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WURLITZER®

CE

Amplifier K99



Operating Instructions

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1 Device description of the amplifier K99

The amplifier K99 is optimised for universal use in Deutsche Wurlitzer GmbH music machines. Great importance had been attached for an easy handling and stand alone function without the S&CC unit. The output power is designed for the typical used internal speakers at Deutsche Wurlitzer GmbH machines, under normal circumstances reaching an impeccable volume level.

DETAILS:

Standard equipment:

- Hybrid power stage technology, short circuit and over temperature protected
- 2 inputs (stereo): CD and tape
- 1 mono input for optional micro kit
- Volume control with 2 pots onboard
- Volume control possible with pots and / or IR at the same time. The pot used at last determines the volume.
- Bass and treble control with pots
- BGM volume reduction, controllable with pot
- Automatic volume correction (AVC), switchable
- 2 channel operation switchable, RH = internal speakers, LH = external speakers
- Status display with 7segment display
- Independent controllable RCA output to connect external amplifiers
- For use with the old and the new changer mechanism.

Optional:

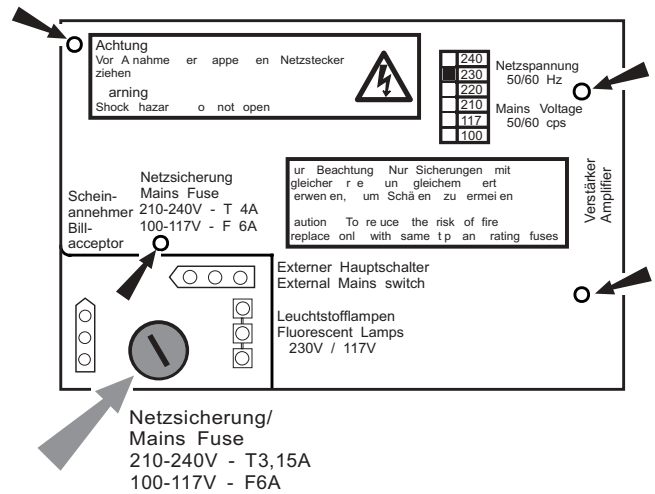
- Remote control of F91 with large distance range. Functions: track selection / volume chan. 1 / volume chan. 2 / mute (toggle) / cancel
- Volume control with two pots in the wired remote box accessible from the machine rear wall, or external. Cancel button and mute button (with toggle function).
- Output transformer (like F91)
- Microphone kit

2 Technical data

	General	USA / Canada
Supply	100v - 240v	117v
Mains frequency	50cps - 60cps	60cps
Input voltage CD	typ. 1.2v	typ. 1.2v
Input voltage tape	300mv	300mv
Output voltage pre amplifier	$\leq 1\text{veff}$	$\leq 1\text{veff}$
Output power	2 x 55w (rms)	2 x 55w (rms)
Output impedance	min. 4ohm	min. 4ohm
Transmission range	20cps - 20,000cps	20cps - 20,000cps
Distorsion factor	< 1%	< 1%
Noise level	Depending on the adjusted volume of the juke-box loudness levels of more than 70 dB(A) can be reached.	

3 Verification of power voltage

The voltage settings are marked on the cover plate of the mains transformer. Machines for USA are set to 117V. They have a special transformer according to UL standard which is not adjustable. Jukeboxes "UNI-Pack" are shipped in 230V setting. This is marked on the machine label inside of the door. If the voltage setting is not clear the transformer cover plate has to be removed. The mains fuse (T3.15A) is located on the left bottom side in-between the three terminals for the bill acceptor, the external mains switch and the fluorescent lamps.



Loosen the four screws to remove the cover plate (small arrows).



ATTENTION! Always remove power plug before opening transformer cover plate. Never attempt any intervention to these parts unless qualified!

The position of the two plug connectors on the transformer terminals 1 to 9 (primary side) indicates the current voltage setting. The following combinations are possible:

240V = 1 - 9

230V = 1 - 8

220V = 2 - 9

210V = 2 - 8

117V = 1 - 6

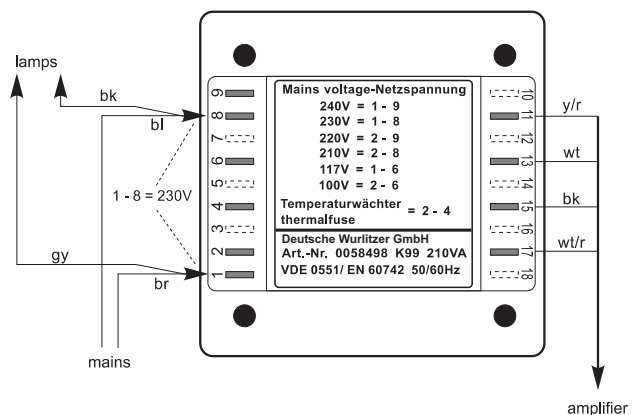
100V = 2 - 6

Notice that these settings cannot be made on machines produced according to UL standard.



