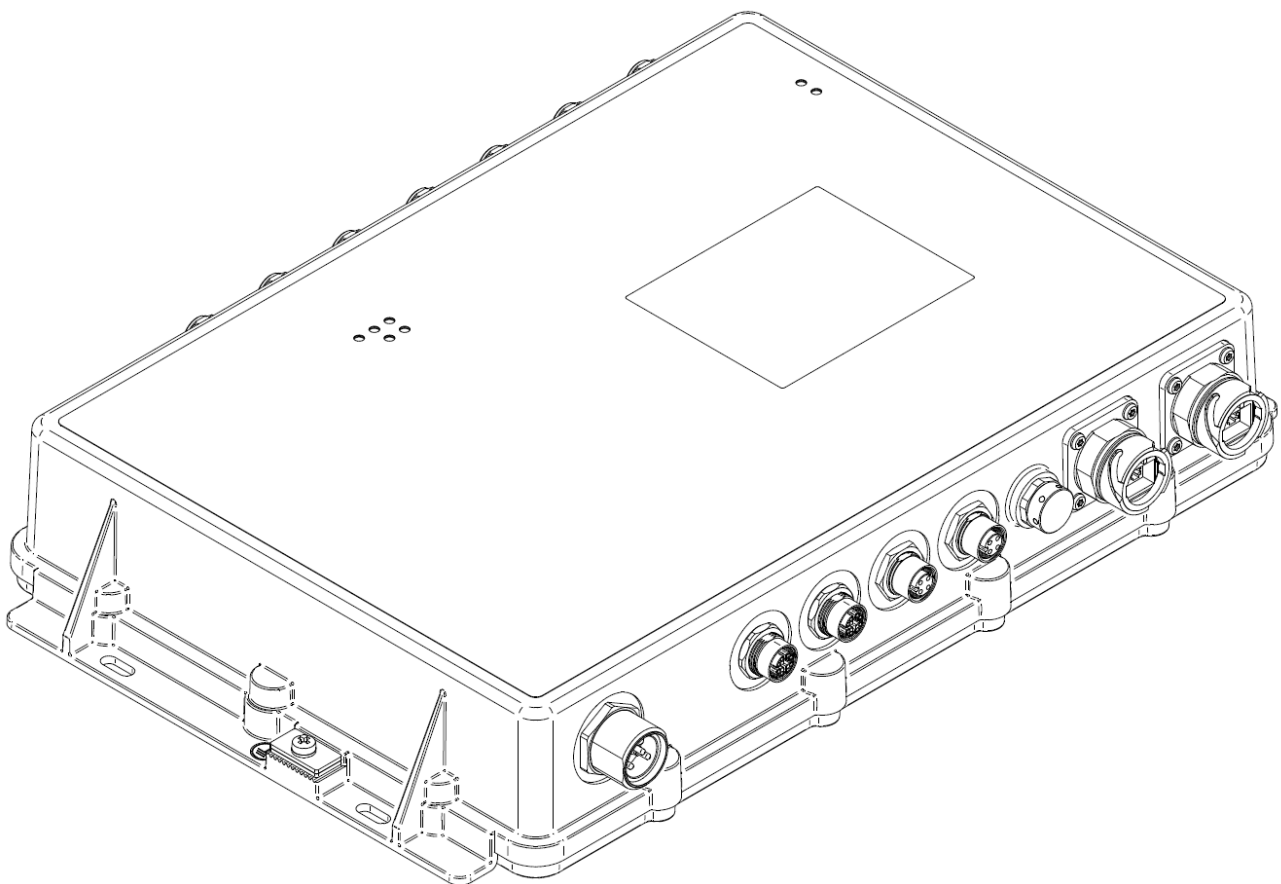


User Manual

Installation

Dragonfly Industrial Wireless Access Point

DAP849



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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 injury.

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 **ACTIONS DES MACHINES INCONTRÔLÉES**

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.

Pour éviter les actions des machines incontrôlées causées par la perte de données, configurez individuellement tous les dispositifs de transmission de données.

Before you start any machine, which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

Avant de démarrer une machine qui est contrôlée via une transmission de données, assurez-vous de terminer la configuration de tous les dispositifs de transmission de données.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

■ **General safety instructions**

The device operates normally with live electrical power. Improper usage of the device entails the risk of physical injury or significant property damage. The correct and safe operation of this device depends on correct handling during transportation, correct 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 IT for inspection.

■ Certified usage

- Use the product only for the application cases described in the Hirschmann IT product information, including this manual.
- Operate the product only according to technical specifications. See [“Technical data” on page 45](#).
- Connect to the product only components suitable for the requirements of the specific application case.

■ 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.

■ Requirements for connecting the supply voltage

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

All variants All of the following requirements are complied with:

The following requirements apply without restrictions:

- ▶ The supply voltage corresponds to the voltage specified on the type plate of the device.
- ▶ The power supply conforms to overvoltage category I or II.
- ▶ 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 cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.
- ▶ The power supply cable is suitable for the voltage, current and physical load.

■ Installation site requirements

“Equipment is intended for installation in Restricted Access Area.”

Restricted access location:

- ▶ The location is outside the operator access area.
 - ▶ The location is accessible to the service personnel even when the device is switched on.
-
- During the installation, make sure that you adhere to the regulations of the country in which you are operating the device.
 - In ambient temperature under -10°C ($+14^{\circ}\text{F}$), use the wiring suitable for minimum temperatures.

■ **Outdoor installation**

Applies to device variants featuring supply voltage that comply with all of the following requirements:

- Install the device in such a way that it is protected against mechanical forces in the area of power supply.
- The device has been approved for outdoor installation in a pollution degree 2 environment.
- Observe the mounting instructions, [see “Installing the antennas” on page 28](#).

■ **Device casing**

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

- Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.
- At ambient air temperatures $> +60^{\circ}\text{C}$ ($+140^{\circ}\text{F}$): The surfaces of the device housing may become hot. Avoid touching the device while it is operating.

■ **Equipment usage**

Only instructed or skilled persons are allowed to use the equipment (no ordinary persons are allowed).

■ **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 to reduce the risk for themselves and others.
- ▶ Qualified personnel receive training on a regular basis.

■ **National and international safety regulations**

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

■ **Grounding the device**

Grounding the device is by means of a separate protective ground connection on the device.

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

The overall shield of a connected shielded twisted pair cable is connected to the ground connection on the metal housing as a conductor.

■ **Lightning protection and surge protection**

Applies exclusively to devices and antennas installed outdoors:

- The installation of the device must be carried out by a lightning protection professional in accordance with valid standards (such as IEC 62305 / DIN EN 62305 (VDE 0185-305)), and in accordance with the lightning protection procedures recognized and proven for the application and the environment.
- Refer to the information in the “WLAN Outdoor Guide” on “Lightning protection and surge protection”.
- The manual is available for download on the internet:
<https://www.doc.hirschmann.com>.
- Ensure that the lightning protection professional installs lightning protection devices (for example lightning conductors) to protect antennas installed outdoors.
- Ensure that the lightning protection professional takes appropriate lightning protection measures that mitigate the effects of lightning strikes.

■ CE marking

Note:

The CE marking applies to DAP849-RW.

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.

▶ **2014/53/EU (RED)**

Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment.

This product may be operated in all European Union (EU) countries under the condition that it has been configured correctly.

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


Belden Deutschland GmbH
Im Gewerbepark 2
58579 Schalksmühle
Germany

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

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

The product can be used in industrial areas.

Notes for countries with the following country codes:

								
AT	BE	BG	CH	CY	CZ	DE	DK	EE
EL	ES	FI	FR	HR	HU	IE	IT	LI
LT	LU	LV	MT	NL	NO	PL	PT	RO
IS	SE	SI	SK	TR				

- ▶ The RED compliance requires compliant operation of the device in the 5 GHz band channels. For the compliant operation of the device, it is prohibited to modify the country code.

■ **LED or laser components**

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

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
L'utilisation des commandes ou réglages ou l'exécution des procédures autres que celles spécifiées dans les présents exigences peuvent être la cause d'une exposition à un rayonnement dangereux.

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019.

■ **FCC note**

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

DAP849

U.S. Contact Information

Belden Inc.

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:

- ▶ This device may not cause harmful interference.
- ▶ This device must accept any interference received, including interference that may cause undesired operation.

