

PAVIRO Router

PVA-4R24



BOSCH

en Operation manual

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1 Safety

**Danger!**

High risk: This symbol indicates an imminently hazardous situation such as "Dangerous Voltage" inside the product.

If not avoided, this will result in an electrical shock, serious bodily injury, or death.

**Warning!**

Medium risk: Indicates a potentially hazardous situation.

If not avoided, this could result in minor or moderate bodily injury.

**Caution!**

Low risk: Indicates a potentially hazardous situation.

If not avoided, this could result in property damage or risk of damage to the unit.

1. **Read these instructions.** – All the safety and operating instructions should be read before the apparatus or system is operated.
2. **Keep these instructions.** – The important safety instructions and operating instructions should be retained for future reference.
3. **Heed all warnings.** – All warnings on the apparatus and in the operating instructions should be adhered to.
4. **Follow all instructions.** – All instructions for installation or use/operating should be followed.
5. **Do not use this apparatus near water.** – Do not use this apparatus near water or a moist environment - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area which is classified as a wet location.
6. **Clean only with dry cloth.** – Unplug the apparatus from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners.
7. **Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.** – Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the apparatus and to protect it from overheating. These openings must not be blocked or covered. This apparatus should not be placed in a built-in installation unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
8. **Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat or in direct sunlight.**
9. **No naked flame sources, such as lighted candles, should be placed on the apparatus.**
10. **Do not defeat the safety purpose of the polarized or ground-type plug.** – A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. **Protect the power cord from being walked on or pinched particularly at plug, convenience receptacles, and the point where they exit from the apparatus.**
12. **Only use attachments/accessories specified by the manufacturer.** – Any mounting of the apparatus should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

13. **Use only with the cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus.** – When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
14. **Unplug this apparatus during lightning storms or when unused for long periods of time.** – Not applicable when special functions are to be maintained, such as evacuation systems.
15. **Refer all servicing to qualified service personnel.** – Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
16. **The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquid, such as vases, shall be placed on the apparatus.**
17. **Batteries (battery pack or batteries installed) shall not be exposed to excessive heat such as sunshine, fire or the like.**

**Caution!**

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of used batteries according to the environmental law and procedures.

18. **Professional installation only** – Do not use this equipment in residential applications.
19. **Condensation** – In order to avoid condensation; wait a few hours before turning on the equipment when it is transported from a cold to a warm space.
20. **Hearing damage** – For apparatus with audio output, to prevent possible hearing damage, do not listen at high volume levels for long periods.
21. **Replacement parts** – When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or having the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
22. **Safety check** – Upon completion of any service or repairs to this apparatus, ask the service technician to perform safety checks to determine that the apparatus is in proper operating condition.

**Danger!**

Overloading – Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.

23. **Power sources** – This apparatus should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company. For apparatuses intended to operate from battery power, or other sources, refer to the operating instructions.
24. **Power lines** – An outdoor system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outdoor system, extreme care should be taken to keep from touching such power lines or circuits, as contact with them might be fatal. U.S.A. models only – refer to the National Electrical Code Article 820 regarding installation of CATV systems.

**Danger!**

Object and Liquid entry – Never push objects of any kind into this apparatus through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the apparatus.

25. **Coax grounding** – If an outside cable system is connected to the apparatus, be sure the cable system is grounded. U.S.A. models only: Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge apparatus, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
26. **Protective grounding** – An apparatus with class I construction shall be connected to a power outlet socket with a protective grounding connection.
- Protective earthing** – An apparatus with class I construction shall be connected to a mains socket outlet with a protective earthing connection.

Note for power connections

- For permanently connected equipment, a readily operable mains plug or all-pole mains switch shall be external to the equipment and in accordance with all applicable installation rules.
- For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.



This label may appear on the bottom of the apparatus due to space limitations.

**Caution!**

To reduce the risk of electrical shock, DO NOT open covers. Refer servicing to qualified service personnel only.

**Warning!**

To prevent fire or shock hazard, do not expose units to rain or moisture.

**Warning!**

Installation should be performed by qualified service personnel only in accordance with the National Electrical Code or applicable local codes.

**Warning!**

Power disconnect: If the apparatus is mains powered and a power supply cord set is provided, the disconnect device is the mains plug of the power cord set.

If an AC-DC adapter is provided and the mains plug that is part of the direct plug-in device, the AC-DC adapter is the disconnect device.

The socket outlet shall be near the apparatus and shall be easily accessible.

**Warning!**

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

**Old electrical and electronic appliances**

Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive).

To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003. CET APPAREIL NUMÉRIQUE DE LA CLASSE B EST CONFORME À LA NORME NMB-003 DU CANADA.



Only used at altitude not exceeding 2000m.



Only used in non-tropical climate regions.

2 Short information

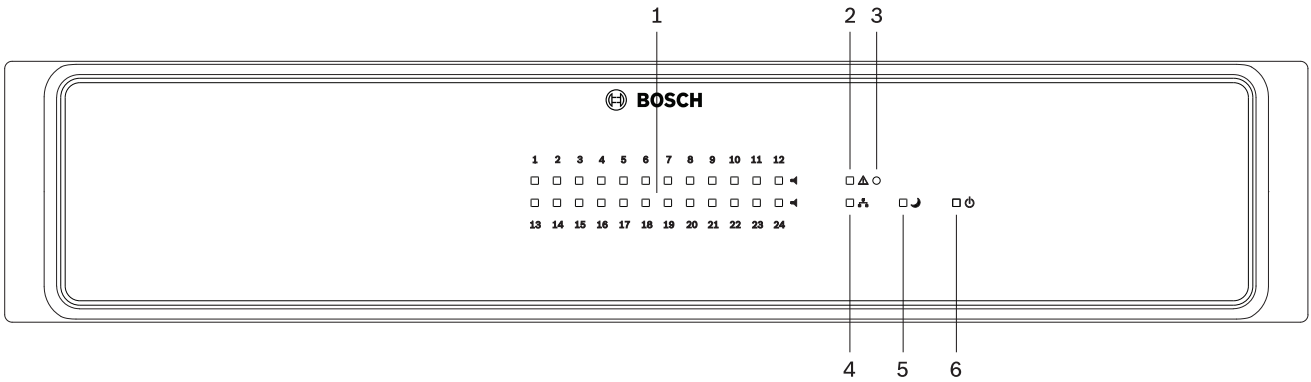
The PVA-4R24 24 Zone Router is a zone extension for the PAVIRO system. The PVA-4R24 adds 24 zones, 20 GPIs, 24 GPOs and 2 control relays to the system and is controlled and supervised via the CAN bus by the PVA-4CR12 (Controller). Up to 20 external routers can be connected to one controller. One router can handle up to 4000 W speaker load. The maximum load of one zone is 500 W.

