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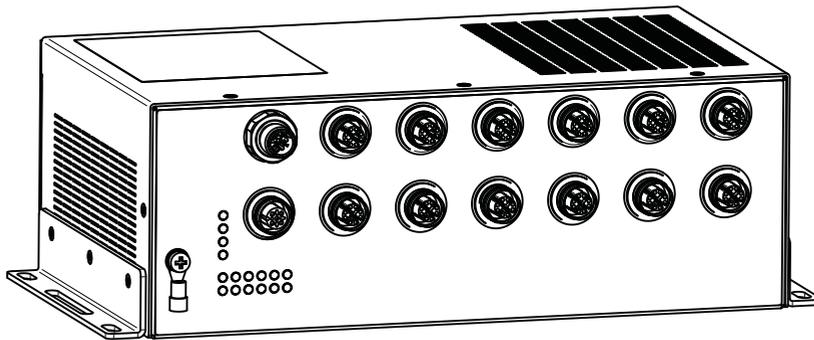
A **BELDEN** BRAND

User Manual

Installation

Industrial Ethernet BOBCAT Extended Switch

BXS



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

Contents

Important information	5
Safety instructions	7
About this manual	13
Key	14
1 Description	15
1.1 General device description	15
1.2 Device name and product code	16
1.3 Device views	17
1.3.1 Front view	17
1.3.1 View from below	17
1.4 Power supply	19
1.4.1 Supply voltage with the characteristic value BB	19
1.4.2 Supply voltage with the characteristic value QQ	19
1.4.3 Supply voltage with the characteristic value N9	19
1.4.4 Supply voltage with the characteristic value M9	19
1.5 Ethernet ports	20
1.5.1 10/100 Mbit/s twisted pair port	20
1.5.2 10/100/1000 Mbit/s twisted pair port	20
1.5.3 Support of PoE(+)	21
1.6 Pin assignments	22
1.7 Display elements	22
1.7.1 Device status	22
1.7.2 Port status	24
1.8 Management interfaces	25
1.8.1 USB-M12-C interface	25
2 Installation	27
2.1 Checking the package contents	27
2.2 Installing and grounding the device	27
2.2.1 Mounting on a flat surface	27
2.2.2 Grounding the device	28

2.3	Connecting the supply voltage	29
2.4	Operating the device	29
2.5	Connecting data cables	30
3	Making basic settings	31
3.1	First login (Password change)	31
4	Monitoring the ambient air temperature	33
5	Maintenance and service	34
6	Disassembly	35
6.1	Removing the device	35
7	Technical data	36
7.1	General data	36
7.2	Supply voltage	36
7.3	Power consumption/power output	39
7.4	Climatic conditions during operation	40
7.5	Climatic conditions during storage	40
7.6	Dimension drawings	41
7.7	Immunity	42
7.8	Electromagnetic compatibility (EMC)	43
7.9	Network range	45
	7.9.1 10/100/1000 Mbit/s twisted pair port	45
8	Scope of delivery	46
9	Accessories	47
9.1	General accessories	47
9.2	Order numbers	47
10	Underlying technical standards	48
A	Further support	49

Important information

Note: 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.

■ Symbol explanation



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.

Safety instructions

WARNING

UNCONTROLLED MACHINE ACTIONS

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.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

■ **General safety instructions**

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.

- 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.

■ **Certified usage**

- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications. [See “Technical data” on page 36.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

■ **Installation site requirements**

- 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 “Technical data” on page 36.](#)

■ 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.

■ 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.

■ Device casing

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

■ 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.

■ Grounding the device

The device is grounded via the separate ground screw.

The grounding screw is located on the front left bottom side of the device.

[See "Grounding the device" on page 28.](#)

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

■ 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 20 °C (36 °F) higher than the maximum ambient air temperature at which the device is used.
Only use copper wire.

■ Requirements for connecting the supply voltage

Before connecting the supply voltage, **always** verify that the requirements listed are complied with.

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 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.

Depending on the supply voltage used, the following additional requirements apply:

Device variants featuring supply voltage with characteristic value BB	<p>All of the following requirements are complied with:</p> <ul style="list-style-type: none">▶ 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 wire diameter of the power supply cable is at least 0.5 mm² (North America: AWG20) on the supply voltage input. <p>Supply with DC voltage:</p> <ul style="list-style-type: none">▶ 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 “Technical data” on page 36.▶ The negative conductors of the voltage inputs are on ground potential.
Device variants featuring supply voltage with characteristic value QQ	<p>All of the following requirements are complied with:</p> <ul style="list-style-type: none">▶ 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 wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input. <p>Supply with DC voltage:</p> <ul style="list-style-type: none">▶ 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 “Technical data” on page 36.▶ The negative conductors of the voltage inputs are on ground potential.

Prerequisites:

Device variants featuring supply voltage with characteristic value M9

All of the following requirements are complied with:

- ▶ The wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input.

Supply with AC voltage:

- ▶ There are fuses in the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: [See “Technical data” on page 36.](#)
- ▶ The power sources are electrically isolated from the ground potential.

Device variants featuring supply voltage with characteristic value N9

All of the following requirements are complied with:

- ▶ The wire diameter of the power supply cable is at least 0.5 mm² (North America: AWG20) on the supply voltage input.

Supply with DC voltage:

- ▶ 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 “Technical data” on page 36.](#)
- ▶ The negative conductors of the voltage inputs are on ground potential.

■ Supply voltage

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

■ National and international safety regulations

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

■ CE marking

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

Device variant	Directive
All variants	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.
Exclusively for device variants featuring supply voltage with characteristic value M9 or N9:	2014/35/EU Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

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 55032

You find more information on technical standards here:

[“Technical data” on page 36](#)

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.

■ UKCA marking

The labeled devices comply with the following UK regulations:

Device variant	Directive
All variants	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 2016
Exclusively for device variants featuring supply voltage with characteristic value M9 or N9:	S.I. 2016 No. 1101 Electrical Equipment (Safety) Regulations 2016



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>

■ **FCC note**

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Industrial Ethernet BOBCAT Extended Switch
BXS

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.