NOTE: Never connect the fluorescent supply to other contact.

If you intend to change the power voltage for a higher voltage (e.g. from 117V to 230V) it is better to use a subtransformer for the fluorescent lamps or change the ballast according to the used voltage (e.g. for 230V).



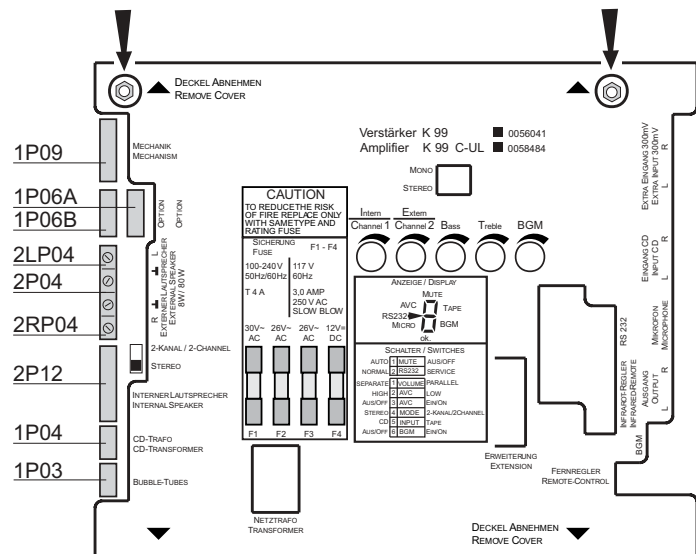
4 Position of fuses and plug connectors on the K99

Usually the jukeboxes are fitted with fuses of DIN 41571 (5x20 mm) slow blow or medium blow. Slow blow fuses of DIN standard bear the letter T (T = "Träge") e.g. T 4/250 means T = slow blow, 4 amps, 250 V maximum operating voltage. Which fuses have to fit in where is printed on the power transformer cover. Fast blow fuses (F = Flink) are unsuitable for the jukebox.

The fuse holder on the amplifier P.C.B. are capable to hold also fuses of 6x32 mm size.

You will find the fuses behind the amplifier cover plate. To remove the plate first unplug the cable coming from the mains transformer.

Next lose slightly both nuts on top of the amplifier accessible through the holes in the cover plate (arrows). To remove the plate first take the bottom side out of its hinges and then the top side.



Connection plan of the plug terminals:

- 1P09 - mechanism, SCC unit
- 1P06A - option
- 1P06B - option
- 2LP04 - external speakers, LH
- 2P04 - external speakers, ground
- 2RP04 - external speakers, RH
- 2P12 - Internal speakers
- 1P04 - CD sub transformer, CD player
- 1P03 - bubble tubes

Fuse

Main fuse T 3,15, res. F6 A for 110/117 V.

Fuse F1: T4A supply 30V ~

Fuse F2: T4A supply 26V ~

Fuse F3: T4A supply 26V ~

Fuse F4: T4A supply +12 V=

Failure

No illumination, machine completely dead.

The digital digit on the CD-control is dark. Power supply for CD player and control unit is interrupted. Credit circuit via LED M is interrupted. If credits are still in memory or free play is programmed; a CD will be placed on turntable but is not spinning.

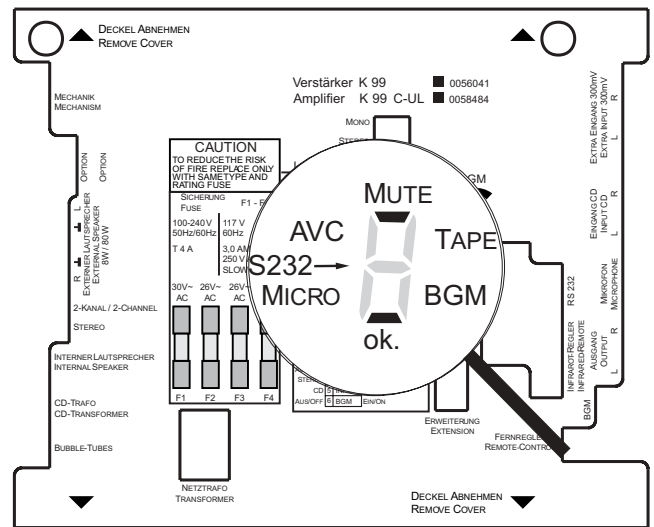
The colour tubes of the One More Time do not rotate, the heating of the bubble tubes is off - no bubbles will appear. Possibly defect of the power stage of the amplifier.

