Promatrix 6000 Controller

PMX-4CR12

en | Operation manual

DYNACORD
GERMAN ENGINEERING EXCELLENCE

Table of contents

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 no 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 lighting 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.

!	RISK OF ELECTRIC SHOCK DO NOT OPEN	⚡
	RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR	

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 PMX-4CR12 controller is the central paging manager for the PROMATRIX 6000 system. Eight local audio inputs can be switched to four audio outputs. A two channel message manager is integrated. The controller provides all the audio processing, supervision and control functions for a complete PROMATRIX 6000 system. A single controller supports up to 16 call stations and 492 paging zones. The controller is equipped with 12 zones, 18 GPIs and 19 GPOs. One controller can handle up to 2000 W loudspeaker load. Additional zones and power can be added by using up to 20 external routers and 40 amplifiers with each 2 $\times$ 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

This chapter explains the basic features of the PROMATRIX 6000 system and its most important functions.

General overview

The PMX-4CR12 is the controller of the PROMATRIX 6000 system. The controller contains all necessary audio functions and is responsible for controlling and monitoring the complete PROMATRIX 6000 system. The type and number of connected audio sources, amplifiers, and relays are extremely variable, and can be adjusted to individual requirements. A single controller can manage up to 16 call stations and up to 492 loudspeaker zones. Control inputs and outputs can be used for controlling and monitoring functions. Both logic level and the analog level signals can be processed. Configuration is performed on a PC using the IRIS-Net software, which also provides access to system documentation and the required user interface. A configuration can be changed at any time, and adjusted to new circumstances without having to modify the system installation. A PC is required only for loading or changing the configuration; it does not need to be connected during live operation. In many cases, however, a permanently connected PC is helpful; for example, to provide detailed status displays and log reports, real-time loudspeaker and sound control, or for remote diagnosis and maintenance via the network. The user interface can be individually tailored, and up to 32 password levels can be assigned.

Audio routing

A digital audio matrix is integrated into the controller. Up to 8 local audio inputs, 2 message playback channels, and 4 internal generators are available. The 4 audio output channels are connected to the amplifiers via a 4-channel audio bus. The amplifiers include an audio input router where the correct input signal is selected automatically. Each loudspeaker circuit can be connected with amplifier outputs via a relay matrix, which allows for 492 loudspeaker zones. The controller manages the audio signals, and distributes them according to priority. In addition to the call stations, other audio sources can also be connected to the audio inputs such as microphones, mixing desks, CD players, MP3 players, tuners, and so on. A number of different connections are available for optimum adjustment.

Audio processing

The controller provides separate volume controls with a mute function for each audio input and audio output. Each audio input has a 3-band equalizer and a compressor for optimal sound adjustment of the audio sources. All outputs are fitted with a 5-band equalizer and a limiter. For the equalizers, the operator can select from five different filter types for each band filter (peak, low-shelving, high-shelving, high pass, low pass). Volume levels, filter parameters, and so on are set on the PC during configuration. However, these can also be changed in real-time during operation using the graphical user interface, the special keys for the call stations, or external operating controls.

Signal generators

The controller provides four signal generators: Two independent generators for generating alarm signals and two independent generators for generating chime signals. Operators can choose between 24 alarm types and six chime types that are available ex-works.

Message manager

The integrated message manager is for EVAC messages and alarm signals, as well as commercial messages and chime/pre-chime signals. The message manager allows easy configuration of EVAC and commercial messages, and other customized audio signals by using the IRIS-Net software.

Call stations

The call stations are used mainly for announcements, but are also used for manual control of the PROMATRIX 6000 system. Possible call station functions include zone/group selection, announcements, program allocation, triggering chime and alarm signals, and message playback. However, special commands such as volume control, light control, function displays, and much more are also possible. The call stations can therefore also be configured for general control tasks. If an announcement is to be routed through a loudspeaker zone that is already occupied, the system issues an occupied notification (i.e., the talk button indicator light flashes). If the call station concerned has a higher priority, it can interrupt the lower-priority call from the other call station/signals. The system is configured to indicate the conditions: The user is notified that the system is occupied when selecting the zone/group (before the interruption) by the flashing talk button indicator light. The user can now decide whether to interrupt the signal immediately, or whether to wait until the end of the active announcement. Each zone selection key has two indicator lights: A green indicator light shows the current selection, and a red indicator light shows if the zone is occupied with an emergency signal. System information or error messages can be displayed on the call station's illuminated graphic display.

Control inputs and outputs

The PROMATRIX 6000 system has analog and logic control inputs and logic control outputs. The control inputs allow a connection to be established to fire alarm systems, intruder alarm systems, or a control desk. However, it is also possible to connect external switches, controllers, or rotary potentiometers, or triggers from external equipment (power supply, power amplifiers, and so on). The control outputs allow the user to activate/deactivate external devices, trigger signals and events, remotely control doors, gates, and roller blinds, and much more.

Automatic control

The controller contains a quartz-controlled real-time clock that can be switched to DCF77 radio clock operation via an optional antenna. The system clock automatically recognizes leap years; in DCF77 mode, it also automatically switches to daylight-saving time. Up to 80 external slave clocks (max. 1 A) can be controlled by the system clock. A special output for polarity switching pulse, which is protected against short circuits, is integrated in the controller for this purpose. Slave clocks are automatically adjusted if a time difference between the slave clocks and the system clock is detected, for example after a power failure or in the event of manual input. Together with the calendar function, the system clock can be used to execute functions such as a break chime, music, gate control, light control, and so on. These functions can be programmed for specific days, but can also be implemented on an hourly, daily, weekly, monthly, and annual basis. Up to 500 time-controlled events can be entered. Functions and parameters can be connected in an internal sequence. The TaskEngine in the controller GUI provides a graphic way to combine processes individually. One example would be a chime signal to be transmitted at a certain volume and with a specific priority in specific call groups, and which simultaneously activates a control output. In this case, the process consists of the "chime" and "analog output" function blocks combined with the parameters of chime type, volume, priority number, call group number, as well as the type and number of the control output. The processes can be triggered via special function keys on the call stations or via control inputs, but can also be linked to clock or calendar dates.
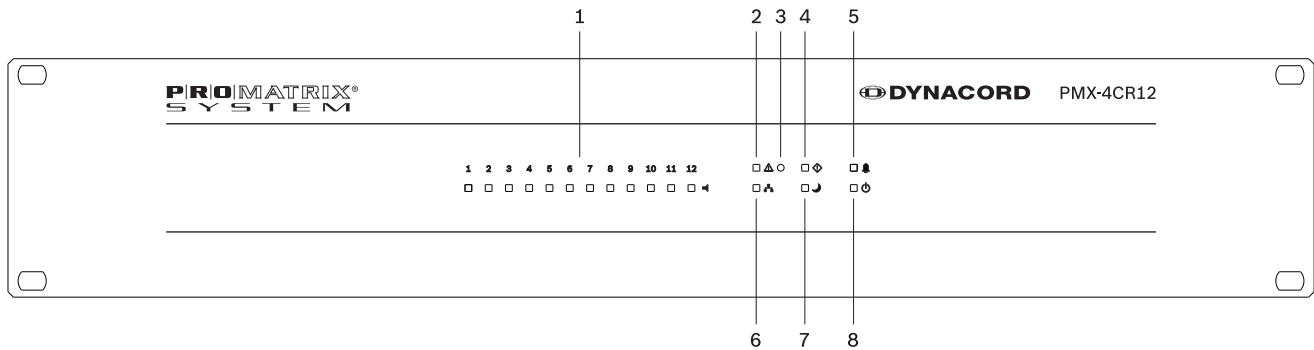
Interfaces

In addition to the control inputs and outputs, the PROMATRIX 6000 system also includes other interfaces. The call stations are connected to the controller via the CST bus (CAN bus standard). Up to four call stations can be connected via one CST bus. The power amplifiers and the routers are controlled and monitored by the controller via an additional, independent CAN bus interface. The connection to a PC is established via an Ethernet interface.