■ **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.

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

Key

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

1 Description

1.1 General device description

The device is designed especially robust and thus also meets the special requirements of railway applications. 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 allows you to set up switched Industrial Ethernet networks according to standard IEEE 802.3.

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>

1.2 Device name and product code

The device name corresponds to a product code. The product code represents specific product properties.

Order number	Device name	Product code
942 302-001	BXS30-12TX-EECC-LV-2A	BXS30-000804-EBB...
942 302-002	BXS30-12TX-EECC-HV-2A	BXS30-000804-EN9...
942 302-003	BXS32-12TX-EECC-LV-2A	BXS32-000804-EQQ...
942 302-004	BXS32-12TX-EECC-HV-2A	BXS32-000804-EN9...
942 302-005	BXS40-12TX-EECC-LV-2A	BXS40-000012-EBB...
942 302-006	BXS40-12TX-EECC-HV-2A	BXS40-000012-EN9...
942 302-007	BXS42-12TX-EECC-LV-2A	BXS42-000012-EQQ...
942 302-008	BXS42-12TX-EECC-HV-2A	BXS42-000012-EN9...

Table 1: Order number, device name and product code

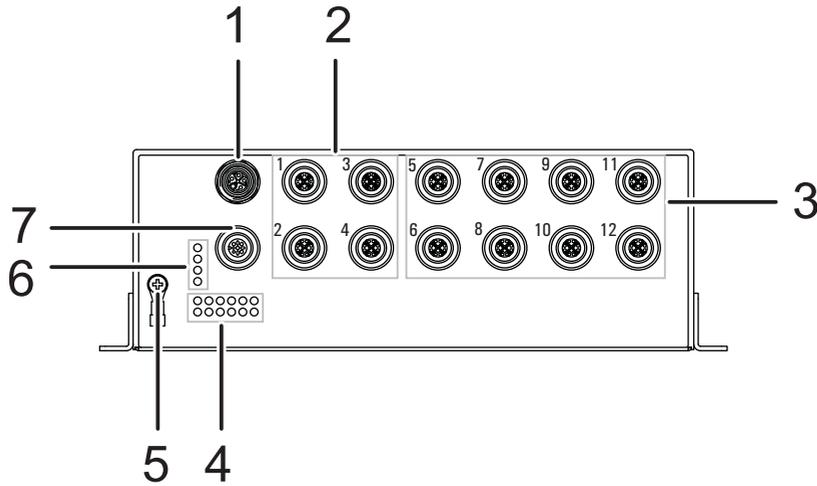
The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.

Item	Characteristic	Characteristic value	Description
1 ... 3	Product	BXS	Industrial Ethernet BOBCAT Extended Switch
4	Data rate	3	Fast Ethernet ports and Gigabit Ethernet ports
		4	Gigabit Ethernet ports
5	Hardware type	0	Standard
		2	Standard with PoE(+)
6	(hyphen)	–	
7 ... 8	Reserved	00	Reserved
9 ... 10	Number Fast Ethernet ports	00	0 × Fast Ethernet ports
		08	8 × Fast Ethernet ports
11 ... 12	Number Gigabit Ethernet ports	04	4 × Gigabit Ethernet ports
		12	12 × Gigabit Ethernet ports
13	(hyphen)	–	
14	Temperature range	S	Standard 0 °C ... +60 °C (+32 °F ... +140 °F)
		T	Extended -40 °C ... +70 °C (-40 °F ... +158 °F)
		E	Extended with Conformal Coating -40 °C ... +70 °C (-40 °F ... +158 °F)
15 ... 16	Supply voltage	BB	Rated voltage 24 V DC
		QQ	Rated voltage range 24 V DC ... 48 V DC
		N9	Rated voltage range 72 V DC ... 110 V DC
		M9	Rated voltage range 110 V AC ... 230 V AC

Table 2: Product code

1.3 Device views

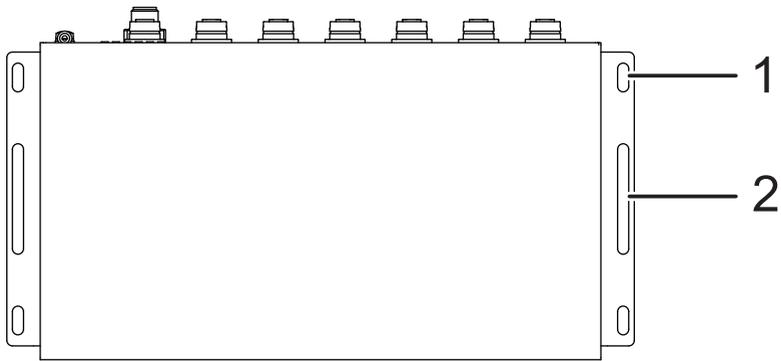
1.3.1 Front view



1	Supply voltage connection	5-pin, "K"- or "L"-coded M12 plug
2	4 × 10/100/1000 Mbit/s twisted pair port	8-pin, "X"-coded M12 socket
	▶ These ports support full duplex only.	
	▶ For PoE device variants: The ports 2, 3, 4 support PoE (PoE+).	
3	depending on the device variants	4-pin, "D"-coded M12 socket
	BXS3...	
	▶ 8 × 10/100 Mbit/s twisted pair port	
	▶ For PoE device variants: These ports support PoE (PoE+).	
	BXS4...	8-pin, "X"-coded M12 socket
	▶ 8 × 10/100/1000 Mbit/s twisted pair port	
	▶ For PoE device variants: These ports support PoE (PoE+).	
4	LED display elements for port status	
5	Grounding screw	
6	LED display elements for device status	
7	USB-M12-C interface	5-pin, "A"-coded M12 socket

Table 3: Front view

1.3.2 View from below



1 ... 2 Slot hole for mounting on a flat surface

Table 4: View from below

1.4 Power supply

1.4.1 Supply voltage with the characteristic value BB

The following options for power supply are available:

- ▶ 5-pin, “L”-coded M12 plug

You will find information on connecting the supply voltage here:

[See “Connecting the supply voltage” on page 29.](#)

1.4.2 Supply voltage with the characteristic value QQ

The following options for power supply are available:

- ▶ 5-pin, “L”-coded M12 plug

You will find information on connecting the supply voltage here:

[See “Connecting the supply voltage” on page 29.](#)

1.4.3 Supply voltage with the characteristic value N9

The following options for power supply are available:

- ▶ 5-pin, “K”-coded M12 plug

You will find information on connecting the supply voltage here:

[See “Connecting the supply voltage” on page 29.](#)

1.4.4 Supply voltage with the characteristic value M9

The following options for power supply are available:

- ▶ 5-pin, “K”-coded M12 plug

You will find information on connecting the supply voltage here:

[See “Connecting the supply voltage” on page 29.](#)

1.5 Ethernet ports

You can connect end devices and other segments to the device ports using twisted pair cables.

