



Studer A Series

Active Monitor Speakers

Operating Instructions

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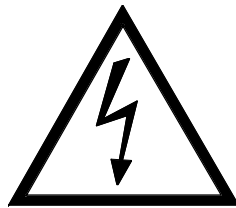
Subject to change



To reduce the risk of electric shock, do not remove covers (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

Afin de prévenir un choc électrique, ne pas enlever les couvercles (où l'arrière) de l'appareil. Il ne se trouve à l'intérieur aucune pièce pouvant être réparée par l'utilisateur.

Um die Gefahr eines elektrischen Schlages zu vermeiden, entfernen Sie keine Geräteabdeckungen (oder die Rückwand). Überlassen Sie Wartung und Reparatur qualifiziertem Fachpersonal.



This symbol is intended to alert the user to presence of uninsulated “**dangerous voltage**” within the apparatus that may be of sufficient magnitude to constitute a risk of electric shock to a person.

Ce symbole indique à l'utilisateur qu'il existe à l'intérieur de l'appareil des “**tensions dangereuses**”. Ces tensions élevées entraînent un risque de choc électrique en cas de contact.

Dieses Symbol deutet dem Anwender an, dass im Geräteinnern die Gefahr der Berührung von “**gefährlicher Spannung**” besteht. Die Grösse der Spannung kann zu einem elektrischen Schlag führen.



This symbol is intended to alert the user to the presence of **important instructions** for operating and maintenance in the enclosed documentation.

Ce symbole indique à l'utilisateur que la documentation jointe contient **d'importantes instructions** concernant le fonctionnement et la maintenance.

Dieses Symbol deutet dem Anwender an, dass die beigelegte Dokumentation **wichtige Hinweise** für Betrieb und Wartung enthält.

CAUTION:

Lithium battery. Danger of explosion by incorrect handling. Replace by battery of the same make and type only.

ATTENTION:

Pile au lithium. Danger d'explosion en cas de manipulation incorrecte. Ne remplacer que par un modèle de même type.

ACHTUNG:

Explosionsgefahr bei unsachgemäßem Auswechseln der Lithium-batterie. Nur durch den selben Typ ersetzen.

ADVARSEL:

Lithiumbatteri. Eksplosionsfare. Udskiftning må kun foretages af en sagkyndig af som beskrevet i servicemanualen (DK).

FIRST AID

(in case of electric shock)

1. Separate the person as quickly as possible from the electric power source:
 - by switching off the equipment
 - or by unplugging or disconnecting the mains cable
 - pushing the person away from the power source by using dry insulating material (such as wood or plastic).
 - *After having sustained an electric shock, always consult a doctor.*

WARNING!

DO NOT TOUCH THE PERSON OR HIS CLOTHING BEFORE THE POWER IS TURNED OFF, OTHERWISE YOU STAND THE RISK OF SUSTAINING AN ELECTRIC SHOCK AS WELL!

2. If the person is unconscious:
 - check the pulse,
 - resuscitate the person if respiration is poor,
 - lay the body down, turn it to one side, call for a doctor immediately.

PREMIERS SECOURS

(en cas d'électrocution)

1. Si la personne est dans l'impossibilité de se libérer:
 - Couper l'interrupteur principal
 - Couper le courant
 - Repousser la personne de l'appareil à l'aide d'un objet en matière non conductrice (matière plastique ou bois)
 - *Après une électrocution, toujours consulter un médecin.*

ATTENTION!

NE JAMAIS TOUCHER UNE PERSONNE QUI EST SOUS TENSION, SOUS PEINE DE SUBIR EGALEMENT UNE ELECTROCUTION.

2. En cas de perte de connaissance de la personne électrocutée:
 - Contrôler le pouls
 - Si nécessaire, pratiquer la respiration artificielle
 - Placer l'accidenté sur le flanc et consulter un médecin.

ERSTE HILFE

(bei Stromunfällen)


1. Bei einem Stromunfall die betroffene Person so rasch wie möglich vom Strom trennen:
 - Ausschalten des Gerätes
 - Ziehen oder Unterbrechen der Netzzuleitung
 - Betroffene Person mit isoliertem Material (Holz, Kunststoff) von der Gefahrenquelle wegstossen
 - *Nach einem Stromunfall sollte immer ein Arzt aufgesucht werden.*

ACHTUNG!

EINE UNTER SPANNUNG STEHENDE PERSON DARF NICHT BERÜHRT WERDEN. SIE KÖNNEN DABEI SELBST ELEKTRISIERT WERDEN!

2. Bei Bewusstlosigkeit des Verunfallten:
 - Puls kontrollieren,
 - bei ausgesetzter Atmung künstlich beatmen,
 - Seitenlagerung des Verunfallten vornehmen und Arzt verständigen.

Installation

Vor der Installation des Gerätes müssen die hier aufgeführten und auch die weiter in dieser Anleitung mit  bezeichneten Hinweise gelesen und während der Installation und des Betriebes beachtet werden.

Untersuchen Sie das Gerät und sein Zubehör auf allfällige Transportschäden.


Ein Gerät, das mechanische Beschädigung aufweist oder in welches Flüssigkeit oder Gegenstände eingedrungen sind, darf nicht ans Netz angeschlossen oder muss sofort durch Ziehen des Netzsteckers vom Netz getrennt werden. Das Öffnen und Instandsetzen des Gerätes darf nur von Fachpersonal unter Einhaltung der geltenden Vorschriften durchgeführt werden.

Falls dem Gerät kein konfektioniertes Netzkabel beiliegt, muss dieses durch eine Fachperson unter Verwendung der mitgelieferten Kabel-Gerätedose IEC320/C13 oder IEC320/C19 und unter Berücksichtigung der einschlägigen, im jeweiligen Lande geltenden Bestimmungen angefertigt werden; siehe unten.

Vor Anschluss des Netzkabels an die Netzsteckdose muss überprüft werden, ob die Stromversorgungs- und Anschlusswerte des Gerätes (Netzspannung, Netzfrequenz) innerhalb der erlaubten Toleranzen liegen. Die im Gerät eingesetzten Sicherungen müssen den am Gerät angebrachten Angaben entsprechen.

Ein Gerät mit einem dreipoligen Gerätestecker (Gerät der Schutzklasse I) muss an eine dreipolige Netzsteckdose angeschlossen und somit das Gerätegehäuse mit dem Schutzleiter der Netzinstallation verbunden werden (Für Dänemark gelten Starkstrombestimmungen, Abschnitt 107).

Installation

Before you install the equipment, please read and adhere to the following recommendations and all sections of these instructions marked with  .

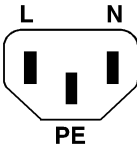
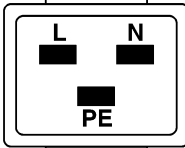
Check the equipment for any transport damage.

A unit that is mechanically damaged or which has been penetrated by liquids or foreign objects must not be connected to the AC power outlet or must be immediately disconnected by unplugging the power cable. Repairs must only be performed by trained personnel in accordance with the applicable regulations.

Should the equipment be delivered without a matching mains cable, the latter has to be prepared by a trained person using the attached female plug (IEC320/C13 or IEC320/C19) with respect to the applicable regulations in your country - see diagram below.

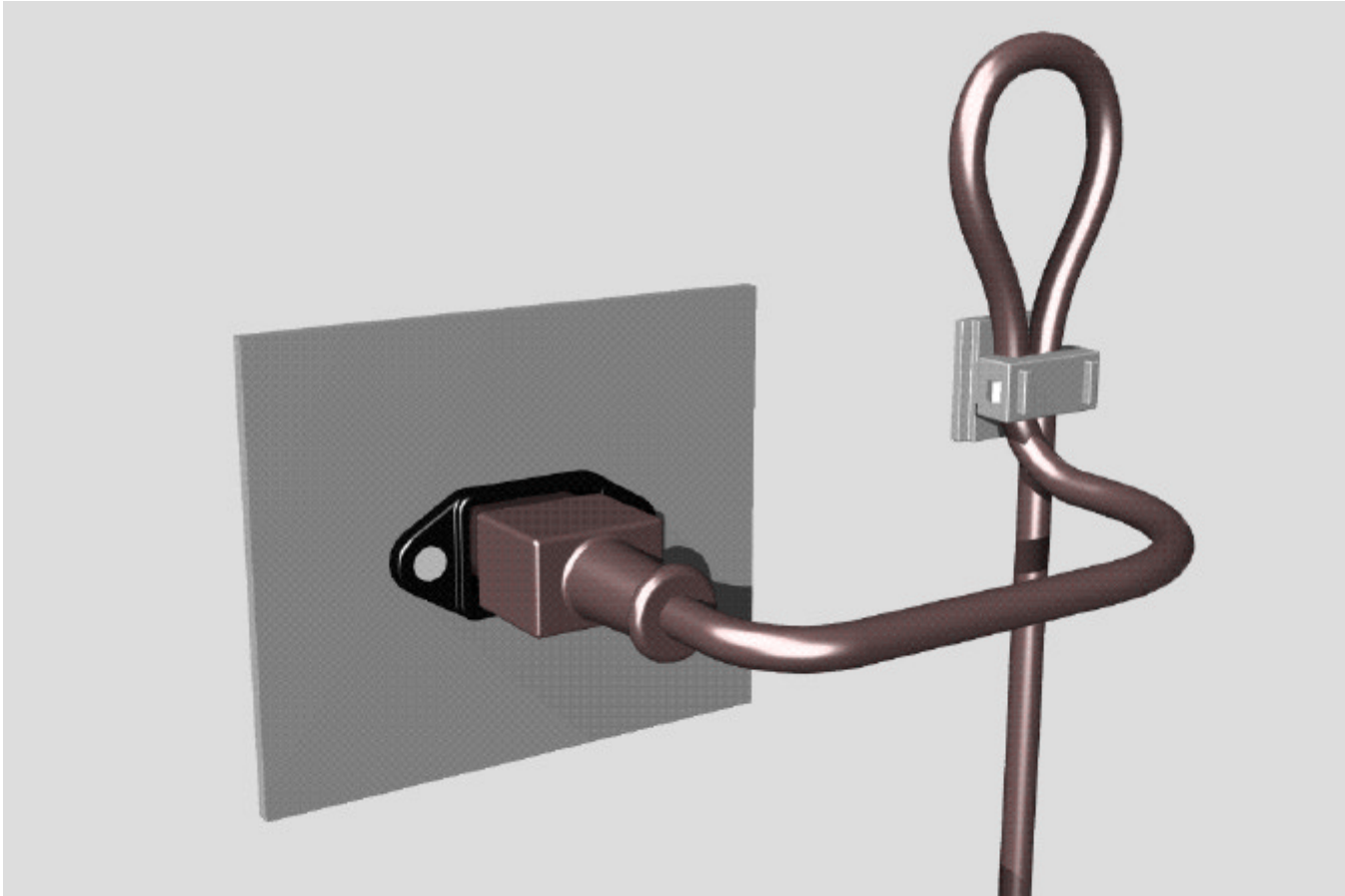
Before connecting the equipment to the AC power outlet, check that the local line voltage matches the equipment rating (voltage, frequency) within the admissible tolerance. The equipment fuses must be rated in accordance with the specifications on the equipment.