A RS-232 port allows to connect a PROMATRIX 4000 system.

Monitoring

The controller monitors all internal functions itself, and the connected call stations, routers and power amplifiers including their connection lines are also monitored by polling and pilot tone. Loudspeaker lines can be monitored by impedance measurement or end-of-line modules installed at the last speaker. The PROMATRIX 6000 system also supports emergency power operation – in the event of a power failure, the controller can assume all power management functions, that is, all unnecessary internal and external consumers switch to standby mode, or are deactivated and only reactivated again when required. This greatly reduces power consumption, and ensures maximum operating time on battery power. Error messages can be displayed on the call station displays in plain text. Collective general fault message is available via floating READY contact on the controller.
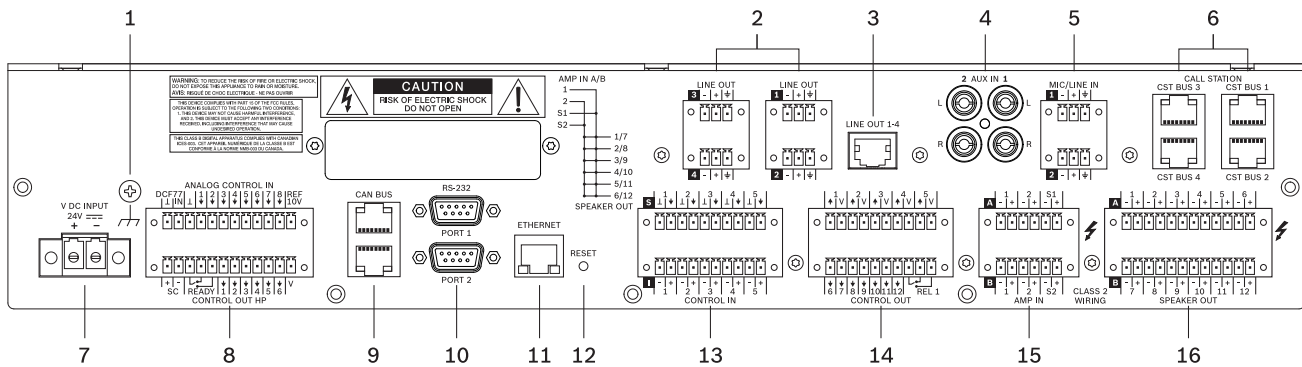
3.1   Front

Number	Symbol	Element	Description
1	◀	Zone status indicator light	Indicates the status of the zone: • 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 yellow if a fault in the system is detected. The indicator is coupled with the READY contact (see section *Ready relay, page 28*) on the rear of the device, which allows any faulty system behavior to be reported externally. Note: The fault types to be indicated via this indicator can be configured.

Number	Symbol	Element	Description
3		Recessed button	The button is protected to prevent it from being pressed accidentally. Use a pointed object (such as a ballpoint pen) to press the button. This button has the following functions: • Silencing of the buzzer: If the buzzer is active, press the button briefly to deactivate the warning tone. • 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 *Displaying the CAN baud rate, page 36* • Indicator test: Press this button for at least three seconds to activate all indicators. All indicators (LEDs) at the front panel light up as long as the button is pressed ("LED test") and the internal buzzer is activated.
4	◇	System fault indicator light	This indicator lights yellow if a system fault according EN 54-16 was detected.
5	🔔	Voice alarm indicator light	This indicator lights red if the controller is in voice alarm state according EN 54-16.
6	⊹	Network indicator light	Indicates the Ethernet network status: • Illuminated green: Successful data communication to all configured Ethernet devices has been established. • Flashing green: Ethernet connection to at least one Ethernet device lost. • Off: No Ethernet connection.
7	☽	Standby indicator light	This indicator lights up green when the device is in standby mode.
8	⏻	Power indicator light	This indicator lights up green when the power supply is OK.

3.2   Rear

Number	Element	Description
1	Grounding screw	Ground connection
2	LINE OUT 1-4 ports (Euroblock)	Balanced line level audio outputs for channel 1 to 4 (parallel to RJ-45 port).
3	LINE OUT 1-4 port (RJ-45)	Balanced line level audio output for channel 1 to 4 (parallel to Euroblock port).
4	AUX IN 1/2 ports (RCA)	Stereo audio input for line level signals.
5	MIC/LINE IN 1/2 ports (Euroblock)	Audio input for microphone or line level signals.
6	CST BUS 1-4 ports (RJ-45)	Ports for connecting call stations.
7	DC power input	
8	CONTROL IN/OUT port	Control port with analog/logic inputs, high power outputs and pins for DCF77 or slave clocks.
9	CAN BUS port	Port for connecting power amplifiers or routers.
10	RS-232 ports	Port 1: Interface for PROMATRIX 4000 system. Port 2: For service only.
11	ETHERNET port with status indicator lights	Port for connecting to a PC or other network devices.
12	Reset button	Reset of the device: Briefly press this button to reset the device.*
13	CONTROL IN port	Control port with isolated or supervised inputs.
14	CONTROL OUT port	Control port with open collector outputs.
15	AMP IN port	Input for 100 V (or 70 V) audio signal from power amplifier.
16	SPEAKER OUT port	Output for speaker zones.

* If the reset button is pressed too long (e.g. > 4 seconds), the device enters the service mode. Press the reset button again to exit the service mode.

4   Parts included

Quantity	Component
1	PMX-4CR12
2	CAN terminating resistor (120 ohm)
1	Euroblock connector 2-pole (Phoenix, PC 5/2-STF-7,62, 1975697, F.01U. 108.398)
6	Euroblock connector 3-pole (Phoenix, MC 1,5/3-STF-3,81, Nr. 1827716, F.01U. 104.680)
2	Euroblock connector 6-pole (Phoenix, MC 1,5/6-ST-3,81, 1827745, F.01U. 104.179)
4	Euroblock connector 10-pole (Phoenix, MC 1,5/10-STF-3,81, 1827787, F.01U. 301.445)
2	Euroblock connector 12-pole (Phoenix, MC 1,5/12-STF-3,81, 1827800, F.01U. 108.397)
4	Foot stand (self-adhesive)
1	Operation manual
1	Important safety instructions

Warranty
For information regarding the warranty, see www.dynacord.com

5   Installation

This device has been developed for horizontal installation in a conventional 19" rack cabinet. As a rule, the device must be mounted in such a way that the ventilation slots are not blocked on either side.

