounting the device onto the DIN rail

Prerequisite:

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

Figure 7. Mounting on the DIN rail



Perform the following work steps:

- Slide the upper snap-in guide of the device into the DIN rail.
- Push the device downwards and onto the DIN rail.
- Snap in the device.

4.3. Grounding the device

⚠ CAUTION



ELECTRIC SHOCK

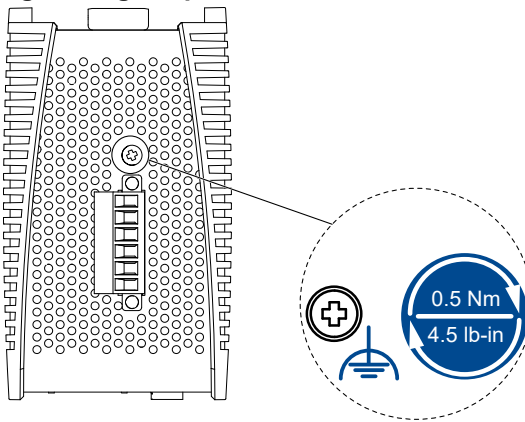
Failure to follow these instructions can result in minor injury, or equipment damage.

Ground the device before connecting any other cables.

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

All device variants have a functional ground connection.

Figure 8. 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 is the same size as or bigger than the cross-section of the power supply cables.

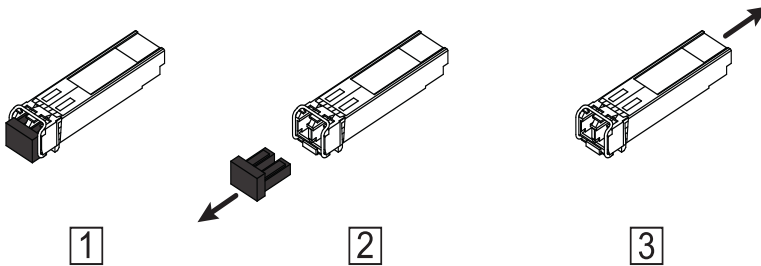
4.4. Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers.

See [Accessories on page 71](#)

Figure 9. 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

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

⚠ WARNING

ELECTRIC SHOCK
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Connect only a supply voltage that corresponds to the type plate of your device.

⚠ AVERTISSEMENT

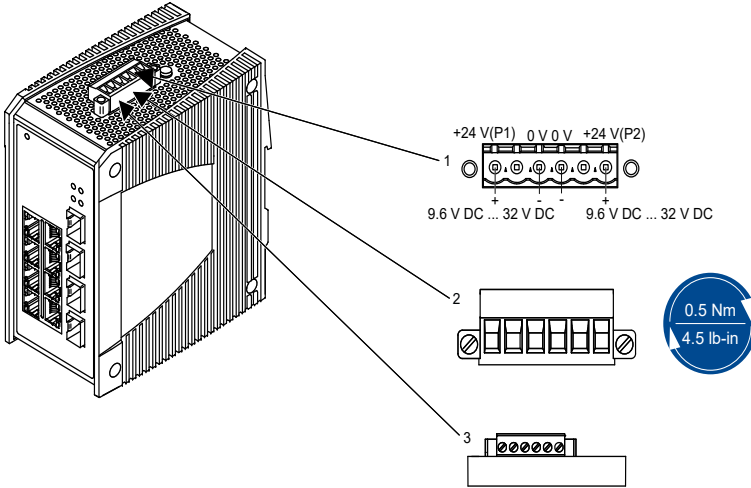
CHOC ÉLECTRIQUE
Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.

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 10. Supply voltage connection and terminal block mounting



Position	Description
1	DC voltage connection on the device.
2	Terminal block mounted on the device (view from top) and tightening torque.
3	Terminal block mounted on the device (view from side).

