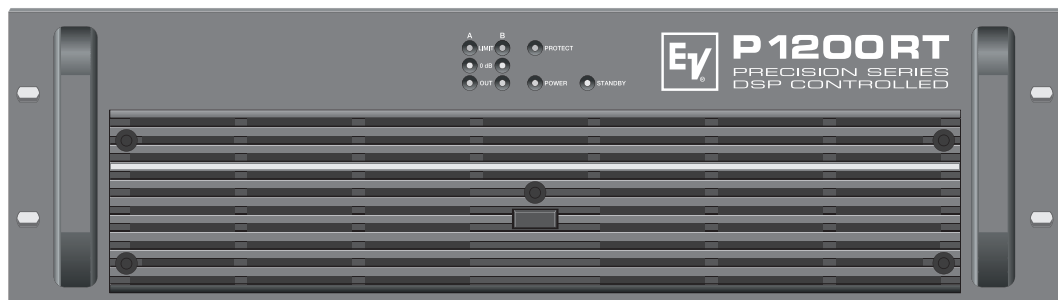
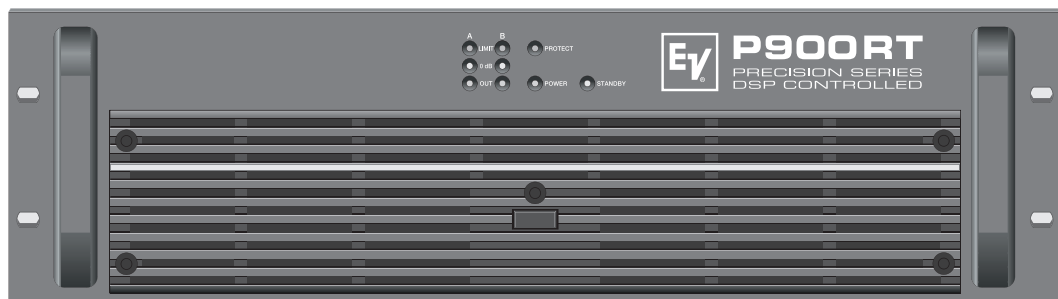




Electro-Voice®

OWNER'S MANUAL
BEDIENUNGSANLEITUNG



P900RT
P1200RT
PRECISION SERIES
DSP CONTROLLED

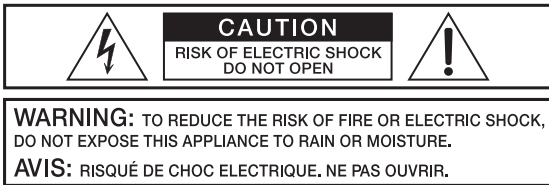
CONTENTS

IMPORTANT SAFETY INSTRUCTIONS	3
IMPORTANT SERVICE INSTRUCTIONS	3
DESCRIPTION	4
UNPACKING & WARRANTY	5
INSTALLATION NOTES	5
FRONT VIEW	6
REAR VIEW	7
INPUT A / INPUT B	7
PARALLEL CONNECTION	7
DSP OUT	7
CONTROL PORT	7
RS-232 INTERFACE	8
ADDRESS	8
REMOTE CAN-BUS	8
EASY REMOTE	9
POWER AMP OUTPUT	9
OUTPUT VOLTAGE CONFIGURATION	10
GROUND-LIFT SWITCH	10
MAINS INPUT	10
CABLING	11
LF-CONNECTION CORDS	10
REMOTE CONTROL NETWORK	11
NETWORK EXAMPLES	12
CAN-BUS	14
MAINS OPERATION & RESULTING TEMP	15
SPECIFICATIONS / TECHNISCHE DATEN	32
BLOCK DIAGRAM AMPLIFIER	34
BLOCK DIAGRAM RCM-24	35
DIMENSIONS / ABMESSUNGEN	36

INHALT

WICHTIGE SICHERHEITSHINWEISE	19
WICHTIGE SERVICEHINWEISE	19
BESCHREIBUNG	20
AUSPACKEN & GARANTIE	21
INSTALLATIONSHINWEISE	21
FRONTSEITE	22
RÜCKSEITE	23
INPUT A / INPUT B	23
PARALLEL	23
DSP OUT	23
CONTROL PORT	23
RS-232 INTERFACE	24
ADDRESS	24
REMOTE CAN-BUS	24
EASY REMOTE	25
ENDSTUFENAUSGÄNGE	25
KONFG. DER AUSGANGSSPANNUNG	26
GROUND-LIFT SCHALTER	26
NETZEINGANG	26
VERKABELUNG	27
NF-VERBINDUNGSKABEL	27
REMOTE CONTROL NETZWERK	27
NETZWERK-BEISPIELE	28
CAN-BUS	30
LEITUNGSSPEZIFIKATIONEN	30
NETZBETRIEB & WÄRMEENTWICKLUNG	31
SPECIFICATIONS / TECHNISCHE DATEN	32
BLOCK DIAGRAM AMPLIFIER	34
BLOCK DIAGRAM RCM-24	35
ABMESSUNGEN	36

IMPORTANT SAFETY INSTRUCTIONS



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated „dangerous voltage“ within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water. Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on this apparatus.
6. Clean only with a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Only use attachments/accessories specified by the manufacturer.
10. 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
11. To completely disconnect mains power from this apparatus, the power supply cord must be unplugged.

For US and CANADA only:

Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

IMPORTANT SERVICE INSTRUCTIONS

CAUTION: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

1. Security regulations as stated in the EN 60065 (VDE 0860 / IEC 65) and the CSA E65 - 94 have to be obeyed when servicing the appliance
2. Use of a mains separator transformer is mandatory during maintenance while the appliance is opened, needs to be operated and is connected to the mains
3. Switch off the power before retrofitting any extensions, changing the mains voltage or the output voltage.
4. The minimum distance between parts carrying mains voltage and any accessible metal piece (metal enclosure), respectively between the mains poles has to be 3 mm and needs to be minded at all times. The minimum distance between parts carrying mains voltage and any switches or breakers that are not connected to the mains (secondary parts) has to be 6 mm and needs to be minded at all times.
5. Replacing special components that are marked in the circuit diagram using the security symbol (Note) is only permissible when using original parts.
6. Altering the circuitry without prior consent or advice is not legitimate.
7. Any work security regulations that are applicable at the location where the appliance is being serviced have to be strictly obeyed. This applies also to any regulations about the work place itself.
8. All instructions concerning the handling of MOS - circuits have to be observed.

NOTE:

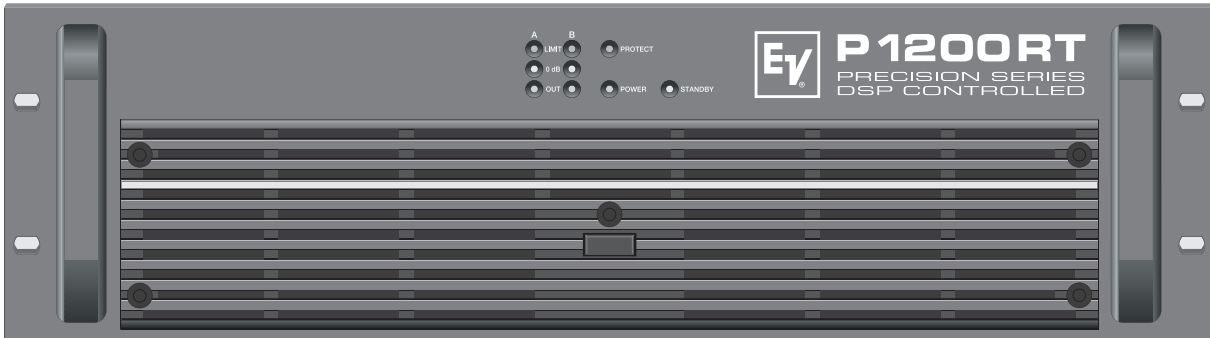


SAFETY COMPONENT (MUST BE REPLACED BY ORIGINAL PART)

DESCRIPTION

Congratulations! With buying an Electro-Voice PRECISION SERIES power amplifier you have chosen an appliance that employs the most advanced technology.

P-Series power amps combine outstanding audio performance, highest reliability and operational stability. Each power amplifier employs an RCM-24 Remote Control module allowing centralized configuration, control and monitoring of all relevant power amp parameters (like output current, output voltage, load impedance, etc.).