When installing the device in the housing and rack cabinet, ensure there is a free channel of air between the sides of the device and the side walls of the cabinet/rack up to the level of the upper rack or cabinet vent so that the devices are sufficiently ventilated. There should be free space of at least 100 mm above the cabinet for ventilation.

Warning!

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

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.
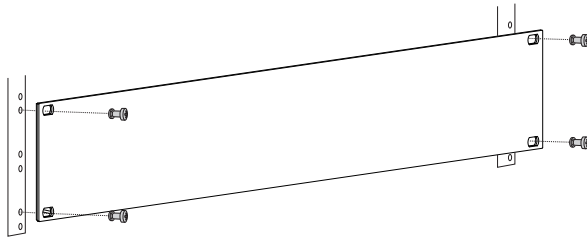

Figure 5.1: Installation of the device into a 19" rack

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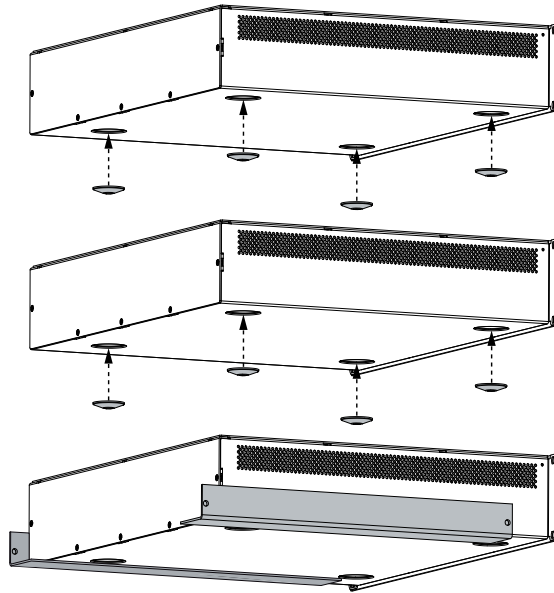
Figure 5.2: Stacking of devices using the supplied foot stands (example with 3 devices, rack mount rails are used for the bottom device only)

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.

6   Connection

6.1   Audio input

6.1.1   Line level signal
MIC/LINE IN
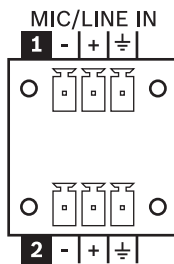
This Euroblock inputs allow the connection of low impedance microphones or line level audio sources.

The audio inputs are electronically balanced. You must always use a balanced audio signal at the input of the device where this is possible. The scope of delivery for the device includes a 3-pin connector. Conductor cross-sections of 0.14 mm² (AWG26) to 1.5 mm² (AWG16) can be used.

Recommended connecting cable: balanced cable with shielded flexible 2 x 0.14 mm².

Balanced cabling

The following illustration shows the balanced cabling of an audio input (or output) on the device.
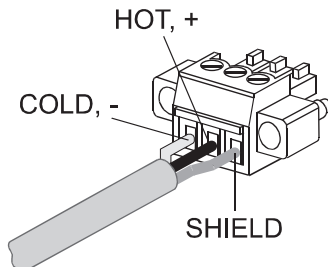

Figure 6.1: Balanced cabling

Unbalanced cabling

If the connecting cable(s) is/are very short and no interference signals are to be expected in the environment of the device, then an unbalanced signal can also be connected. In this case, it is imperative that a bridge in the connector between the shield and the inverting pin is switched (see diagram below), otherwise the level can drop by 6 dB. However, for reasons of immunity to external interference sources such as dimmers, mains supplies, HF control lines etc., balanced cabling is always preferable.
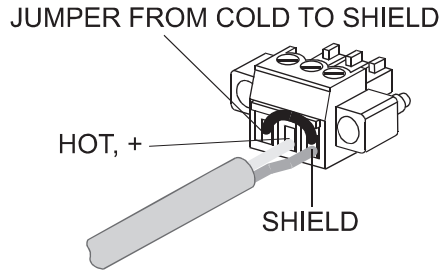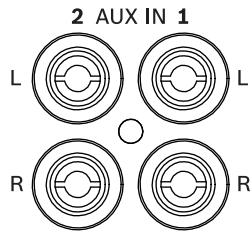
JUMPER FROM COLD TO SHIELD

HOT, +

SHIELD

Figure 6.2: Unbalanced cabling
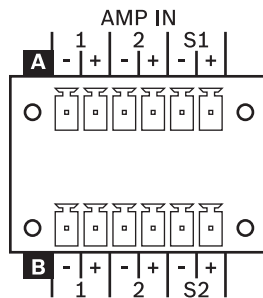
AUX IN

2 AUX IN 1

L   L

R   R

The RCA inputs AUX IN 1/2 allow connecting stereo line level sources. The stereo signal is internally summed.
Recommended connecting cable: Standard AUX cable.

6.1.2   Amplifier inputs

AMP IN
1   2   S1
A - + - + - +

- + - + - +
B 1   2   S2

The AMP IN audio inputs allow to connect the 100 V (or 70 V) output signals of two 2-channel power amplifiers (up to four power amplifier channels) to the integrated 2-in-6 router blocks A or B. Additionally there are two 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 PMX-4CR12 includes two 2-in-6 routing blocks A or B. Each routing block provides 2 regular inputs, 1 spare amplifier input and 6 outputs. Spare amplifier input S1 is for replacing the amplifiers connected to inputs 1 of routing block A and B. Spare amplifier input S2 is for replacing the amplifiers connected to the inputs 2 of routing blocks A and B.
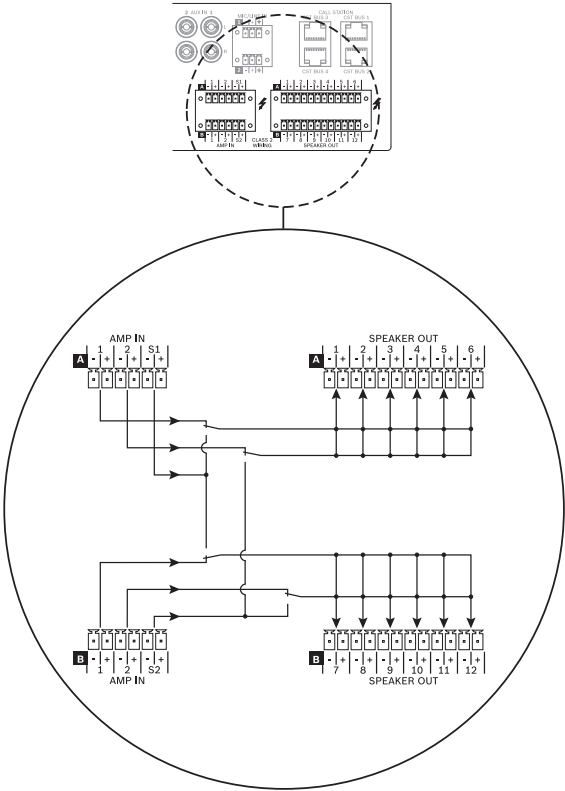
6.2   Audio output

6.2.1   Line level signal

The four audio output channels of the controller can be connected via Euroblock or RJ-45.
Using the RJ-45 socket is recommended for connecting PROMATRIX 6000 power amplifiers.
The internal connections of the outputs are given in following table.