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

to operate the equipment.

■ **RF exposure warning**

- ▶ This equipment complies with FCC and CE radiation exposure limits set forth for an uncontrolled environment.
- ▶ This product may not be collocated or operated in conjunction with any other antenna or transmitter.
- ▶ Confirm that this equipment is installed and operated in accordance with the provided instructions. Make sure that the antenna(s) used for this transmitter is installed at a distance of at least 20 cm from every person and must not be collocated or operating in conjunction with any other antenna or transmitter.

■ **Recycling note**



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

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

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

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

This does not apply if the used device is handed in for reuse.

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 the device as a printout can be found for downloads on the Internet at: <https://catalog.belden.com>.

Key

The symbols used in this manual have the following meanings:

▶	List
□	Work step
■	Subheading
Link	Cross-reference with link
Note:	A note emphasizes a significant fact or draws your attention to a dependency.

1 Description

1.1 General device description

We provide industrial-grade wireless access solutions for verticals such as rail transit, process automation, discrete automation, and energy with DAP800 family. The DAP800 portfolio incorporates Wi-Fi 6 (IEEE 802.11ax) technology.

In rail transit scenarios, DAP849 is deployed for Wi-Fi coverage along the tracks and in depots to facilitate wireless communication with onboard DAP800 clients.

In verticals such as process automation, discrete automation, and energy, the DAP849 is installed in factory workshops, logistics warehouses, metallurgical industry facilities, ports and docks, and so on.

DAP849 is designed for 110 V/230 V AC power supply scenarios, and it enables wired transmission with 2 fiber optic (FO) ports and 2 ethernet ports. This expands the networking topology options to include more configurations, such as daisy chain connection and direct connection.

This device is rated at IP67 protection level.

1.2 Device name and product code

The device name corresponds to the product code. The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.

Product Number	Product Code	Product Description
9AA 102 001	DAP849-RWAAZT6O6EHH	DAP800 Outdoor Wi-Fi 6 (802.11ax) Access Point (AP), 110 V/230 V AC, 2 x 1G ETH, 2 x 1G Fiber Optic, Extended Temp with Conf. Coating
9AA 102 002	DAP849-RWAAZT6O8EHH	DAP800 Outdoor Wi-Fi 6 (802.11ax) AP, 110 V/230 V AC, 2 x 1G ETH, 2 x 2.5G FO, Extended Temp with Conf. Coating

Table 1: Device name, product code and description

Product Code	Explanation
Device	DAP849
XX	RW
A	AP
A	110 V/230 V AC
Z	Approval EN50121-4, EN45545-2
T6	100/1000 Mbit/s M12 connector
O6/O8	O6: FO with 1000 Mbit/s Small Form-factor Pluggable (SFP) O8: FO with 2500 Mbit/s SFP
E	Extended, -40°C to +70°C with conformal coating
HH	Reserved

Table 2: Product code explanation

1.3 Device view

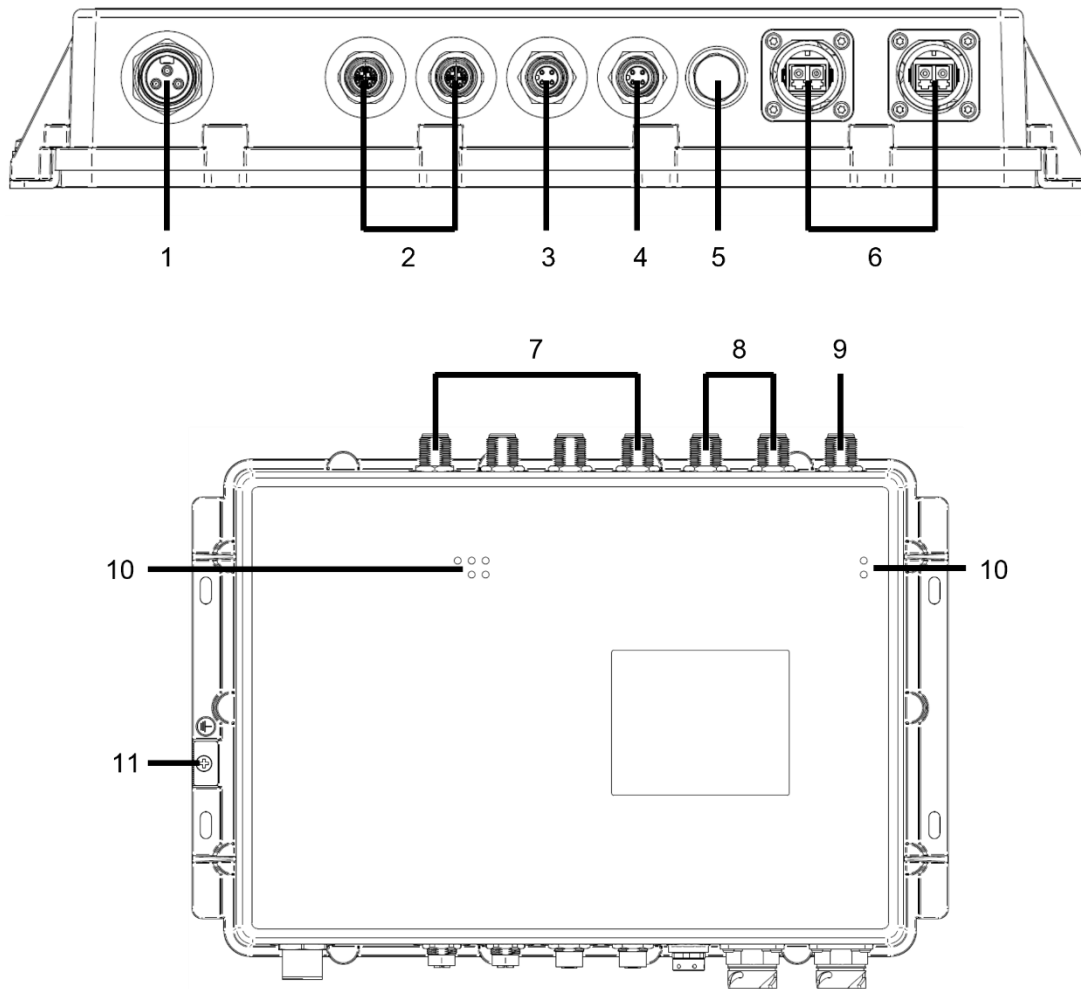


Figure 1: Device view

1	Supply voltage connection	3-pin, 7/8" socket for power supply 110 V/230 V AC, 50 Hz/60 Hz
2	Ethernet ports	8-pin, "X"- coded M12 socket for 100/1000 Mbit/s twisted pair connections
3	V.24 (Switch)	4-pin, "A"-coded M12 socket for switch
4	V.24 (WIFI)	4-pin, "A"-coded M12 socket for Wi-Fi
5	Air valve	Do not open
6	FO ports	1G or 2.5G FO ports
7	ANT1–ANT4 ports	Used to connect Wi-Fi 5 GHz antennas
8	ANT5–ANT6 ports	Used to connect Wi-Fi 2.4 GHz antennas
9	ANT7 port	Used to connect scanning antennas
10	LED display element	Indicate device status with different colors
11	Connection for protective ground	

1.4 Power supply

One 3-pin 7/8" plug is available for the power supply to the device. For more details about power supply, see ["Connecting the power supply" on page 32](#).

1.5 Ethernet ports

The ethernet ports support connections to end devices or other network segments via either twisted pair cables or optical fibers.

You can find the information on the pin assignments for making patch cables in [Table 3](#).

1.5.1 100/1000 Mbit/s port

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

This port supports the following:

- ▶ Auto crossing (if auto-negotiation is activated)
- ▶ Auto-negotiation
- ▶ Auto-polarity
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full-duplex mode
- ▶ 1000 Mbit/s full-duplex mode
- ▶ Delivery state: Auto-negotiation activated

The socket housing is electrically connected with the device housing.

This table shows the pin assignments of the 100/1000 Mbit/s port.