Equipment supplied with a 3-pole appliance inlet (equipment conforming to protection class I) must be connected to a 3-pole AC power outlet so that the equipment cabinet is connected to the protective earth conductor of the AC supply (for Denmark the Heavy Current Regulations, Section 107, are applicable).

 <p>IEC 320 / C13</p>	 <p>IEC 320 / C19</p>
Female plug (IEC320), view from contact side: L live; brown N neutral; blue PE protective earth; green and yellow	National American Standard: Black White green
Connecteur femelle (IEC320), vue de la face aux contacts: L phase; brun N neutre; bleu PE terre protective; vert et jaune	Standard national américain: Noir Blanc Vert
Ansicht auf Steckkontakte der Kabel-Gerätesteckdose (IEC320): L Phase; braun N Nulleiter; blau PE Schutzleiter; gelb/grün	USA-Standard: Schwarz Weiss grün

Zugentlastung für den Netzanschluss

Zum Verankern von Steckverbindungen ohne mechanische Verriegelung (z.B. IEC-Kaltgerätedosen) empfehlen wir die folgende Anordnung:



Mains connector strain relief

For anchoring connectors without a mechanical lock (e.g. IEC mains connectors), we recommend the following arrangement:

Vorgehen: Der mitgelieferte Kabelhalter ist selbstklebend. Bitte beachten Sie bei der Montage die folgenden Regeln:

1. Der Untergrund muss sauber, trocken und frei von Fett, Öl und anderen Verunreinigungen sein. Temperaturbereich für optimale Verklebung: 20...40° C.
2. Entfernen Sie die Schutzfolie auf der Rückseite des Kabelhalters und bringen sie ihn mit kräftigem Druck an der gewünschten Stelle an. Lassen sie ihn unbelastet so lange wie möglich ruhen – die maximale Klebekraft ist erst nach rund 24 Stunden erreicht.
3. Die Stabilität des Kabelhalters wird erhöht, wenn Sie ihn zusätzlich verschrauben. Zu diesem Zweck liegen ihm eine selbstschneidende Schraube sowie eine M4-Schraube mit Mutter bei.
4. Legen Sie das Kabel gemäss Figur in den Halter ein und pressen Sie die Klemme kräftig auf, bis das Kabel fixiert ist.

Procedure: The cable clamp shipped with your unit is auto-adhesive. If mounting, please follow the rules below:

1. The surface to be adhered to must be clean, dry, and free from grease, oil or other contaminants. Best application temperature range is 20...40° C.
2. Remove the plastic protective backing from the rear side of the clamp and apply it firmly to the surface at the desired position. Allow as much time as possible for curing. The bond continues to develop for as long as 24 hours.
3. For improved stability, the clamp can be fixed with a screw. For this purpose, a self-tapping screw and an M4 bolt and nut are included.
4. Place the cable into the clamp as shown in the illustration above and firmly press down the internal top cover until the cable is fixed.

Lufttemperatur und Feuchtigkeit

Allgemein

Die Betriebstauglichkeit des Gerätes oder Systems ist unter folgenden Umgebungsbedingungen gewährleistet:

EN 60721-3-3, Set IE32, Wert 3K3.

Diese Norm umfasst einen umfassenden Katalog von Parametern; die wichtigsten davon sind: Umgebungstemperatur +5...+40 °C; rel. Luftfeuchtigkeit 5...85% – d.h. weder Kondensation noch Eisbildung; abs. Luftfeuchtigkeit 1...25 g/m³; Temperatur-Änderungsrate < 0,5 °C/min. In den folgenden Abschnitten wird darauf näher eingegangen.

Unter den genannten Bedingungen startet und arbeitet das Gerät oder System problemlos. Ausserhalb dieser Spezifikationen möglicherweise auftretende Probleme sind in den folgenden Abschnitten beschrieben.

Umgebungstemperatur

Geräte und Systeme von Studer sind allgemein für einen Umgebungstemperaturbereich (d.h. Temperatur der eintretenden Kühlluft) von +5...+40 °C ausgelegt. Bei Installation in einem Schrank muss der vorgesehene Luftdurchsatz und dadurch die Konvektionskühlung gewährleistet sein. Folgende Tatsachen sind dabei zu berücksichtigen:

1. Die zulässige Umgebungstemperatur für den Betrieb der Halbleiter-Bauelemente beträgt 0 °C bis +70 °C (commercial temperature range for operation).
2. Der Luftdurchsatz der Anlage muss gewährleisten, dass die austretende Kühlluft ständig kühler ist als 70 °C.
3. Die mittlere Erwärmung der Kühlluft soll 20 K betragen, die maximale Erwärmung an den heissen Komponenten darf somit um weitere 10 K höher liegen.
4. Zum Abführen einer Verlustleistung von 1 kW bei dieser zulässigen mittleren Erwärmung ist eine Luftmenge von 2,65 m³/min notwendig.

Beispiel: Für ein Rack mit einer Leistungsaufnahme $P = 800$ W ist eine Kühlluftmenge von $0,8 * 2,65$ m³/min nötig, entsprechend 2,12 m³/min.

5. Soll die Kühlfunktion der Anlage (z.B. auch bei Lüfter-Ausfall oder Bestrahlung durch Spotlampen) überwacht werden, so ist die Temperatur der Abluft unmittelbar oberhalb der Einschübe an mehreren Stellen im Rack zu messen; die Ansprechtemperatur der Sensoren soll 65 bis 70 °C betragen.

Reif und Tau

Das unversiegelte System (Steckerpartien, Halbleiteranschlüsse) verträgt zwar leichte Eisbildung (Reif). Mit blossen Auge sichtbare Betauung führt jedoch bereits zu Funktionsstörungen. In der Praxis kann mit einem zuverlässigen Betrieb der Geräte bereits im Temperaturbereich ab -15 °C gerechnet werden, wenn für die Inbetriebnahme des kalten Systems die folgende allgemeine Regel beachtet wird:

Wird die Luft im System abgekühlt, so steigt ihre relative Feuchtigkeit an. Erreicht diese 100%, kommt es zu Niederschlag, meist in der Grenzschicht zwischen der Luft und einer kühleren Oberfläche, und somit zur Bildung von Eis oder Tau an empfindlichen Systemstellen (Kontakte, IC-Anschlüsse etc.). Ein störungsfreier Betrieb mit interner Betauung, unabhängig von der Temperatur, ist nicht gewährleistet.

Air temperature and humidity

General

Normal operation of the unit or system is warranted under the following ambient conditions defined by:

EN 60721-3-3, set IE32, value 3K3.

This standard consists of an extensive catalogue of parameters, the most important of which are: ambient temperature +5...+40° C, relative humidity 5...85% – i.e. no formation of condensation or ice; absolute humidity 1...25 g/m³; rate of temperature change < 0,5 °C/min. These parameters are dealt with in the following paragraphs.

Under these conditions the unit or system starts and works without any problem. Beyond these specifications, possible problems are described in the following sections.

Ambient temperature

Units and systems by Studer are generally designed for an ambient temperature range (i.e. temperature of the incoming air) of +5...+40 °C. When rack mounting the units, the intended air flow and herewith adequate cooling must be provided. The following facts must be considered:

1. The admissible ambient temperature range for operation of the semiconductor components is 0 °C to +70 °C (commercial temperature range for operation).
2. The air flow through the installation must provide that the outgoing air is always cooler than 70 °C.
3. Average heat increase of the cooling air shall be 20 K, allowing for an additional maximum 10 K increase at the hot components.
4. In order to dissipate 1 kW with this admissible average heat increase, an air flow of 2,65 m³/min is required.