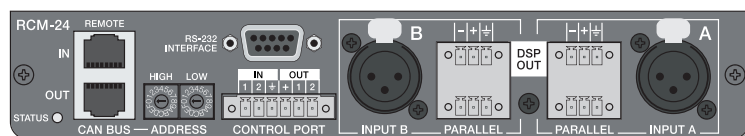
The power amplifiers employ two high-performance output transformers each and offer floating loudspeaker outputs.

The gapless protection circuitry concept not only prevents the power amp itself but also the connected loudspeaker systems from being damaged. These extensive protections include Dynamic Audio Limiters, DC/HF-Protections, Back-EMF-Protection, Inrush Current Limiter, Short Circuit Protection and of course Thermal Overload Protection for the output transistors and mains transformers.

Three-speed high performance fans guarantee outstanding thermal stability at absolute low running noise. The ventilation is directed front-to-rear allowing trouble-free operation even in smaller amp-racks.

Comprehensively dimensioned power supply units with low-leakage toroidal transformers provide extensive headroom far above the stated nominal power.

The RCM-24 provides full-size overview of the system's entire status and control over all relevant system parameters at any time. The RCM-24 module allows integration into a Remote



Control Network consisting of up to 250 power amps. The Windows Software IRIS – Intelligent Remote & Integrated Supervision – allows controlling and monitoring an entire PA-system from a single or several PCs. Any operational status like initial power-on status, temperature, modulation, limiting, activation of protections, deviation in the load impedance, etc., are centrally registered and displayed, which provides the opportunity to take specific measures prior to the occurrence of critical operational states. Programming an automatic response for exceeding or falling below specific limits is possible as well. All parameters, e.g. power-on/off, levels, muting, filters, etc. can be controlled in real-time and saved in any power amp

Monitoring the connected loudspeaker systems is performed through measuring output currents and –voltages of the two power amplifier channels. Each time the signal falls below or exceeds set limit values is immediately indicated and logged, thus detecting and indicating short circuits and line interruption during normal operation. The integrated impedance test function allows more precise checking the connected loudspeaker systems. The integrated signal generator is employed together with the current/voltage testing to measure the connected loudspeakers' and cable's impedance plus over the entire frequency range. The resulting impedance graph is displayed on the PC-screen. Comparing the measured impedance progression to a reference value is possible at all times, which allows recognizing even the slightest loudspeaker defects or irregularities.

Next to controlling and monitoring, the RCM-24 Remote Control module provides comprehensive signal processing functions. It includes a total of 20 parametric filter-, X-over functions, delays, routing and level control as well as compressors and limiters per channel. All parameters can be freely edited and stored in the module's 8 user presets. Independent from network control all DSP-settings (filter, delay, level) are maintained in case of failure. Additionally, the control inputs of the power amps can be used for network-independent switching to another preset (e.g. alarm settings with maximum energy for voice and text announcements). Therefore, P-Series amps with RCM-24 modules installed fulfil even the highest safety requirements.

When designing the RCM-24, uncompromising audio quality was the highest maxim. AD/DA-conversion is performed at a resolution of 24-bit and 128-times oversampling with linear phase; the internal word length is 48 bits. With this the RCM-24's dynamic range reaches 115 dB, which is an absolute peak value for digital audio appliances.

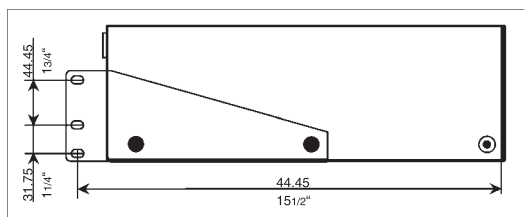
All configuration, control and monitoring details of P-Series power amps are explained in the documentation accompanying the PC Windows software IRIS.

UNPACKING & WARRANTY

Carefully open the packaging and take out the power amplifier. Next to the power amplifier itself, the package also includes this owner's manual, a mains cord, the warranty certificate, four stand-feet, six screw-on connectors (1x 2-pole, 4x 3-pole, 1x 6-pole) plus a set of rack shelf mounting adapters. Please inspect carefully whether all information in the warranty certificate has been filled in completely, since only a completely filled in warranty certificate entitles you to stake any warranty claims. The appliance comes with a 36 months warranty, starting with the date when receiving the good from your dealer.

INSTALLATION NOTES

Generally, installing or mounting power amps should be carried out in a way that guarantees continuously unopposed front-to-rear air circulation. When including an appliance in a closed cabinet or rack shelf system make sure to provide sufficient ventilation. Leave a gap of at least 60mm x 330mm (up to the cabinet's top ventilation louvers) for air circulation between the rear of the power amplifier and the cabinet's/rack's rear wall. Make sure to leave at least 100mm of space above the cabinet or rack shelf system. Since the temperature inside of the cabinet or rack shelf system can easily rise up to 40°C during operation, bearing in mind the maximally allowable environmental temperature during operation for all other appliances installed in the same rack shelf system is mandatory. (also refer to "MAINS OPERATION & RESULTING TEMPERATURE")

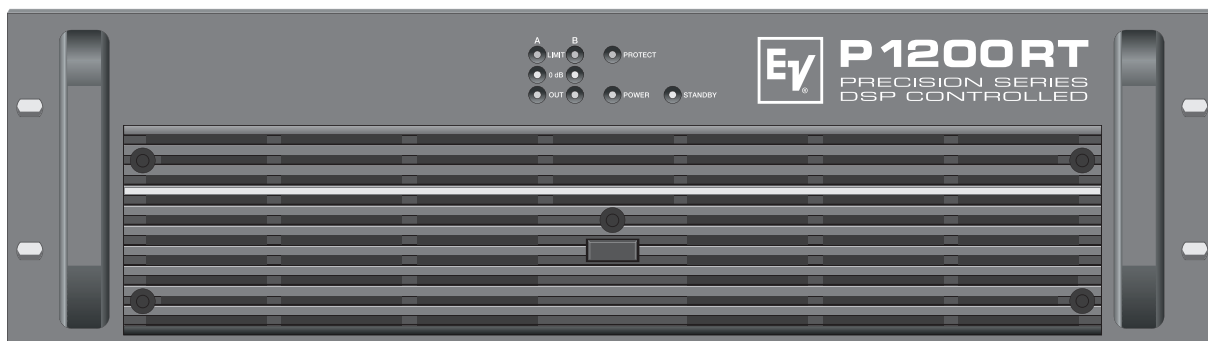


The use of rails or optionally available rack adapters – NRS 90235 (112733) – is mandatory as well when installing the appliance in a rack shelf system to prevent the front panel from bending.

Caution: For problem-free operation exceeding the maximally allowable environmental temperature or +40°C is not permissible.

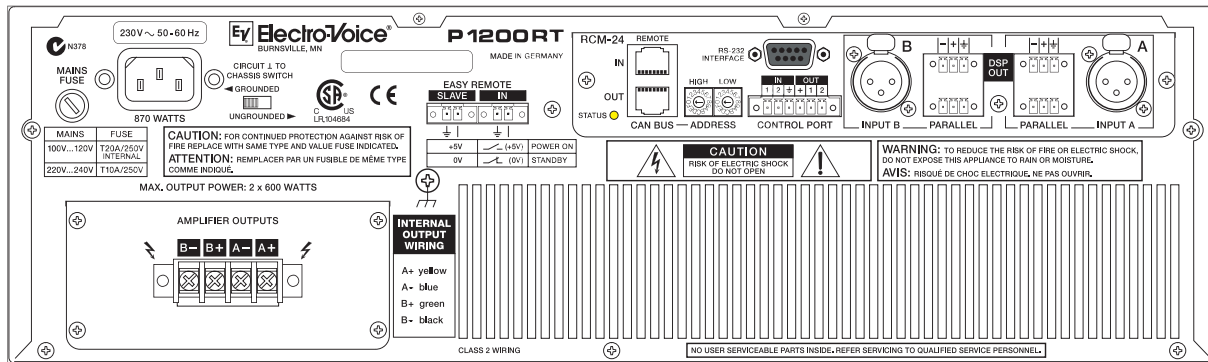
The power amplifier has to be protected against: dripping or splashing water, direct sunlight, high temperatures or direct influence of heat sources, high humidity, extensive dust and vibrations. Condensation on internal parts may occur after transporting the power amplifier from a cold into a warmer environment. In that case operation is only permissible after the appliance has gained the new temperature (after approximately one hour). If foreign objects or liquids have entered the power amplifier's enclosure make sure to instantly separate the appliance from the mains power and contact an authorised DYNACORD service centre for inspection before continuing operation. Do not use any sprays or solvents for cleaning the appliance, because they might severely damage the surface of the enclosure or lead to dangerous fire hazard.