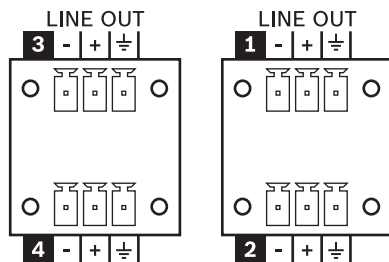| Euroblock		Function	RJ-45
Number	Pin		
LINE OUT 1	1	- (Cold)	7
	2	+ (Hot)	8
	3	Shield	Plug
LINE OUT 2	1	- (Cold)	5
	2	+ (Hot)	4
	3	Shield	Plug
LINE OUT 3	1	- (Cold)	3
	2	+ (Hot)	6
	3	Shield	Plug
LINE OUT 4	1	- (Cold)	1
	2	+ (Hot)	2
	3	Shield	Plug

Table 6.1: Internal connection of line level audio outputs

Notice!
The maximum overall cable length between controller and amplifiers is 100 m.

Euroblock

The audio outputs are electronically balanced. You must always use a balanced audio signal at
the output of the device where this is possible. The scope of delivery for the device includes 3-
pin connectors. Conductor cross-sections of 0.14 mm² (AWG26) to 1.5 mm² (AWG16) can be
used.
Recommended connecting cable: balanced cable with flexible 2 x 0.14 mm² shielding.

Balanced cabling

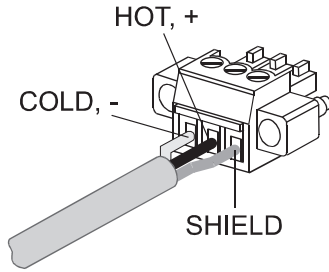The following illustration shows the balanced cabling of an audio input (or output) on the device.
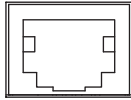

Figure 6.3: Balanced cabling

RJ-45

LINE OUT 1-4

The pin assignment of the LINE OUT 1-4 audio output sockets allows to connect the controller to the RJ-45 audio input socket of the PROMATRIX 6000 power amplifier using standard RJ-45 patch cables.
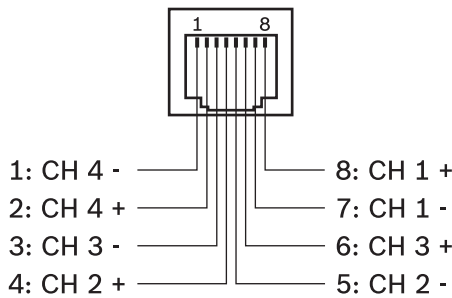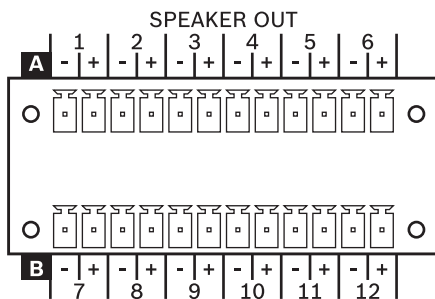

1: CH 4 -	8: CH 1 +
2: CH 4 +	7: CH 1 -
3: CH 3 -	6: CH 3 +
4: CH 2 +	5: CH 2 -

Figure 6.4: Pin assignment of the LINE OUT 1-4 socket

6.2.2   Loudspeaker outputs

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   Call station
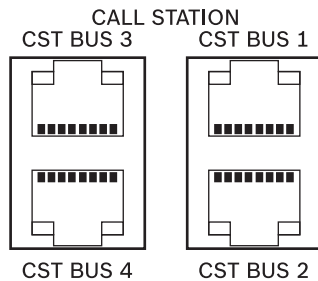
The four **C**all **ST**ation (CST) BUS ports connect call stations with the controller. This are 8-pole RJ-45 ports that integrate the power supply, control interface (CAN bus), and audio interface. Every CST BUS supports up to 4 call stations. In total 16 call stations can be connected to one controller.

> **Notice!**
> Using twisted pair cables for CAN (4, 5), AUDIO CONTROLLER TO CALL STATION (3, 6) and AUDIO CALL STATION TO CONTROLLER (7, 8) connections is mandatory.
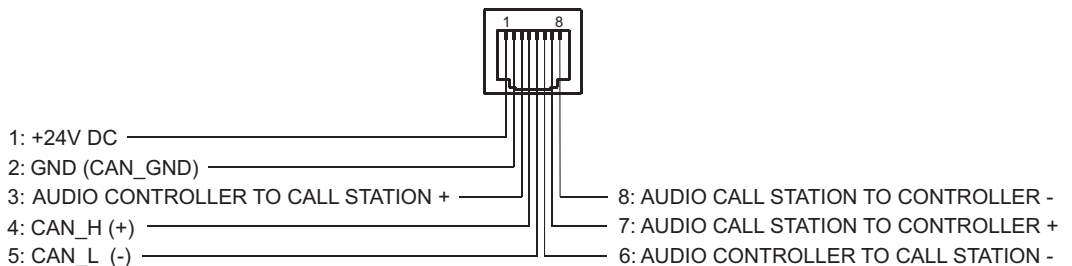

1: +24V DC
2: GND (CAN_GND)
3: AUDIO CONTROLLER TO CALL STATION +
4: CAN_H (+)
5: CAN_L (-)

8: AUDIO CALL STATION TO CONTROLLER -
7: AUDIO CALL STATION TO CONTROLLER +
6: AUDIO CONTROLLER TO CALL STATION -

Figure 6.5: Pin assignment of CST BUS port

8: AUDIO CALL STATION TO CONTROLLER -
7: AUDIO CALL STATION TO CONTROLLER +
6: AUDIO CONTROLLER TO CALL STATION -
5: CAN_L (-)
4: CAN_H (+)
3: AUDIO CONTROLLER TO CALL STATION +
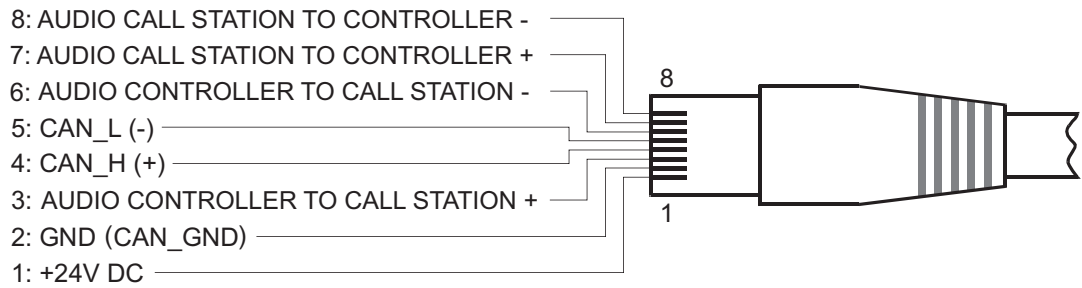2: GND (CAN_GND)
1: +24V DC

Figure 6.6: Pin assignment of CST BUS connector

For the CST BUS, the same requirements apply for the used line (length, cross section, etc.) as for the CAN bus interface (see section CAN BUS). As the CST BUS includes the power supply for all connected call stations or call station extensions, the power consumption must be considered when selecting cable length or cross section. Please refer to the call station manual for details about power consumption.
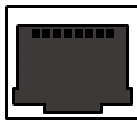
Notice!