The zone indicator lights on the front indicate the current status of every zone:




- Green: Zone in use for non emergency purpose
- Red: Zone in use for emergency purpose
- Yellow: Zone fault detected
- Off: Zone in idle condition

3 System overview

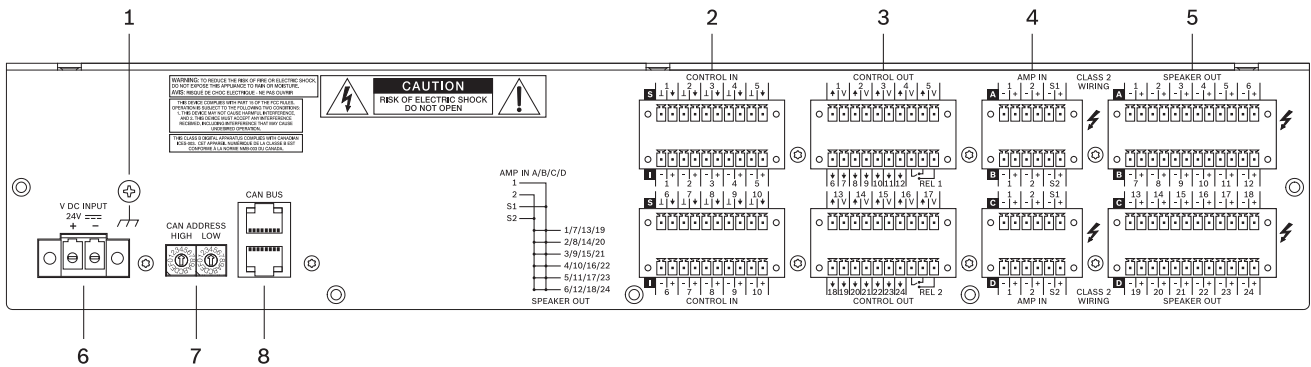
3.1 Front panel



Number	Symbol	Element	Description
1	◀	Zone status indicator light	Indicates the status of the zone: <ul style="list-style-type: none"> - Green = Zone is in use for non-emergency purpose - Yellow = Zone fault detected (Note: The indication of this status has the highest priority) - Red = Zone is in use for emergency purpose - Off = Zone in idle condition
2	⚠	General fault warning indicator light	This indicator lights up yellow if a fault in the device is detected. Note: The fault types to be indicated via this indicator can be configured.

Number	Symbol	Element	Description
3		Recessed button	<p>The button is protected to prevent it from being pressed accidentally. Use a pointed object (such as a ballpoint pen) to press the button.</p> <p>This button has the following functions if the CAN address of the device is not set to 00:</p> <ul style="list-style-type: none"> – Find function: If the find function of the device is activated, press this button to deactivate the indicators. – Displaying the CAN baud rate: Press this button for at least one second. Please refer to section <i>Displaying the CAN baud rate</i>, page 25. – LED test: Press this button for at least three seconds to activate the LED test. All indicators at the front panel light up as long as the button is pressed. <p>This button has the following functions if the CAN address of the device is set to 00:</p> <ul style="list-style-type: none"> – Resetting a fault (e.g. watchdog fault): Press the button briefly to confirm a fault. – Setting/displaying the CAN baud rate: Press this button for at least one second. Please refer to section <i>Configuring the CAN baud rate</i>, page 25. – Resetting to delivery condition: Press this button for at least three seconds. Please refer to section <i>Resetting to factory default settings</i>, page 29.
4		Network indicator light	This indicator lights up green if successful data communication has been established.
5		Standby indicator light	This indicator lights up green when the device is in standby mode.
6		Power indicator light	This indicator lights up green when the power supply is OK.

3.2 Rear panel



Number	Element	Description
1	Grounding screw	Ground connection
2	CONTROL IN ports	Control port with isolated or supervised inputs. Please refer to section <i>Control input</i> , page 20.
3	CONTROL OUT ports	Control port with open collector outputs. Please refer to section <i>Control output</i> , page 21.
4	AMP IN ports	Input for 100 V (or 70 V) audio signal from power amplifier.
5	SPEAKER OUT ports	Output for speaker zones.
6	DC power input	
7	CAN ADDRESS selector switch	HIGH-byte and LOW-byte for configuring the CAN address of the device.
8	CAN BUS port	Connection with CAN bus, e.g. controller.

4 Parts included

Quantity	Component
1	PVA-4R24
1	Euroblock connector 2-pole (Phoenix, PC 5/2-STF-7,62, 1975697, F.01U.108.398) for 24 V DC
4	Euroblock connector 6-pole (Phoenix, MC 1,5/6-ST-3,81, 1827745, F.01U.104.179) for audio inputs
8	Euroblock connector 10-pole (Phoenix, MC 1,5/10-STF-3,81, 1827787, F.01U.301.445) for control inputs or outputs
4	Euroblock connector 12-pole (Phoenix, MC 1,5/12-STF-3,81, 1827800, F.01U.108.397) for audio outputs
4	Foot stand (self-adhesive)
1	Operation manual
1	Important safety instructions

5 Installation

This device has been designed to be installed horizontally in a conventional 19" rack cabinet.