FRONT VIEW

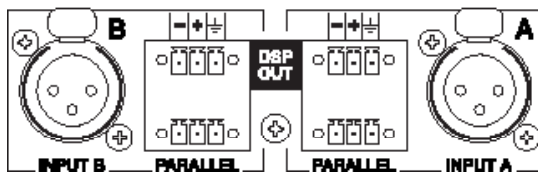


Use the **POWER switch** located in the centre of the front panel to switch the appliance's power on. The soft-start function prevents current inrush peaks on the mains, which in addition prevents the mains line protection switch from activating during power-on operation of the power amplifier. The loudspeaker outputs are activated via relay switching with a delay of approximately 2 seconds effectively attenuating eventual power-on noise. The PROTECT LED lights during the delay time and the fans run at maximum speed. This is normal to confirm the immaculate operation of the protection circuitry. Upon power-on, all power amps with RCM-24 Module installed regain the state of operation prior to the last power-off. For example: if a power amplifier had been switched off using the POWER-switch while being in Stand-by mode, upon power-on it restarts in this exact mode.

- POWER** This indicator lights when the power amplifier has been switched on. Causes for the POWER-indicator not lighting are: the appliance is not connected to the mains network, a defective primary fuse, or the power amplifier is set to stand-by operation (STAND-BY LED lights).
- STANDBY** **This indicator light when the power amplifier is in stand-by mode, which can be activated from the RCM-24 or via Easy Remote. In stand-by operation only the internal auxiliary power supply unit is activated. The main power supply unit is separated from the mains.**
- PROTECT** The PROTECT LED lights indicating that one of the internal protection circuits against thermal overload, short-circuit, Back-EMF, HF-occurrence at the output, etc., has been activated. In that case, the output relays separate the power amps from the load connected to prevent the connected loudspeaker systems and the power amplifiers as well from being damaged. Whatever caused the fault – e.g. a short-circuited speaker cable – **needs to be remedied. In case of thermal overload you have to wait until the power amplifier automatically regains normal operation.**
- OUT** The OUT LED lights as soon as an audio signal of approximately 30dB below full modulation is present. The LED is dimmed when speaker cables are short-circuited or a protection circuit has been activated.
- 0 dB** The 0dB LED lights when the power amplifier is driven at its maximum. Higher input voltage does not result in higher peak output voltage.
- LIMIT** This indicator lights as soon as the integrated dynamic limiter is activated and the power amplifier is driven at the clipping limit or generally at its maximum capacity. Short-term blinking is not a problem, since the internal limiter trims input levels of up to +21dBu down to a S/N-ratio of approximately 1%. If, on the other hand, this LED lights constantly, reducing the volume is recommended to prevent the loudspeaker systems connected from being damaged by probable overload.



INPUT A / INPUT B



The inputs INPUT A & INPUT B are electronically balanced offering an input sensitivity of +6dBu (1.55 V) for direct connection of mixing consoles, etc. Connection can be established via the XLR-type input connectors or the supplied screw-on connectors, which are connected in parallel. The pin-assignment of the XLR-type input connectors is according to the

IEC 268 standard. In case floating inputs are needed, retrofitting optionally available input transformers is possible. One extension-kit NRS 90208 (Order-No. 121 641) per channel is needed.

PARALLEL CONNECTION

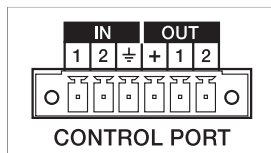
Connection can be established via the XLR-type input connectors INPUT A / INPUT B or the supplied screw-on connectors which are connected in parallel. In addition, using the PARALLEL-connectors provides the possibility of connecting the input signal through to feed additional power amplifiers, without the need for extra splitter-cables.

DSP OUT

The DSP output signal – i.e. the post-digital-signal-processing-unit audio signal – is present at the DSP OUT. The DSP output signal is simultaneously fed to the power amplifier output stage and is correspondingly amplified present at the power amp’s main outputs.

The DSP OUT can be utilized for feeding the digitally processed audio signal from the RCM-24 Remote Control Module to additional power amplifiers (without DSP-module); e.g. for increasing the overall output power. With a nominal level of +6dBu and a maximum level of +21dBu (8.7V) the output signal is electronically balanced. Output impedance is 100 Ω.

CONTROL PORT



The CONTROL PORT offers two freely programmable control inputs and control outputs as well as the reference connections for ground potential and +5V. Using the PC Windows software IRIS, the control inputs can be configured and serve for instance for Power-On / Stand-by switching, preset switching or parameter control.

The two control contacts IN1 / IN2 are internally set to +5V (open) via pull-up resistors. Activating the control inputs is possible by closing the contacts to ground potential (pin 3) via external switches, pushbuttons or relays.

The two control outputs OUT1 / OUT2 are carried out as Open Collector Outputs. In non-active state (Off) they provide high ohmic resistance. In the active state (On) these outputs are connected to ground. The outputs serve for signalling internal operational states. They can be used for the direct triggering of LEDs, indication lights or relays. The +5V reference connector provides power supply for externally connected appliances with amperage of maximally 100mA. The control outputs allow signal indication of operational states (critical temperature, exceeding or decline of defined limit values, faults, etc.) at central operator desks or to other systems (fire alarm system, general alert system) even without PC. For further detail about configuring the control ports, please refer to the documentation accompanying the IRIS software.

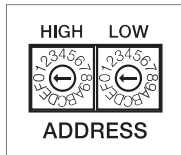
REAR VIEW

RS-232 INTERFACE



The RS-232 interface is for connecting media control systems as well as building management systems providing control and monitoring of all parameters. Communication is established via an easily implemented ASCII-protocol allowing trouble-free integration of Remote Amplifiers in media and touch panel control systems. For a programmer's guide and complete protocol description, please refer to the documentation accompanying the IRIS software.

ADDRESS



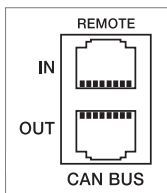
The address selection switch allows setting the amplifier's network address, which, within a CAN-network, can range from 01 to 250 (FA hex). Caution: Each address may exist only once within a network. Otherwise network conflicts might occur. Address setting has to be performed in hexadecimal code. The selection switch LOW represents the low-value digit while the HIGH-switch represents the high-value digit.

Address-Table:

HIGH	LOW	Adress	HIGH	LOW	Adress
0	0	Stand-alone	8	0 ... F	128 ... 143
0	1 ... F	1 ... 15	9	0 ... F	144 ... 159
1	0 ... F	16 ... 31	A	0 ... F	160 ... 175
2	0 ... F	32 ... 47	B	0 ... F	176 ... 191
3	0 ... F	48 ... 63	C	0 ... F	192 ... 207
4	0 ... F	64 ... 79	D	0 ... F	208 ... 223
5	0 ... F	80 ... 95	E	0 ... F	224 ... 239
6	0 ... F	96 ... 111	F	0 ... A	240 ... 250
7	0 ... F	112 ... 127	F	B ... F	reserved

Address 0 (00 hex, factory-pre-set) ensures that the amplifier is separated from the remote communication, so that it does not appear in the system set-up even though it might be connected to the CAN-bus. When the amplifier is powered-on with its address set to "0", all internal parameters are set to "0" respectively to bypass and the routing is set to 2-in-2. In that case the amplifier behaves absolutely linear, i.e. signal processing is deactivated.

REMOTE CAN BUS

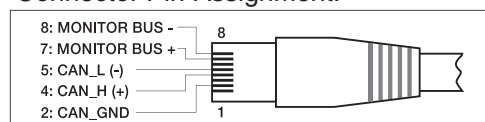


Each amplifier employs two RJ-45 sockets for Remote CAN-bus connection. The sockets are parallel connected and serve as input as well as for connecting through of the Remote network. Common RJ-45 patch cables can be used for rack-shelf cabling. The CAN-bus needs to be terminated at both ends using a 120ohms termination plug.

Detailed guidelines concerning cabling and bus length are provided in the chapter "REMOTE CONTROL NETWORK".

Both RJ-45 sockets additionally carry the balanced audio monitor signal. The nominal output level is +6dBu (1.55V) while the maximum output level is +21dBu (8.7V).