1.5.1 10/100 Mbit/s twisted pair port

This port is a 4-pin, “D”-coded M12 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
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- ▶ 100 Mbit/s half-duplex mode, 100 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-X.

1.5.2 10/100/1000 Mbit/s twisted pair port

This port is an 8-pin, “X”-coded M12 socket.

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

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing
- ▶ 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

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI-X.

Note: The twisted pair ports 1 ... 4 support full duplex only.

See [“Front view” on page 17](#).

1.5.3 Support of PoE(+)

The device variants BXS32... and BXS42... support Power over Ethernet (PoE) and Power over Ethernet Plus (PoE+).

The Ethernet ports 2 ... 12 are PoE ports.

See [“Front view” on page 17](#).

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, see the technical data: See [“Technical data” on page 36](#).

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.

1.6 Pin assignments

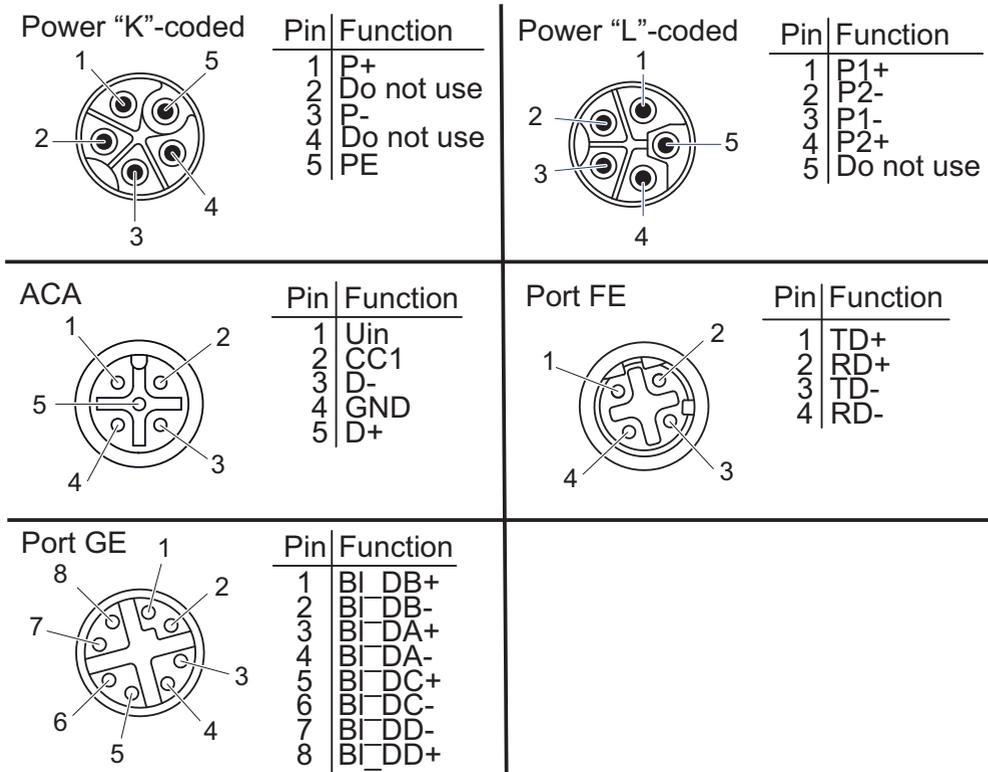


Figure 1: Pin assignments: Interfaces and ports

1.7 Display elements

1.7.1 Device status

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

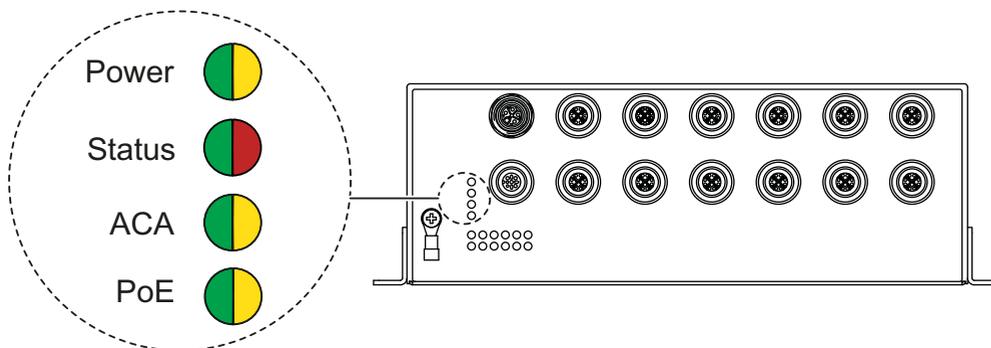


Figure 2: LED display elements for device status

LED	Display	Color	Activity	Meaning
Power	Supply voltage	—	none	Supply voltage is too low
		yellow	lights up	Device variants with redundant power supply: Supply voltage 1 or 2 is on
			flashes 4 × a period	Software update is running. Maintain the power supply.
		green	lights up	Device variants with redundant power supply: Supply voltage 1 and 2 is on Device variants with single power supply: Supply voltage is on
Status	Device Status	—	none	Device starts Device is not ready for operation
		green	lights up	Device is ready for operation Characteristics can be configured
		red	lights up	Device is not ready for operation
			flashes 4 × a period	Device has detected a multiple IP address
ACA	Storage medium ACA22-M12-C (EEC)	—	none	No ACA connected
		green	lights up	ACA is plugged
			flashes 3 × a period	Device writes to/reads from the storage medium
		yellow	lights up	ACA is not ready for operation
PoE		—	none	Supply voltage is too low
		yellow	lights up	Supply voltage is too low for PoE support.
		green	lights up	PoE voltage is on

Table 5: Meaning of the device display elements

1.7.2 Port status

These LEDs display port-related information.