Example: A rack dissipating $P = 800$ W requires an air flow of $0,8 * 2,65$ m³/min which corresponds to 2,12 m³/min.

5. If the cooling function of the installation must be monitored (e.g. for fan failure or illumination with spot lamps), the outgoing air temperature must be measured directly above the modules at several places within the rack. The trigger temperature of the sensors should be 65 to 70 °C.

Frost and dew

The unsealed system parts (connector areas and semiconductor pins) allow for a minute formation of ice or frost. However, formation of dew visible with the naked eye will already lead to malfunctions. In practice, reliable operation can be expected in a temperature range above -15 °C, if the following general rule is considered for putting the cold system into operation:

If the air within the system is cooled down, the relative humidity rises. If it reaches 100%, condensation will arise, usually in the boundary layer between the air and a cooler surface, together with formation of ice or dew at sensitive areas of the system (contacts, IC pins, etc.). Once internal condensation occurs, troublefree operation cannot be guaranteed, independent of temperature.

Vor der Inbetriebnahme muss das System auf allfällige interne Btauung oder Eisbildung überprüft werden. Nur bei sehr leichter Eisbildung kann mit direkter Verdunstung (Sublimation) gerechnet werden; andernfalls muss das System im abgeschalteten Zustand gewärmt und getrocknet werden.

Das System ohne feststellbare interne Eisbildung oder Btauung soll möglichst homogen (und somit langsam) mit eigener Wärmeleistung aufgewärmt werden; die Lufttemperatur der Umgebung soll ständig etwas tiefer als diejenige der Systemluft sein.

Ist es unumgänglich, das abgekühlte System sofort in warmer Umgebungsluft zu betreiben, so muss diese entfeuchtet sein. Die absolute Luftfeuchtigkeit muss dabei so tief sein, dass die relative Feuchtigkeit, bezogen auf die kälteste Oberfläche im System, immer unterhalb 100% bleibt.

Es ist dafür zu sorgen, dass beim Abschalten des Systems die eingeschlossene Luft möglichst trocken ist (d.h. vor dem Abschalten im Winter den Raum mit kalter, trockener Luft belüften und feuchte Gegenstände, z.B. Kleider, entfernen).

Die Zusammenhänge sind im folgenden Klimatogramm ersichtlich. Zum kontrollierten Verfahren gehören Thermometer und Hygrometer sowie ein Thermometer innerhalb des Systems.

Beispiel 1: Ein Ü-Wagen mit einer Innentemperatur von 20 °C und 40% relativer Luftfeuchtigkeit wird am Abend abgeschaltet. Sinkt die Temperatur unter +5 °C, bildet sich Tau oder Eis.

Beispiel 2: Ein Ü-Wagen wird morgens mit 20 °C warmer Luft von 40% relativer Luftfeuchtigkeit aufgewärmt. Auf Teilen, die kälter als +5 °C sind, bildet sich Tau oder Eis.

Before putting into operation, the system must be checked for internal formation of condensation or ice. Only with a minute formation of ice, direct evaporation (sublimation) may be expected; otherwise the system must be heated and dried while switched off.

A system without visible internal formation of ice or condensation should be heated up with its own heat dissipation, as homogeneously (and subsequently as slow) as possible; the ambient temperature should then always be lower than the outgoing air.

If it is absolutely necessary to operate the system immediately within warm ambient air, this air must be dehydrated. In such a case, the absolute humidity must be so low that the relative humidity, related to the coldest system surface, always remains below 100%.

Ensure that the enclosed air is as dry as possible when powering off (i.e. before switching off in winter, aerate the room with cold, dry air, and remove humid objects as clothes from the room).

These relationships are visible from the following climatogram. For a controlled procedure, thermometer and hygrometer as well as a thermometer within the system will be required.

Example 1: An OB-van having an internal temperature of 20 °C and rel. humidity of 40% is switched off in the evening. If temperature falls below +5 °C, dew or ice will be forming.

Example 2: An OB-van is heated up in the morning with air of 20 °C and a rel. humidity of 40%. On all parts being cooler than +5 °C, dew or ice will be forming.

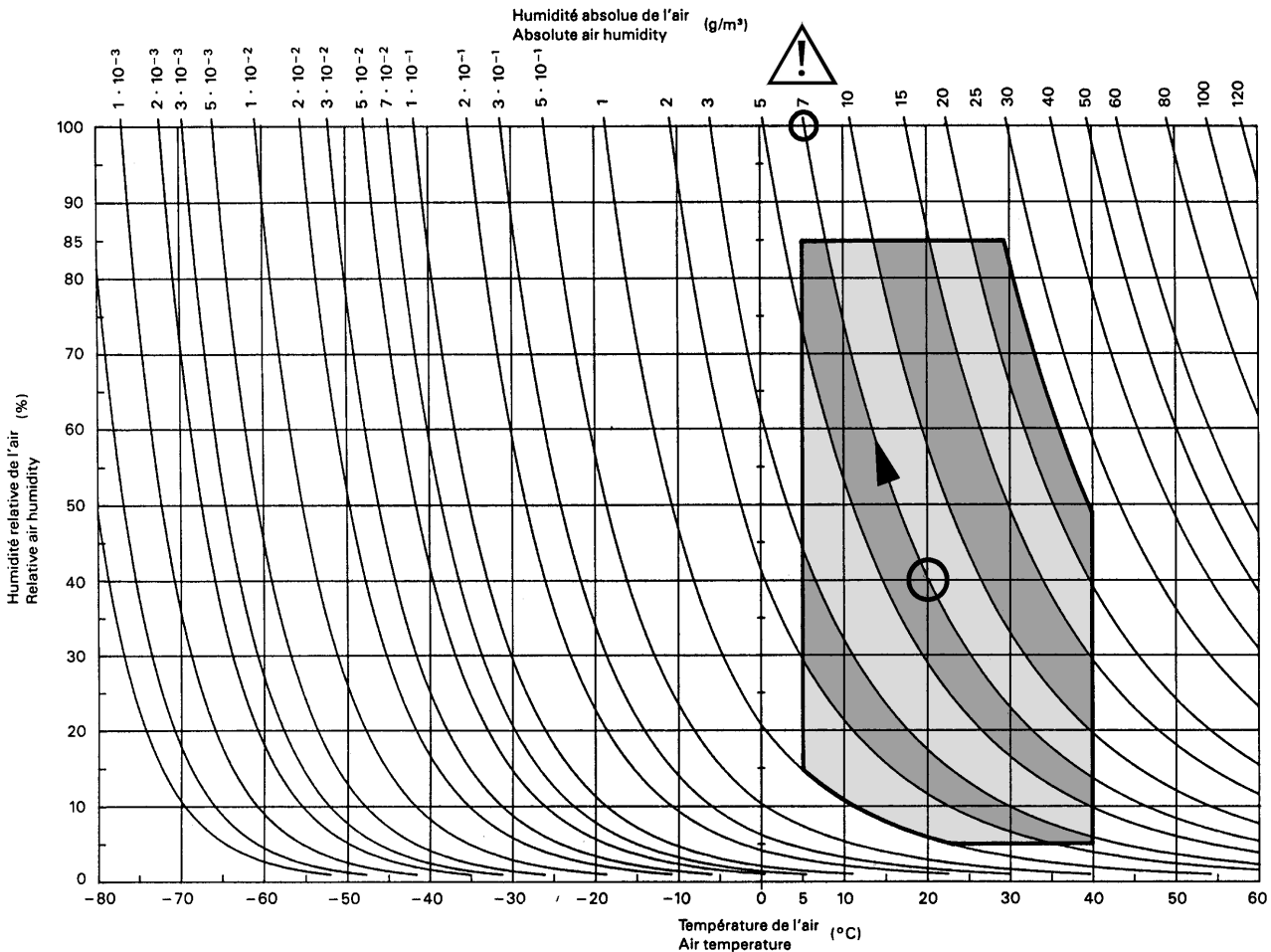


Figure B.3 – Climatogramme pour catégorie 3K3
Climatogram for class 3K3

Wartung und Reparatur

Durch Entfernen von Gehäuseteilen, Abschirmungen etc. werden stromführende Teile freigelegt. Deshalb müssen u.a. die folgenden Grundsätze beachtet werden: Eingriffe in das Gerät dürfen nur von Fachpersonal unter Einhaltung der geltenden Vorschriften vorgenommen werden.

Vor Entfernen von Gehäuseteilen muss das Gerät ausgeschaltet und vom Netz getrennt werden.

Bei geöffnetem, vom Netz getrenntem Gerät dürfen Teile mit gefährlichen Ladungen (z. B. Kondensatoren, Bildröhren) erst nach kontrollierter Entladung, heiße Bauteile (Leistungshalbleiter, Kühlkörper etc.) erst nach deren Abkühlen berührt werden.

Bei Wartungsarbeiten am geöffneten, unter Netzspannung stehenden Gerät dürfen blanke Schaltungs- teile und metallene Halbleitergehäuse weder direkt noch mit nichtisoliertem Werkzeug berührt werden.