Front attachment of the device

Refer to the following illustration to attach the front of the device, using four screws and washers. Because of painted surfaces the connection of the grounding screw at the rear panel of the device is recommended.

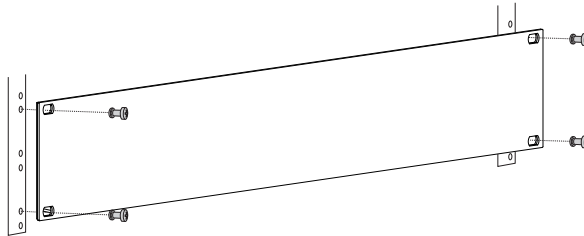


Figure 5.1: Installation of the device into a 19" rack



Caution!

The use of rack mount rails is recommended when installing the device in a rack shelf or rack cabinet to prevent the front panel from twisting or warping. If devices should be stacked in the rack (e.g. using the self-adhesive foot stands supplied) the maximum permissible load of the mount rails must be considered. Please refer to the technical specifications provided by the rack rail manufacturer.

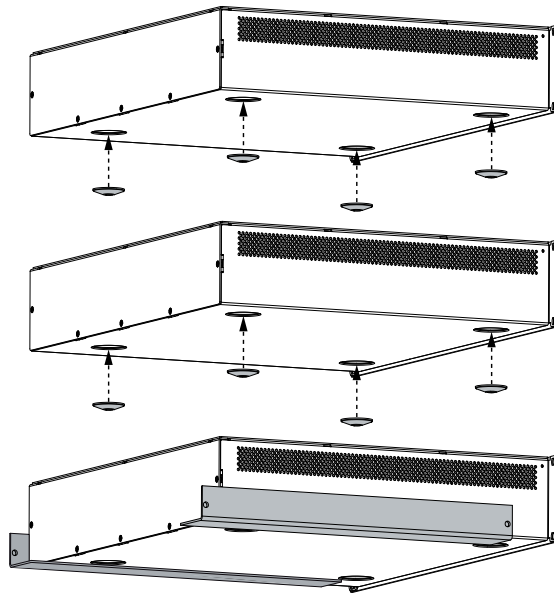


Figure 5.2: Stacking of devices using the supplied foot stands (example with 3 devices, rack mount rails are used for the bottom device only)

The device must be protected from:

- Dripping water or spray
- Direct sunlight
- High ambient temperatures or immediate sources of heat
- High humidity
- Large dust deposits

- Strong vibrations

If these requirements cannot be guaranteed, the device must be regularly serviced to prevent any outages that could occur as a result of negative ambient conditions. If a solid object or fluid enters the housing, immediately disconnect the device from the voltage supply, and have it serviced by an authorized technician before it is recommissioned.

**Warning!**

The maximum ambient temperature of +45 °C should not be exceeded.

Standby mode

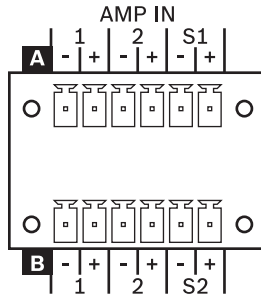
In standby mode, the power consumption of the device significantly reduces. In standby mode, the following functions are still available:

- Remote control via the CAN bus
- Monitoring of the DC input
- Function of the Control Port

Standby operation is activated via the CAN bus and indicated by the Standby indicator light.

6 Connection

6.1 Audio input



The AMP IN audio inputs allow to connect the 100 V (or 70 V) output signals of up to eight power amplifier channels to the integrated 2-in-6 router blocks A, B, C or D. Additionally there are four input channels for spare amplifiers.

The delivery includes 6-pin connectors. Conductor cross-sections of 0.14 mm² (AWG26) to 1.5 mm² (AWG16) can be used.

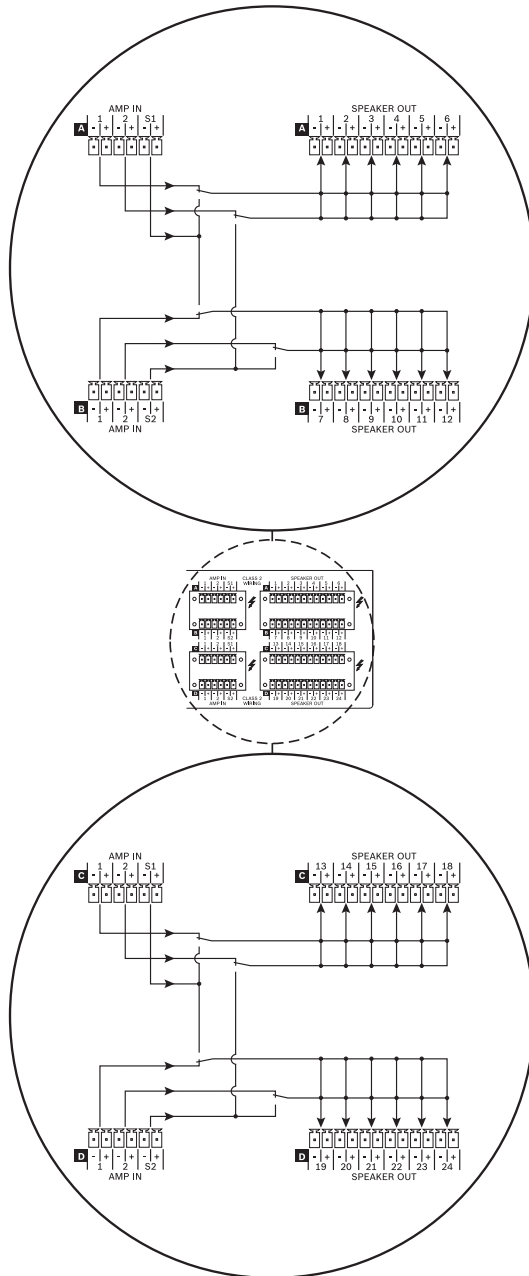
Recommended connecting cable: flexible CU strand, LiY, 0.75 mm².