Connector Pin-Assignment:



(Connector Pin-Assignment:)

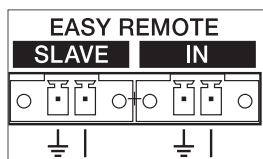
STATUS

The STATUS LED provides optical indication of CAN-bus traffic. When the power amplifier's address is set to "00" so that it is separated from the CAN-bus, the STATUS LED blinks every 3 seconds.

As soon as CAN-bus communication is recognized, the LED is activated for at least 100ms whenever the power amplifier actively sends data on the CAN-bus.

The STATUS LED may also be activated from the PC. In this case, the LED of the according power amplifier blinks fast and steady while all other status-LEDs within the system stay dimmed.

EASY REMOTE



Easy Remote provides a simple way to remotely power-on/off the power amplifier. The Easy Remote function is only useful for appliances not employing a RCM-24 Module. Controlling appliances with RCM-24 Module installed per Easy Remote is practically pointless.

EASY REMOTE IN

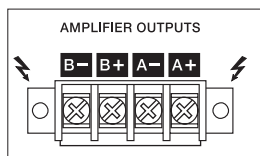
Leaving the pins of the EASY REMOTE IN socket open, i.e. when connecting +5V, the appliance power is switched on. When connecting the EASY REMOTE IN, i.e. when feeding 0V from the control output, the appliance enters standby mode.

EASY REMOTE SLAVE

The EASY REMOTE SLAVE connector provides connection for additional appliances with Easy-Remote function (e.g. for switching several devices within a rack-shelf ON/OFF).

The switching of the slave-units is delayed to prevent the mains fuses from blowing.

POWER AMPLIFIER OUTPUTS



4-pole binding-post terminals are provided for the power amplifier channels „A“ and „B“. Two integrated audio output transformers convert the power amp's nominal output voltage to 100V or 70V respectively. Depending on the configuration, the corresponding output voltage is present at the floating output terminals.

The maximum amount of connected loudspeaker systems is reached when the loudspeaker network's total power consumption equals the power amplifier's nominal output capacity, without exceeding the power amp's nominal load impedance.

For further information on nominal output capacity and nominal load impedance, please refer to the "SPECIFICATIONS".

Caution: During operation the binding-post terminals might carry high voltages. Therefore, installing the loudspeaker network has to be in accordance with applicable safety regulations. Installation has to be carried out by accordingly trained professionals only.

When installing and operating 100V PA-systems obeying the VDE-regulation DIN VDE 0800 is mandatory.

Especially when 100V alarm PA-system installations are concerned, safety measures have to be in accordance with rating class 3. Before operating the power amplifier closing the coverlid attached to the terminal strip is mandatory.

REAR VIEW

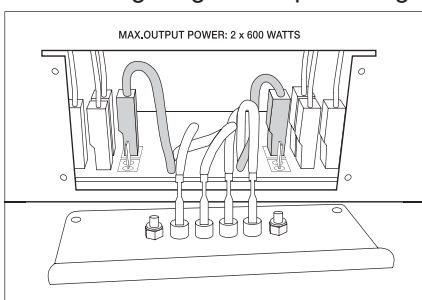
OUTPUT VOLTAGE CONFIGURATION

The power amplifier's output voltage is factory pre-set to the corresponding voltage setting for loudspeaker networks as they are usually used in the specific country of shipment. Changing this setting takes only little effort.

Mains Voltage	Factory Pre-Set
220V, 230V, 240V	100V Output Voltage
100V, 120V	70V Output Voltage

Caution: Opening the appliance is necessary to reconfigure the output voltage setting. Therefore, only trained personnel may perform reconfiguration. Before changing the configuration the power amplifier has to be separated from the mains through pulling the mains plug.

For reconfiguring the output voltage, please proceed as follows:

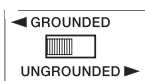


- Disconnect any cables connected to the appliance; especially the mains cord.
- Remove all fixing screws of the output connectors panel.
- Pull out the panel by holding it at the terminal strips (see diagram).
- The connector pins 100V and 70V are for selecting the desired output voltage for channel A (right channel) & B (left channel).
- Change the output voltage by pulling the corresponding connector (grey shaded in the diagram) and inserting it to the connector pin for the desired voltage setting.
- The diagram shows the configuration with both channels set to 70V.

For the RCM-24 Module to be able to assign the corresponding currents and voltages, the appliance needs to be modified as follows:

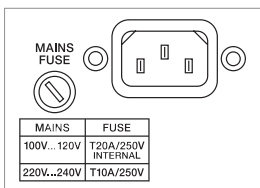
- Remove all screws securing the cover plate.
- Remove the plastic screw in the top plate.
- Open the appliance by removing the cover.
- On the printed board assembly 86276:
 - for 100V output voltage: close the bridge R56
 - for 70V output voltage: open the bridge R56
- Proceed in reverse order to reassemble the appliance.

GROUND-LIFT SWITCH



The ground-lift switch allows eliminating noise loops. If the power amplifier is operated together with other equipment in a 19" rack-shelf, setting the switch to its GROUNDED position is recommended. If the power amplifier is operated together with appliances with differing ground potentials, setting the switch to its UNGROUNDED position is recommended.

MAINS INPUT



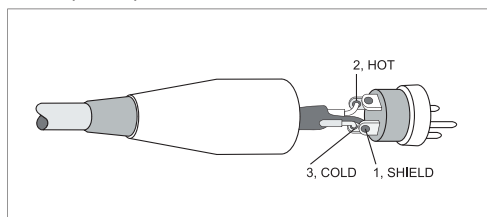
Under normal circumstances, the mains fuse only blows in case of fault. Replacing the fuse is only permissible when using a new fuse of the same type with identical amperage, voltage and blow characteristics. If the mains fuse blows more often, please contact an authorized service centre.

LF-CONNECTION CORDS

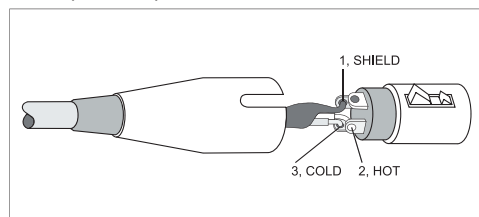
Choosing balanced cables (two conductors for the audio signal plus separate shielding mesh) with XLR-type connectors is recommended for LF-signal connection. Although connecting unbalanced cables to the power amplifier inputs is possible as well, using balanced cabling is always preferable. A great number of today's audio appliances employ balanced outputs. With balanced cabling, the shield connects all metal enclosure parts and thus efficiently eliminates the introduction of noise and hum.

XLR-type connector pin-assignment

XLR (male)



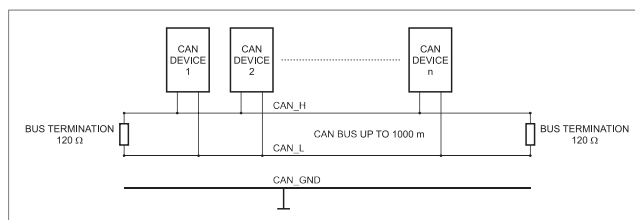
XLR (female)



REMOTE CONTROL NETWORK

The network of the remote power amps is based on the CAN-bus standard, which for years is especially popular in automotive, industrial and security applications. The CAN-bus is a balanced serial interface for command and data transmission. Controlling the power amplifiers is performed from a PC with IRIS – Intelligent Remote & Integrated Supervision – software installed. The UCC1 USB-CAN Converter serves as interface between the PC and the CAN-bus. Connecting up to 100 power amplifiers per CAN-Bus with a maximum total cable length of 1,000 meters is possible. An additional CAN-bus is needed for controlling more than 100 power amps while the IRIS software allows administering a total of 250 power amps.