Zusätzliche Gefahren bestehen bei unsachgemäßer Handhabung besonderer Komponenten:

- *Explosionsgefahr* bei Lithiumzellen, Elektrolyt-Kondensatoren und Leistungshalbleitern
- *Implosionsgefahr* bei evakuierten Anzeigeeinheiten
- *Strahlungsgefahr* bei Lasereinheiten (nichtionisierend), Bildröhren (ionisierend)
- *Verätzungsgefahr* bei Anzeigeeinheiten (LCD) und Komponenten mit flüssigem Elektrolyt.

Solche Komponenten dürfen nur von ausgebildetem Fachpersonal mit den vorgeschriebenen Schutzmitteln (u.a. Schutzbrille, Handschuhe) gehandhabt werden.

Maintenance and Repair

The removal of housing parts, shields, etc. exposes energized parts. For this reason the following precautions should be observed:

Maintenance should only be performed by trained personnel in accordance with the applicable regulations.

The equipment should be switched off and disconnected from the AC power outlet before any housing parts are removed.

Even if the equipment is disconnected from the power, parts with hazardous charges (e.g. capacitors, picture tubes) must not be touched until they have been properly discharged. Touch hot components (power semiconductors, heat sinks, etc.) only when cooled off.

If maintenance is performed on a unit that is opened and switched on, no uninsulated circuit components and metallic semiconductor housings must be touched neither with your bare hands nor with uninsulated tools.

Certain components pose additional hazards:

- *Explosion hazard* from lithium batteries, electrolytic capacitors and power semiconductors
- *Implosion hazard* from evacuated display units
- *Radiation hazard* from laser units (non-ionizing), picture tubes (ionizing)
- *Caustic effect* of display units (LCD) and such components containig liquid electrolyte.

Such components should only be handled by trained personnel who are properly protected (e.g. safety goggles, gloves).

Elektrostatische Entladung (ESD) bei Wartung und Reparatur

Electrostatic Discharge (ESD) during Maintenance and Repair



- ATTENTION:** Observe precautions for handling devices sensitive to electrostatic discharge!
- ATTENTION:** Respecter les précautions d'usage concernant la manipulation de composants sensibles à l'électricité statique!
- ACHTUNG:** Vorsichtsmassnahmen bei Handhabung elektrostatisch entladungsgefährdeter Bauelemente beachten!

Viele ICs und andere Halbleiter sind empfindlich gegen elektrostatische Entladung (ESD). Unfachgerechte Behandlung von Baugruppen mit solchen Komponenten bei Wartung und Reparatur kann deren Lebensdauer drastisch vermindern.

Bei der Handhabung der ESD-empfindlichen Komponenten sind u.a. folgende Regeln zu beachten:

- ESD-empfindliche Komponenten dürfen ausschliesslich in dafür bestimmten und bezeichneten Verpackungen gelagert und transportiert werden.
- Unverpackte, ESD-empfindliche Komponenten dürfen nur in dafür eingerichteten Schutzzonen (EPA, z.B. Gebiet für Feldservice, Reparatur- oder Serviceplatz) gehandhabt und nur von Personen berührt werden, die durch ein Handgelenkband mit Serienwiderstand mit dem Massepotential des Reparatur- oder Serviceplatzes verbunden sind. Das gewartete Gerät wie auch Werkzeug, Hilfsmittel, EPA-taugliche (elektrisch halbleitende) Arbeits-, Ablage- und Bodenmatten müssen ebenfalls mit diesem Potential verbunden sein.
- Die Anschlüsse der ESD-empfindlichen Komponenten dürfen unkontrolliert weder mit elektrostatisch aufladbaren (Gefahr von Spannungsdurchschlag), noch mit metallischen Oberflächen (Schockentladungsfahr) in Berührung kommen.
- Um undefinierte transiente Beanspruchung der Komponenten und deren eventuelle Beschädigung durch unerlaubte Spannung oder Ausgleichsströme zu vermeiden, dürfen elektrische Verbindungen nur am abgeschalteten Gerät und nach dem Abbau allfälliger Kondensatorladungen hergestellt oder getrennt werden.

Many ICs and semiconductors are sensitive to electrostatic discharge (ESD). The life of components containing such elements can be drastically reduced by improper handling during maintenance and repair work.

Please observe the following rules when handling ESD sensitive components:

- ESD sensitive components should only be stored and transported in the packing material specifically provided for this purpose.
- Unpacked ESD sensitive components should only be handled in ESD protected areas (EPA, e.g. area for field service, repair or service bench) and only be touched by persons who wear a wristlet that is connected to the ground potential of the repair or service bench by a series resistor. The equipment to be repaired or serviced and all tools, aids, as well as electrically semiconducting work, storage and floor mats should also be connected to this ground potential.
- The terminals of ESD sensitive components must not come in uncontrolled contact with electrostatically chargeable (voltage puncture) or metallic surfaces (discharge shock hazard).
- To prevent undefined transient stress of the components and possible damage due to inadmissible voltages or compensation currents, electrical connections should only be established or separated when the equipment is switched off and after any capacitor charges have decayed.

SMD-Bauelemente

Der Austausch von SMD-Bauelementen ist ausschliesslich geübten Fachleuten vorbehalten. Für verwüstete Platinen können keine Ersatzansprüche geltend gemacht werden. Beispiele für korrekte und falsche SMD-Lötverbindungen in der Abbildung weiter unten.

Bei Studer werden keine handelsüblichen SMD-Teile bewirtschaftet. Für Reparaturen sind die notwendigen Bauteile lokal zu beschaffen. Die Spezifikationen von Spezialbauteilen finden Sie in der Serviceanleitung.

SMD Components

SMDs should only be replaced by skilled specialists. No warranty claims will be accepted for circuit boards that have been ruined. Proper and improper SMD soldering joints are depicted below.

Studer does not keep any commercially available SMDs in stock. For repair the corresponding devices should be purchased locally. The specifications of special components can be found in the service manual.

<p>Demontage/Dismounting</p>	
<p>Montage/Mounting</p>	<p>Beispiele/Examples</p>

Störstrahlung und Störfestigkeit

Das Gerät entspricht den Schutzanforderungen auf dem Gebiet elektromagnetischer Phänomene, wie u.a. in den Richtlinien 89/336/EWG und FCC, Part 15, aufgeführt:

1. Vom Gerät erzeugte elektromagnetische Strahlung ist soweit begrenzt, dass bestimmungsgemässer Betrieb anderer Geräte und Systeme möglich ist.
2. Das Gerät weist eine angemessene Festigkeit gegen elektromagnetische Störungen auf, so dass sein bestimmungsgemässer Betrieb möglich ist.

Das Gerät wurde getestet und erfüllt die Bedingungen der im Kapitel „Technische Daten“ aufgeführten EMV-Standards. Die Limiten dieser Standards gewährleisten mit angemessener Wahrscheinlichkeit sowohl den Schutz der Umgebung wie auch entsprechende Störfestigkeit des Gerätes. Absolute Garantie, dass keine unerlaubte elektromagnetische Beeinträchtigung während des Betriebes entsteht, ist jedoch nicht gegeben.

Um die Wahrscheinlichkeit solcher Beeinträchtigung weitgehend auszuschliessen, sind u.a. folgende Massnahmen zu beachten:

- Installieren Sie das Gerät gemäss den Angaben in der Betriebsanleitung, und verwenden Sie das mitgelieferte Zubehör.
- Verwenden Sie im System und in der Umgebung, in denen das Gerät eingesetzt ist, nur Komponenten (Anlagen, Geräte), die ihrerseits die Anforderungen der obenerwähnten Standards erfüllen.
- Sehen Sie ein Erdungskonzept des Systems vor, das sowohl die Sicherheitsanforderungen (die Erdung der Geräte gemäss Schutzklasse I mit einem Schutzleiter muss gewährleistet sein), wie auch die EMV-Belange berücksichtigt. Bei der Entscheidung zwischen stern- oder flächenförmiger bzw. kombinierter Erdung sind Vor- und Nachteile gegeneinander abzuwägen.
- Benutzen Sie abgeschirmte Kabel, wo vorgesehen. Achten Sie auf einwandfreie, grossflächige, korrosionsbeständige Verbindung der Abschirmung zum entsprechenden Steckeranschluss und dessen Gehäuse. Beachten Sie, dass eine nur an einem Ende angeschlossene Kabelabschirmung als Sende- bzw. Empfangsantenne wirken kann (z.B. bei wirksamer Kabellänge von 5 m oberhalb von 10 MHz), und dass die Flanken digitaler Kommunikationssignale hochfrequente Aussendungen verursachen (z.B. LS- oder HC-Logik bis 30 MHz).
- Vermeiden Sie Bildung von Masseschleifen oder vermindern Sie deren unerwünschte Auswirkung, indem Sie deren Fläche möglichst klein halten und den darin fliessenden Strom durch Einfügen einer Impedanz (z.B. Gleichtaktdrossel) reduzieren.

Electromagnetic Compatibility

The equipment conforms to the protection requirements relevant to electromagnetic phenomena that are listed in the guidelines 89/336/EC and FCC, part 15.

1. The electromagnetic interference generated by the equipment is limited in such a way that other equipment and systems can be operated normally.
2. The equipment is adequately protected against electromagnetic interference so that it can operate correctly.