Routing

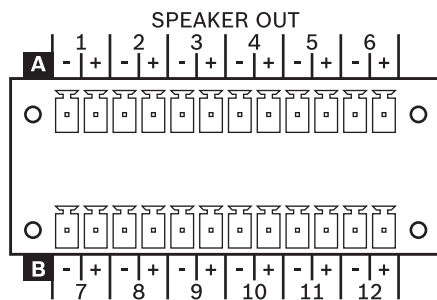
Following illustration gives an overview of possible routings between the AMP IN audio inputs and the SPEAKER OUT audio outputs using the internal relays of the device. The PVA-4R24 includes four 2-in-6 routing blocks A, B, C or D. Each routing block provides 2 regular inputs, 1 spare amplifier input and 6 outputs.

Spare amplifier input S1 of AMP IN A (C) is for replacing the amplifiers connected to inputs 1 of routing blocks A (C) and B (D).

Spare amplifier input S2 of AMP IN B (D) is for replacing the amplifiers connected to inputs 2 of routing blocks A (C) and B (D).



6.2 Audio output



The audio outputs on the device allow to connect 100 V (or 70 V) loudspeaker zones. The delivery includes 12-pin connectors. Conductor cross-sections of 0.14 mm² (AWG26) to 1.5 mm² (AWG16) can be used.

Recommended connecting cable: flexible CU strand, LiY, 0.75 mm².

For ease of installation, the connector can be removed. Several loudspeakers can be connected until the point at which the total power consumption of the loudspeaker network corresponds to the nominal power value of the amplifier channel, where the rated load resistance of the power amplifier outputs is not to be exceeded. The nominal power values and the rated load resistances of the outputs can be found in the documentation of the power amplifier.



Notice!

Conductor cross-section

The maximum voltage drop must be less than 10% to avoid alarm signal attenuation and ensure a sufficient signal level of the pilot tone for (optional) EOL modules.

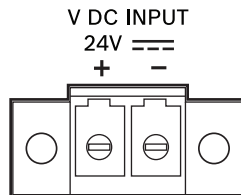


Danger!

It is possible that during operation shock hazard voltages (> 140 V peak value) may be present at the outputs. Therefore, the connected loudspeaker zones have to be installed in accordance with applicable safety regulations. When installing and operating 100 V loudspeaker networks, compliance with the VDE regulation DIN VDE 0800 is mandatory. Especially, when 100 V loudspeaker networks in alarm system applications are concerned, all safety precautions have to be in accordance with the safety class 3 standard.

6.3

Supply voltage



Connect a 24-volt DC source to the DC power input. The delivery includes a 2-pin connector.

Conductor cross-sections of 0.2 mm² (AWG24) to 6 mm² (AWG10) can be used.

Recommended connecting cable: flexible CU strand, LiY, 4 mm².

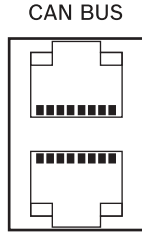
The DC input is protected against incorrect polarity and overload. The associated fuse is located on the inside of the device and is not accessible from outside of the device.



Warning!

Never connect the positive terminal + with ground.

6.4 CAN BUS



This section contains information about the connection of the device to the CAN BUS and the correct setting of the CAN address.

Connection

The device has two RJ-45 jacks for the CAN BUS. The jacks are connected in parallel, and act as an input and for daisy chaining the network. The CAN bus allows different data rates to be used, where the data rate is indirectly proportional to the bus length. If the network is small, data rates of up to 500 kbit/s are possible. In larger networks, the data rate must be decreased (down to the minimum data rate of 10 kbit/s), please refer to section Configuring the CAN baud rate.



Notice!

The data rate is preset to 10 kbit/s in the factory.

The following table explains the relationship between data rates and bus lengths/network size. Bus lengths of over 1,000 m must be implemented only with CAN repeaters.

Data rate (in kbit/s)	Bus length (in meters)
500	100
250	250
125	500
62.5	1000

Table 6.1: Data rate and bus length of the CAN BUS

The following diagrams show the assignment of the CAN port/CAN connector.

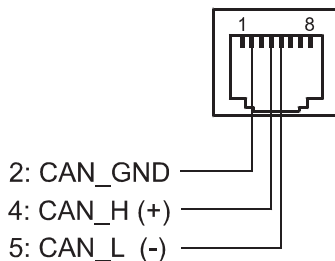


Figure 6.1: Assignment of the CAN port

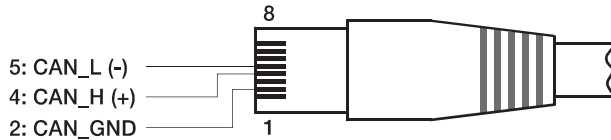


Figure 6.2: Assignment of the CAN connector

Pin	Designation	Cable color	
		T568A	T568B
2	CAN_GND	Green	Orange
4	CAN_H (+)	Blue	
5	CAN_L (-)	Blue stripes	

Table 6.2: Assignment of the CAN BUS interface

Cable specification

In accordance with the ISO 11898-2 standard, shielded twisted-pair cables with an impedance of 120 ohms must be used as the data transfer cable for the CAN bus. A terminating resistance of 120 ohms must be provided at both ends as the cable terminator. The maximum bus length depends on the data transmission rate, the type of data transmission cable, and the number of bus participants.

Bus length (in m)	Data transmission cable		Termination (in Ω)	Maximum data transmission rate
	Resistance per unit (in mΩ/m)	Cable cross-section		
0 to 40	< 70	0.25 to 0.34 mm ² AWG23, AWG22	124	1000 kbit/s at 40 m
40 to 300	< 60	0.34 to 0.6 mm ² AWG22, AWG20	127	500 kbit/s at 100 m
300 to 600	< 40	0.5 to 0.6 mm ² AWG20	150 to 300	100 kbit/s at 500 m
600 to 1000	< 26	0.75 to 0.8 mm ² AWG18	150 to 300	62.5 kbit/s at 1000 m

Table 6.3: Relationships for CAN networks with up to 64 participants

If there are long cables and several devices on the CAN bus, terminating resistors with ohm ratings higher than the specified 120 ohms are recommended in order to reduce the resistive load for the interface drivers, which in turn reduces the voltage loss from one cable end to another.