SCC unit dead - digital display dark (except red LED M still lighting up on coin insertion). The LED's K and Z on the SCC unit are dark. No initialisations run after power ON. The status display on the amplifier is dark.

5 The first power ON

The mains switch is located at the rear side of the amplifier and thus it is on the rear side of the jukebox. For wall-boxes it is possible to connect an external mains switch to the amplifier accessible then from the side. In position 'I' jukebox and amplifier are switched on.

Up to approx. 1 sec. after power on random segments of the status display will light. Followed displaying the version number of the amplifier software (1.0, or higher). Then the bottom segment for "ok." and the upper segment for MUTE will light. The amplifier is now in STANDBY MODE. Depending on other enabled options more segments may light as well (e.g. AVC).



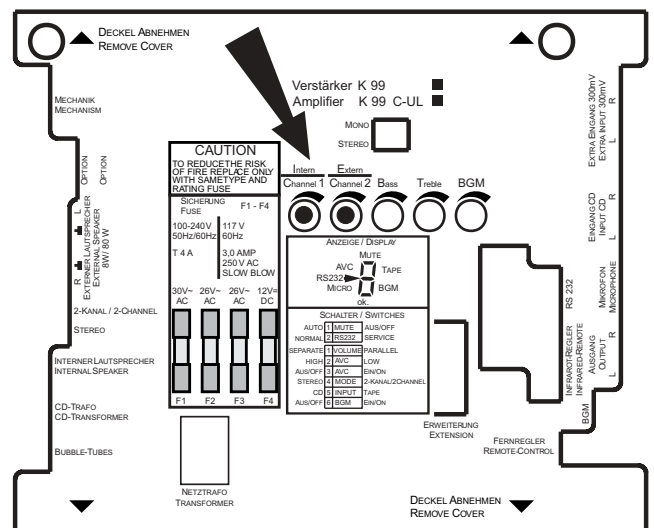
6 Volume control

You can control the volume of the jukebox from different points at the same time:

- With the pots Vol.1 and Vol.2 on the amplifier.
- With an optional connectable IR remote control.
- With the pots of the control box at the rear side of the jukebox.

The device from which the volume is changed determines it.

The volume control unit can be taken out and may be mounted at another place as a remote control. Its cable may be extended as required with any kind of wire. The voltages of the control wires are 5V DC.



The control box has two volume knobs (Intern / Channel 1 and Extern / Channel 2). In position "Stereo" the knob "Intern / Channel 1" is effective for the internal speakers. The knob Extern / Channel 2 is controlling the volume of the RCA outputs for an optional external amplifier. In DIP switch position "2 Channel" the channels 1 (RH) and 2 (LH) are controlled separately.



ATTENTION! The pots Vol.1 and Vol.2 on the amplifier are not effective if the wire control box is connected.

7 The infrared remote control

As desired an infrared remote control will be installed from factory or can be delivered as conversion kit (part no. 0058809). If it has been installed the hand transmitter is located in the cashbox.

If credit is given or free play is programmed a CD can be selected with the buttons 0 to 9 and R.

Double button functions as required in the service programs (i.e. press button 5 -hold down- and press button R), are impossible. For this you can only use the keyboard of the jukebox.

You can control the volume by means of the buttons + and -. In stereo mode the internal +/- buttons control the volume of the internal speakers. The external +/- buttons control the volume of the K99 RCA jacks for an optional external amplifier. In 2-channel mode you can control the external speakers by the buttons + and - of the external channel.

Beam the jukebox directly if possible.

You can connect the wire remote control box as well.