The network topology used by the CAN-bus is based on the so-called “bus or line topology”, i.e. all participants are connected via a single two-wire cable (Twisted-Pair cable, shielded or unshielded) with the cabling running from one participant on the bus to the next, allowing unlimited communication among all appliances. In general, it does not matter whether a participant on the bus is a power amplifier



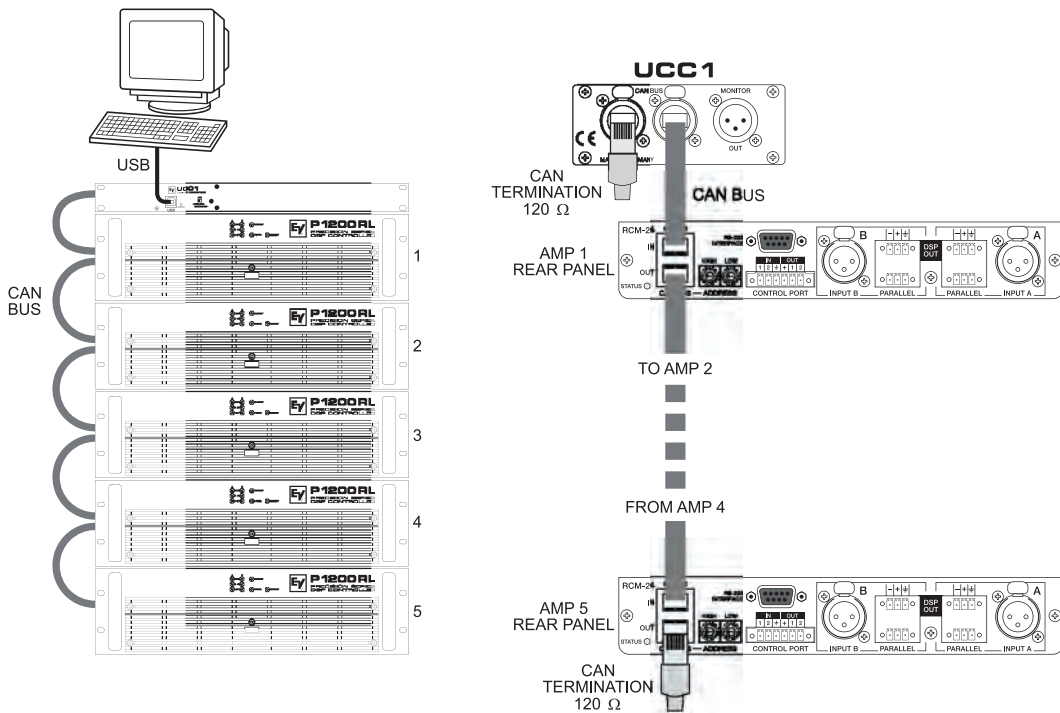
or an UCC1 USB-CAN converter, so that both – UCC1 and the PC as well – can be inserted at any position. Incorporating several UCC1 and PCs on a single CAN-bus is also possible. A total of up to 100 appliances can be operated on a single CAN-bus. Since the CAN-interfaces of all appliances are galvanically separated from the rest of the

circuitry, network cabling also carries a common ground conductor (CAN_GND) ensuring that all CAN-interfaces in the network are connected to a common ground potential. The UCC1 provides the possibility for switching the CAN-ground to circuit-ground.

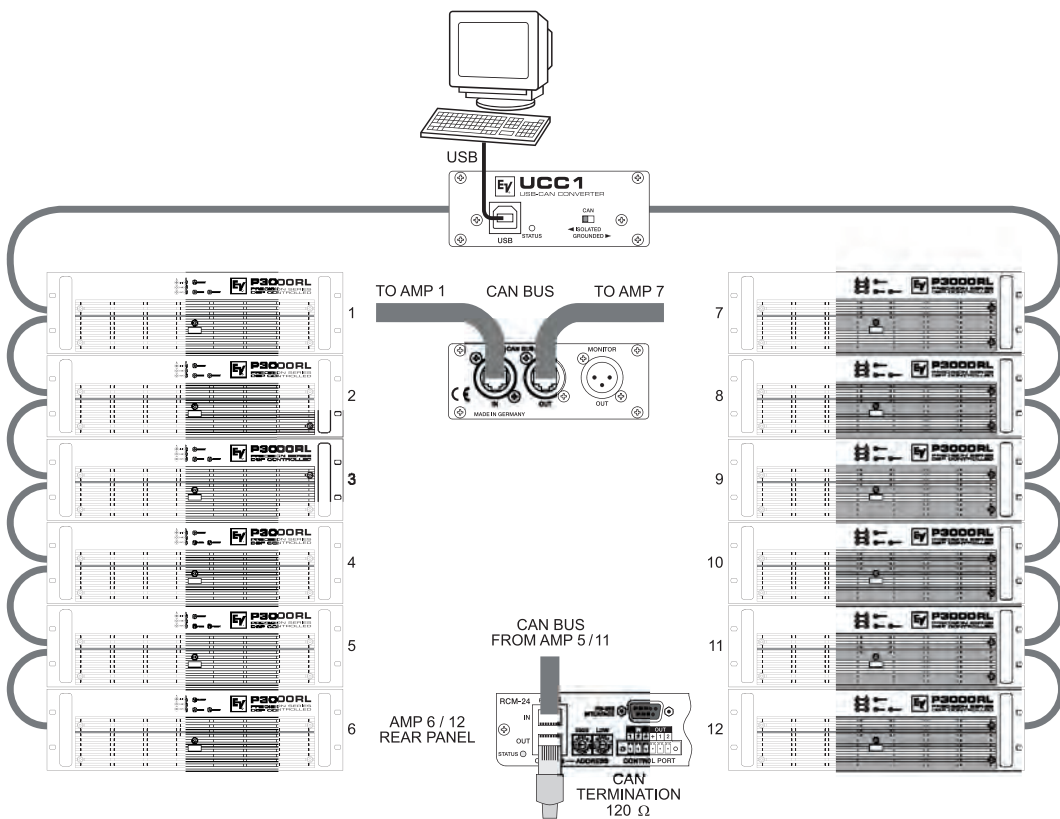
Each participant on the bus system has two RJ-45 connectors for the Remote CAN-bus. These sockets are connected in parallel to serve as input and output (for connecting through) for the data transfer within the remote-network. The CAN-bus has to be terminated at both ends using 120Ω terminator plugs, two of which – CAN-TERM 120Ω – are supplied with the UCC1. Connect one of these to the RJ-45 socket of the first and the other to the socket of the last appliance on the CAN-bus.

NETWORK-EXAMPLES

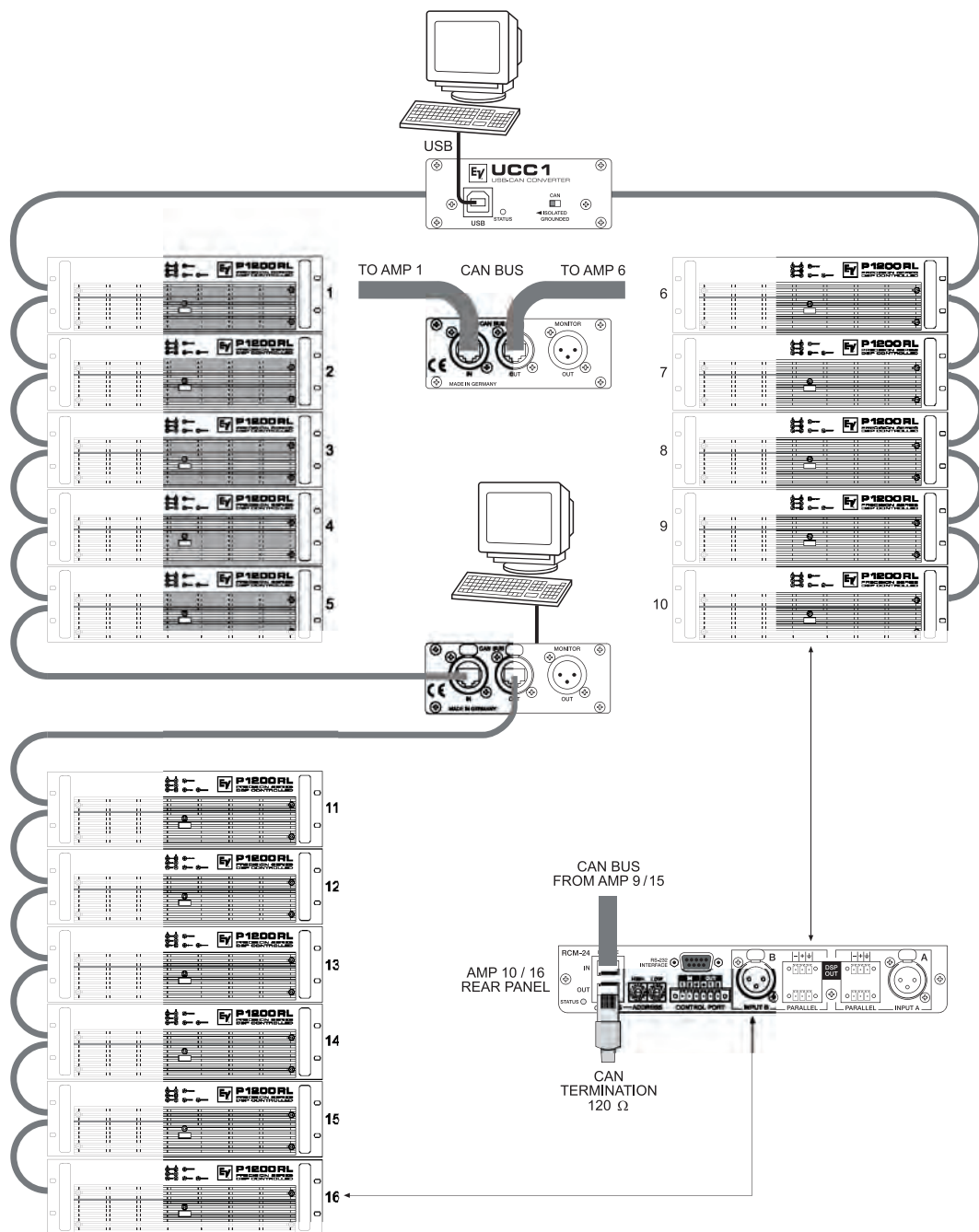
The following diagrams show examples of the data-bus wiring for different order of size:



System with 5 amps and one UCC1 / PC at the beginning of the bus
Terminators at the UCC1 (first unit on the bus) and at amp 5 (last unit on the bus)



System with 2 amp-racks and an UCC1 / PC in the middle
Terminators at amp 6 (first unit on the bus) and amp 12 (last unit on the bus)



System with several amp-racks and several UCC1 / PCs
 UCC1s anywhere on the CAN-bus
 Terminators at amp 10 (first unit on the bus) and amp 16 (last unit on the bus)

Next to the CAN-bus signal, network cabling also carries the balanced monitor audio signal for monitoring the power amp inputs and outputs. This monitor-bus allows software-controlled monitoring of the input and output signals of all power amps that are included in the remote network, without the need for additional wiring. The monitor signal is present at the UCC1's XLR-type MONITOR Output connector for further distribution to (e.g.) a mixing console to be monitored via headphones or an active monitor speaker connected.

CAN-BUS

Baud Rate	Bus Length
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
62.5 kbit/s	1000 m
20 kbit/s	2500 m
10 kbit/s	5000 m

The CAN-bus allows using different data rates, with the data rate being indirectly proportional to the bus length. Small networks allow baud rates up to 500kbit/s.

For sizable dimensioned networks reducing the baud rate (minimum 10kbit/s) is necessary. The integration of repeaters is generally recommended when the bus-length exceeds 1,000m.

CAN-BUS CABLE SPECIFICATIONS

According to the ISO 11898-2 standard, CAN-bus data transfer cabling has to be carried out using Twisted-Pair cables with or without shielding providing a characteristic impedance of 120Ω. Both ends of a CAN-bus need to be terminated with 120Ω termination-plugs.

The maximum bus-length depends on the actual data transfer rate, the kind of data transfer cable being used, as well as the total number of participants on the bus. The following table shows the most essential coherencies for CAN-networks consisting of up to 64 participants:

Bus Length	Cable for data Transmission		Termination	Max. Data Transfer Rate
	Resistance per Unit Length	Cable Diameter		
0 ... 40 m	< 70 mΩ/m	0.25 ... 0.34 mm ² AWG23, AWG22	124 Ω	1000 kbit/s bei 40 m
40 ... 300 m	< 60 mΩ/m	0.34 ... 0.6 mm ² AWG22, AWG20	127 Ω	500 kbit/s bei 100 m
300 ... 600 m	< 40 mΩ/m	0.5 ... 0.6 mm ² AWG20	150 Ω ... 300 Ω*	100 kbit/s bei 500 m
600 ... 1000 m	< 26 mΩ/m	0.75 ... 0.8 mm ² AWG18	150 Ω ... 300 Ω*	62.5 kbit/s bei 1000 m

* With longer cables and many participants on the CAN-bus, termination resistors with higher impedance than the specified 120Ω are recommended to reduce the ohmic load of the interface drivers and therefore the voltage drop between the two cable ends.

The following table is meant for first assessment of necessary cable diameters for different bus lengths and bus-participant numbers:

Bus Length	Number of Appliances on the CAN-Bus		
	32	64	100
100 m	0.25 mm ² bzw. AWG24	0.34 mm ² bzw. AWG22	0.34 mm ² bzw. AWG22
250 m	0.34 mm ² bzw. AWG22	0.5 mm ² bzw. AWG20	0.5 mm ² bzw. AWG20
500 m	0.75 mm ² bzw. AWG18	0.75 mm ² bzw. AWG18	1.0 mm ² bzw. AWG17

Additionally, the length of branch lines – for participants that are not directly connected to the CAN-bus – is also of importance. For data transfer rates of up to 125kbit/s, the maximum length of a single stub cable should not exceed 2m. For higher bit rates a maximum length of only 0.3m is still permissible. The entire length of all branch lines should not exceed 30 m.

General Note:

As long as only short distances (up to 10m) are concerned, common RJ-45 patch cables with 100Ω characteristic impedance (AWG 24 / AWG 26) can be used for the cabling inside of a rack-shelf system. The previously outlined guidelines for network cabling are mandatory as far as the rack-shelf interconnection or fixed installations are involved.

MAINS OPERATION & RESULTING TEMPERATURE

MAINS OPERATION

The following tables allow determining power supply and cabling requirements. The values of the column „1/8 max. Output“ are relevant for „normal“ operation. These values are based on operating the power amplifier with VDE-noise at 1/8 of the maximum output power, which approximately equates the load of the power amplifier being operated with a music signal at maximum volume possible, without noticeable clipping.

RESULTING TEMPERATURE INSIDE THE POWER AMPLIFIER

The power drawn from the mains network is converted into acoustic output power to feed the connected loudspeaker systems & heat. The difference between drawn power and dispensed power is called leakage power or dissipation (Pd). The amount of heat resulting from power dissipation might remain inside of a rack-shelf and needs to be diverted using appropriate measures. The following table provides auxiliary means for calculating the temperatures inside of a rack-shelf system/cabinet and the ventilation efforts necessary. The column “Pd” lists the leakage power in relation to different operational states. The column “BTU/hr” lists the dispensed heat amount per hour.

P1200RT	U _{Mains} [V]	I _{Mains} [A]	P _{Mains} [W]	P _{out} [W]	P _d [W]	BTU/hr ⁽³⁾
Idling	230V	0.55	85	-	85	290
Max. Output ⁽¹⁾ 100V @ 40Ω, 70V @ 19.6Ω	230V	6.40	1185	2 x 380	425	1450
Max. Output ⁽¹⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	10.5	2030	2 x 600	830	2832
1/3 max. Output ⁽¹⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	6.60	1230	2 x 200	830	2832
1/8 max. Output ⁽²⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	3.80	675	2 x 75	525	1791
Normal Operation (-10dB) ⁽¹⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	3.78	670	2 x 50	570	1945
Nominal Operation (0dB) ⁽¹⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	9.69	1870	2 x 500	870	2969
Alarm Operation (-3dB) ⁽¹⁾ 100V @ 20Ω, 70V @ 9.8Ω	230V	7.27	1370	2 x 250	870	2969

P900RT	U _{Mains} [V]	I _{Mains} [A]	P _{Mains} [W]	P _{out} [W]	P _d [W]	BTU/hr ⁽³⁾
Idling	230V	0.45	70	-	70	239
Max. Output ⁽¹⁾ 100V @ 57Ω, 70V @ 28Ω	230V	4.97	920	2 x 280	360	1228
Max. Output ⁽¹⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	8.16	1580	2 x 450	680	2320
1/3 max. Output ⁽¹⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	5.13	960	2 x 150	660	2252
1/8 max. Output ⁽²⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	2.90	520	2 x 56.3	407.5	1390
Normal Operation (-10dB) ⁽¹⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	2.84	505	2 x 35	435	1484
Nomonal Operation (0dB) ⁽¹⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	7.32	1410	2 x 350	710	2423
Alarm Operation (-3dB) ⁽¹⁾ 100V @ 28.5Ω, 70V @ 14Ω	230V	5.48	1030	2 x 175	680	2320

For approximation; when operating the appliance at 120V mains the stated current values need to be doubled.