The following table allows initial estimates for the required cable cross-section for different bus lengths and various numbers of bus participants.

Bus length (in m)	Number of devices on the CAN Bus		
	32	64	100
100	0.25 mm ² or AWG24	0.34 mm ² or AWG22	0.34 mm ² or AWG22
250	0.34 mm ² or AWG22	0.5 mm ² or AWG20	0.5 mm ² or AWG20
500	0.75 mm ² or AWG18	0.75 mm ² or AWG18	1.0 mm ² or AWG17

Table 6.4: CAN BUS cable cross-section

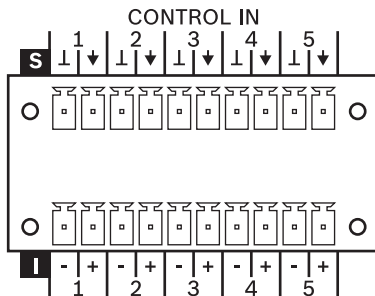
If a participant cannot be directly connected to the CAN bus, a stub line (branch line) must be used. Since there must always be precisely two terminating resistors on a CAN bus, a stub line cannot be terminated. This creates reflections, which impair the rest of the bus system. To minimize these reflections, these stub lines must not exceed a maximum individual length of 2 m at data transmission rates of up to 125 kbit/s, or a maximum length of 0.3 m at higher bit rates. The overall length of all branch lines must not exceed 30 m.

The following applies:

- In terms of rack wiring, standard RJ-45 patch cables with 100-ohm impedance (AWG 24/ AWG 26) can be used for short distances (up to 10 m).
- The guidelines specified above for the network cabling must be used when wiring the racks with each other and for the building installation.

6.5

Control input



There are two control input ports (input 1–5 or 6–10) on the rear of the device.

The CONTROL IN port is split into two halves:

- The upper half has five freely configurable **supervised**, not isolated control inputs.
- The lower half has five freely configurable **isolated** control inputs.

The delivery includes 10-pole connectors. Conductor cross-sections of 0.14 mm² (AWG26) to 1.5 mm² (AWG16) can be used. Recommended connecting cable: Flexible CU strand, LiY, 0.25 mm². The control port is configured in IRIS-Net.



Caution!

The maximum permissible voltage on a control input is 32 V.

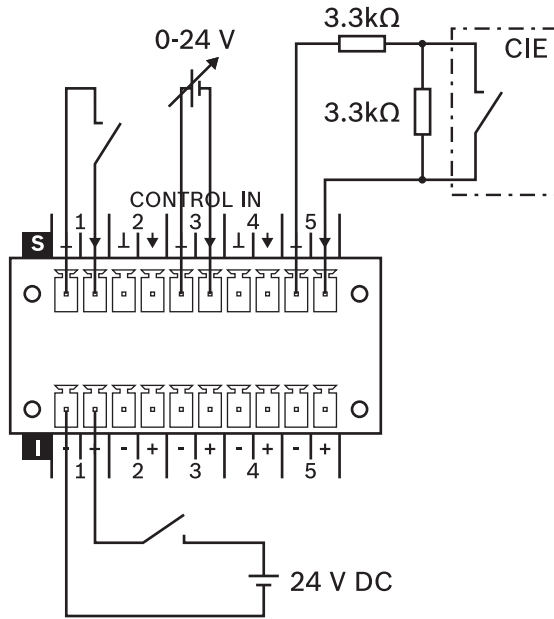


Figure 6.3: Using supervised or isolated inputs of the CONTROL IN port

Supervised control inputs

The supervised control inputs can be used as

- normal logical (high/low) input (with low ≤ 5 V or high ≥ 10 V) or
- supervised input with states active, not active, open circuit or short circuit.

When using a supervised input (e.g. for connecting a CIE) add two resistors as illustrated above (if not already included in the outputs of the connected device).



Notice!

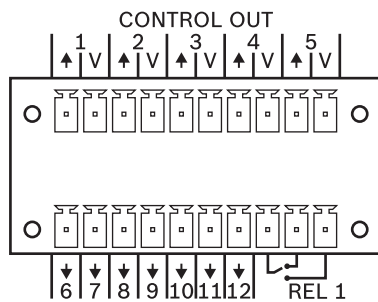
The supervised inputs are internally equipped with 8.2 kΩ pull up resistors. The ground pins are equipped with a common self resettable 140 mA fuse.

Isolated control inputs

The isolated control inputs can be used as normal logical (high/low) input (with low ≤ 5 V or high ≥ 10 V) only. This inputs comply with VDE 0833-4.

6.6

Control output



Control outputs

The freely programmable control outputs are designed as open collector outputs that have a high resistance (open) when not active (OFF/inactive). When active (ON/active), the outputs are closed to ground.



Caution!

The maximum permissible current per output is 40 mA. The maximum permissible voltage is 32 V.

To operate externally connected elements, a voltage source is available on the connection V (the voltage at connection V is identical to the device input voltage); see also the following illustration. The ground pin is equipped with a common self resettable 750 mA fuse.