The terminating of the CST BUS in the controller is configured via IRIS-Net during system configuration.

6.4   Ethernet

ETHERNET

Connecting the controller via the Ethernet interface allows the controller to communicate with a PC. This not only allows simple configuration of the controller using the IRIS-Net software, but it also allows you to operate and monitor the entire system.

LED status lights

The Ethernet interface of the controller has an orange and a green LED to display the status of the Ethernet connection. If no network cable is connected, both LEDs remain unlit. The orange connectivity LED on the left side of the Ethernet interface illuminates once the controller has established an Ethernet connection with another device (e.g. an Ethernet switch). The green network traffic LED on the right side of the Ethernet interface briefly illuminates each time Ethernet data is transferred.

Crossover cable

When using a crossover cable to connect a controller with a PC directly, wire-pair 2 must be swapped with wire-pair 3. This creates the necessary switch of sending and receiving lines; with a hub/switch, this exchange is performed internally.

6.5   Supply voltage
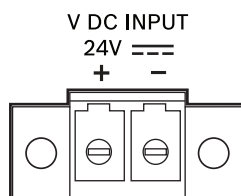
V DC INPUT
24V
+   −

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
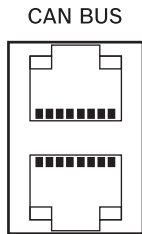located on the inside of the device and is not accessible from outside of the device.

> **Warning!**
> Never connect the positive terminal + with ground.

6.6   CAN BUS

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 6.2: Data rate and bus length of the CAN BUS

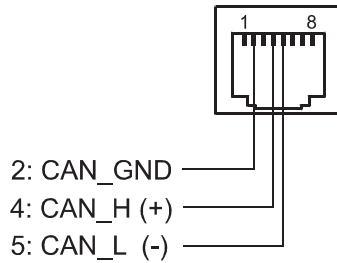The following diagrams show the assignment of the CAN port/CAN connector.
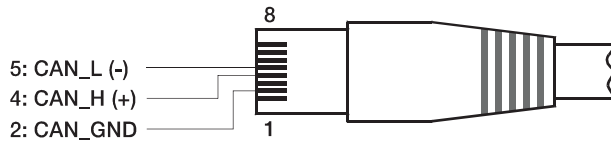
Figure 6.7: Assignment of the CAN port

Figure 6.8: 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 6.3: 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 mm² AWG23, AWG22	124	1000 kbit/s at 40 m
40 to 300	< 60	0.34 to 0.6 mm² AWG22, AWG20	127	500 kbit/s at 100 m
300 to 600	< 40	0.5 to 0.6 mm² AWG20	150 to 300	100 kbit/s at 500 m
600 to 1000	< 26	0.75 to 0.8 mm² AWG18	150 to 300	62.5 kbit/s at 1000 m

Table 6.4: 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 mm² or AWG24	0.34 mm² or AWG22	0.34 mm² or AWG22
250	0.34 mm² or AWG22	0.5 mm² or AWG20	0.5 mm² or AWG20
500	0.75 mm² or AWG18	0.75 mm² or AWG18	1.0 mm² or AWG17

**Table 6.5: 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.

6.7   Slave clocks
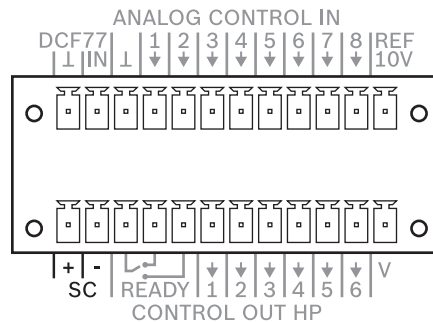
The lower half of the control port has a special, short-circuit-proof output for polarity switch impulses. Slave clocks connected here are automatically adjusted if a time difference is detected between the slave clocks and the system clock, for example after a power failure or in the event of manual input. Ensure that all slave clocks are connected with the same polarity.

> **Notice!**
>
> The maximum permissible number of slave clocks on the SC output depends on the power consumption of the slave clock type used. Example: When using a slave clocks type with a power consumption of 12 mA up to 80 slave clocks can be connected.

6.8   DCF77
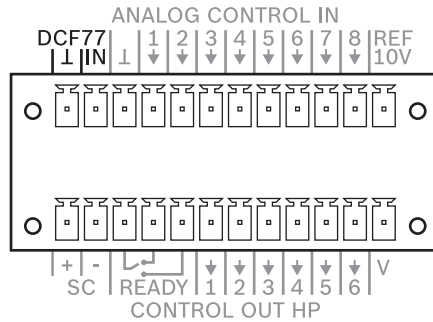
The top half of the control port has an input for the radio receiver of the DCF77 signal. We recommend using the DYNACORD NRS 90193 receiver. Observe the delivered documentation when connecting the receiver to the controller.

6.9   Ready relay
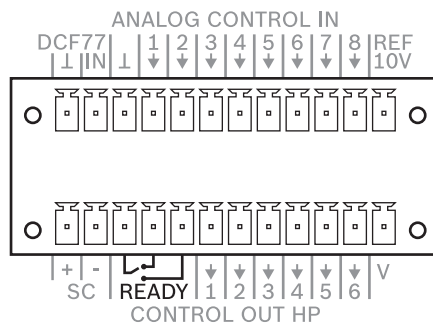
The lower half of the control port has a potential-free READY changeover contact. This changeover contact signals to other devices that the controller is ready for operation or indicates faults in the system. The following table shows the possible statuses of the ready contact.

Status	Switch position	Description
Ready for operation (= ready)		The voltage supply is functioning, the boot process of the device has completed, and there are no faults in the system. The relay has been activated.
Not ready		The voltage supply is off/interrupted or the boot process of the device has not yet completed, or there is a fault in the system. The relay has dropped/is without power.

Table 6.6: READY contact

The changeover contact position for the status "not ready" is displayed on the device. The IRIS-Net software allows the user to configure the fault types for which the changeover contact should switch over and signal the status "not ready". To integrate the controller into the hazard alert systems, a normally-closed contact (standby current principle) is recommended, i.e., the left and right pin.
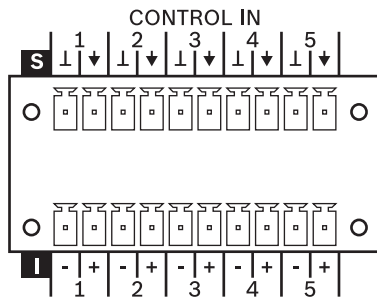

⚠️ **Caution!**

The maximum load of the ready contact is 32 V/1 A.