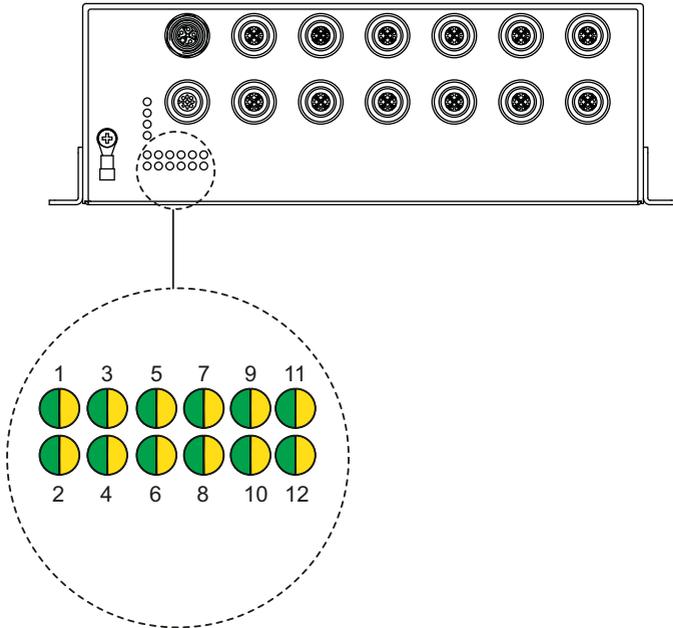


Figure 3: LED display elements for port status

Display	Color	Activity	Meaning
L/D	—	none	Device detects an invalid or missing link
Link status	green	lights up	Device detects a valid link
Data traffic		flashes 1 × a period	Port is switched to stand-by
		flashes 3 × a period	Port is switched off
	yellow	flashing	Device is transmitting and/or receiving data
		flashes 3 × a period	The device deactivates the relevant port (auto-deactivation).

Table 6: Meaning of the port display elements

1.8 Management interfaces

1.8.1 USB-M12-C interface

This interface is a 5-pin, “A”-coded M12 socket with shielding.

The interface was designed for the use with the external storage medium ACA22-M12-C (EEC). Additionally, the interface allows you to connect your device temporarily via terminal emulation or network to an external device using an adapter cable. The adapter cable is available as an accessory ([see on page 47 “Accessories”](#)).

The interface allows you to configure, manage and check your device.

The USB-M12-C interface has the following properties:

- ▶ Supports the USB Host mode and USB Device mode
- ▶ Supports USB 2.0 (data rate max. 480 Mbit/s)
- ▶ Connector: 5-pin, “A”-coded M12 socket
- ▶ Supplies current of max. 500 mA
- ▶ Supported file system: FAT32

■ Configuration via ACA22-M12-C (EEC)

You have the option to connect the storage medium AutoConfiguration Adapter ACA22-M12-C (EEC). It is used for saving/loading the configuration data and diagnostic information, and for loading the software. You find detailed information on the configuration via ACA22-M12-C (EEC) in the software user documentation. You find the software user documentation as PDF files on the Internet at <https://www.doc.hirschmann.com>.

Note: The ACA22-M12-C (EEC) storage medium can remain permanently connected to the device.

■ Configuration, management and checking via adapter cable

You have the option to configure, manage and check your device via the interface using an adapter cable. You find detailed information in the software user documentation. You find the software user documentation as PDF files on the Internet at <http://www.doc.hirschmann.com>. The adapter cable is available as an accessory ([see on page 47 “Accessories”](#)).

To connect the BXS device to an external device, perform the following work steps:

- Connect the adapter cable to the BXS device first.
- Connect the adapter cable to the external device next.

Note: Exclusively connect adapter cables temporarily. Adapter cables may exclusively be used to configure, manage and check your device.

2 Installation

The devices have been developed for practical application in a harsh industrial environment and in the rail sector.

On delivery, the device is ready for operation.

Perform the following steps to install and configure the device:

- ▶ [Checking the package contents](#)
- ▶ [Installing and grounding the device](#)
- ▶ [Connecting the supply voltage](#)
- ▶ [Operating the device](#)
- ▶ [Connecting data cables](#)
- ▶ [Making basic settings](#)

2.1 Checking the package contents

- Check whether the package includes all items named in the section [“Scope of delivery” on page 46](#).
- Check the individual parts for transport damage.

2.2 Installing and grounding the device

2.2.1 Mounting on a flat surface

Perform the following work steps:

- Verify that the minimum clearance at the ventilation slots is maintained to meet the climatic conditions during operation:
Minimum clearance at the ventilation slots: 5 cm (2 in).
- Mount the device on a 0.15 m² (1.62 sq ft) large, 2 mm (0.09 in) thick metal plate to which you do not connect any other heat source. Otherwise the maximum ambient temperature is reduced by 5 K.
[See “General data” on page 36](#).
- You will find the drilling dimensions for mounting the device in the chapter [“Dimension drawings” on page 41](#).
- Install the device with screws on a flat surface.
Completely screw the device to the flat surface using screws through each mounting hole. Exclusively use screws suitable for the installation and application case to ensure flawless operation of the device.

- Remove the premounted transport protection caps.
- Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
See “Accessories” on page 47.

Note: For applications in trains, seal all unused ports with metal protection screws if the German Regelung Nr. EMV 06 (Regulation No. EMV 06) for electromagnetic compatibility of railway vehicles with railway radio services is to be applied.