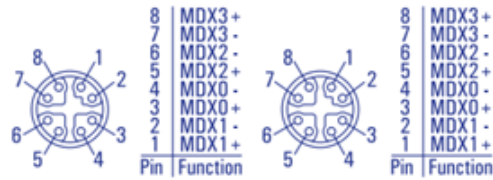
Connector	Pin	Function
 <p>Ethernet 1 Ethernet 2</p>	1	MDX1+
	2	MDX1-
	3	MDX0+
	4	MDX0-
	5	MDX2+
	6	MDX2-
	7	MDX3-
	8	MDX3+

Table 3: Pin assignments of the 100/1000 Mbit/s port

1.5.2 FO port

The FO port enables connections to fiber network in compliance with the standard IEEE 802.3.

The port supports either 1000 Mbit/s full-duplex mode or 2500 Mbit/s full-duplex mode.

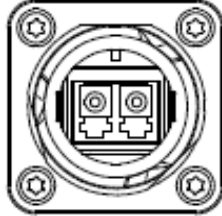


Figure 2: IP67 plug as per IEC 61076-3-106

1.6 Antenna connections

The device has connections for external antennas. These connectors are N female sockets. It is recommended to install an N-Abschl-Wdst. 50 Ohm termination resistor on unused antenna ports to prevent signal interference. The "Antenna Guide" document provides an overview of the antennas that can be used as well as the suitable antenna accessories. The manual is available for downloads on the Internet:
<https://catalog.belden.com>.

1.7 Display elements

After the supply voltage is set up, the software starts and initializes the device. Afterwards, the device performs a self-test. During this process, various LEDs light up.

The device is equipped with LED displays that indicate different status with different colors.



Figure 3: LED display elements

LED Element	Color	Activity	Function
Power	Off	-	Power is not ready
	Green	Solid	Supply voltage is active
Eth1	Off	-	No link is detected
	Green	Solid	Link is detected
	Green	Blinking	Link activity
Eth2	Off	-	No link is detected
	Green	Solid	Link is detected
	Green	Blinking	Link activity
FO1	Off	-	No link is detected
	Green	Solid	Link is detected
	Green	Blinking	Link activity
FO2	Off	-	No link is detected
	Green	Solid	Link is detected
	Green	Blinking	Link activity
WIFI 2.4G	Off	-	No valid connection
	Green	Solid	2.4G link is active
WIFI 5G	Off	-	No valid connection
	Green	Solid	5G link is active

Table 4: LED display description

1.8 V.24 interfaces (external management)

The device includes two V.24 interfaces: V.24 (WIFI) and V.24 (Switch). Both interfaces are 4-pin, “A”-coded M12 sockets.

The interfaces are serial and enable the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). You can set up a connection to the Command Line Interface (CLI) and the System Monitor.

VT100 terminal settings	
Speed	115200 Baud
Data	8 bits
Stopbit	1 bit
Handshake	off
Parity	None

Table 5: VT100 terminal settings

You can use the V.24 interface to connect the device.


Connector	Pin	Function
 V. 24 (Switch) V. 24 (WIFI)	1 TX	Transmit data
	2 RX	Receive data
	3 N.C.	Not connect
	4 GND	Ground

Table 6: V.24 connector pins information

The terminal cable is available as an accessory.

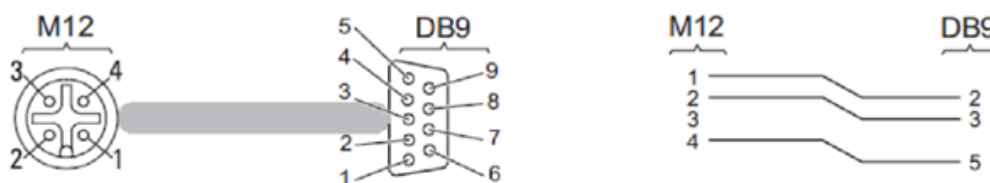


Figure 4: Terminal cable for connecting an external management station

2 Installation

WARNING

ELECTRIC SHOCK

CHOC ÉLECTRIQUE

Exclusively install this device in a restricted access location, to which maintenance staff have exclusive access. Install the device in such a way that it is protected against mechanical forces in the area of the power supply.

Installez exclusivement ce dispositif dans un emplacement à accès restreint, auquel le personnel de maintenance a un accès exclusif. Installez le dispositif de manière à ce qu'il soit protégé contre les forces mécaniques dans la zone d'alimentation électrique.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

The devices are developed for practical application in a harsh industrial environment. On delivery, the device is ready for operation.

To protect the exposed uninstalled contacts of the components from dirt, connect the individual system components in a dry and clean working area.

The device fulfills the protection class IP67 under the following conditions exclusively:

- ▶ All the connectors and cables connected also fulfill protection class IP67.
- ▶ All the unused connections and ports are sealed with appropriate protection screws.
- ▶ The protection screws that are available as accessories comply with degrees of protection IP67.

To install the device, perform the following work steps:

- ▶ [Checking the package contents](#)
- ▶ [Installing and grounding the device](#)
- ▶ [Installing the antennas](#)
- ▶ [Connecting the power supply](#)
- ▶ [Operating the device](#)
- ▶ [Connecting data cable](#)

2.1 Checking the package contents

- According to the device variant, check whether the package contains all items listed in the scope of delivery.
See [“Scope of delivery, order number, and accessories”](#) on page 52.
- Check the individual parts for transport damage.

2.2 Installing and grounding the device

2.2.1 Installing the device onto or on a flat surface

You have the option of attaching the device with suitable hardware to a vertical flat surface.

Proceed as follows:

- Prepare the assembly at the installation site.
See “Dimension drawings” on page 46.
- Install the device with 4 x M5 screws (suggest screw length no less than 12 mm) on a flat surface larger than 400 mm in width and 280 mm in height.
- Seal all unused sockets or ports with protection screws.

Note: The cross-sectional area of the protective earthing conductor should be not less than 0.5 mm², and the AWG should be 20 or larger.

2.2.2 Grounding the device

WARNING

ELECTRIC SHOCK ÉLECTROCUTION

Ground the device before connecting any other cables.

Mettez à la terre l'appareil avant de brancher tout autre câble.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

Ground the device by a separate ground connection on the device. The overall shield of a connected shielded twisted-pair cable is connected to the metal housing as a conductor. The insulation of the protective earthing conductor should be green and yellow color. The device variants feature a connection for protective grounding, see [Figure 5](#).

- Terminate the ground conductor between the fastening plates.
- Make sure the fastening plates cover the stripped part of the ground conductor completely.
- Tighten the grounding screw (M4 × 10 mm) with a tightening torque of 3 ± 0.5 Nm.

Note: Use toothed washers to ensure good electrical conductivity for

the connection.

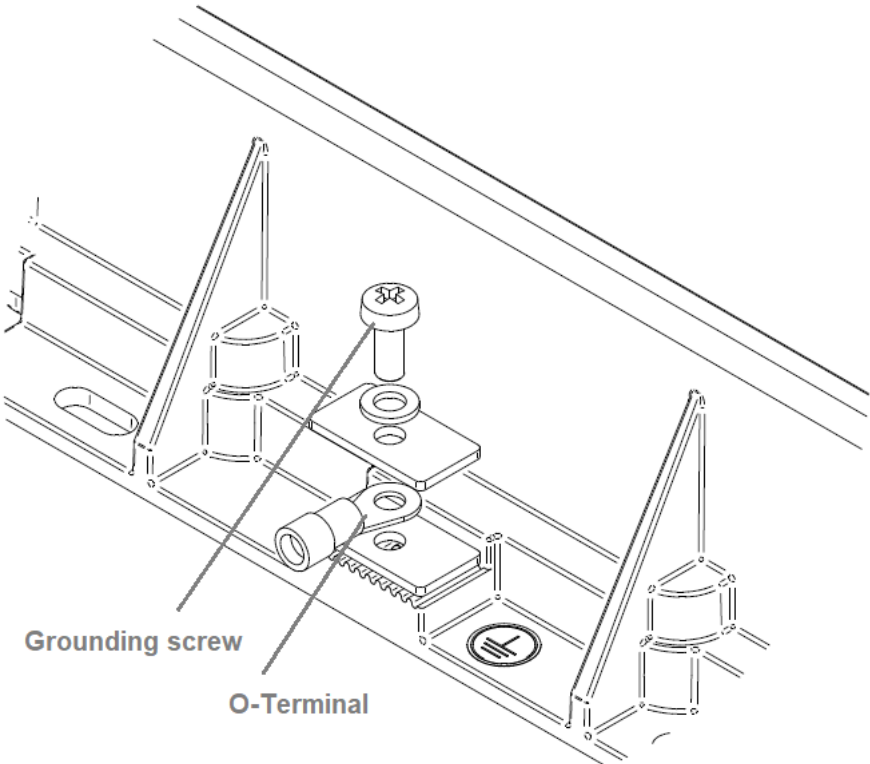


Figure 5: Connection for protective ground

2.3 Installing the antennas

WARNING

ELECTRIC SHOCK

ÉLECTROCUTION

Mount the antennas outdoors only with the surge protection device BAT-ANT-Protector m-f.