6.10 Control input

6.10.1 CONTROL IN

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!**

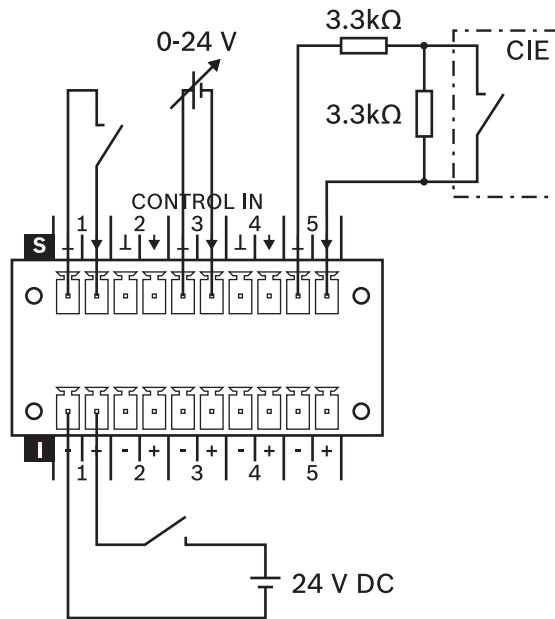The maximum permissible voltage on a control input is 32 V.

Figure 6.9: 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),
- analog input (0–24 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).
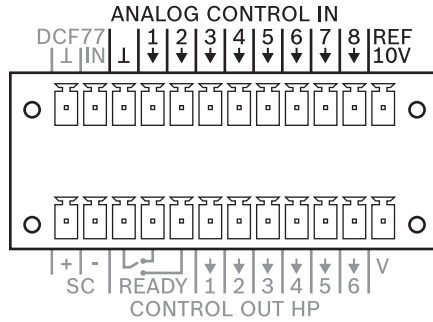
i	**Notice!** The supervised inputs are internally equipped with 8.2 kΩ pull up resistors. The ground pins are equipped with a common self resettable 140 mA fuse.

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.

6.10.2   ANALOG CONTROL IN

The upper half of the control port has eight freely programmable control inputs for voltages of between 0 volts and 10 volts. The inputs are numbered 1 through 8. The controller provides its own voltage supply for externally connected control elements, e.g., a potentiometer. The voltage supply is available at the control port connections for 10V REF and ground; see the following diagram.

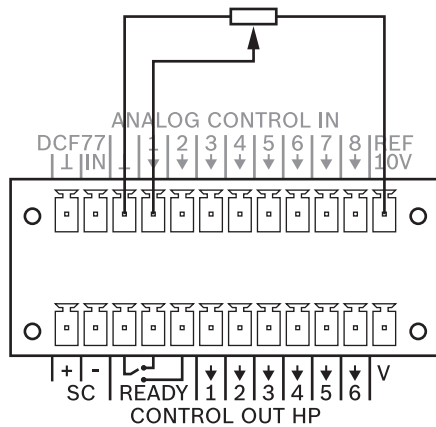**Figure 6.10: Sample application of a control input and use of an analog input signal**

The control inputs can also be used as digital control inputs. Internally, the control inputs are connected to ground via a resistor. If an input is connected to the 10 V REF pin or another, external voltage, the input switches to the active status (On).

⚠ **Caution!**
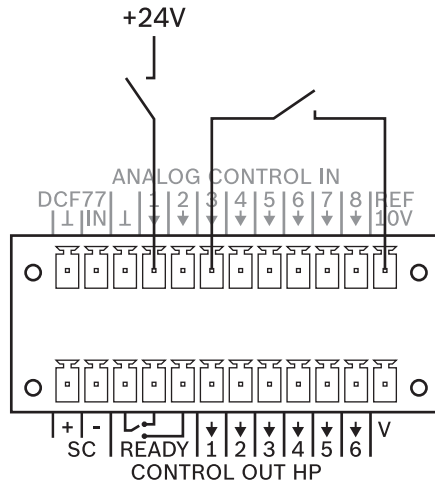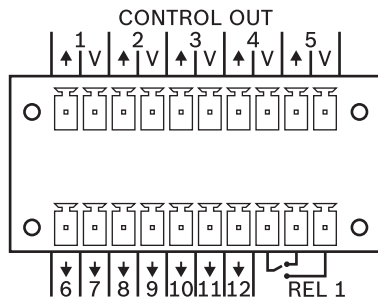
The maximum permissible voltage on a control input is 32 V.

Figure 6.11: Sample application of a control input and use of 2 digital input signals

6.11 Control output

6.11.1 CONTROL OUT

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.
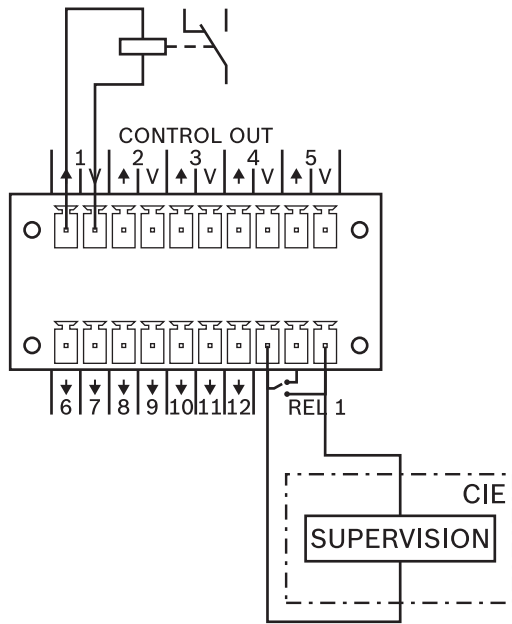
Figure 6.12: Connecting a relay and the supervision contacts of a CIE to the CONTROL OUT port

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.
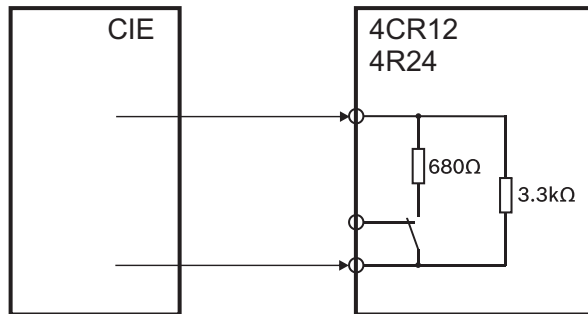
Figure 6.13: Internal configuration of the REL contact (VDE 0833-4)

6.11.2   CONTROL OUT HP
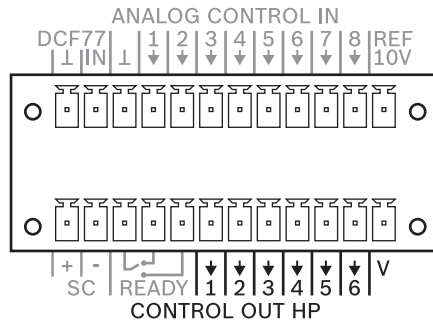
The lower half of the control port has six freely programmable **h**igh **p**ower (HP) control outputs numbered 1 through 6. In inactive mode (Off), these control outputs are open, while in active mode (On), they are closed to ground. To operate the externally connected elements, a voltage source is available on the connection V; see also the following diagram.

Notice!

The voltage value used as the supply voltage for the controller is always present on the V output.

Caution!