The unit has been tested and conforms to the EMC standards applicable to residential, commercial and light industry, as listed in the section „Technical Data“. The limits of these standards reasonably ensure protection of the environment and corresponding noise immunity of the equipment. However, it is not absolutely warranted that the equipment will not be adversely affected by electromagnetic interference during operation.

To minimize the probability of electromagnetic interference as far as possible, the following recommendations should be followed:

- Install the equipment in accordance with the operating instructions. Use the supplied accessories.
- In the system and in the vicinity where the equipment is installed, use only components (systems, equipment) that also fulfill the above EMC standards.
- Use a system grounding concept that satisfies the safety requirements (protection class I equipment must be connected with a protective ground conductor) that also takes into consideration the EMC requirements. When deciding between radial, surface or combined grounding, the advantages and disadvantages should be carefully evaluated in each case.
- Use shielded cables where shielding is specified. The connection of the shield to the corresponding connector terminal or housing should have a large surface and be corrosion-proof. Please note that a cable shield connected only single-ended can act as a transmitting or receiving antenna (e.g. with an effective cable length of 5 m, the frequency is above 10 MHz) and that the edges of the digital communication signals cause high-frequency radiation (e.g. LS or HC logic up to 30 MHz).
- Avoid ground loops or reduce their adverse effects by keeping the loop surface as small as possible, and reduce the noise current flowing through the loop by inserting an additional impedance (e.g. common-mode rejection choke).

Class A Equipment - FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residen-

tial area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution:

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment. Also refer to relevant information in this manual.

CE-Konformitätserklärung

Der Hersteller,
RELEC SA,
CH-1400 Yverdon

erklärt in eigener Verantwortung, dass die Produkte

Studer A1, Active Studio Monitor,
(ab Serie-Nr. 190916),
Studer A3, Active Studio Monitor,
(ab Serie-Nr. 183701),
Studer A5, Active Studio Monitor,
(ab Serie-Nr. 181700),

auf die sich diese Erklärung bezieht, entsprechend den Bestimmungen der EU-Richtlinien und Ergänzungen

- Elektromagnetische Verträglichkeit (EMV):
89/336/EWG + 92/31/EWG + 93/68/EWG
- Niederspannung:
73/23/EWG + 93/68/EWG

mit den folgenden Normen und normativen Dokumenten übereinstimmen:

- Sicherheit:
Schutzklasse 1, EN 60065:1993; IEC 65:1985
- EMV:
EN 55103-1/-2:1996, elektromagnetische Umgebungen E2 und E4

Yverdon, 31. März 1999



Alain Roux, Direktor

CE Declaration of Conformity

The manufacturer,
RELEC SA,
CH-1400 Yverdon

declares under his sole responsibility that the products

Studer A1, Active Studio Monitor,
(on from serial No. 190916),
Studer A3, Active Studio Monitor,
(on from serial No. 183701),
Studer A5, Active Studio Monitor,
(on from serial No. 181700),

to which this declaration relates, according to following regulations of EU directives and amendments

- Electromagnetic Compatibility (EMC):
89/336/EEC + 92/31/EEC + 93/68/EEC
- Low Voltage (LVD):
73/23/EEC + 93/68/EEC

are in conformity with the following standards or other normative documents:

- Safety:
Class 1, EN 60065:1993; IEC 65:1985
- EMC:
EN 55103-1/-2:1996, electromagnetic environments E2 and E4

Yverdon, March 31, 1999



Alain Roux, Director

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1 WELCOME!

We are happy to welcome you in the circle of the users of Studer's A series active speakers, and we felicitate you on your selection. Thanks to Studer's experience collected during more than 40 years of business in the professional audio products field, you may expect that the performance of your new unit will fulfill your highest demands.

1.1 Basics

With the A series, Studer has created a family of active speaker systems. With exterior dimensions kept at a minimum, but nevertheless with high sound pressure levels, these speakers are suited for many different applications. For audition rooms and continuity cubicles, for the editing studio and control rooms, for use in mobile applications or OB vans, the A series offers ideal problem-oriented solutions.

The Studer A series active speakers can be adjusted to any individual requirement by means of various controls. Differences in operating levels or differences due to speaker placement can be compensated thanks to the variable input sensitivity and the bass roll-off controls. For horizontal placement, the A5's mid-range/tweeter unit can be rotated by $\pm 90^\circ$ after loosening four screws.

To meet professional standards, the A series is equipped with an XLR-compatible connector and electronically balanced line input (A1) or transformer-balanced line input (A3 and A5).

The most important characteristics of the A series active speakers can be summarized as follows:

- Active 2- or 3-way speakers for high sound pressure levels in near-field applications or medium- and large-sized monitoring rooms.
- Suited for all commonly used operating levels, input sensitivity continuously adjustable.
- Low distortion rating; the magnetic flux is stabilized by damping the coil reaction.
- Exceptional damping of the individual systems by negative output impedance of the power amplifiers.
- Matched signal propagation delay between the individual transducers through separate electronic delay lines.
- Group delay compensated band-pass filters.

Negative output impedance:

A speaker diaphragm should accurately follow the electrical excitation. In the Studer A series active speakers, this is achieved with negative output impedance in all power amplifiers, which efficiently attenuates undesired echo oscillations of the diaphragm. Each of the frequency ranges features its own power amplifier with negative output impedance. This forces the diaphragm to exactly follow the input signal, and undesired responses (diaphragm and enclosure echoes) are suppressed. Percussive signals in particular (e.g. applause) are reproduced very accurately.

This principle is also an essential prerequisite for other improvements:

- Utilization of optimum crossover network techniques
- Other distortion reduction measures.

Helmholtz resonator

A cavity with an external opening is referred to as Helmholtz resonator. If a driven diaphragm is added to this system, the well-known “bass reflex” enclosure is obtained, having the advantage of significantly more energy gain in the bass reflex resonance area. The transmission range can thus be expanded toward the low end without overloading the speaker.

In combination with the negative output impedance, it is possible to consider this arrangement strictly as a Helmholtz resonator again, being easily compensated for the bass reflex drawbacks by electronic means. Such a combination achieves clean bass reproduction down to frequencies amazingly low for the given enclosure size.

Group-delay-compensated filters

The evaluation of a speaker cannot simply be based on one single point of the room, but the entire radiation behavior must be considered.

The division of the frequency spectrum, unfortunately made necessary by various reasons such as Doppler effect, partial oscillations of the diaphragms, etc., creates additional problems.

If the individual speaker systems are arranged vertically, the horizontal radiation characteristic depends almost exclusively on the quality of the chassis. In the vertical direction, however, a bundled aggregate signal is obtained. If the partial signals are not in phase with each other – either due to different acoustic propagation times or phase rotation in the crossover – the radiation lobe changes its direction in the transition zones. If the ear is not accurately positioned, dips or even peaks in the frequency response can strongly influence the sound impression and the localization of the sound source.

Delay compensation

The distance from the point of origin of the sound to the speaker surface varies because the individual speaker systems have different mounting depth. With wide-band signals, this normally leads to dispersion (i.e. the individual frequency components arrive at the listening position at different times).

In the Studer A series active speakers, these differences in the transit time of the audio signals are compensated by analog delay circuits maintaining the necessary delay up to frequencies above the audio range.

Time delay compensation, negative output impedance of the power amplifiers, and a sophisticated crossover design offering steep filter characteristics *and* phase linearity, all together leads to the excellent impulse behavior of the A series and to their greatly improved reproduction of transient music signals.

Ideally suited for surround sound

A unique feature of the A-Series studio monitors is that different speaker types can be mixed for setting up a surround system. The simple reason for this is the group-delay compensation.

Usually, combining different speaker types with uncompensated group-delay can cause quite unpleasant phase-domain effects, resulting in sound sources being placed in wrong positions. Parts of a signal panned to the right side could then be localized behind the listener or in other undesired positions. The different A-Series studio monitors feature identical phase response over the whole frequency spectrum and therefore give an accurate sound source positioning.

1.2 Safety and Connections

1.2.1 Utilization for the Purpose Intended



The Studer A series active speakers are designed for professional use. It is presumed that the units are operated only by trained personnel; servicing must be performed by qualified experts.

The electrical connections may be connected only to the appropriate voltages and signals specified in this manual. Please consult the Safety and EMC sections at the very beginning of this manual.

1.2.2 Unpacking and Inspection

Your new unit is shipped in a special packing which protects it against mechanical shock during transit. Care should be exercised when unpacking so that its surfaces do not get marred.

Verify that the content of the packing agrees with the items listed on the enclosed shipping list. Check the condition of the equipment for signs of shipping damage. If there should be any complaints please immediately notify the forwarding agent and your nearest Studer distributor.

Please retain the packing material because it offers the best protection in case your unit ever needs to be transported.