Montez les antennes uniquement à l'extérieur avec le dispositif de protection contre les surtensions BAT-ANT-Protector m-f.

See [“Scope of delivery, order number, and accessories” on page 52.](#)

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

WARNING

ELECTRIC SHOCK OR FALLING

ÉLECTROCUTION OU CHUTE

Avoid mounting the antenna near power lines.

Évitez de monter l'antenne à proximité des lignes électriques.

When installing an antenna from a ladder or elevating equipment, take precautions to avoid falling and ensure the equipment is securely positioned on solid ground.

Lors de l'installation d'une antenne depuis une échelle ou un équipement élévateur, prenez des précautions pour éviter les chutes et assurez-vous que l'équipement est solidement positionné sur un sol stable.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

The device has connections for external antennas. These connectors are N

female sockets.

On delivery, the antenna connections are sealed with protection caps. When an antenna port is not used, Hirschmann recommends using an N-Abschl-Wdst. 50 Ohm resistor to avoid suffering from signal interference.

■ **BAT-ANT-Protector m-f connectors**

BAT-ANT-Protector m-f is the surge protection device. The BAT-ANT-Protector m-f is recommended for protecting the interior electronics of the device with outdoor antennas. Despite outer surge protection measures, partial discharges can still cause surges that can damage the device. The BAT-ANT Protector m-f should be mounted as close as possible to the device.

The BAT-ANT-Protector m-f provides two connectors, one for connecting to the AP and the other for connecting to the antenna (see [Figure 6](#)).



Figure 6: BAT-ANT-Protector m-f connectors

- 1 – N socket for connection to the antenna (unprotected end)
2 – N plug for connection to the AP (protected end marked in red)

■ **Prerequisites**

- Only qualified personnel are permitted to install the device in accordance with the relevant national installation and safety rules. Its usage is only permitted under the conditions stated and shown in this instruction.
- The BAT-ANT-Protector m-f and the equipment connected to it can be damaged by electromagnetic surges exceeding the given specification, for example due to a direct lightning strike.
- The operational voltage of the system/equipment to be protected must not exceed the maximum permissible operating voltage (rated voltage) of the BAT-ANT-Protector m-f.
- Disconnect or switch off inline equipment when installing or removing the BAT-ANT-Protector m-f.
- Do not open the BAT-ANT-Protector m-f. Opening the BAT-ANT Protector m-f will void the warranty and may result in accidental destruction of electronic components.
- If exposed to extreme environmental conditions, especially icy conditions or a polluted atmosphere, the connectors should be covered

- with a self-vulcanizing tape or a cold shrink tube.
- If the BAT-ANT-Protector m-f is mated with connectors made of copper-alloy base material and trimetal or nickel plating, the connector area must be taped to improve long-term durability.
 - All pertinent country, state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components. This equipment must only be installed and serviced by qualified personnel.

■ **Work steps**

- Remove the pre-mounted protection caps from the antenna connections.
- Mount the BAT-ANT-Protector m-f as described below.

▶ **Connecting to the AP**

To connect the BAT-ANT-Protector m-f to the AP proceed as follows:

- Connect one end of the adapter cable supplied with the antenna to the N plug of the BAT-ANT-Protector m-f.
- Connect the other end of the adapter cable to the antenna output of the AP.

Note: Depending on the type, you can connect the BAT-ANT-Protector m-f directly to the antenna output of the AP. In this case you do not need an adapter cable.

▶ **Connecting to the antenna**

To connect the BAT-ANT-Protector m-f to the antenna proceed as follows:

- Connect one end of the antenna cable to the N socket of the BAT-ANT-Protector m-f.
- Connect the other end of the antenna cable to the antenna input.
- Seal an unused socket with a terminating resistor to avoid interferences from radio signals. The terminating resistor is available as an accessory.

Note: Depending on the connector type, you may require an adapter or an adapter cable.

▶ **Grounding the BAT-ANT-Protector m-f**

Ground the BAT-ANT-Protector m-f appropriately according to all national, state, and local regulations to ensure that any surges can be conducted away from the device to the building's earthing system. Fix a cable lug with a nut as shown in [Figure 7](#).

Note: Use a sufficiently sized grounding cable (min. 16 mm² or 0.02 in² / AWG 6) as short a distance as possible (max. 0.5 m or 19.69 in).



Figure 7: Grounding the BAT-ANT-Protector m-f

You can find information on setting the transmit power in chapter [“Configuring the transmit power”](#) on page 40.

2.4 Connecting the power supply

WARNING

ELECTRIC SHOCK

ÉLECTROCUTION

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

Avant de connecter les fils électriques, vérifiez toujours que les exigences énumérées sont respectées.

See “Requirements for connecting electrical wires” on page 7.

See “Requirements for connecting the supply voltage” on page 7.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

The supply voltage is electrically isolated from the casing.

One 3-pin 7/8" plug is available for the power supply to the device. The tightening torque can be found in “[Technical data](#)” section on page 45.

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

Connect the electrical wires to the socket according to the pin assignments.

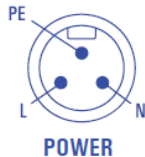
Type and Specification of the Supply Voltage	Connector	Pin	Function
Rated voltage range 110 V/230 V AC, 50 Hz/60 Hz		PE	Protective Earth
		L	Line
Voltage range incl. maximum tolerances 85 - 264 V AC, 47 - 63 Hz		N	Neutral

Table 7: Supply voltage specifications and pin information

2.5 Operating the device

WARNING

ELECTRIC SHOCK

ÉLECTROCUTION

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

Avant de connecter les fils électriques, vérifiez toujours que les exigences énumérées sont respectées.

See “Requirements for connecting electrical wires” on page 7.

See “Requirements for connecting the supply voltage” on page 7.

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

Le non-respect de cette instruction peut entraîner la mort, des blessures graves ou des dommages matériels.

By connecting the supply voltage via a connector, you start the operation of the device.

Proceed as follows:

- Connect the power supply cable.
- Enable the supply voltage.

2.6 Connecting data cable

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

- ▶ Keep the length of the data cables as short as possible.
- ▶ Use optical data cables for the data transmission between buildings.
- ▶ When using copper cables, ensure 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, ensure that the power supply cable and data cables cross at a 90° angle.
- ▶ Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. Only use shielded data cables to meet EMC requirements according to EN 50121-4 and marine applications.
- ▶ Connect the data cables according to your requirements.
[See “Ethernet ports” on page 19.](#)
- ▶ Find the prescribed tightening torque of the locking screw in chapter [“General technical data” on page 45.](#)

3 Basic settings

The IP address must be configured when the device is installed for the first time. DAP849 supports the following options for configuring the IP address:

- ▶ Set the IP address through the V.24 interface.
- ▶ Obtain the IP address through DHCP.

■ Default settings

- ▶ The device requests the IP address from a DHCP server by default.
- ▶ The data rate of V.24 (Switch) and V.24 (WIFI) is 115200 Baud.

4 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:

- By default, the Wi-Fi management address ('ifconfig br-wan') can be retrieved through the V.24 (WIFI) interface. Connect the Ethernet port of the PC to Ethernet 1 port of DAP849, set the IP address of the PC to the same subnet as the Wi-Fi management address, then open a browser and go to <http://<Wi-Fi management address>:8080> to access the web interface of the AP.

Note: It is recommended to access the web window in chrome browser for the best possible user experience.

- Log on to the device by choosing "Administrator" as the user account and typing "admin" as the default password.