2.2.2 Grounding the device

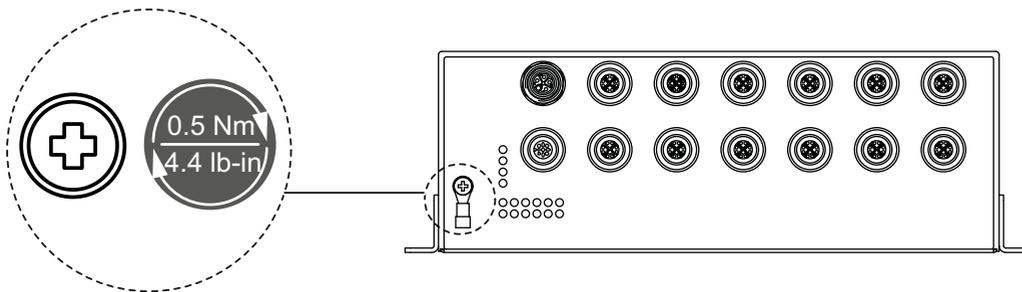


Figure 4: Position of the ground connection on the device; tightening torque.

Depending on the characteristic value of the supply voltage, the device either has connections for functional ground or protective ground.

WARNING

ELECTRIC SHOCK

Ensure that the cross section of the ground conductor is at least the same size as the cross section of the power supply cable.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Perform the following work steps:

- Ground the device via the ground screw.

2.3 Connecting the supply voltage



WARNING

ELECTRIC SHOCK

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

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

In addition, observe the following safety instruction for device variants featuring supply voltage with characteristic value QQ:



WARNING

ELECTRIC SHOCK

The rated voltage of 48 V specified for trains can exceed the SELV limit of 60 V for a short time according to EN 50155 § 5.1.1.1. Limit the overvoltage to a maximum of 60 V by additional measures.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

- Mount the power supply cable to the power supply connector of the device.
You find the prescribed tightening torque in chapter:
[“Supply voltage” on page 36](#)
- Enable the supply voltage.

2.4 Operating the device

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

2.5 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.
- When using copper cables, provide 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. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90° angle.
- Use shielded data cables, for example SF/UTP cables according to ISO/IEC 11801.
- Connect the data cables according to your requirements.

See [“Ethernet ports” on page 20](#).

3 Making basic settings

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

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:

- ▶ Input via the HiView or Industrial HiVision application. You find further information about the applications HiView or Industrial HiVision on the Internet at the Hirschmann product pages:

HiView

<http://www.hirschmann.com/en/QR/INET-HiView>

Industrial HiVision

<http://www.hirschmann.com/en/QR/INET-Industrial-HiVision>

- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP (Option 82)
- ▶ AutoConfiguration AdapterACA22-M12-C (EEC)
- ▶ Configuration via USB-M12-C interface

■ **Default settings**

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Ethernet ports: link status is not evaluated
- ▶ TP ports: Autonegotiation
- ▶ RSTP (Rapid Spanning Tree) activated

3.1 First login (Password change)

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

Perform the following steps:

- Open the Graphical User Interface, the Command Line Interface, or HiView the first time you log on to the device.
- Log on to the device with the default password “private”. 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, then the device prompts you to confirm your new password.
- Log on to the device again with your new password.

Note: If you lost your password, then use the System Monitor to reset the password.

For further information see:

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

4 Monitoring the ambient air temperature

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

See [“Climatic conditions during operation” on page 40](#).

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.

The temperature displayed in the CLI (Command Line Interface) and the GUI (Graphical User Interface) is the internal temperature of the device. It is higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

5 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.
- ▶ 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 degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

Note: You find information on settling complaints on the Internet at <http://www.beldensolutions.com/en/Service/Repairs/index.phtml>.

6 Disassembly

6.1 Removing the device



WARNING

ELECTRIC SHOCK

Disconnect the grounding only after disconnecting all other cables.

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

Perform the following work steps:

- Disable the supply voltage.
- Disconnect the data cables.
- Disconnect the power supply cable.
- Disconnect the grounding.
- Remove the screws.

7 Technical data

7.1 General data

General data		
Dimensions W × H × D	See "Dimension drawings" on page 41.	
Weight	BXS30-12TX-EECC-LV-2A BXS40-12TX-EECC-LV-2A	2.25 kg (4.96 lbs)
	BXS30-12TX-EECC-HV-2A BXS40-12TX-EECC-HV-2A	2.15 kg (4.74 lbs)
	BXS32-12TX-EECC-LV-2A BXS42-12TX-EECC-LV-2A	2.37 kg (5.22 lbs)
	BXS32-12TX-EECC-HV-2A BXS42-12TX-EECC-HV-2A	2.63 kg (5.8 lbs)
	Mounting	See "Mounting on a flat surface" on page 27.
	Pollution degree	2
	Degree of protection	IP40

Table 7: General data

7.2 Supply voltage

Supply voltage with the characteristic value BB		
Rated voltage DC:	24 V DC	
Voltage range DC incl. maximum tolerances:	16.8 V DC ... 32 V DC	
Rated voltage for rail applications according to EN 50155	24 V DC	
Voltage range including maximum tolerances for rail applications according to EN 50155 (permanent)	16.8 V DC ... 30 V DC	
Voltage range including maximum tolerances for rail applications according to EN 50155 (0.6 × U _N for 0.1 s; 1.4 × U _N for 1 s)	14.4 V DC ... 33.6 V DC	
Connection type	5-pin, "L"-coded M12 plug	
	Tightening torque	0.6 Nm (5.3 lb-in)
	Wire diameter	min. AWG20 (0.5 mm ²)
Power loss buffer	>10 ms at 20.4 V DC	

Table 8: Supply voltage with characteristic value BB

Supply voltage with the characteristic value BB

Overload current protection on the device	Non-replaceable fuse 3.5 A	
Back-up fuse for each voltage input	Nominal rating:	2 A
	Characteristic:	slow blow
Peak inrush current	<2 A	
Current integral I ² t	<0.1 A ² s	
Connection for functional ground	Grounding screw See "Grounding the device" on page 28.	
	Tightening torque	0.5 Nm (4.4 lb-in)