The maximum permissible power on the V output is 200 mA.
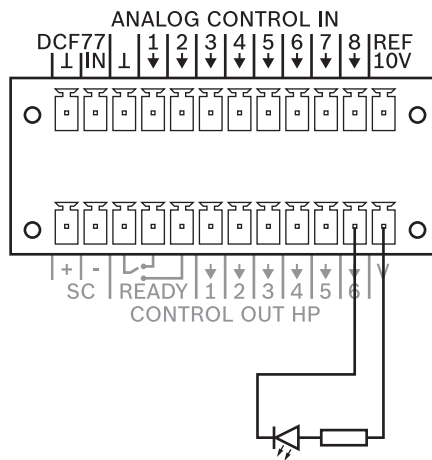
Figure 6.14: Sample application of a high power control output (LED with series resistor)

6.12   RS-232

RS-232

PORT 1

PORT 2
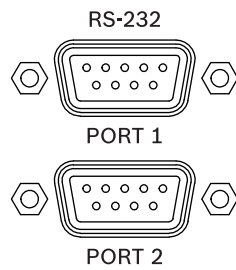
With the RS-232 interface on the rear panel, communication with the PMX-4CR12 is possible via a simple ASCII communication protocol. Thus, the PMX-4CR12 can be connected to a PROMATRIX 4000 system. The cable which is used for the connection should not be longer than 15 meters.

i	**Notice!** Use only PORT 1 for connecting a PROMATRIX 4000 system. PORT 2 is for service only.

7   Configuration

IRIS-Net

IRIS-Net PC software is used to configure and operate the PROMATRIX 6000 system. It enables the overall configuration of the controller and connected devices to be performed off-line using a PC (i.e., without establishing a connection between the PC and controller). The configuration can then be transferred by establishing a connection between the PC and controller via Ethernet. In addition to configurations, IRIS-Net can also be used for comprehensive checking and monitoring of a system. For more information about installing IRIS-Net on your PC, see the file "iris_readme.pdf". During the installation, the IRIS-Net user manual is automatically copied to the PC.

7.1   Network configuration

The controller can be connected to a TCP/IP network via the Ethernet interface on the rear panel. The controller has the following network configuration by default:

Parameter	Value
IP address	192.168.1.100
Subnet mask	255.255.255.0
Gateway	192.168.1.1
DHCP	Disabled

Table 7.1: Factory setting for Ethernet interface

An IP address must be unique, i.e., it must only be assigned to one device (host) in a network. If a new Ethernet is established for operating the controller, we recommend retaining the default network ID and subnet mask. When integrating the controller into an existing Ethernet, the network configuration of the controller must be adjusted. The default IP address of the controller can be retained if
- only one single controller is connected with the default network configuration via Ethernet, and
- the network ID 192.168.1 can be retained, and
- no other device has the host ID 100.

If at least one of these three conditions is not met, the default IP address of the controller must be changed.

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. Please refer to the following table for details.

Baud rate (in kbit/s)	Zone status indicator light of zone 11	Zone status indicator light of zone 12	Network indicator light
10	Off	Off	**On**
20	Off	**On**	Off
62.5	Off	**On**	**On**
125	**On**	Off	Off

Baud rate (in kbit/s)	Zone status indicator light of zone 11	Zone status indicator light of zone 12	Network indicator light
250	**On**	Off	**On**
500	**On**	**On**	Off

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

	Notice!
i	Edit CAN baud rate Use the IRIS-Net software to edit the CAN baud rate.

8   Operation

In accordance with the specified and technical details for this product, the controller can be used to control and monitor a PROMATRIX 6000 public address and voice alarm systems within the building installation.

The controller is not a stand-alone device. The following are the minimum requirements for operation:

1. A mains adapter (24 V) sufficiently configured for the system's power demands.
2. If the device is to be operated with call stations: The required number of call stations (max. 16) and the corresponding connecting cables.
3. If the audio element of the device is to be used: Power amplifier incl. cabling and loudspeaker with cabling.
4. If the internal real-time clock is to be synchronized to the DCF77 time signal: An active DCF77 reception antenna incl. cabling. (This feature can be used only in regions in which the DCF77 signal can be received with sufficient strength, or if converters from different time information to DCF77 are used.)
5. If slave clocks are to be controlled: The required number of slave clocks incl. cabling
6. If additional line relays and/or control inputs or outputs are to be used: A router and the corresponding connecting cables.

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 PMX-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% ± 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 EOL 8001 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.
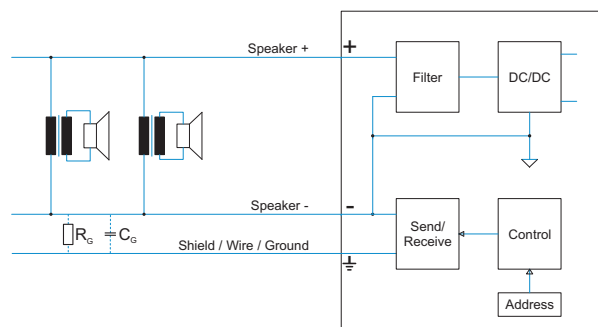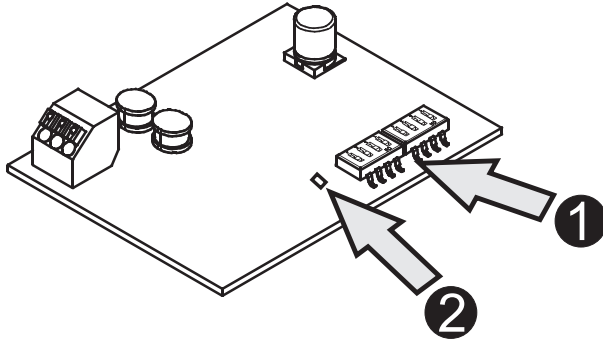

Figure 8.1: Circuit diagram (R_G and C_G are caused by the loudspeaker installation, e.g. wire type, length)

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 EOL 8001.

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

Firmware update

IRIS-Net can be used to update the firmware of the controller, please refer to the IRIS-Net documentation.

> **Warning!**
>
> Risk of explosion if battery is not replaced correctly. Must be replaced only with the same or equivalent type of battery.