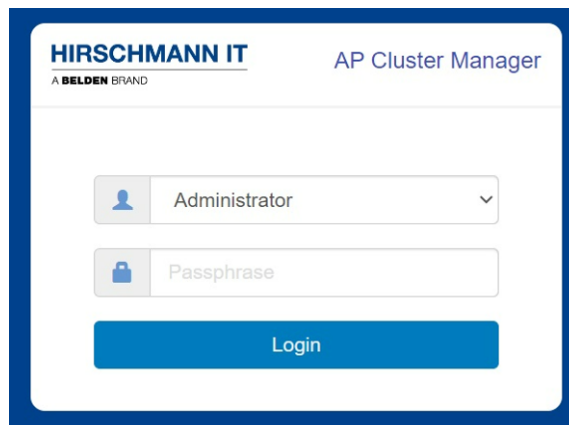


Figure 8: Administrator login window

- Select "DAC/BWO" for BWO mode, or "Cluster" for cluster mode.
 - ▶ If you select "DAC/BWO" mode, you need to input the management server (BWO or DAC) address to convert DAP849 to BWO mode. For more configuration, see *DAP849 User Manual*.

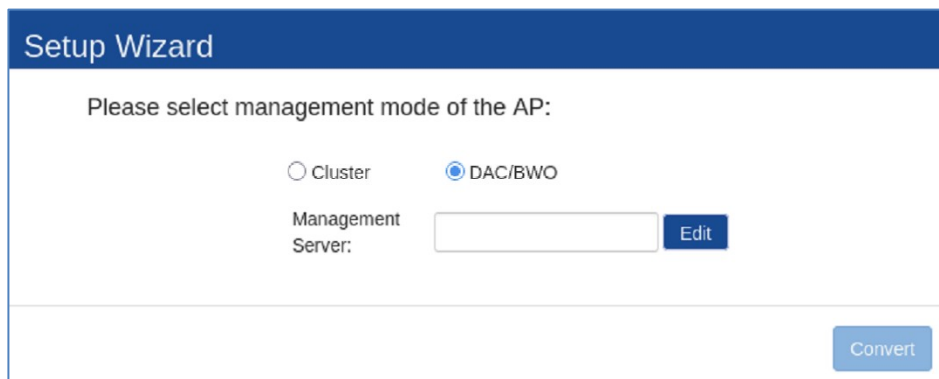


Figure 9: BWO mode selection

- ▶ If you select “Cluster” mode, a popup Setup Wizard displays.

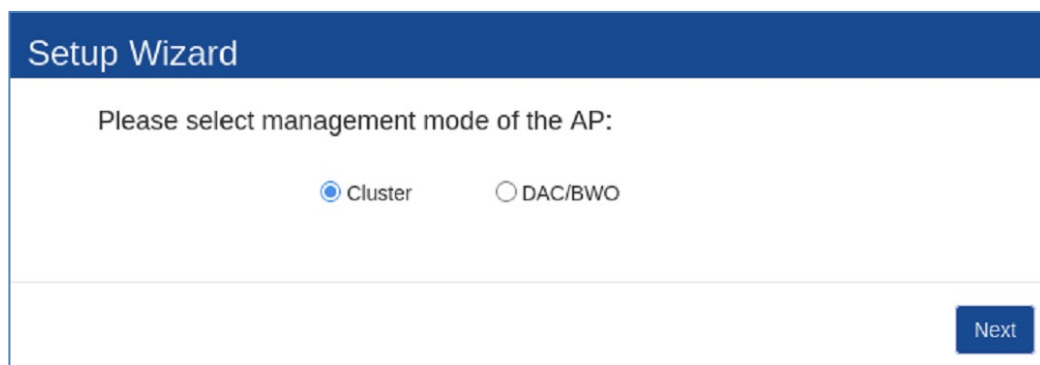


Figure 10: Cluster mode selection

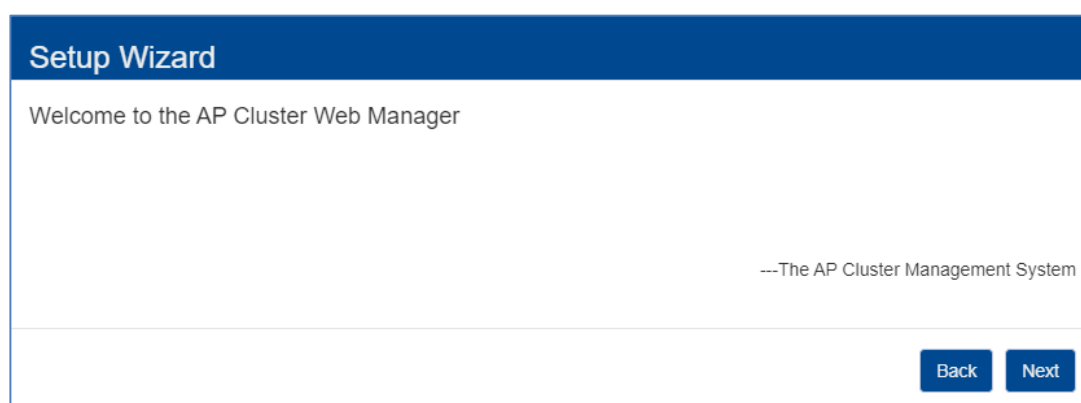


Figure 11: AP cluster web manager

Note: Three pre-configured login accounts are supported: Administrator, Viewer and Guest Manager. You can modify the account password, but the account name is not modifiable.

- ▶ Administrator account can be used to set up and check the AP status.
- ▶ Viewer account can be used to check the AP status ONLY.
- ▶ Guest Manager account can be used to check the AP status and register accounts for portal authentication.

For more detailed configuration, see *DAP849 User Manual* in <https://catalog.belden.com>.

The device prompts you to type in a new password.

- Type in your new password.
Choose a password that contains at least 8 characters, which includes upper-case characters, lower-case characters, numerical digits and special characters.
- Confirm your new password.
Note: The window below displays to select the Country/Region and Time Zone.

Setup Wizard

Step 1/3 Change your administrator password

Password:

Confirm:

[Back](#) [Next](#)

Figure 12: Password change wizard

- Choose your Country/Region and Time Zone.

Setup Wizard

Step 2/3 Choose your Country or Region

Country/Region:

Time Zone:

[Back](#) [Next](#)

Figure 13: Country/Region and Time Zone selection window

5 Defining WLAN basic settings

You have the following options to define the WLAN basic settings:

- ▶ By the wired local network (LAN).
- ▶ By the wireless network (WLAN) if the WLAN encryption (for example WPA2) is set accordingly in a device with a wireless interface and in the configuration computer.

For more details, see *DAP849 User Manual* in <https://catalog.belden.com>.

6 Configuring the transmit power

You can modify the transmission power and working channel for the DAP849 in the RF Configuration window. By default, the Dynamic Radio Management (DRM) technology automatically manages the working channel and transmitting power. However, if you want to manually set the channel and power values for the AP, you can disable the Automatic Channel Selection (ACS) and Automatic Power Control (APC). In manual mode, you can adjust the transmitted power in 1 dB increments for the AP.