(1) modulated with sine signal

(2) modulated with VDE-noise

(3) 1BTU = 1055.06J = 1055.06Ws

SPECIFICATIONS / TECHNISCHE DATEN

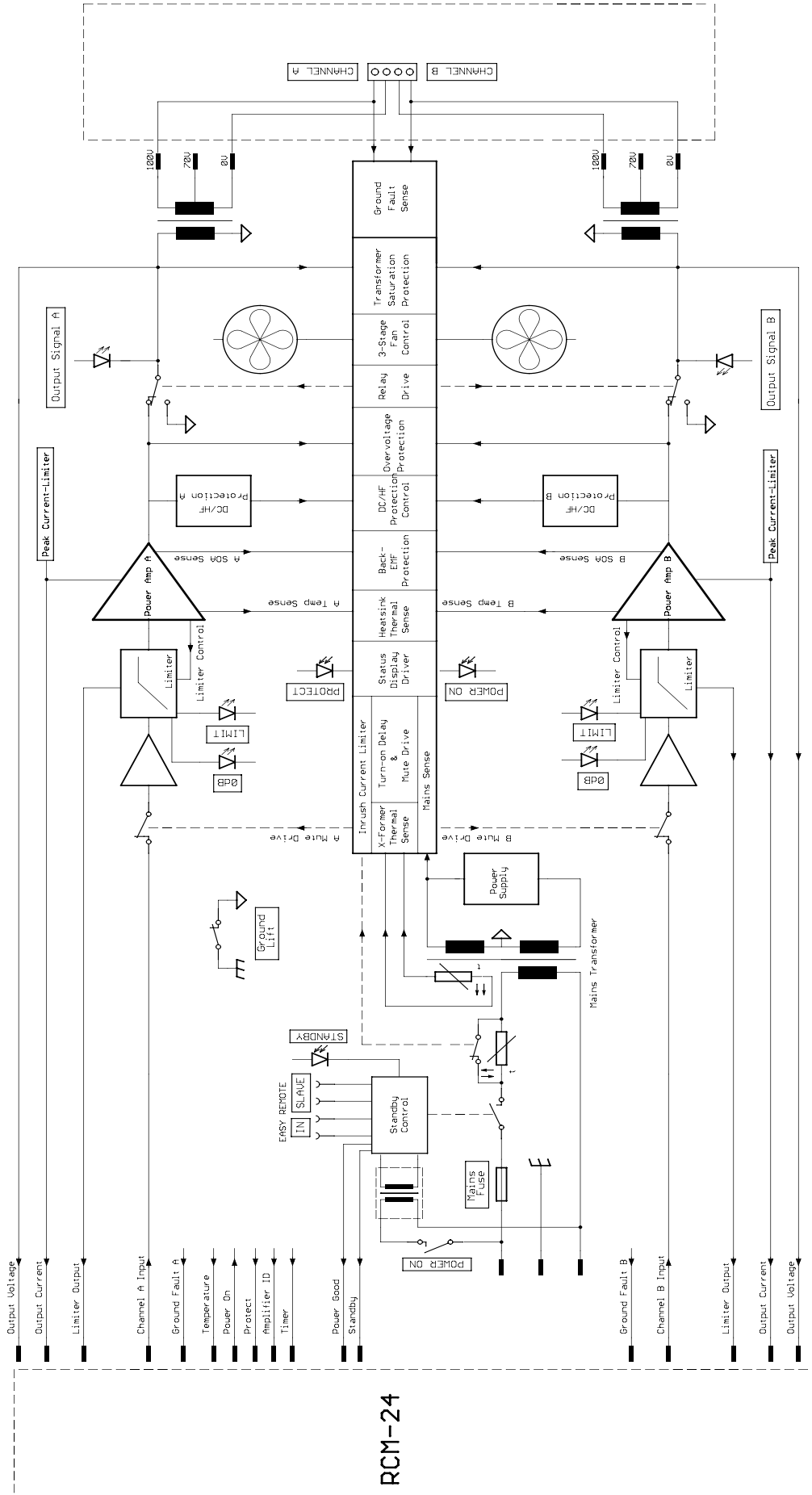
System (amplifier) at rated conditions, both channels driven, rated loads, unless otherwise specified.

	P900RT		P1200RT	
	100V	70V	100V	70V
Rated Load Impedance	28.5Ω	14Ω	20Ω	9.8Ω
Maximum Midband Output Power THD = 1%, 1kHz	410W	400W	590W	580W
Maximum Midband Output Voltage THD = 1%, 1kHz, RMS, rated load	108V	74.8V	109.5V	75.4V
Rated Output Power THD < 0.2%, 20Hz ... 20kHz	350W	350W	500W	500W
Rated Output Voltage THD < 0.2%, 20Hz ... 20kHz	100V	70V	100V	70V
Maximum RMS Voltage Swing THD = 1%, 1kHz, no load	125V	87V	121V	88V
THD at rated output power, MBW = 80kHz, 1kHz	< 0.05%			
IMD-SMPTE 60Hz, 7kHz	< 0.1%			
DIM30 3.15kHz, 15kHz	< 0.2%			
Crosstalk Attenuation ref. 1kHz, at rated output power	> 80dB			
Frequency Response -3dB, ref. 1kHz	45Hz ... 22.5kHz			
Damping Factor at 100Hz / 1kHz, 8Ω	> 300 / > 200			
Signal to Noise Ratio, Amplifier A-weighted	106dB			
Signal to Noise Ratio, System A-weighted	100dB			
Input Sensitivity at rated output power @ 4Ω, 1kHz	+6dBu (1.55V)			
Max. Input Voltage	+21dBu (8.7V)			
Input Impedance 20Hz ... 20kHz, balanced	20kΩ			
CMR @ 1kHz	80dB			
Output Voltage DSP OUT / Monitor	rated: +6dBu (1.55V) max: +21dBu (8.7V)			
Output Impedance DSP OUT / Monitor	< 100Ω			
Minimum Output Load DSP OUT / Monitor	600Ω			
Digital Signal Processing				
AD & DA Conversion	24 Bit, Sigma-Delta, 128 x Oversampling, Linear Phase			
Sample Rate	48kHz			
Internal Wordlength	48 bit			
Dynamic Range	115dB (typical)			
Functions	Volume Control, Routing, X-Over (6, 12, 18, 24 dB/Oct Slope, Butterworth, Bessel, Linkwitz-Riley), Filter (Parametric EQ, Lo / Hi Shelving EQ, LPN, Lo / Hi Pass, Allpass), Compressor / Limiter, Delay			