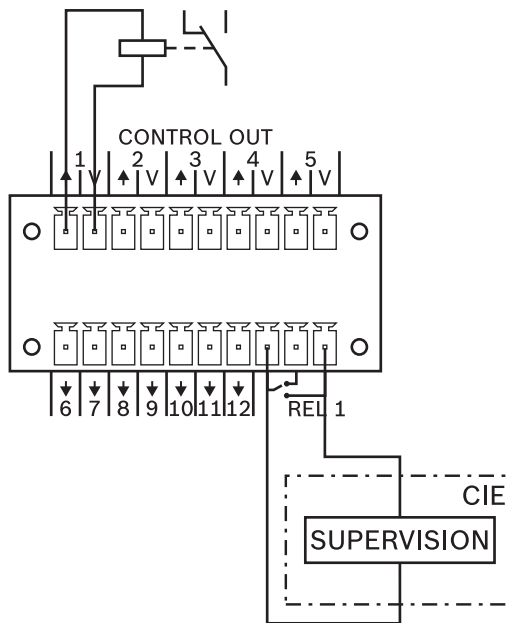


Figure 6.4: Connecting a relay and the supervision contacts of a CIE to the CONTROL OUT port

Control relay

The control relay REL (changeover contact) can be used as VDE 0833-4 compliant output. The IRIS-Net software allows the user to configure the parameters or fault types for which the changeover contact should switch over. To integrate the device into the hazard alert systems, a normally-closed contact (standby current principle) is recommended.



Caution!

The maximum load of the control relay is 32 V/1 A.

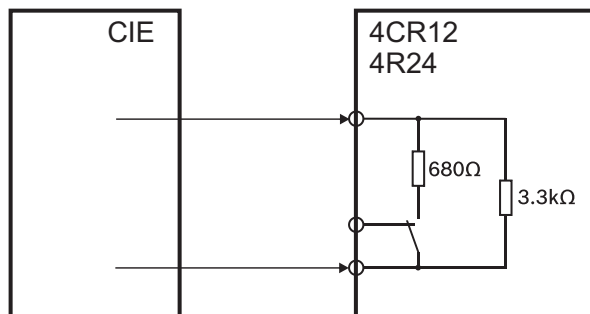
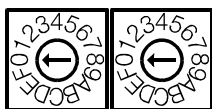


Figure 6.5: Internal configuration of the REL contact (VDE 0833-4)

7 Configuration

7.1 Setting the CAN address



HIGH LOW
CAN ADDRESS

The CAN address of the device is set using the two address selector switches HIGH and LOW. Addresses 1 to 250 (01 hex to FA hex) can be used in a CAN network. The address is set using the hexadecimal numbering system. The LOW selector switch is for the low-order digit and the HIGH selector switch is for the high-order digit.



Notice!

Each address may only occur once in the system, otherwise network conflicts will occur.

The address 0 (00 hex, set on delivery) ensures that the device is disconnected from the remote communication. This means that the device does not appear in the system, even if it is connected to the CAN bus.

HIGH	LOW	Address
0	0	Stand-alone
0	1 to F	1 to 15
1	0 to F	16 to 31
2	0 to F	32 to 47
3	0 to F	48 to 63
4	0 to F	64 to 79
5	0 to F	80 to 95
6	0 to F	96 to 111
7	0 to F	112 to 127
8	0 to F	128 to 143
9	0 to F	144 to 159
A	0 to F	160 to 175
B	0 to F	176 to 191
C	0 to F	192 to 207
D	0 to F	208 to 223
E	0 to F	224 to 239

HIGH	LOW	Address
F	0 to A	240 to 250
F	B to F	Reserved

Table 7.1: CAN addresses

7.2 Displaying the CAN baud rate

To display the CAN baud rate, press the Recessed button and keep the button pressed down for at least one second. Three front panel indicator lights then display the set baud rate for two seconds, afterwards all indicators light up (“LED test”). Please refer to the following table for details.

Baud rate (in kbit/s)	Zone status indicator light of zone 23	Zone status indicator light of zone 24	Network indicator light
10	Off	Off	On
20	Off	On	Off
62.5	Off	On	On
125	On	Off	Off
250	On	Off	On
500	On	On	Off

Table 7.2: Displaying the CAN baud rate via indicator lights on the front panel

7.3 Configuring the CAN baud rate

The CAN baud rate can be configured using a UCC1 USB-CAN CONVERTER or directly on the front of the device.

Changing the CAN baud rate



Notice!

The CAN baud rate can only be changed if the CAN address is set to 00.

To change the CAN baud rate, perform the following steps:

1. Press the Recessed button and keep the button pressed down for at least one second. The CAN baud rate is indicated for two seconds, please refer to the section entitled “Displaying the CAN baud rate” for more information.
2. As soon as the CAN baud rate is displayed, release the Recessed button. Please note that if the button is pressed for more than 3 seconds, the device will be reset to factory settings.
3. Briefly press the Recessed button to switch to the next-higher CAN baud rate. The LEDs indicate the new setting.
4. Repeat step 3 until the desired baud rate has been set. (Example: To change the baud rate from 62.5 kbit/s to 20 kbit/s, press the Recessed button exactly five times, i.e. 62.5 > 125 > 250 > 500 > 10 > 20).
5. The new CAN baud rate is applied two seconds after the last time that the Recessed button is pressed.

8 Operation

8.1 Line supervision

For loudspeaker line supervision three different options are available. They differ in performance, cost, and suitability for various applications and situations.

In general the device can detect open circuit and short circuit. In case of an open circuit only a fault message will be generated. In case of a short circuit a fault message will be generated and the loudspeaker line will be automatically deactivated to avoid influence to other loudspeaker lines.

8.1.1 Impedance measurement

The PVA-4CR12 controller is equipped with a speaker line impedance measurement function. This function measures the effective values of the output current and the output voltage. The impedance value of the connected speaker line is calculated using these measurements. Due to the frequency and temperature dependence of the speaker line, the value obtained can vary substantially. A continuous sinusoidal signal with an appropriate frequency is recommended for the measurement. The voltage and current measurements do not claim to be a calibrated measurement of absolute values. The measured value is compared with the reference measurement in question and a good/bad status is indicated depending on the difference between these two values. If the controller is replaced, the reference measurement must be performed again. The impedance measurement is configured using the IRIS-Net software.