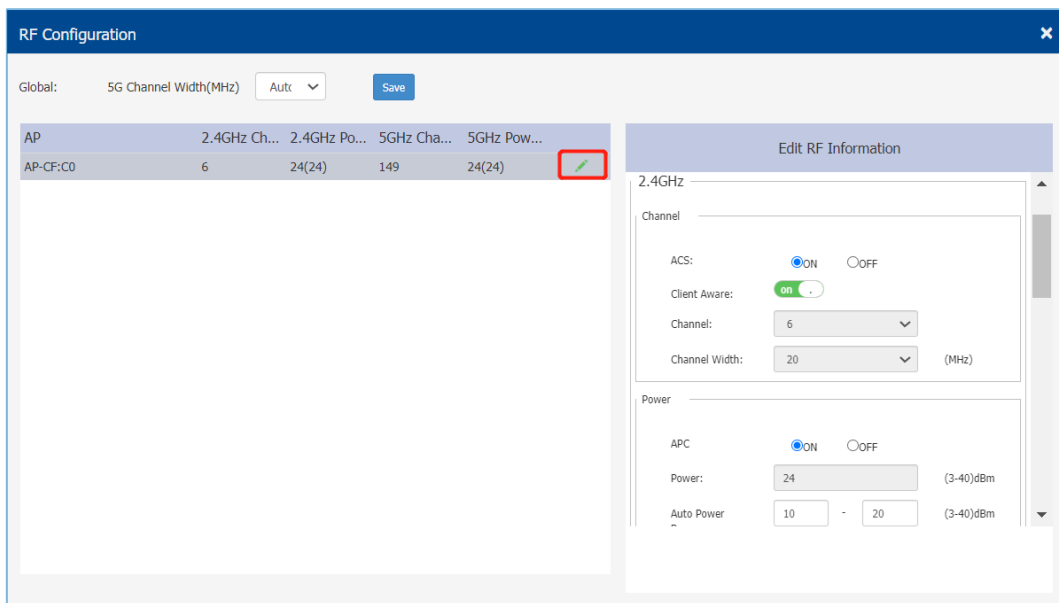


Figure 14: RF Configuration window

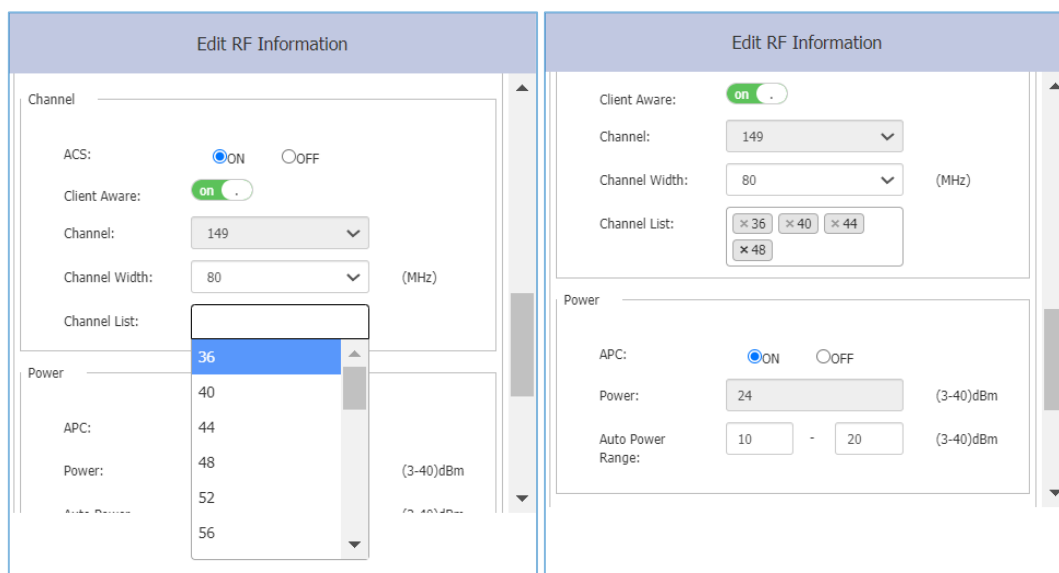


Figure 15: Automation channel and power control selection window

Besides, you can specify the channels list or power range applicable for auto selection, which can reduce the chances of low-power transmitting or Dynamic Frequency Selection (DFS) channel conflict.

Note: DFS relies on the background scanning feature. To ensure that DFS is effective, make sure that the background scanning feature is enabled.

In certain scenarios such as a MESH deployment or a railway deployment scenario with a DAP849, it is recommended to manually set the channel and transmit power.

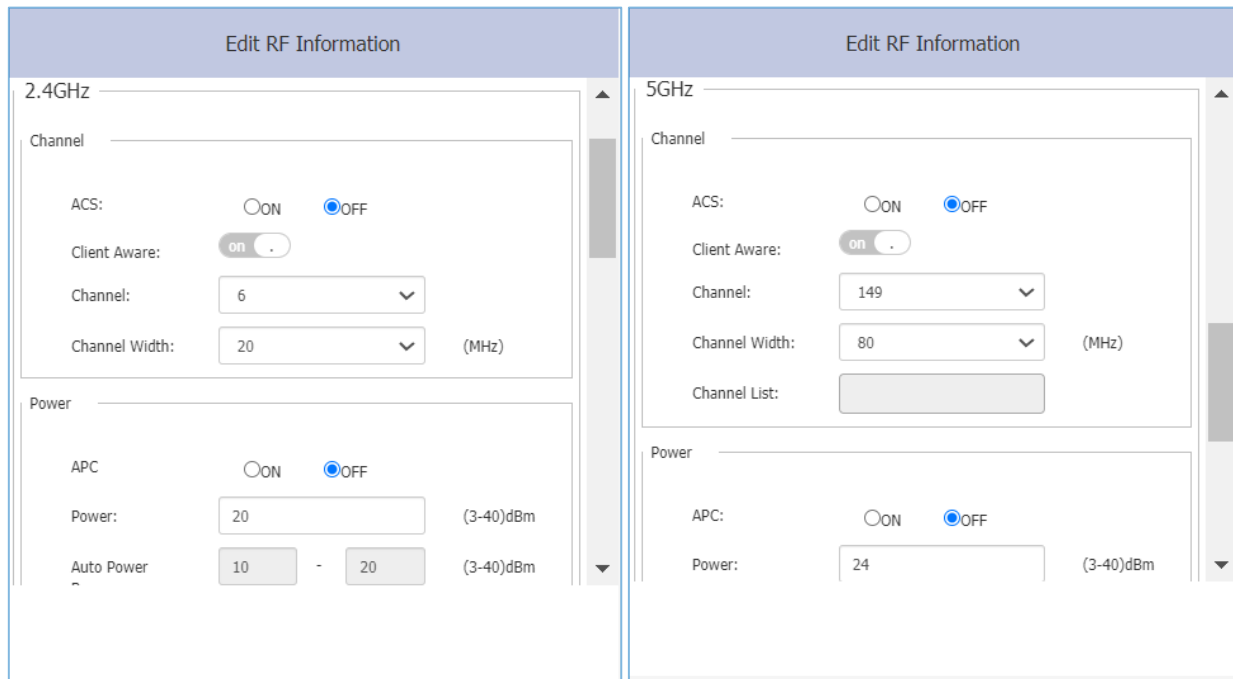


Figure 16: Manually set Channel and Power

Keyword specification in RF Configuration window.

Parameter	Specification
ACS	Configure the working channel of the radio. <ul style="list-style-type: none"> ▶ ON - Dynamically assigns the working channel by ACS. ▶ OFF - Manually specify the channel (allowed channels vary by country/region).
Client Aware	If “Client Aware” is enabled, ACS does not change channels for DAPs with connected clients, except for high-priority events such as RADAR detected. If “Client Aware” is disabled, the DAP may change to a more optimal channel, which may temporarily disrupt current client traffic.
Channel	Indicate the channel number on specific radio. It is only configurable when ACS is “OFF”.
Channel Width	Configure the channel width. Channel width is used to control how broad the signal is for transferring data. By increasing the channel width, you can increase the speed and throughput of a wireless broadcast. However, larger channel width brings more unstable transmission in crowded areas with a lot of frequency noise and interference. The channel width support is different between 2.4 GHz and 5 GHz. <ul style="list-style-type: none"> ▶ 2.4 GHz - 20 MHz/40 MHz ▶ 5 GHz- 20 MHz/40 MHz/80 MHz/160 MHz.