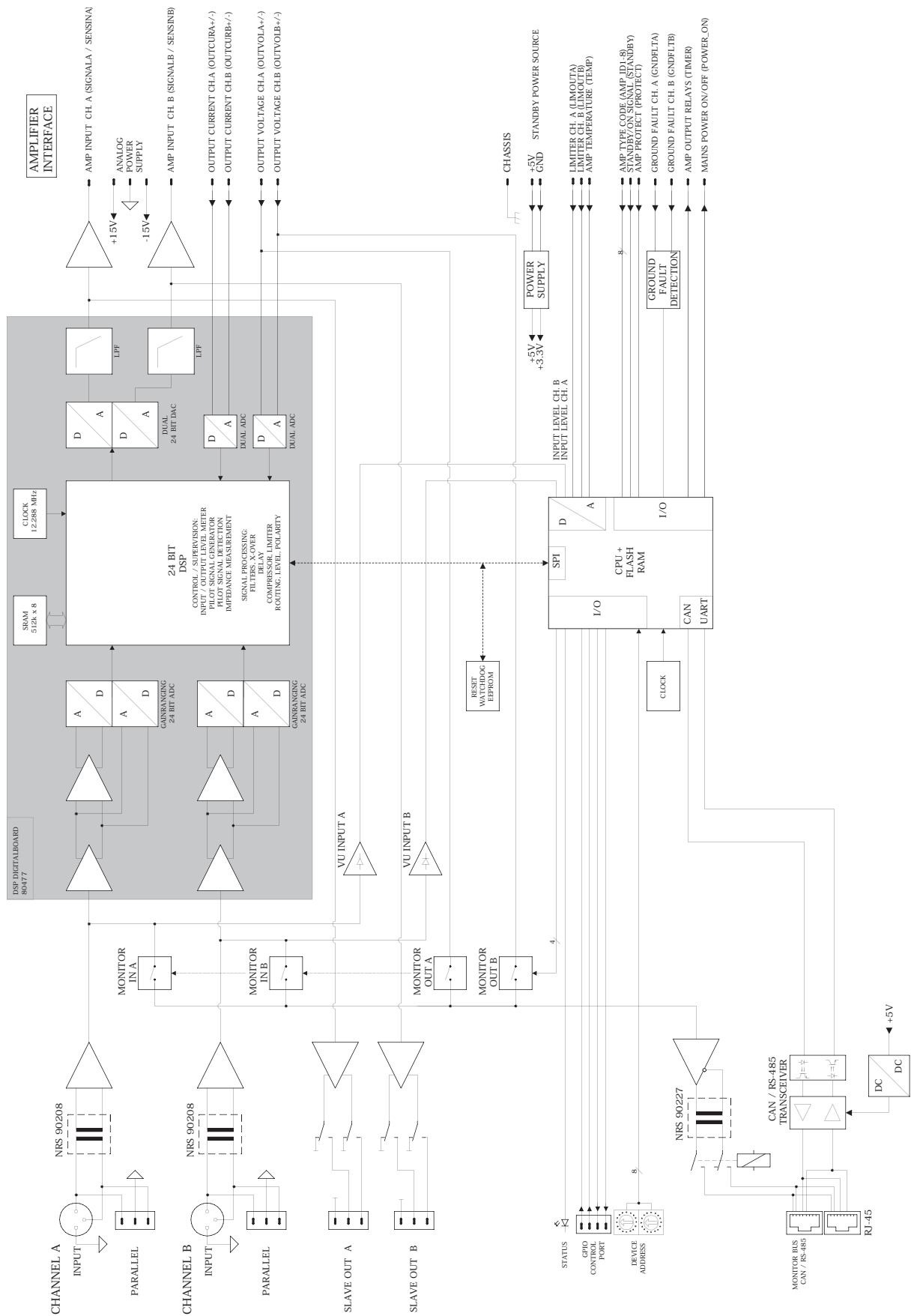
SPECIFICATIONS / TECHNISCHE DATEN

Interfaces	CAN-Bus, 10 ... 500 kbit/s, RJ-45 (PC Control) RS-232, 19.2 kbit/s, 9-pol. SUB-D (Multi Media Control)	
Control Port / GPIO	6-pol. Phoenix 2 Control Inputs Inactive / OFF +5.0V (> 2.4V) or open (internal pull-up) Active / ON 0V (< 0.8V) 2 Control Outputs Inactive / OFF High (Open Collector) Active / ON Low (< 0.5V / I = 0.7A) Input Voltage +32.0V max. Switching Current 1.0A max. Reference Outputs +5.0V / 100mA and GND	
Power Requirements	240V, 230V, 120V, 100V / 50Hz ... 60Hz, factory configured	
Power Consumption <small>1/8 max. output voltage at rated load</small>	690W	870W
Protection	Audio limiters, High temperature, DC, HF, Back-EMF, Peak current limiters, Inrush current limiters, Turn-on delay	
Cooling	Front-to-rear, 3-stage-fans	
Dimensions <small>(W x H x D), mm</small>	483 x 132.5 x 426	
Weight	22kg	24kg
Optional Input Transformer	NRS 90208 (121 641)	
Optional Output Transformer <small>(Monitor)</small>	NRS 90227 (112 679)	
Rear-rackmount 15,5"	NRS 90235 (112 733)	
Rear-rackmount 18"	NRS 90223 (112 701)	

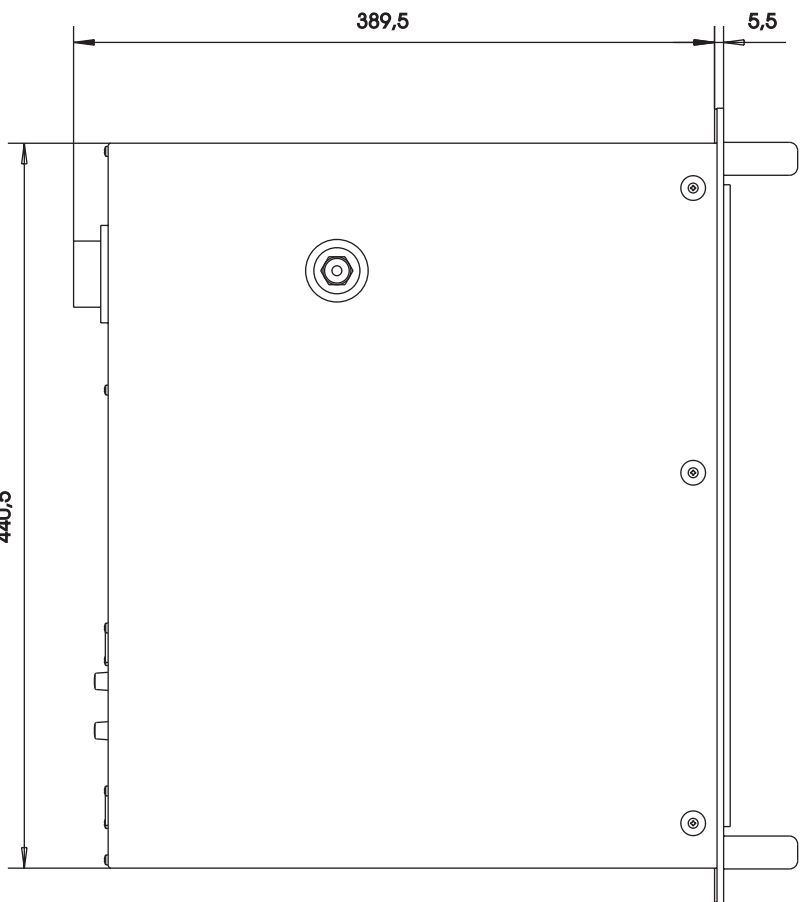
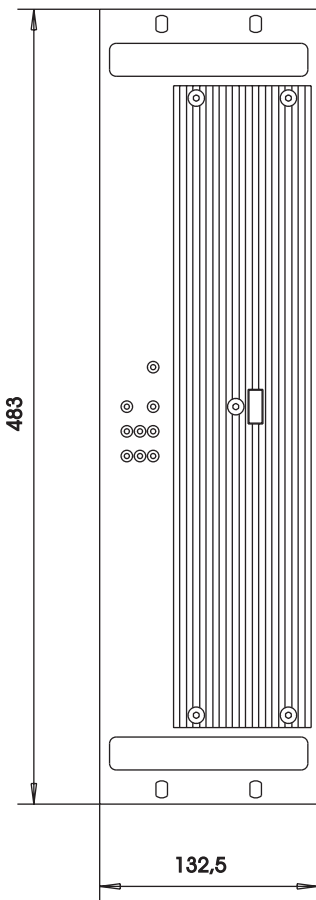
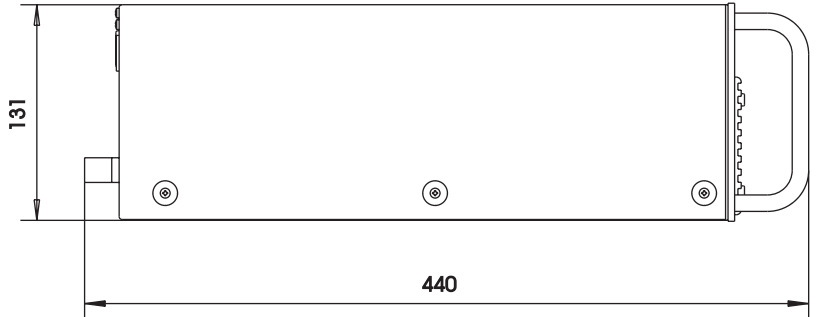
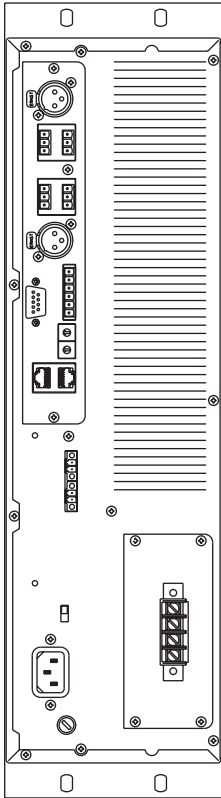
BLOCK DIAGRAM AMPLIFIER



BLOCK DIAGRAM RCM-24



DIMENSIONS / ABMESSUNGEN



NOTES



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