*Table 8: Supply voltage with characteristic value BB***Supply voltage with characteristic value QQ**

Rated voltage range DC:	24 V DC ... 48 V DC	
Voltage range DC incl. maximum tolerances:	16.8 V DC ... 60 V DC	
Rated voltage range for railway applications according to EN 50155	24 V DC ... 48 V DC	
Voltage range including maximum tolerances for rail applications according to EN 50155 (permanent)	16.8 V DC ... 60 V DC	
Voltage range including maximum tolerances for railway applications according to EN 50155 (<0.1 s)	14.4 V DC ... 60 V DC	
Max. PoE power	60 W	
Connection type	5-pin, "L"-coded M12 plug	
	Tightening torque	0.6 Nm (5.3 lb-in)
	Wire diameter	min. AWG18 (0.75 mm ²)
Power loss buffer	>10 ms at 20.4 V DC	
Overload current protection on the device	Non-replaceable fuse 10 A	
Back-up fuse for each voltage input	Nominal rating:	10 A ... 20 A
	Characteristic:	slow blow
Peak inrush current	<8 A	
Current integral I ² t	<1 A ² s	
Connection for functional ground	Grounding screw See "Grounding the device" on page 28.	
	Tightening torque	0.5 Nm (4.4 lb-in)

*Table 9: Supply voltage with characteristic value QQ***Supply voltage with the characteristic value N9**

Rated voltage range DC:	72 V DC ... 110 V DC	
Voltage range DC incl. maximum tolerances:	50.4 V DC ... 138 V DC	
Rated voltage range for railway applications according to EN 50155	72 V DC ... 110 V DC	

Table 10: Supply voltage with characteristic value N9

Supply voltage with the characteristic value N9			
Voltage range including maximum tolerances for rail applications according to EN 50155 (permanent)	50.4 V DC ... 138 V DC		
Voltage range including maximum tolerances for rail applications according to EN 50155 (0.6 × U _N for 0.1 s; 1.4 × U _N for 1 s)	43.2 V DC ... 154 V DC		
Max. PoE power	BXS32/42	60 W	
Connection type	5-pin, "K"-coded M12 plug		
	Tightening torque	0.6 Nm (5.3 lb-in)	
	Wire diameter	min. AWG20 (0.5 mm ²)	
Power loss buffer	>10 ms at 61.2 V DC		
Overload current protection on the device	Non-replaceable fuse 4 A		
Back-up fuse for each voltage input	Nominal rating:	BXS30/40	1 A ... 20 A
		BXS32/42	4 A ... 20 A
	Characteristic:	slow blow	
Peak inrush current	BXS30/40	<1 A	
	BXS32/42	<4 A	
Current integral I ² t	BXS30/40	<0.1 A ² s	
	BXS32/42	<0.5 A ² s	
Connection for protective ground	Grounding screw See "Grounding the device" on page 28.		
	Tightening torque	0.5 Nm (4.4 lb-in)	

Table 10: Supply voltage with characteristic value N9

Supply voltage with the characteristic value M9			
Rated voltage range AC:	110 V AC ... 230 V AC, 50 Hz ... 60 Hz		
Voltage range AC incl. maximum tolerances:	88 V AC ... 265 V AC, 47 Hz ... 63 Hz		
Max. PoE power	BXS32/42	60 W	
Connection type	5-pin, "K"-coded M12 plug		
	Tightening torque	0.6 Nm (5.3 lb-in)	
	Wire diameter	min. AWG18 (0.75 mm ²)	
Power loss buffer	>10 ms at 93.5 V AC		
Overload current protection on the device	Non-replaceable fuse 4 A		
Back-up fuse for each voltage input	Nominal rating:	BXS30/40	1 A ... 20 A
		BXS32/42	4 A ... 20 A
	Characteristic:	slow blow	
Peak inrush current	BXS30/40	<1 A	
	BXS32/42	<4 A	
Current integral I ² t	BXS30/40	<0.1 A ² s	
	BXS32/42	<0.5 A ² s	

Table 11: Supply voltage with characteristic value M9

Supply voltage with the characteristic value M9

Connection for protective ground Grounding screw

[See “Grounding the device” on page 28.](#)

Tightening torque 0.5 Nm (4.4 lb-in)

Table 11: Supply voltage with characteristic value M9

7.3 Power consumption/power output

Device variant	Product code	Max. power consumption	Power output
BXS30-12TX-EECC-LV-2A	BXS30-000804-EBB...	11.4 W	39 Btu (IT)/h
BXS30-12TX-EECC-HV-2A	BXS30-000804-EN9...	9.7 W	33 Btu (IT)/h
–	BXS30-000804-EM9...	11 W	37.5 Btu (IT)/h
BXS32-12TX-EECC-LV-2A	BXS32-000804-EQQ...	22.3 W + 60 W PoE	76.2 Btu (IT)/h + 60 W PoE
BXS32-12TX-EECC-HV-2A	BXS32-000804-EN9...	23.2 W + 60 W PoE	79.2 Btu (IT)/h + 60 W PoE
–	BXS32-000804-EM9...	24 W + 60 W PoE	81.8 Btu (IT)/h + 60 W PoE
BXS40-12TX-EECC-LV-2A	BXS40-000012-EBB...	13.1 W	44.7 Btu (IT)/h
BXS40-12TX-EECC-HV-2A	BXS40-000012-EN9...	11.9 W	40.5 Btu (IT)/h
–	BXS40-000012-EM9...	13 W	44.3 Btu (IT)/h
BXS42-12TX-EECC-LV-2A	BXS42-000012-EQQ...	24.1 W + 60 W PoE	82.2 Btu (IT)/h + 60 W PoE
BXS42-12TX-EECC-HV-2A	BXS42-000012-EN9...	25 W + 60 W PoE	85.2 Btu (IT)/h + 60 W PoE
–	BXS42-000012-EM9...	25.5 W + 60 W PoE	87.1 Btu (IT)/h + 60 W PoE