1.2.3 Installation



Before any connection:

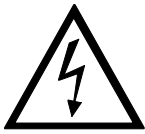
Check the line voltage selector setting before connecting the unit to the mains. The voltage selector is located inside the fuse holder next to the power inlet. The unit can be operated on mains voltages of 115 or 230 V_{AC}, 50 to 60 Hz. Also check for correct value of the primary fuse:

A1	230 V: T 1.6 A L 250 V (5 × 20 mm)
	115 V: T 3.15 A L 250 V (5 × 20 mm)
	<i>USA and Canada:</i> 115 V: 3.2 A slow blow UL/CSA (5 × 20 mm)
A3	230 V: T 0.8 A L 250 V (5 × 20 mm)
	115 V: T 1.6 A L 250 V (5 × 20 mm)
	<i>USA and Canada:</i> 115 V: 1.6 A slow blow UL/CSA (5 × 20 mm)
A5	230 V: T 0.5 A L 250 V (5 × 20 mm)
	115 V: T 1.0 A L 250 V (5 × 20 mm)
	<i>USA and Canada:</i> 115 V: 1.0 A slow blow UL/CSA (5 × 20 mm)



Mains cable:

Depending on your country, the A Series Active Monitor Speakers come with an IEC mains cable or a female IEC 320/C13 mains cable socket. This socket has to be connected to an appropriate mains cable by a trained technician with respect to your local regulations. Refer to the “Installation” section at the beginning of this manual.



Danger! *Repair work may only be performed by a trained service technician. The primary fuse must be replaced by a spare fuse of exactly the same type. The unit must not be opened by the user because of the risk of a severe electric shock hazard!*

Humidity: Do not use the units near any source of moisture or in excessively humid environments.

Ventilation: *In order to guarantee adequate air circulation, the unit's rear side must not be mounted closer than 6 cm from a wall.*

Magnetic radiation: *Do not mount the A5 and A3 units closer than 40 cm from a video or computer monitor. Thanks to low magnetic dispersion drivers and additional screening, the A1 units can be operated also next to video or computer monitors, or measuring instruments.*

Mounting facilities: Four tapped M6 inserts are located on the bottom of the A5 and A3 units. They can be used for mounting it on a base plate, a wall-mount kit or a stand (refer to section 2.2, Options).



The A5 cannot be mounted with a ceiling mounting kit. When mounted on a stand or wall-mount, please make sure that the tilting angle in either direction does not exceed 30°!

The A1 is shipped with a threaded mounting bracket for easy installation on a microphone stand.

Location: The A series has been aligned for free placement, i.e. not close to walls or in edges. Ideal mounting distances are 1...2 m from walls and at least 60 cm from the floor. If operation of the A5 or A3 units near room boundaries is required, the resulting bass boost can be compensated with the ROLL OFF control.

On the A1 unit the ROLL OFF control is not available, because this type and size of loudspeaker usually is not operated near room boundaries.

2 GENERAL

2.1 Scope of Delivery

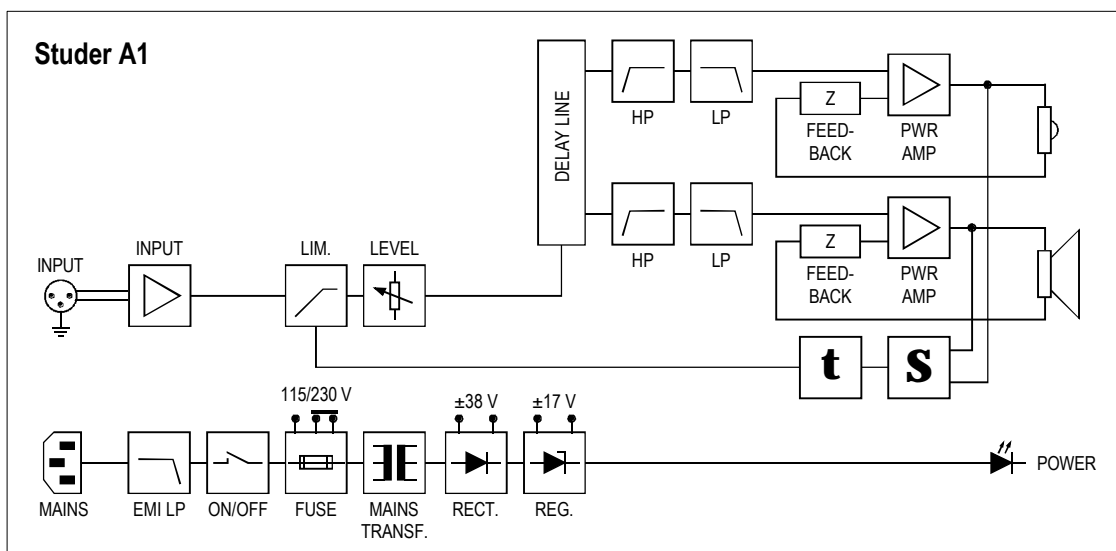
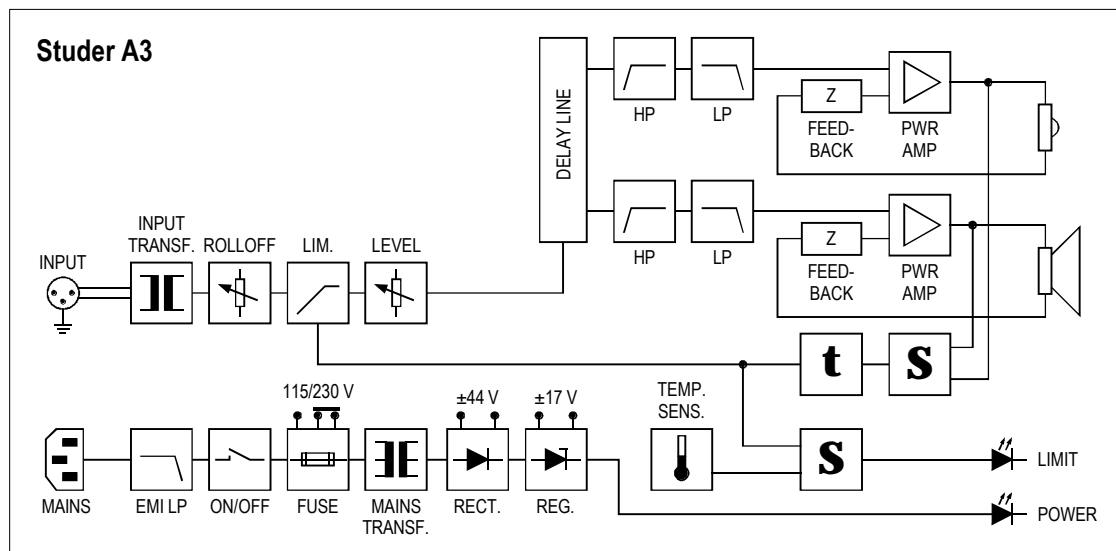
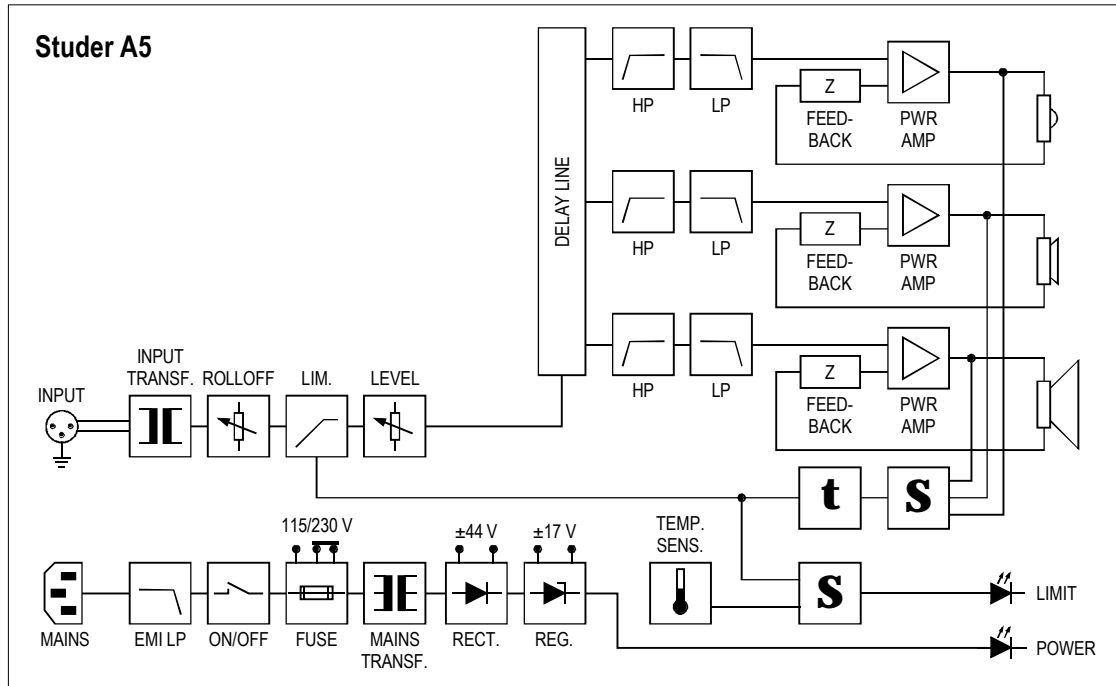
The Studer A series active speakers are shipped with an operating manual (order no. 10.27.4551), and either an IEC 320/C13 socket or an IEC mains cable, depending on your country.

2.2 Options

Order No.