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	Rated voltage DC: 24 V DC	+24 V	Plus terminal of the supply voltage
	Voltage range DC incl. maximum tolerances: 9.6 V DC ... 32 V DC	0 V	Minus terminal of the supply voltage

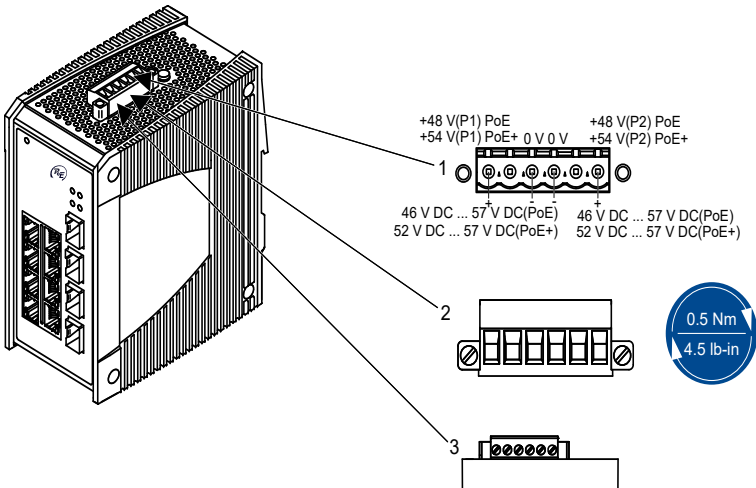
For the supply voltage to be connected, perform the following steps:

- 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 11. Supply voltage connection and terminal block mounting



Position	Description
1	DC voltage connection on the device.
2	Terminal block mounted on the device (view from top) and tightening torque.
3	Terminal block mounted on the device (view from side).

Table 11. 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

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.

4.6. 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 the 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 channels.
- 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.

See [Electromagnetic compatibility \(EMC\) on page 65](#)

- Connect the data cables according to your requirements.
See [Ethernet ports on page 30](#)
- Use CAT5e cable or higher for twisted pair connections.

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 on the Internet at the Hirschmann product pages:
See www.belden.com/get-ProvizeExplorer

5.1. Default settings

- IP address: The device looks for the IP address 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 Simple Network Management Protocols (SNMP), are disabled on the device by default. After you have changed the default password, enable the needed protocols.
- The Provice Explorer lets you change the default password using the protocols Secure Shell (SSH) or 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 Provice Explorer the first time you log on to the device.
- Log on to the device with 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.

For further information, see <https://hirschmann-support.belden.com/en/kb/required-password-change-new-procedure-for-first-time-login>

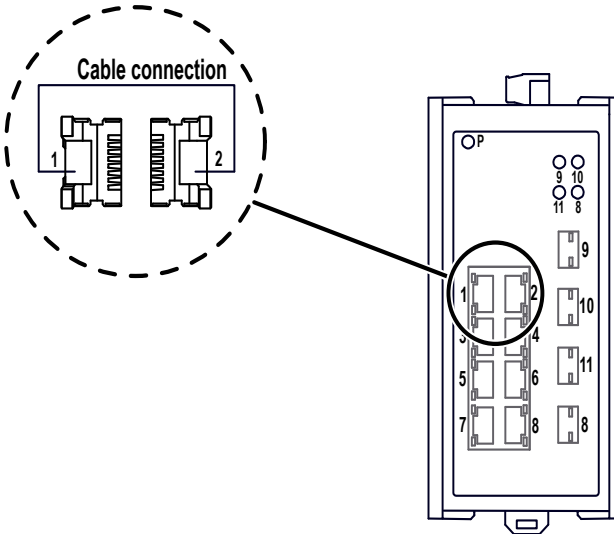
6. Device recovery

There are two ways of device recovery.

- [Manual device recovery on page 51](#)
- [Firmware recovery on page 52](#)

6.1. Manual device recovery

Figure 12. Manual device recovery.



Perform the following work steps:

- Create a physical loopback by connecting a cable between port 1 and port 2.
- Reboot the device.

Note: A successful reboot is required for successful execution of the manual recovery.

6.2. Firmware recovery

The device is equipped with the following firmware recovery options:

- [Manual recovery on page 52](#)
- [Automatic recovery on page 52](#)

6.2.1. Manual recovery

If the device does not respond to your commands due to a detected failure, then manually restart the device 3 times.

Perform the following work steps:

- Disconnect or disable the power supply to the device. When the device status LED stops glowing, the POWER OFF cycle is completed.
- Begin the consecutive restart within the interval of 2 minutes after you have POWERED OFF the device.
- Connect or enable the power supply to the device. When the device is POWERED ON, the system restart is completed.
- Repeat the above steps 2 more times.

On successful manual recovery, at the third restart, the device starts up by loading the previous version of the device software to help provide the device access.

After successful manual recovery, before operating any device feature, it is advisable to upload the latest version of the device software. To upload the new device software, refer to software manual at: <https://www.doc.hirschmann.com>

6.2.2. Automatic recovery

This recovery method does not require any action by the user because, the device performs this recovery step automatically.