Table 12: Power consumption/power output

7.4 Climatic conditions during operation

Climatic conditions during operation	
Minimum clearance at the ventilation slots: 5 cm (2 in)	
Ambient air temperature ^a	-40 °C ... +70 °C (-40 °F ... +158 °F)
	Derating:
	<ul style="list-style-type: none"> ▶ Mount the device on a 0.15 m² (1.62 sq ft) large, 2 mm (0.09 in) thick metal plate to which you do not connect any other heat source. Otherwise the maximum ambient temperature is reduced by 5 K. ▶ When using more than 30 W PoE power, the maximum ambient air temperature is reduced by 5 K. ▶ When using more than 4 ports with 1000 Mbit/s, the maximum ambient air temperature is reduced by 2 K. ▶ When using more than 8 ports with 1000 Mbit/s, the maximum ambient air temperature is reduced by 4 K. ▶ When using the device above 2000 m ASL (6562 ft ASL), the maximum ambient air temperature is reduced by 10 K.
Maximum inner temperature of device (guideline)	+83 °C (+181.4 °F)
Humidity	1 % ... 95 % (non-condensing)
Air pressure	Without derating <ul style="list-style-type: none"> ▶ min. 795 hPa (+2000 m ASL; +6562 ft ASL) ▶ max. 1060 hPa (-400 m ASL; -1312 ft ASL) with derating: 10 K at >2000 m ASL (6562 ft ASL) <ul style="list-style-type: none"> ▶ min. 700 hPa (+3000 m ASL; +9842 ft ASL) ▶ max. 1060 hPa (-400 m ASL; -1312 ft ASL)

Table 13: Climatic conditions during operation

a. Temperature of the ambient air at a distance of 5 cm (2 in) from the device

7.5 Climatic conditions during storage

Climatic conditions during storage		
Ambient temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)	up to 3 months
	-40 °C ... +70 °C (-40 °F ... +158 °F)	up to 1 year
	-40 °C ... +50 °C (-40 °F ... +122 °F)	up to 2 years
	0 °C ... +30 °C (+32 °F ... +86 °F)	up to 10 years

Table 14: Climatic conditions during storage

Climatic conditions during storage	
Humidity	1 % ... 95 % (non-condensing)
Air pressure	▶ min. 700 hPa (+3000 m ASL; +9842 ft ASL)
	▶ max. 1060 hPa (-400 m ASL; -1312 ft ASL)

Table 14: Climatic conditions during storage

7.6 Dimension drawings

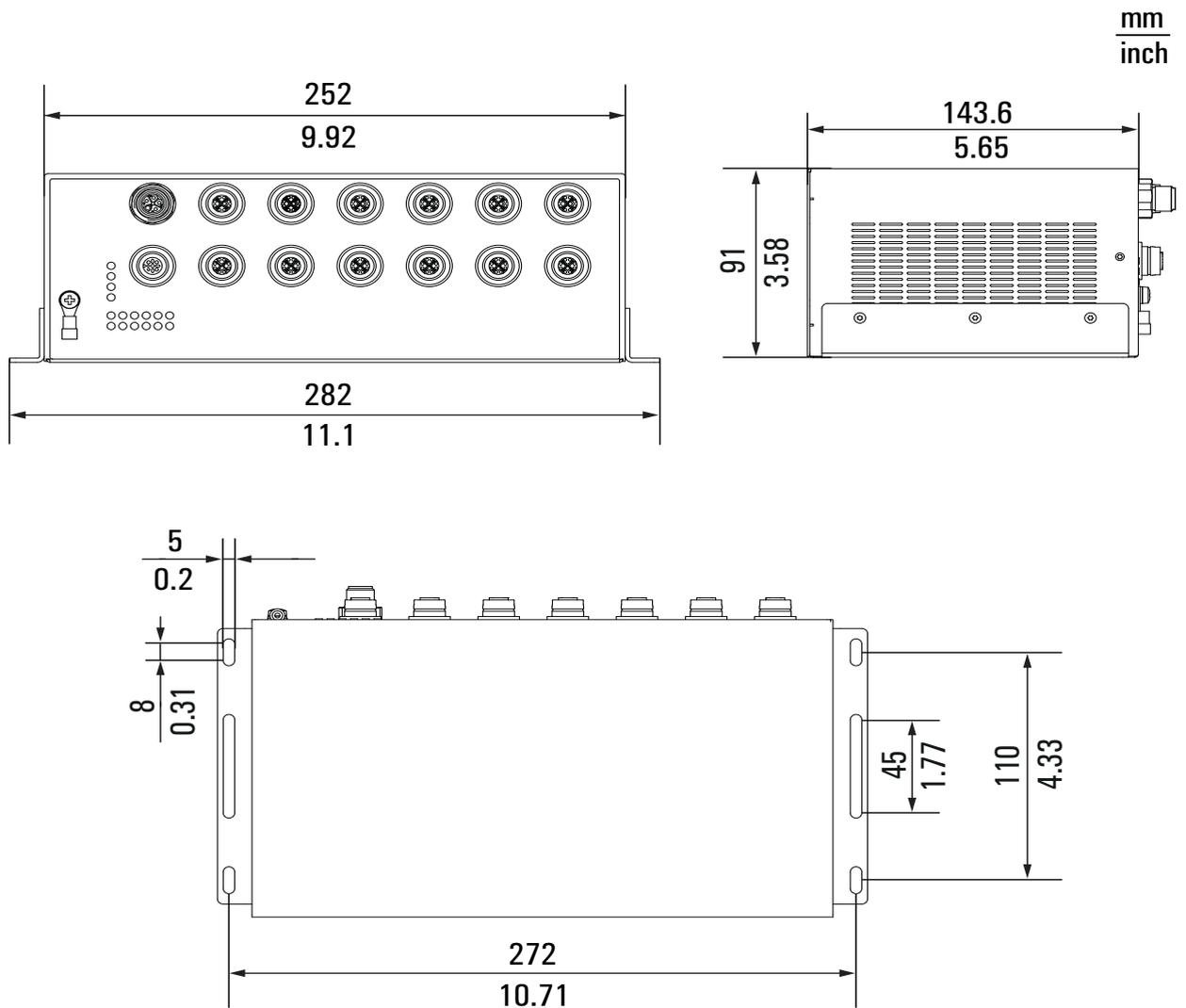


Figure 5: Dimension drawings

7.7 Immunity

Immunity		Standard applications ^a	Railway applications (trackside) ^b	Railway applications (on vehicles) ^c
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude	—	Operating 5 Hz ... 150 Hz, Broadband noise vertical: 1.0 m/s ² (rms) horizontal: 0.7 m/s ² (rms)
		8.4 Hz ... 200 Hz with 1 g	—	disabled: 5 Hz ... 150 Hz, Broadband noise vertically: 5.72 m/s ² (rms) horizontally: 3.96 m/s ² (rms)
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms	—	vertical: 30 m/s ² , 30 ms horizontal: 50 m/s ² , 30 ms