Parameter	Value	Default setting (IRIS-Net)
Impedance range	20–10000 Ω (corresponds to 500 W to 1 W)	
Impedance tolerance	6% \pm 2 Ω	
Frequency range	20–4000 Hz	30 Hz
Voltage range	0.1–1.0 V	0.5 V

Table 8.1: Impedance measurement specification



Notice!

The total impedance connected at the output on the amplifier (loudspeakers and cabling) must be within the specified impedance range in terms of the test frequency (see the table entitled “Impedance measuring specification”).



Notice!

To detect a line interruption to a single speaker, or the failure of a single speaker, the following instructions must be observed: Do not connect more than five speakers to one speaker line. All speakers on the speaker line must have the same impedance.

8.1.2

EOL slave module

End-of-line (EOL) technology enables the loudspeaker lines to be monitored for short-circuit and interruptions. The EOL modules can be used for permanent supervision on not active and active speaker lines, e.g. for speaker lines with permanent background music or if passive volume controls are used.

Method of operation

An EOL slave module PVA-1WEOL is installed at the end of the speaker line. The speaker line is used for both the power supply of the module (via the non-audible pilot tone) and for bi-directional communication between the EOL master in the output stage and the EOL slave module (using very low-frequency signals). If a communication error occurs – for example, if the EOL master does not receive a response from the slave – then an error message is generated. The unique addressing of the slave modules means that multiple slave modules can be connected to one speaker line.

For communication between the master and the slave modules, the EOL slave modules must be connected to ground. The shielding on the speaker cable, a free wire in the speaker cable, or any other available ground point – such as the safety ground of the power supply system – can be used for this purpose. The resistance R_G between an output line of the amplifier and ground must be at least 1.5 MΩ. The capacity C_G between an output line of the device and the ground must not be greater than 400 nF.

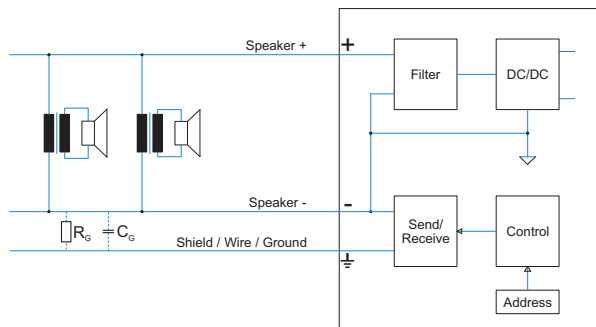
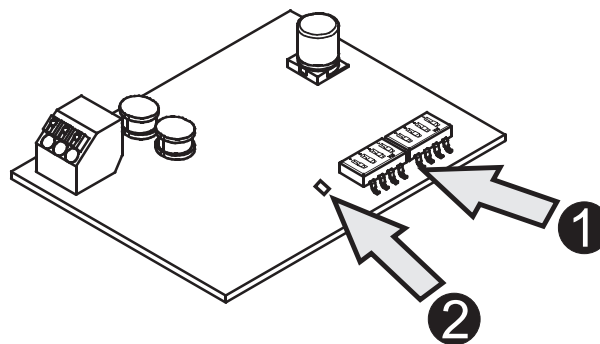


Figure 8.1: Circuit diagram (R_G and C_G are caused by the loudspeaker installation, e.g. wire type, length)

EOL monitoring function setup

Connect the EOL slave modules to the end of the speaker line. Set the desired address at the DIP switches ❶. For details please refer to the installation note of the PVA-1WEOL.



8.1.3

Plena EOL

The Plena end-of-line boards can be used for permanent supervision on not active and active speaker lines. The PLN-1EOL module can be used e.g. for speaker lines with permanent background music or if passive volume controls are used.

Plena end-of-line boards PLN-1EOL monitor the presence of a pilot tone on a loudspeaker line. The board connects at the end of a loudspeaker line and detects the pilot tone signal. This signal is always present on the line: when back ground music (BGM) is playing, when a call is in progress, and when no signal is present. The pilot tone is inaudible and at a very low level (e.g. -20 dB). When the pilot tone signal is present, an LED lights up, and a contact on the board is closed. When the pilot tone fails, the contact opens, and the LED goes off. If mounted

at the end of the loudspeaker line, this applies to the integrity of the whole line. Presence of the pilot tone signal does not depend on the number of loudspeakers on the line, the load on the line, or the line capacitance. The contact can be used to detect and report faults on a loudspeaker line.

Several EOL boards can be daisy-chained to a single fault input. This allows a loudspeaker line with several branches to be monitored. Since the background music also includes a pilot tone signal, there is no need to interrupt background music.

Please refer to the system manual for details about installation and configuration.

8.2 Pilot tone

This device includes an internal, configurable pilot tone generator and signal amplifier, which can be switched to the speaker zones. The pilot tone generator is configured using the IRIS-Net software.

Parameter	Value/Range	Default setting (IRIS-Net)
Generator status	On/Off	Off
Signal frequency	18000–21500 Hz	21000 Hz
Signal amplitude (depends on load)	1–10 V	8 V



Notice!

Under certain conditions (e.g. high signal level or loudspeakers with high sensitivity in the high frequency range) it may be possible that people can hear the pilot tone. In this case, increase the frequency of the pilot tone.

9 Maintenance

9.1 Firmware update

IRIS-Net can be used to update the firmware on the device. Depending on the CAN data rate used, the update will take one or more minutes to complete. Since development work is always being performed in relation to all system software, it may be necessary to update the firmware on the controller. Any software incompatibilities are displayed in IRIS-Net. For more information on firmware updates, please refer to the IRIS-Net documentation.

9.2 Resetting to factory default settings

The device is programmed in the factory with the following functions and properties:

Parameter	Setting/description
CAN baud rate	10 kbit/s
Speaker out relays	Off (all zones switched to AMP IN 1)
GPI	Digital input (no supervision)
GPO	Off
Internal pilot tone generator	Off

Table 9.1: Device factory default settings

The device settings can be reset to the default values manually or using IRIS-Net. To perform a manual reset, perform the following steps **with the device switched on**:

1. Disconnect the device from the CAN BUS.
2. Set the address to "00" using the CAN ADDRESS selector switch on the rear panel.
3. Press the Recessed button on the front panel and keep the button pressed down for three seconds.