Due to a detected failure of the current device software, the device automatically performs 1 ... 3 system restarts. If the first 2 restarts do not help recover the current device software, the device automatically loads the previous version of the device software.

For example, during a software update if there is a detected failure of the current device software, the device performs automatic recovery. The user can identify automatic recovery by the action of automatic restart by the device.

On successful automatic recovery, the device starts up by loading the previous version of the device software.

After successful automatic recovery, before operating any device feature, it is advisable to upload the latest version of the device software. To upload the new device software, refer to software manual at: <https://www.doc.hirschmann.com>

7. Monitoring ambient conditions

7.1. Monitoring the ambient air temperature

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

See [Climatic conditions during operation on page 61](#)

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

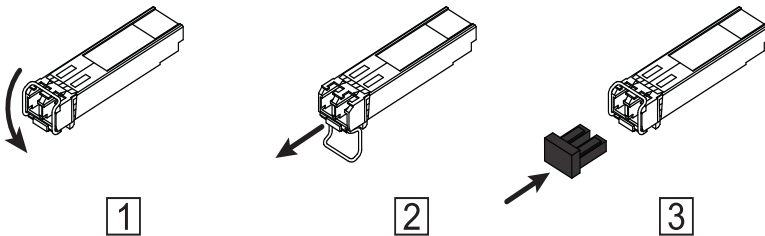
- When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- Relays are subject to natural wear. This 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 on the Hirschmann product pages on the Internet (<http://www.hirschmann.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 on the Internet at: <http://www.beldensolutions.com/en/Service/Repairs/index.phtml>.

9. Disassembly

9.1. Removing an SFP transceiver (optional)

Figure 13. 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



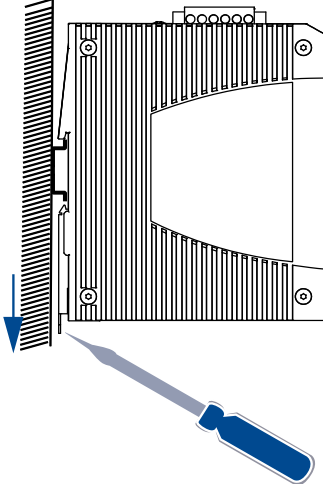
ELECTRIC SHOCK

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Disconnect the grounding only after disconnecting all other cables.

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

Figure 14. Removal from the DIN rail



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 60	
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 mm ² (18 AWG)
	max. conductor cross-section	2.5 mm ² (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 I^2t	<1 A ² s
Connection for functional ground	See Grounding the device on page 40

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	0.75 mm ² (18 AWG)
	max. conductor cross-section	2.5 mm ² (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 40	
Current integral I^2t	<1 A ² s	
Max. PoE power	Nominally	180 W

10.3. Power consumption/power output

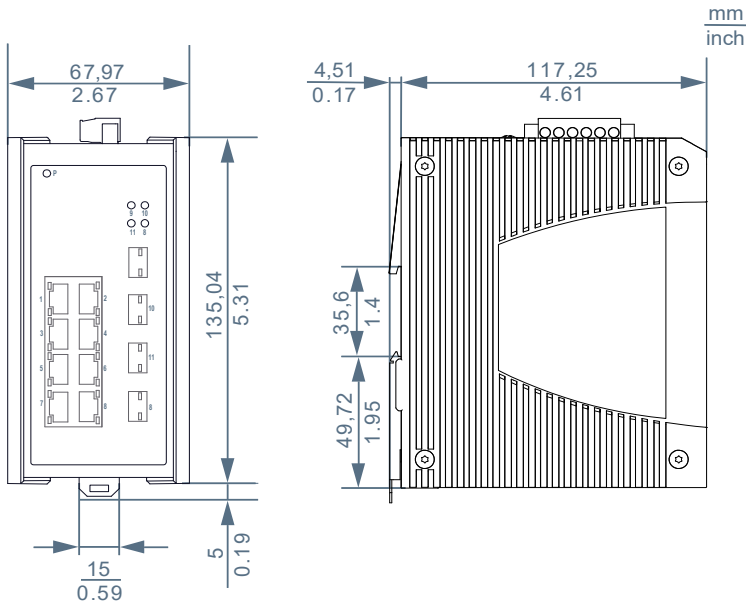
Table 15. Power consumption/power output