Table 15: Immunity

- a. EN 61131-2, CE, FCC – applies to all devices
- b. According to EN 50121-4.
- c. According to EN 50155.

7.8 Electromagnetic compatibility (EMC)

EMC interference emission		Standard applications ^a	Railway applications (trackside) ^b	Railway applications (on vehicles) ^c
Radiated emission				
EN 55032		Class A	Class A	Class A
FCC 47 CFR Part 15		Class A	Class A	Class A
EN 61000-6-4		Fulfilled	Fulfilled	Fulfilled
EMV 06 Rev. 2.0		—	—	Class S1
Conducted emission				
EN 55032	AC and DC supply connections	Class A	Class A	Class A
FCC 47 CFR Part 15	AC and DC supply connections	Class A	Class A	Class A
EN 61000-6-4	AC and DC supply connections	Fulfilled	Fulfilled	Fulfilled
EN 55032	Telecommunication connections	Class A	Class A	Class A
EN 61000-6-4	Telecommunication connections	Fulfilled	Fulfilled	Fulfilled

Table 16: EMC interference emission

- a. EN 61131-2, CE, FCC – applies to all devices
- b. According to EN 50121-4.
- c. According to EN 50155.

EMC interference immunity		Standard applications ^a	Railway applications (trackside) ^b	Railway applications (on vehicles) ^c
Electrostatic discharge				
EN 61000-4-2	Contact discharge	±4 kV	±6 kV	±6 kV
EN 61000-4-2	Air discharge	±8 kV	±8 kV	±8 kV
Electromagnetic field				

Table 17: EMC interference immunity

EMC interference immunity		Standard applications^a	Railway applications (trackside)^b	Railway applications (on vehicles)^c
EN 61000-4-3	80 MHz ... 800 MHz	10 V/m	10 V/m	20 V/m
	800 MHz ... 1000 MHz	10 V/m	20 V/m	20 V/m
	1.4 GHz ... 2.0 GHz	3 V/m	10 V/m	10 V/m
	2.0 GHz ... 2.7 GHz	1 V/m	5 V/m	5 V/m
	2.7 GHz ... 5.1 GHz	3 V/m	—	—
	5.1 GHz ... 6.0 GHz	3 V/m	3 V/m	3 V/m
Fast transients (burst) – power supply connection				
EN 61000-4-4		±2 kV	±2 kV	±2 kV
Fast transients (burst) – data line				
EN 61000-4-4		±1 kV	±2 kV	±2 kV
Voltage surges – power supply connection				
EN 61000-4-5	line/ground	±2 kV	±2 kV	±2 kV
EN 61000-4-5	line/line	±1 kV	±1 kV	±1 kV
Voltage surges - data line				
EN 61000-4-5	line/ground	±1 kV	±2 kV	±2 kV
Conducted disturbances				
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V	10 V

Table 17: EMC interference immunity

- a. EN 61131-2, CE, FCC – applies to all devices
- b. According to EN 50121-4.
- c. According to EN 50155.

7.9 Network range

7.9.1 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)

Table 18: Network range: 10/100/1000 Mbit/s twisted pair port

8 Scope of delivery

Scope of delivery
1 × Device
1 × Safety and general information sheet
1 × M12 Power connector for crimp connections with wire diameter AWG16 (1.5 mm ²)

Table 19: Scope of delivery

9 Accessories

9.1 General accessories

Designation	Order number
AutoConfiguration Adapter ACA22-M12-C (EEC)	942 306-001
M12-USB adapter cable (for connecting the ACA with a computer)	942 199-001
Adapter cable M12 5-pin to USB (for configuration of BXS devices)	942 309-001
Field attachable connector for the power supply, M12, "K"-coded, for crimp connections with wire diameter AWG16 (1.5 mm ²)	934 935-002
Field attachable connector for the power supply, M12, "L"-coded, for crimp connections with wire diameter AWG16 (1.5 mm ²)	934 935-005
Protection screw for M12 socket, metal, IP65/67 (25 pieces)	942 057-001
Protection screw for M12 socket, plastic, IP65/67 (25 pieces)	942 057-002
Industrial HiVision Network Management Software	943 156-xxx

Table 20: Accessories: General accessories

9.2 Order numbers

Name	Order number
BXS30-12TX-EECC-LV-2A	942 302-001
BXS30-12TX-EECC-HV-2A	942 302-002
BXS32-12TX-EECC-LV-2A	942 302-003
BXS32-12TX-EECC-HV-2A	942 302-004
BXS40-12TX-EECC-LV-2A	942 302-005
BXS40-12TX-EECC-HV-2A	942 302-006
BXS42-12TX-EECC-LV-2A	942 302-007
BXS42-12TX-EECC-HV-2A	942 302-008

Table 21: Order numbers

10 Underlying technical standards

Name	
FCC 47 CFR Part 15	Code of Federal Regulations
NEMA TS 2	Traffic Controller Assemblies with NTCIP Requirements (environmental requirements)
UL 61010-2-201	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment
EMV 06	Regulation No. EMV 06: Technical rules for electromagnetic compatibility – Proof of radio compatibility of rail vehicles with railway radio services
EN 45545-2	Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.
EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 50155	Railway applications – Electronic equipment used on rolling stock
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: safety 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
IEEE 802.3	Ethernet

Table 22: List of the 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.

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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