The device has now been reset to the factory default settings.



Caution!

Before reconnecting the device to the CAN BUS, note the CAN baud rate, which may change under certain circumstances.

10 Technical data

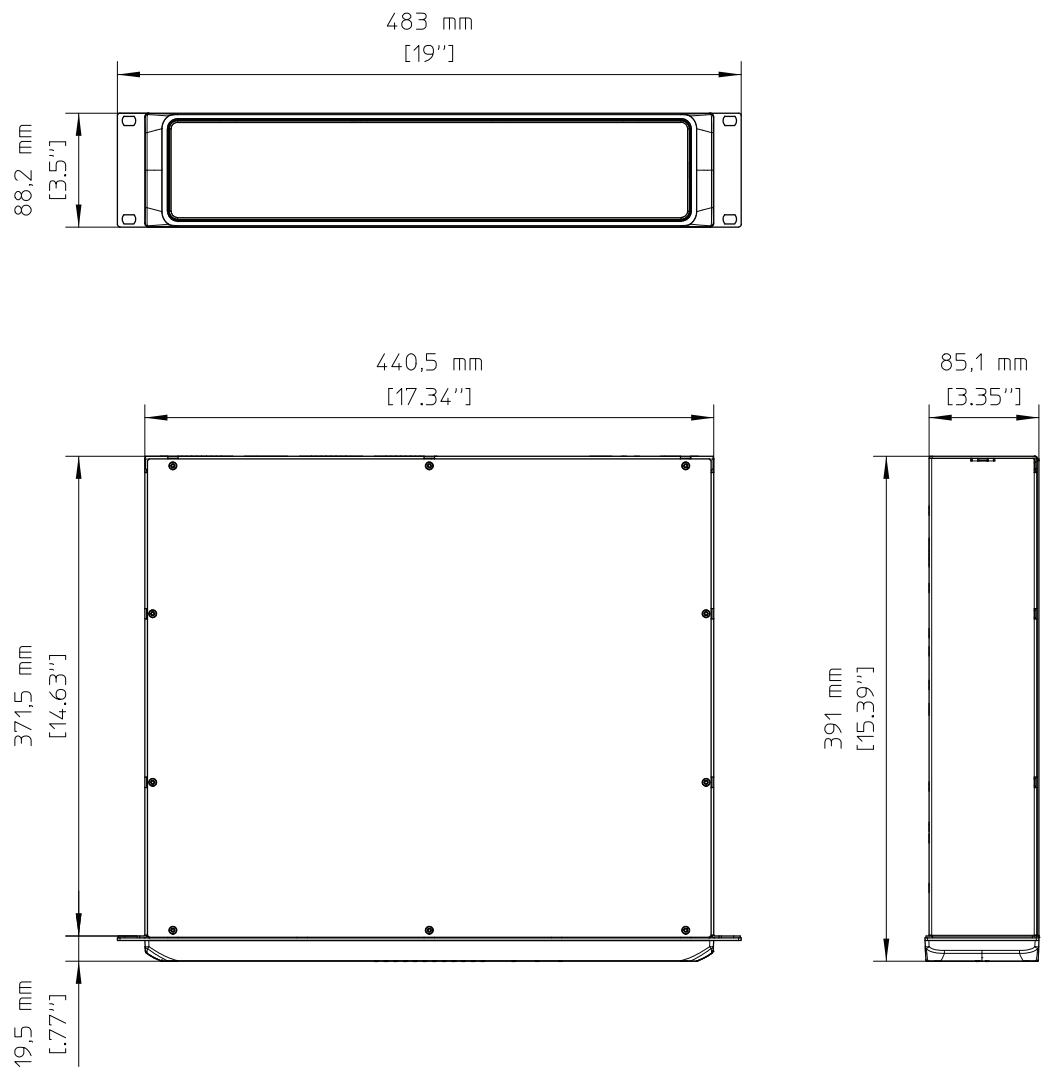
PVA-4R24 24 Zone Router	PAVIRO Router including routing and supervision
Audio inputs (100 V)	AMP IN: 4 × 6-pin port
– Max. voltage	120 V _{eff}
– Max. current	7.2 A
– Max. power	500 W
Audio outputs (100 V)	SPEAKER OUT: 4 × 12-pin port
– Max. voltage	120 V _{eff}
– Max. current	7.2 A
– Max. power	500 W
CONTROL IN	4 × 10-pin port
– Control inputs	<ul style="list-style-type: none"> – 10 supervised inputs (0–24 V, U_{max} = 32 V) – 10 isolated inputs (Low: U ≤ 5 V DC; High: U ≥ 10 V DC, U_{max} = 32 V)
CONTROL OUT	4 × 10-pin port
– Control outputs	24 Low Power outputs (open collector, U _{max} = 32 V, I _{max} = 40 mA)
– Control relay	2 (NO/NC relay contacts, U _{max} = 32 V, I _{max} = 1 A)
Interfaces	
– CAN BUS port	2 × RJ-45, 10 to 500 kbit/s (for controller, router, amplifier connection)
DC power input	21–32 V DC
Power consumption	5–60W
Maximum supply current	<ul style="list-style-type: none"> – Standby < 250 mA – Idle/Announcement/Alert < 800 mA
Operating temperature	-5 °C to 45 °C
Electromagnetic environment	E1, E2, E3
Product dimensions (Width × Height × Depth)	19", 2 HU, 483 × 88.2 × 391 mm
Net weight	8.2 kg
Shipping weight	9.7 kg

10.1 Standards

The device meets the following standards (as of February 2015):

- EN 50130-4
- EN 50581
- IEC 60065
- EN 60945
- EN 60950
- EN 61000-6-3

10.2 Dimensions



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