Parameter	Specification
	<p>Note: Some high-frequency channels (e.g., 165) do not support 40 MHz/80 MHz/160 MHz. If an AP is using these channels, a channel width of 40 MHz/80 MHz/160 MHz will not be available. For example, 160 MHz is only supported on channel settings 36 through 128.</p>
Channel List	<p>Specify the available channel(s) that can be selected DRM.</p> <p>Note: It does not support on 2.4 GHz Band.</p>
APC	<p>Configures the transmit power of the wireless radio:</p> <ul style="list-style-type: none"> ▶ 2.4 GHz - Configure the power setting for 2.4 GHz radio. <ul style="list-style-type: none"> • ON - Dynamically assign the 2.4 GHz transmit power by APC. • OFF - Manually specify the power setting. ▶ 5 GHz - Configure the power setting for 5 GHz radio. <ul style="list-style-type: none"> • ON - Dynamically assign the 5 GHz transmit power by APC. • OFF - Manually specify the power setting.
Power	<p>Specify the transmit power on a specific radio, indicating transmission Equivalent Isotropically Radiated Power (EIRP) setting on the radio. It can be configured when ACS is set to "OFF".</p>
Auto Power Range	<p>Configurable when APC is set to "ON":</p> <ul style="list-style-type: none"> ▶ Minimum Tx Power - Specify the minimum transmit power for auto power setting. This can prevent the AP from selecting a low transmit power, resulting in poor quality transmission. ▶ Maximum Tx Power - Specify the maximum transmit power for auto power setting.
Radio	<p>Enable or disable the specific radio. When it is disabled, all SSID on the radio will be disabled.</p>
Short GI	<p>Enable or disable short Guard Interval (GI).</p> <p>In IEEE 802.11 OFDM-based communications, a GI is used to help ensure that distinct transmissions occur between the successive data symbols transmitted by a device. The standard symbol GI used in IEEE 802.11 OFDM is 800 nanoseconds in duration. To increase the data rates, the IEEE 802.11 standard added optional support for a 400 nanoseconds guard interval (Short GI). This would help provide approximately an 11% increase in the data rates. However, using Short GI will result in higher packet error detection rates, when the delay spread of the RF channel exceeds the Short GI, or if timing synchronization between the transmitter and receiver is not precise. By default, Short GI is enabled on the wireless radio.</p> <p>If the multipath effect is too serious (too many metals or other reflecting materials), disabling Short GI is recommended.</p>
High Efficiency	<p>Enable or disable IEEE 802.11ax high efficiency wireless functionality. When disabled, the high efficiency mode capable AP will downgrade to Very High Throughput (VHT) mode.</p>

Table 8: RF configuration parameters

7 Maintenance and service

- Hirschmann IT largely avoided using high-wear parts when designing this device. 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 specifications.
- Hirschmann IT is continually working on improving and developing their software. Check regularly for any updated version of the software that offers you additional benefits. You can find information and software downloads on the Hirschmann IT product pages at:
<https://catalog.belden.com>
- According to the pollution degree of the operating environment, check at regular intervals that ports in the device are not obstructed.

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

8 Disassembly

- Disconnect the data cable.
- Disconnect the power supply.
- Remove the antennas.
- Disconnect the grounding wire.

9 Technical data

9.1 General technical data

Dimensions W × H × D	DAP849	See “Dimension drawings” on page 46
Weight	DAP849	4.4 kg (9.7 lb)
Supply voltage	Connection type	3-pin, 7/8” connector Tightening torque 2.5 Nm (22 lb-in)
	Rated voltage	AC Input: 110 V/230 V AC
	Maximum tolerances	AC Input: 85 V to 264 V AC, 47 Hz to 63 Hz
	Rated current	AC Input: 140 mA/290 mA
	Power loss buffer	> 10 ms at 110 V AC
	Overload current protection on the device	Fuse
	Peak inrush current	< 65 A
Climatic conditions during operation	Minimum clearance around the device	Top and bottom device side: 30 cm (11.81 in) Left and right device side: 2 cm (0.79 in)
	Ambient air temperature ^a	-40°C ... +70°C (-40°F ... +158°F)
	Humidity	10 % ... 95 % (non-condensing)
	Altitude	≤ 3000 m
Climatic conditions during storage	Ambient air temperature ^a	-40°C ... +85°C (-40°F ... +185°F)
	Humidity	10 % ... 95% (non-condensing)
Pollution degree		2
Wind resistance		Up to 100 MPH sustained winds Up to 165 MPH sustained gusts
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1
	Degree of protection	IP67

Table 9: General technical data

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

9.2 Dimension drawings

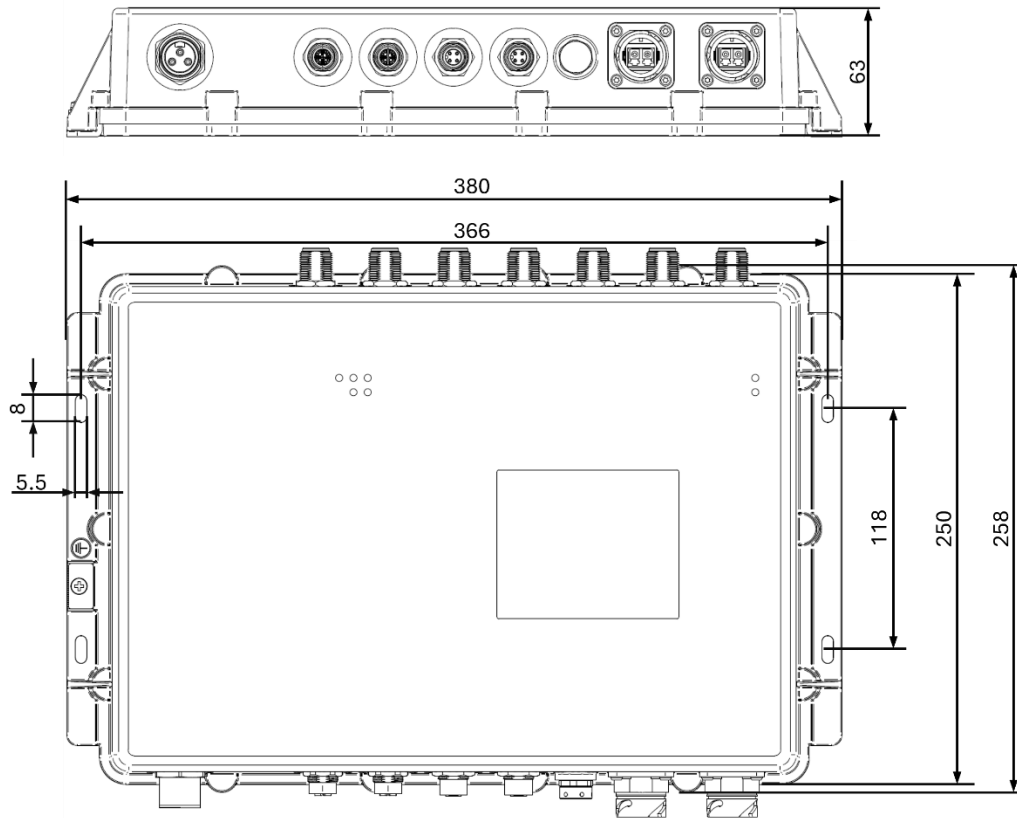


Figure 17: DAP849 dimensional measurements (unit: mm)

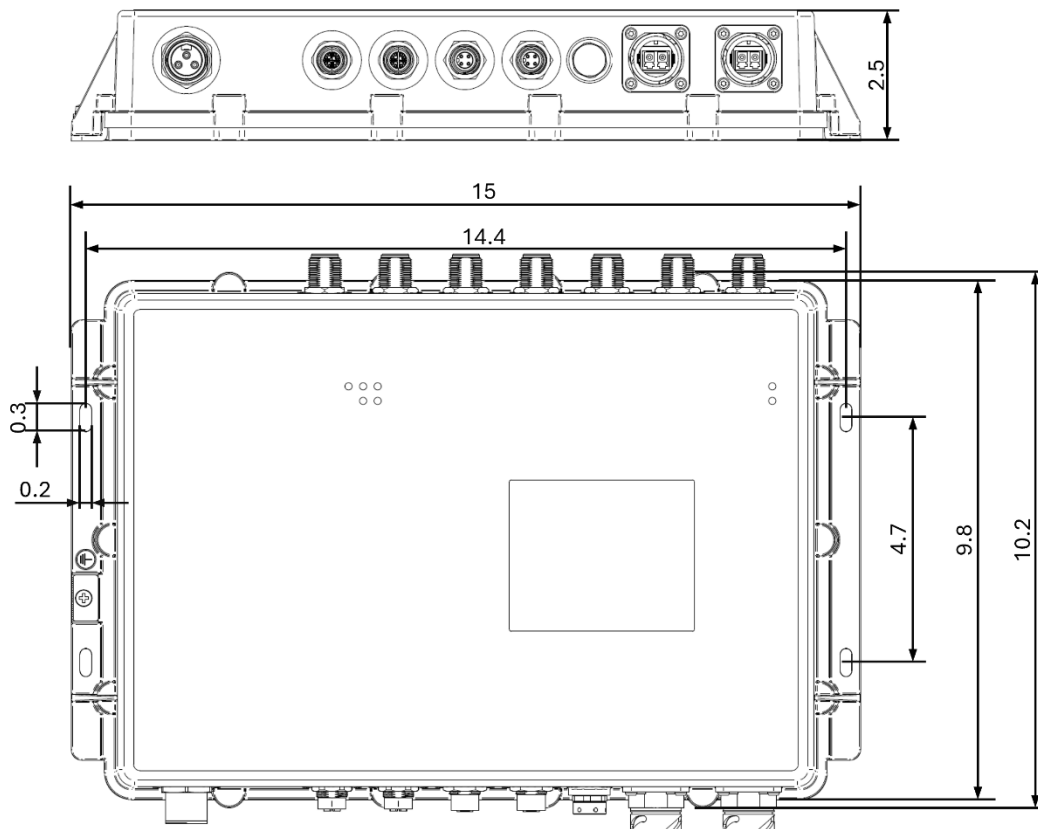


Figure 18: DAP849 dimensional measurements (unit: inch)