Wall-mount kit (for A5 and A3) (OmniMount) with adjustable tilt. <i>Caution: The maximum tilting angle of the A5 must not exceed 30°!</i>	20.020.230.04
Floor stand (for A5 and A3) Moveable floor stand complete with 4 castors, rugged aluminium design. Adjustable column height. Maximum carrying capacity 40 kg.	20.020.230.21
Floor stand (for A5 and A3) Foldable tripod floor stand. Adjustable column height (1.25...2.3 m). Maximum carrying capacity 50 kg.	10.705.214.60
Woofers protection grille (for A1) Set for one A1 speaker, containing a protection grille, mounting hardware, and instruction sheet.	15.258.211.00
Operating Instructions (additional manual)	10.27.4551
Operating and Service Instructions	10.27.4540

2.3 Block Diagrams



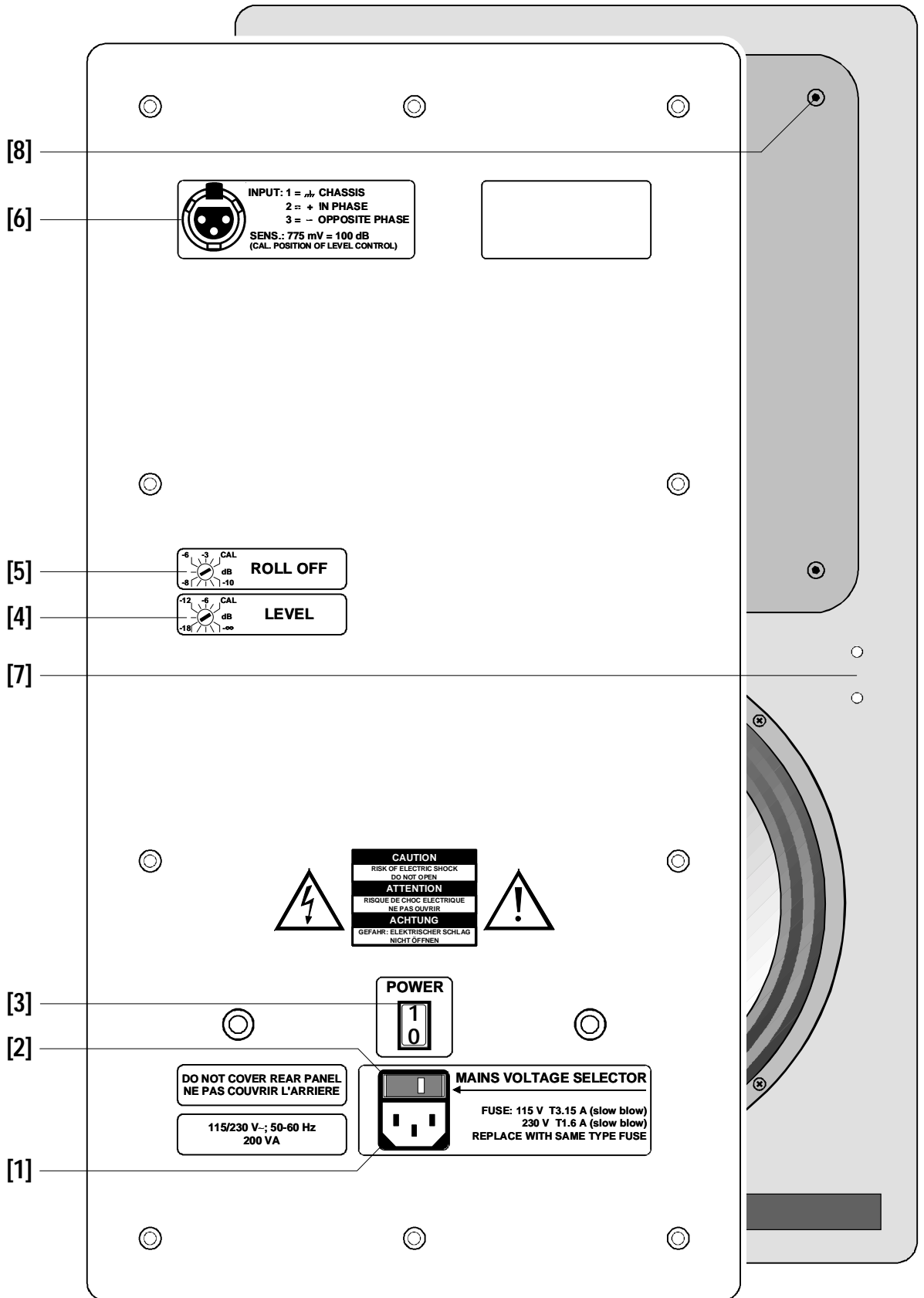
2.4 Technical Specifications (preliminary, subject to change without notice)

	A5	A3	A1
Input	transformer-balanced		electronically balanced
Input impedance	balanced, 5 k Ω	balanced, 5 k Ω	balanced, 12 k Ω
Input sensitivity for 100 dB SPL @ 1 m	0.775 V		
Signal-to-noise ratio	-100 dBA		
Max. input voltage	24 Vpp		20 Vpp
Continuous max. SPL, 1 m	110 dB	108 dB	101 dB
Program max. SPL, 1 m (short term RMS)	118 dB	114 dB	106 dB
Frequency response, -6 dB	38...23000 Hz	43...23000 Hz	58...22000 Hz
Frequency response	± 1.5 dB (50 Hz...20 kHz)	± 2 dB (48 Hz...20 kHz)	± 2.5 dB (65 Hz...18 kHz)
Distortion THD @ 90 dB SPL/1 m	< 1% (50 Hz...20 kHz)	< 1.2% (48 Hz...20 kHz)	< 1% (75 Hz...15 kHz)
Dispersion (P.N. 4...16 kHz at -6 dB)	90° x 90° (H x V)	90° x 90° (H x V)	100° x 100° (H x V)
System	3-way	2-way	2-way
Crossover frequency	450 Hz, 3 kHz	2.2 kHz	3.5 kHz
Woofer ext./diaphragm	\varnothing 250 mm / \varnothing 205 mm	\varnothing 215 mm / \varnothing 170 mm	\varnothing 142 mm / \varnothing 102 mm
Midrange ext./diaphragm	\varnothing 142 mm / \varnothing 102 mm	-	-
Tweeter ext./diaphragm	\varnothing 100 mm / \varnothing 25 mm	\varnothing 100 mm / \varnothing 25 mm	\varnothing 70 mm / \varnothing 20 mm
Input connector	1 x XLR 3f		
Dimensions W x H x D [mm]	320 x 590 x 380	250 x 400 x 305	162 x 242 x 170
Net weight	29 kg	12.8 kg	5 kg
Mains	115/230 V (50/60 Hz)		
Power inlet	IEC 320/C14		
Power consumption	18...200 VA	10...100 VA	7...70 VA
Relative humidity (average / max.)	< 75% / < 90%		
Ambient temperature	5...40° C		
Safety standard	Protection class I according to EN 60065: 1992, IEC 65: 1985.		
EMC standard	EN 55103-1/-2; 1996, electromagnetic environments E2 and E4.		

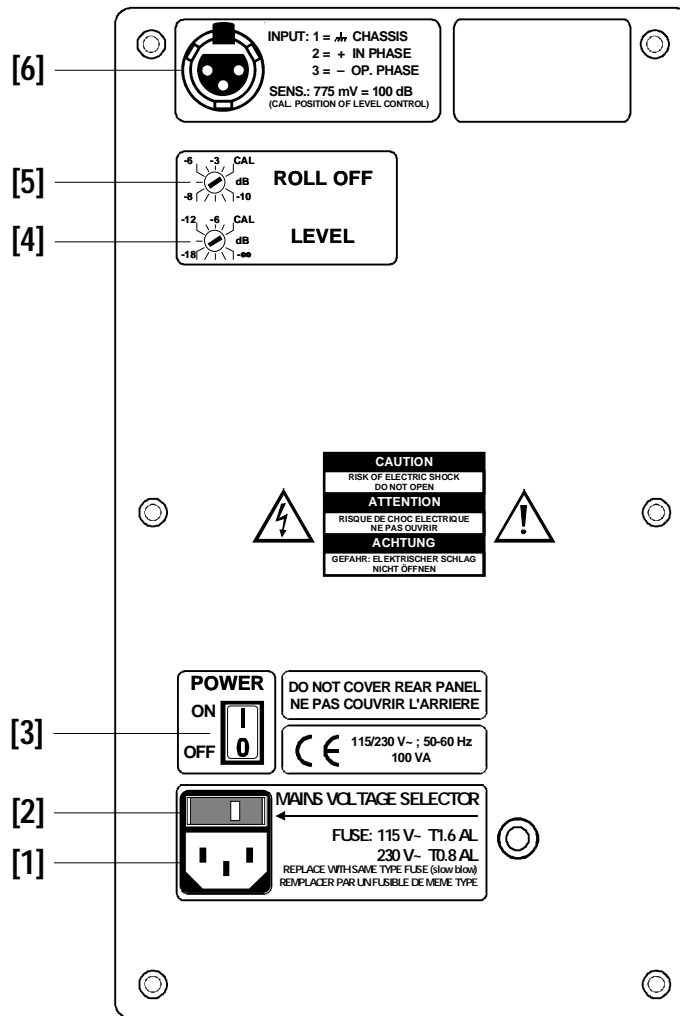
3 OPERATION

3.1 Connectors, controls

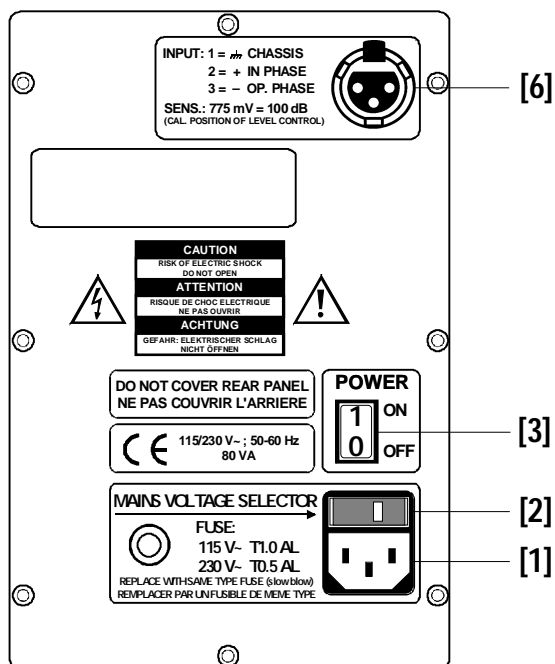
A5:



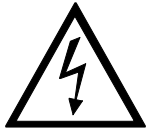
A3:



A1:



[1] IEC mains connector



Appliance inlet IEC 320/C14 for connection to a 3-pole AC power outlet with protective ground.