10   Technical data

PMX-4CR12 Controller	PROMATRIX 6000 controller including signal processing, routing, system control and supervision
Audio	8 audio inputs, 4 audio outputs
Safety/redundancy	Internal supervision, system monitoring, watchdog, fault output
PC configuration and control software	• Configuration Wizard: Easy system configuration. • IRIS-Net: Integration of controller, amplifiers, call stations, routers and peripheral control; configuration, control, and supervision for complete audio systems; programmable user control panels and access levels. • Hot Swapper (included in IRIS-Net package): Easy updating of messages during runtime.
Frequency response (ref. 1 kHz)	20 Hz to 20 kHz (-0.5 dB)
Signal-to-noise ratio (A-weighted)	Line in to line out: 106 dB typical
THD+N	< 0.05%
Crosstalk (line level)	Line in to line out (0 dB gain): < 100 dB at 1 kHz
Sample rate	48 kHz
DSP processing resolution	24-bit linear A/D and D/A conversion, 48-bit processing
Audio inputs (microphone/line level)	MIC/LINE: 2 × 3-pin port, electronically symmetric AUX: 2 × Stereo RCA
• Input level (nominal)	MIC/LINE: 15 dBu AUX: 9 dBu
• Input level (max. before clip)	MIC/LINE: 18 dBu AUX: 12 dBu
• Input impedances	MIC/LINE: 2.2 kΩ AUX: 8 kΩ
• Common mode rejection	MIC/LINE: > 50 dB
• Phantom power, switchable	MIC/LINE: 48 V DC
• A/D conversion	24 Bit, Sigma-Delta, 128 times oversampling
Audio inputs (100 V)	AMP IN: 2 × 6-pin port
• Max. voltage	120 V

• Max. current	7.2 A
• Max. power	500 W
Audio outputs (line level)	LINE OUT: 1 x RJ-45, 4 x 3-pin port
• Output level (nominal)	6 dBu
• Output level (max. before clip)	9 dBu
• Output impedance	<50 Ω
• Min. load impedance	400 Ω
• D/A conversion	24 Bit, Sigma-Delta, 128 times oversampling
Audio outputs (100 V)	SPEAKER OUT: 2 × 12-pin port
• Max. voltage	120 V_{eff}
• Max. current	7.2 A
• Max. power	500 W
• Crosstalk (100 V)	AMP IN to SPEAKER OUT: < 100 dB at 1 kHz with 1 kΩ load
Call station bus (CST)	4 × integrated power+CAN+audio interface, RJ-45
• Power	+24 V DC, electronic fuse
• CAN	10, 20 or 62.5 kbit/s
• Audio	electronically symmetric
• Max. length	1000 m
ANALOG CONTROL IN	1 × 12-pin port
• Control inputs	• 8 (analog 0-10 V/logic control; low: U ≤ 5 V DC; high: U ≥ 10 V DC; U_{max} = 32 V DC)
• Reference outputs	• +10 V, 100 mA • GND
• Time sync input	1 (DCF-77 receiver)
CONTROL OUT HP	1 × 12-pin port
• Control outputs	• 6 High Power outputs (open collector, U_{max} = 32 V, I_{max} = 1 A)
• Reference output V	• +24 V, I_{max} = 200 mA
• Ready/fault output	1 (NO/NC relay contacts, U_{max} = 32 V, I_{max}= 1 A)
• Slave clock output	1 (24 V DC, max. 1 A)
CONTROL IN	2 × 10-pin port

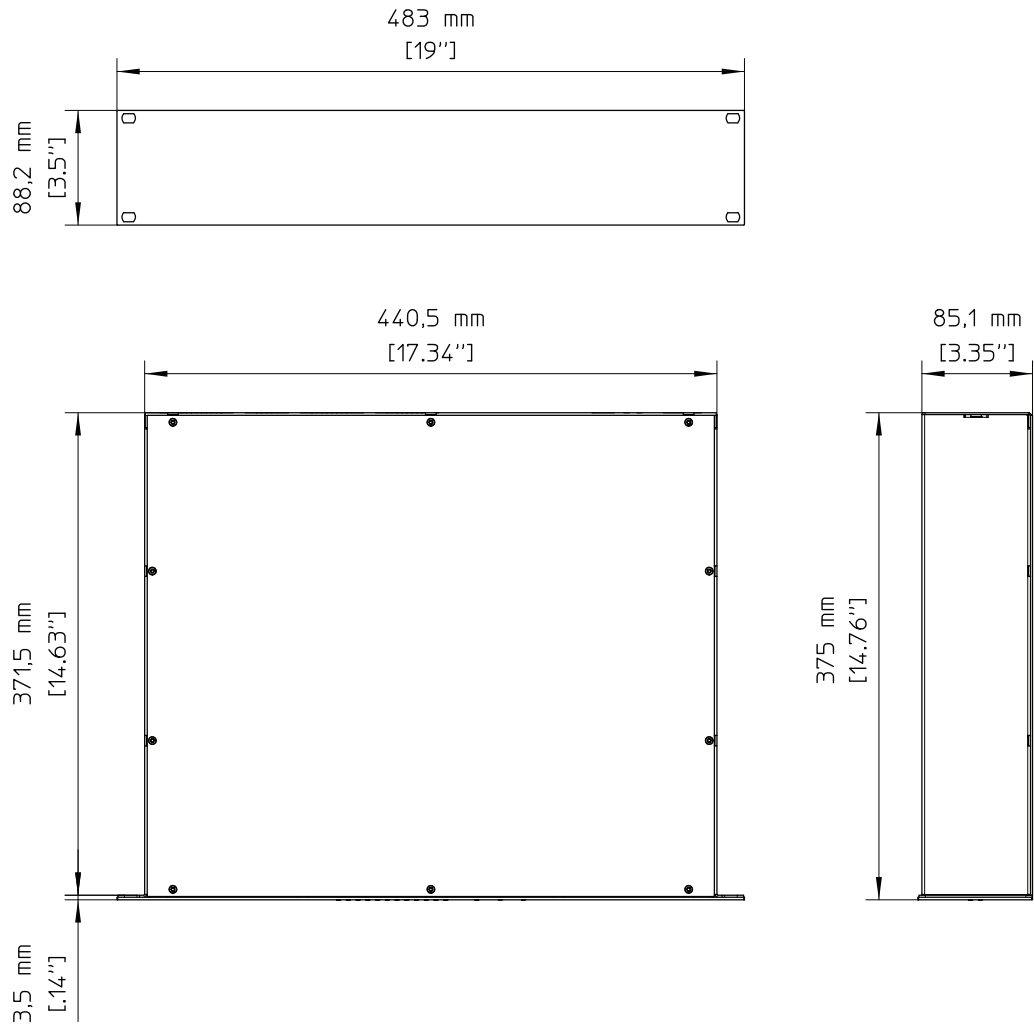|	
• Control inputs	• 5 supervised inputs (0–24 V, U_{max} = 32 V) • 5 isolated inputs (low: U ≤ 5 V DC; high: U ≥ 10 V DC;, U_{max} = 32 V)
CONTROL OUT	2 × 10-pin port
• Control outputs	12 Low Power outputs (open collector, U_{max} = 32 V, I_{max} = 40 mA)
• Control relay	1 (NO/NC relay contacts, U_{max} = 32 V, I_{max}= 1 A)
Interfaces	
• Ethernet	1 × RJ-45, 10/100 MB (for PC connection)
• CAN BUS port	2 × RJ-45, 10 to 500 kbit/s (for amplifier, router connection)
• RS-232	2 × 9-pin DSUB (port 1 for PROMATRIX 4000, port 2 for service only)
DC power input	21–32 V DC
Power consumption	10 to 250 W
Operating temperature	-5 °C to +45 °C
Electromagnetic environment	E1, E2, E3
Product dimensions (Width × Height × Depth)	19", 2 HU, 483 × 88.2 × 375 mm
Net weight	8.0 kg
Shipping weight	9.5 kg

10.1   Standards

The device meets the following standards (as of February 2015):
- IEC 60065
- EN 61000-6-3
- EN 50130-4
- EN 60945
- EN 60950

10.2   Dimensions