9.3 WLAN module specifications

9.3.1 Radio technology

Antenna connection	Each WLAN module: 6 × N socket
Range	Depending on the antenna used, frequency range and data rate
Encryption	Personal: <ul style="list-style-type: none">▶ Static WEP▶ WPA3 Personal▶ WPA2 Personal▶ Both (WPA2 & WPA)▶ Both (WPA3 & WPA2) Enterprise: <ul style="list-style-type: none">▶ WPA2 Enterprise▶ WPA3 Enterprise▶ Both (WPA2 & WPA)
Frequency range	<ul style="list-style-type: none">▶ Support of 2.4 GHz: 2400 MHz to 2483.5 MHz▶ Support of 5 GHz: 5150 MHz to 5250 MHz, 5250 MHz to 5350 MHz, 5470 MHz to 5725 MHz, 5725 MHz to 5850 MHz
Modulation technology	<ul style="list-style-type: none">▶ 802.11b: BPSK, QPSK, CCK▶ 802.11a/g/n/ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM▶ 802.11ax: BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM
Radio topology	WLAN Access-Point, MESH, Bridge

Table 10: Radio technology information

9.3.2 Roaming

- ▶ IEEE 802.11k (Radio Resource Measurement)
- ▶ IEEE 802.11v (Wireless Network Management)
- ▶ IEEE 802.11r (Fast Roaming)
- ▶ PMK Caching

9.3.3 Receiving sensitivity and data rate of the WLAN module

The values shown in the following table are the maximum values of the WLAN module. The values should not be construed as guaranteed performance metrics for the overall product. In some country-specific profiles, the module may reduce its data rate automatically to comply with national standards.

Rate	Receive sensitivity (single chain or per chain)	
	2.4 GHz	5 GHz
1 Mb/s	-99	
11 Mb/s	-89	
6 Mb/s	-93	-91
54 Mb/s	-76	-74
HT20(MCS0/8)	-92	-90
HT20(MCS7/15)	-74	-72
HT40(MCS0/8)	-91	-88
HT40(MCS7/15)	-74	-70
VHT20(MCS0)	-92	-90
VHT20(MCS8)	-70	-68
VHT40(MCS0)	-91	-88
VHT40(MCS9)	-68	-64
VHT80(MCS0)		-86
VHT80(MCS9)		-61
HE20(MCS0)	-94	-92
HE20(MCS11)	-63	-62
HE40(MCS0)	-91	-89
HE40(MCS11)	-62	-60
HE80(MCS0)		-87
HE80(MCS11)		-58

Table 11: RF performance table for DAP849

9.4 EMC and immunity

EMC interference immunity			
EN 61000-4-2	Electrostatic discharge		
	Contact discharge		8 kV
	Air discharge		15 kV
EN 61000-4-3 EN 50121-4	Electromagnetic field		
	80 MHz ... 1000 MHz		max. 20 V/m
	1000 MHz ... 6000 MHz		max. 10 V/m
EN 61000-4-4	Fast transients (burst)		
	Power line		2 kV
	Data line		2 kV
EN 61000-4-5	Surges voltage		
	Power line	line/line	1 kV
	Power line	line/ground	2 kV
	Data line	Shield cable	4 kV
EN 61000-4-6	Conducted interference voltages		
	150 kHz ... 80 MHz		10 V

Table 12: EMC interference immunity test

EMC interference emission	
EN 55032	Class A
FCC 47 CFR Part 15	Class A

Table 13: EMC interference emission test

Immunity	
Vibration	IEC 60068-2-6 Test Fc test level according to IEC 61131-2
Shock	IEC 60068-2-27 Test Ea level according to IEC 61131-2

Table 14: Immunity test

9.5 Network transmission distance

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

The Fiber length of 1000 Mbit/s FO ports	
Single mode fiber (SM) 9/125 μm	0 -10 km, 1310 nm; 10.5 dB link budget; 0.4 dB/km

The Fiber length of 2500 Mbit/s FO ports	
Single mode fiber (SM) 9/125 μm	0 - 5 km, 1310 nm; 8.5 dB link budget; 0.55 dB/km

9.6 Power consumption/power output

Name	Maximum power consumption	Power output
DAP849	30 W	102.36 Btu (IT)/h

10 Scope of delivery, order number, and accessories

■ Order numbers and scope of delivery for DAP849-RW series

Product code	Order number	Scope of delivery
DAP849-RWAAZT6O6EHH	9AA 102 001	1x DAP849 device 1x Outdoor safety instructions 1x Safety and general information sheet
DAP849-RWAAZT6O8EHH	9AA 102 002	1x RKC30/9,7/8" 3 pin connector [942 086 003] IP67 Caps for all connectors FOSS declarations for Wi-Fi and Switch

Table 15: Order number and delivery scope of DAP849 RW series

■ Accessories to be ordered separately for DAP849-RW series

Category	Accessory description	Order number
Ethernet connector	EM12G OCTOPUS: Field attachable Gigabit Ethernet connector, M12 male, 8-pole, "X"-coded	942 083 001
Terminal cable	Terminal Cable, M12-4 pin to DB9: Terminal cable Side A: M12 "A"-coded 4-pin connector Side B: Sub-D connector, 9-pin	943 902 001
Protector	ANT-Protector m-f	942 999 393
	BAT-ANT-Protector m-f	943 903 373
Termination resistors	N-Abschl-Wdst. 50 Ohm	942 118 001
Fiber connector	Plug casing for IP67 plug acc. to IEC 61076-3-106	Ordered at BTR NETCOM GmbH

Table 16: Accessories of DAP849 RW series

11 Technical standards

Standards	Name
EN 300 328	Electromagnetic compatibility and radio spectrum matters (ERM) - bandwidth transfer systems - data transmission equipment operating in 2.4 GHz band
EN 301 893	5 GHz RLAN
EN 302 502	Wireless Access System (WAS); 5,8 GHz fixed broadband data transmitting systems
EN 50385	Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market
EN 301 489-1	Electromagnetic compatibility for radio equipment and services - Part 1: Common technical requirements
EN 301 489-17	Electromagnetic compatibility (EMC) for radio equipment and services - Specific conditions for broadband and wideband transmission systems
UL 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements
CAN/CSA 22.2 No. 62368-1:19	Audio/video, information and communication technology equipment - Part 1: Safety requirements
IEC/EN 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements
EN 60950-22	Information technology equipment - Safety - Part 22: Equipment to be installed outdoors
EN 55032	Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN 50121-4	Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signaling and telecommunications apparatus
EN 45545-2	Fire protection on railway vehicles - Part 2: Requirement for fire behaviours of materials and components
EN/IEC 61000-6-4	Electromagnetic compatibility - Part 6-4: Generic standards - Emission standard for industrial environments
EN/IEC 61000-6-2	Electronic compatibility (EMC) - Part 6-2: Generic standards - Immunity standards for industrial environments
EN 18031-1	Common security requirements for radio equipment - Part 1: Internet connected radio equipment
EN 18031-2	Common security requirements for radio equipment - Part 2: radio equipment processing data, namely Internet connected radio equipment, childcare radio equipment, toys radio equipment and wearable radio equipment
EN 61131-2	Programmable controllers - Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	FCC Title 47 Part 15 – Radio frequency devices regulations

Table 17: Technical standards

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

The device fulfills the technical standards as specified in their current versions.

A Further support

Technical questions

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

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

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

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

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