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	56Btu (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 15. 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)	0 K
	Left and right device side: 0 cm (0 in)	
	Top and bottom device side: 2 cm (0.8 in)	0 K
	Left and right device side: 0 cm (0 in)	
LRS32/LRS42 Standard mounting (vertical)	Top and bottom device side: 0 cm (0 in)	10 K
	Left and right device side: 0 cm (0 in)	
	Top and bottom device side: 5 cm (2 in)	0 K
	Left and right device side: 1 cm (0.4 in)	
LRS32/LRS42 Standard mounting (vertical)	Top and bottom device side: 2 cm (0.8 in)	3 K
	Left and right device side: 1 cm (0.4 in)	

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

Mounting	Minimum clearance at the ventilation slots	Derating
	Top and bottom device side: 0 cm (0 in)	15 K
	Left and right device side: 1 cm (0.4 in)	
LRS32-HP/LRS42-HP Standard mounting (vertical)	Top and bottom device side: 5 cm (2 in)	0 K
	Left and right device side: 5 cm (2 in)	
	Top and bottom device side: 2 cm (0.8 in)	3 K
	Left and right device side: 5 cm (2 in)	
	Top and bottom device side: 0 cm (0 in)	20 K
	Left and right device side: 5 cm (2 in)	

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 the SFP transceiver

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

Table 22. Fast Ethernet SFP transceiver (continued)

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-LH/LC	0 K	15 K	15 K
M-FAST SFP-LH/LC EEC	0 K	0 K	0 K
M-FAST SFP-TX/RJ45	0 K	15 K	15 K
M-FAST SFP-TX/RJ45 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	0 K	1 K per SFP transceiver + 15 K	2 K per SFP transceiver + 15 K
M-SFP-LH/LC EEC	0 K	1 K per SFP transceiver	2 K per SFP transceiver
M-SFP-LH+/LC	2 K per SFP transceiver + 15 K	1 K per SFP transceiver + 15 K	2 K per SFP transceiver + 15 K
M-SFP-TX/RJ45	2 K per SFP transceiver	1 K per SFP transceiver + 15 K	3 K per SFP transceiver + 15 K
M-SFP-TX/RJ45 EEC	0 K	1 K per SFP transceiver	3 K per SFP transceiver
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	0 K	15 K	15 K

Table 23. Gigabit Ethernet SFP transceiver (continued)

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-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	2 K per SFP transceiver

10.9. Immunity

Table 24. Immunity

Immunity		Standard applications ¹	Railway applications (trackside) according to EN 50121-4
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm, 10 cycles, 1 octave/min	-
		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.

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

Table 25. EMC interference emission

EMC interference emission	Standard applications ²	Railway applications (track-side) as per EN 50121-4
EN 55032	Class A	–
FCC 47 CFR Part 15	Class A	–
EN 61000-6-4	Fulfilled	Fulfilled

Table 26. EMC interference immunity

EMC interference immunity		Standard applica- tions ³	Railway appli- cations (track- side) as per EN 50121-4
Electrostatic discharge			
EN 61000-4-2	Contact discharge	±4 kV	±6 kV
EN 61000-4-2	Air discharge	±8 kV	±8 kV
Electromagnetic field			
EN 61000-4-3	80 MHz ... 1000 MHz	max. 10 V/m	max. 20 V/m
	1.0 GHz ... 6.0 GHz	3 V/m	max. 10 V/m
Fast transients (burst) – power supply connection			
EN 61000-4-4		±2 kV	±2 kV
Fast transients (burst) – data line			
EN 61000-4-4		±2 kV	±2 kV
Voltage surges – power supply connection			
EN 61000-4-5	line/ground	±2 kV	±2 kV
EN 61000-4-5	line/line	±1 kV	±1 kV
Voltage surges - data line			
EN 61000-4-5	line/ground	±1 kV	±2 kV
Conducted disturbances			
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V

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

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

10.11. Network range

Note: The line 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 27. 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. Fast Ethernet SFP Transceiver

Table 28. F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver)

Product code	Mode ⁴	Wave length	Fiber	System at- tenuation	Example for F/O ca- 5 ble length	Fiber at- tenuation	BLP/Disper- sion
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
M-FAST-SFP- 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)
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)

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

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

Table 28. F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver) (continued)

Product code	Mode ⁴	Wave length	Fiber	System at- tenuation	Example for F/O ca- ble length ⁵	Fiber at- tenuation	BLP/Disper- sion
M-FAST-SFP- LH/LC...	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/LC...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	55 km ... 140 km (14.29 mi ... 86.99 mi)	0.18 dB/ km ⁶	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/LC 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/LC 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)