Supply voltage (selectable): 115 or 230 V_{AC}; frequency 50...60 Hz.

For connecting to the mains, please consult the Safety section at the very beginning of this manual.

Make sure that the voltage selector setting matches your local line voltage!

[2] Mains fuse, voltage selector



The voltage selector is contained within the fuse holder; its setting can be changed only while the power is switched off. To change the setting, first pull out the black fuse holder cover, then pull out the grey fuse holder. Insert it into the fuse holder cover again after having rotated it by 180 degrees. Check for correct setting before plugging in the fuse holder cover: The set voltage value is indicated in the small window in the fuse holder cover.

The primary fuse must be replaced by a spare fuse of exactly the same type and value!

[3] POWER

Power on/off switch.

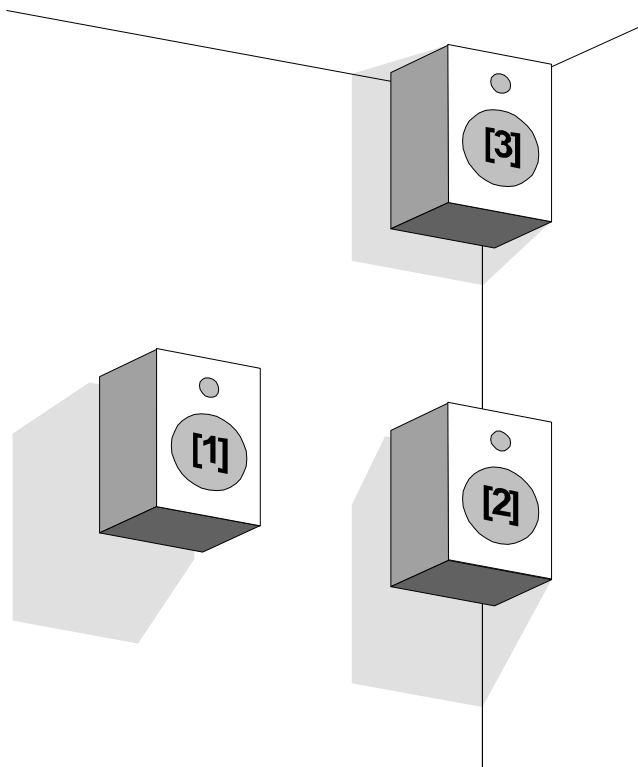
[4] LEVEL

Potentiometer for matching the input sensitivity to your standard line level.

Note: *For the A1, this control is located on the front panel.*

[5] ROLL OFF (A3 and A5 only)

Continuously adjustable bass cut filter, allows attenuation of the low frequencies in order to compensate for boundary reflections when the unit is mounted close to one (approx. -3 dB setting, fig. [1]), to two (approx. -6 dB setting, fig. [2]), or to three room boundaries (approx. -10 dB setting, fig. [3]).



[6] INPUT

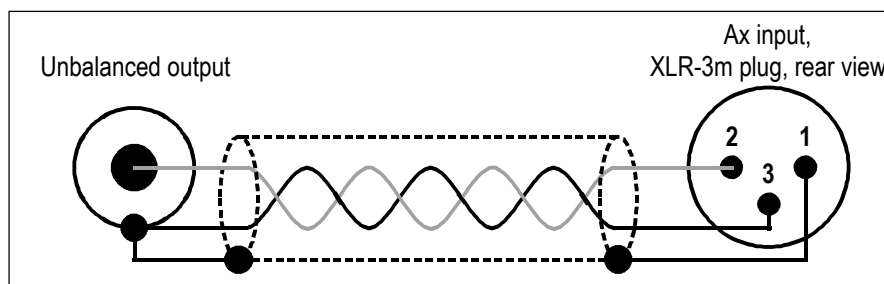
Transformer-balanced (A5 and A3) or electronically balanced (A1) audio input on female 3-pin XLR connector.

Pin assignment:

Pin	Signal
1	Ground
2	Input +
3	Input -
-	Chassis

Polarity: A positive voltage on pin 2 causes a positive diaphragm deflection (i.e., the woofer's diaphragm moves towards the listener).

Note: The A series speakers can also be driven by unbalanced sources (Hi-Fi). In that case, use a cable according to the diagram below.

**[7] Pilot LEDs**

All A Series speakers feature a green Power On LED.

The A1 speaker is overload-protected by a limiter function *without* LED indicator.

On the A3 and A5 speakers, the red Alarm LED on the front panel indicates as follows:

Status	Red Alarm LED status	Audio output
Normal operation conditions	dark	No limiting or muting
Chassis overload (limiter active)	flickering	Output is attenuated to a safe level until input signal is reduced.
Overheat detection (above approx. 65...75° C)	continuously on	Output is muted until amplifier is cooled down.

[8] Midrange/tweeter unit (A5 only)

If the A5 cannot be set up vertically (which in fact is the recommended position), its midrange/tweeter assembly can be rotated by ± 90 degrees.

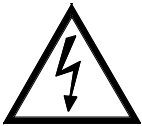
To do so, switch the speaker off and unplug the mains connection; loosen the 4 mounting screws (Allen screwdriver no. 4) of the midrange/tweeter assembly. Because it fits quite tightly, you can use one of the four recesses located at the circumference of the midrange speaker to pull out the assembly carefully.

Reinsert it after having turned it by the required angle, and re-tighten the four screws in order to get a sealed joint again.

4 SERVICE INFORMATION

Detailed service instructions can be found in the Operating and Service Instructions manual which is separately available (order no. 10.27.4540).

4.1 General



Important! Repair work may only be performed by a trained service technician. The primary fuse must be replaced by a spare fuse of exactly the same type and rating. The unit must not be opened by the user – risk of a severe electrical shock hazard!

- During servicing, *never* short any two terminals.
- The settings of an assembled and aligned unit may slightly differ from the ones of the aligned PCB.
- If acoustical measurements are performed with an MLS system, insatisfactory results will be obtained unless obstacles are at a distance larger than the current wavelength. *For more information on frequency response measurements, please refer to the Appendix of the Operating and Service Instructions manual (order no. 10.27.4540).*
- In case of incorrect manipulation and/or adjustment, the manufacturer cannot be made liable for failure or insatisfactory results.

4.2 Spare Parts

Item	Order no.		
	A1	A3	A5
Primary fuse (230 V) (5 × 20 mm)	51.01.0114 (T 0.5 A L 250 V)	51.01.0116 (T 0.8 A L 250 V)	51.01.0119 (T 1.6 A L 250 V)
Primary fuse (115 V) (5 × 20 mm)	51.01.0117 (T 1.0 A L 250 V)	51.01.0119 (T 1.6 A L 250 V)	51.01.0122 (T 3.15 A L 250 V)
Primary fuse (USA/Canada) (5 × 20 mm)	51.01.1017 (1.0 A slow blow UL/CSA)	51.01.1020 (1.6 A slow blow UL/CSA)	51.01.1026 (3.2 A slow blow UL/CSA)
Woofers unit	15.258.210.00	15.258.110.00	15.258.010.00
Mid-range unit	-----	-----	15.258.020.00
Tweeter unit	15.258.240.00	15.258.140.00	15.258.040.00
* Complete backpanel/heat-sink assembly, including power supply and amplifiers	* 15.258.230.00	* 15.258.130.00	* 15.258.030.00
Backpanel only, silk screened	15.258.220.00	15.258.120.00	15.258.050.00
Mains transformer	15.258.221.00	15.258.121.00	15.258.121.00 (2 pcs. used)
* Power amplifier, preadjusted	* 15.258.222.00	* 15.258.122.00	* 15.258.052.00
Mounting bracket	15.258.223.00	-----	-----
Enclosure body, empty	15.258.229.00	15.258.129.00	15.258.059.00
Woofers protection grille, mounting kit	15.258.211.00	-----	-----



*** Important note:** When ordering a complete backpanel/amplifier assembly or a power amplifier unit, it is mandatory to declare the speaker type and serial number (as indicated on the speaker's backpanel). Only if these conditions are met, the manufacturer can ensure that the desired spare part is shipped with correct pre-alignments.