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

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

6. With ultra-low-loss optical fiber.

10.11.3. Gigabit Ethernet SFP transceiver

Table 29. F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode ⁷	Wave length	Fiber	System at-tenuation	Example for F/O ca-ble length ⁸	Fiber at-tenuation	BLP ⁹ /Dis-persion
M-SFP-SX/L-C...	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/L-C...	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-LX/LC...	MM	1310 nm ¹⁰	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/L-C...	MM	1310 nm ¹¹	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/L-C...	SM	1310 nm	9/125 μm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi) ¹²	0.4 dB/km	3.5 ps/ (nm×km)

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

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

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

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

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

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

Table 29. F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode ⁷	Wave length	Fiber	System at-tenuation	Example for F/O cable length ⁸	Fiber at-tenuation	BLP ⁹ /Dispersion
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/L- C...	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 (typi- cally)	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 (typi- cally)	19 ps/ (nm×km)
SFP-GIG-LX/LC...	MM	1310 nm ¹³	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
SFP-GIG-LX/LC...	MM	1310 nm ¹⁴	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

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

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

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

Table 29. F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode ⁷	Wave length	Fiber	System at-tenuation	Example for F/O cable length ⁸	Fiber at-tenuation	BLP ⁹ /Dispersion
SFP-GIG-LX/LC...	SM	1310 nm	9/125 μm	0 dB ... 10.5 dB	0 km ... 20 km ¹⁵ (0 mi ... 12.43 mi)	0.4 dB/km	3.5 ps/ (nm×km)

10.12. Accessories

You find more information on available accessories in the Belden Online Catalog, <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 30. General accessories

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

10.12.1. Fast Ethernet SFP transceiver

Table 31. Accessory: Fast Ethernet SFP transceiver

Fast Ethernet SFP transceiver	Certification type ¹⁶	Order number
M-FAST SFP-TX/RJ45	Standard level	942 098-001
M-FAST SFP-TX/RJ45 EEC	Standard level	942 098-002

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

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

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

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

16. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL8 61010-2-201.

Use Standard level SFP transceivers for industrial applications that exclusively require following approvals: CE, FCC, UL8 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL8 121201 (Hazardous Locations), IEC8 61850-3, EN8 50121-4, ATEX or IECEx.

Table 31. Accessory: Fast Ethernet SFP transceiver (continued)

Fast Ethernet SFP transceiver	Certification type ¹⁶	Order number
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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
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

10.12.2. Gigabit Ethernet SFP transceiver

Table 32. Accessory: Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Certification type ¹⁷	Order number
M-SFP-TX/RJ45	Standard level	943977001
M-SFP-TX/RJ45 EEC	Standard level	942161001

The following operating conditions apply to twisted pair transceivers:

16. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL8 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require following approvals: CE, FCC, UL8 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL8 121201 (Hazardous Locations), IEC8 61850-3, EN8 50121-4, ATEX or IECEx.
17. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL8 61010-2-20.
Use Standard level SFP transceivers for industrial applications that exclusively require following approvals: CE, FCC, UL8 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL8 121201 (Hazardous Locations), IEC8 61850-3, EN8 50121-4, ATEX or IECEx.

Table 32. Accessory: Gigabit Ethernet SFP transceiver (continued)

Gigabit Ethernet SFP transceiver	Certification type ¹⁷	Order number
<ul style="list-style-type: none"> • 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
M-SFP-LH+/LC EEC	Standard level	942119001
SFP-GIG-LX/LC	Entry level	942196001
SFP-GIG-LX/LC EEC	Entry level	942196002

10.13. Scope of delivery

Table 33. Scope of delivery

Amount	Article
1 x	Device
1 x	Safety and general information sheet
1 x	Terminal block for supply voltage

17. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL8 61010-2-20.

Use Standard level SFP transceivers for industrial applications that exclusively require following approvals: CE, FCC, UL8 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL8 121201 (Hazardous Locations), IEC8 61850-3, EN8 50121-4, ATEX or IECEx.

10.14. 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 on the Hirschmann website at: www.hirschmann.com in the product information.

Table 34. List of the 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
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: Safety requirements
FCC 47 CFR Part 15	Code of Federal Regulations
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: <http://www.hirschmann.com>.

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

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

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