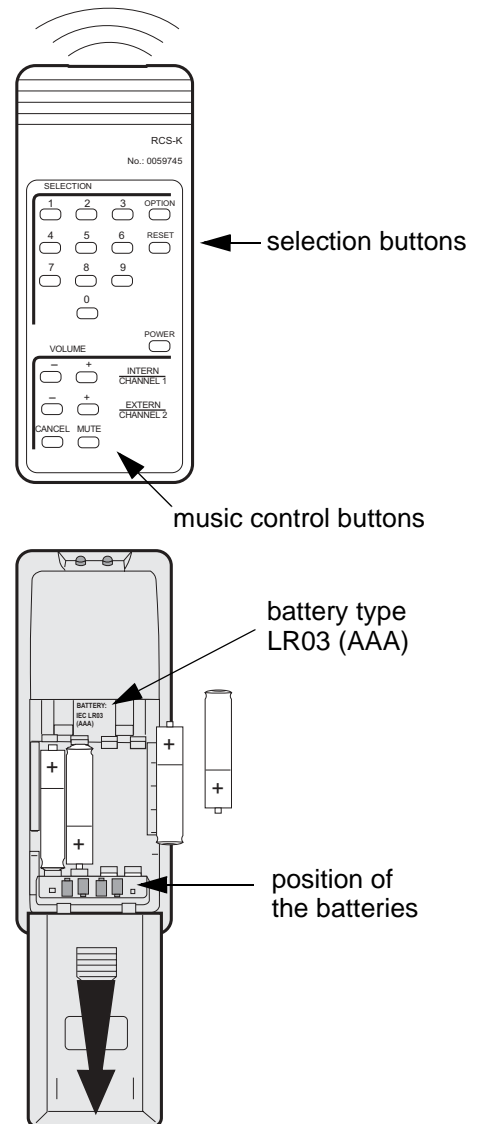
The power-on volume level is always set by the channel 1 and 2 pots on the amplifier or on the control box (if connected).

Batteries will be delivered. Necessary are 4 micro cells type LR03 (AAA).

To open the battery compartment move the cover like shown in the picture.

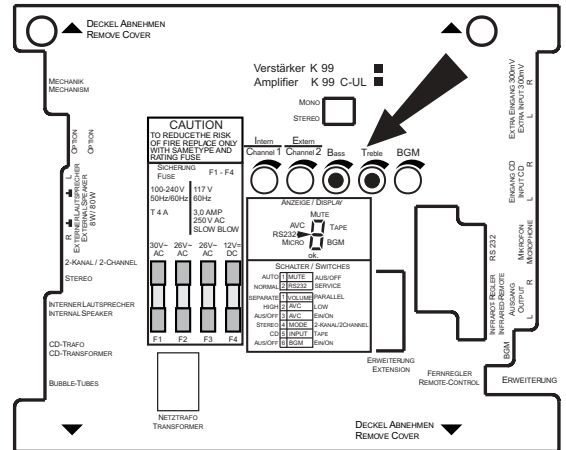
Needed battery type and position of the batteries in the hand transmitter are shown on the casing.

Part no. of the hand transmitter: 0059745.



8 Treble and bass control

You can control the sound with the knobs bass and treble on the amplifier.

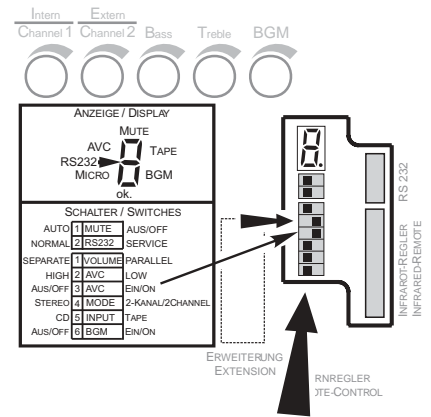


9 Automatic volume correction

The AVC sets CDs with different volume levels to an equal level. The level of CDs with a high level will be reduced; the level of low-levelled CDs will be increased. This control works rather slow to save the dynamic range of the track.

You can enable the correction with the DIP switch "AVC" (the 3rd switch of the 6 sw. group). Default is AVC disabled.

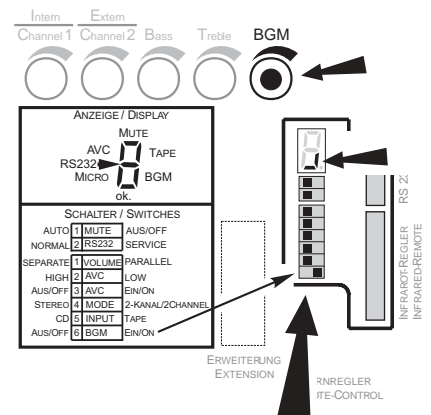
With the second DIP switch of the 6 sw. group you can reduce the intensity of volume correction.



10 Background Music - volume attenuation

In the BGM (Back Ground Music) mode the reproduction loudness will be reduced by a certain factor.

The signal "BGM" pin 1 plug brown of the SCC unit controls this function. You also can switch "BGM" on by means of the DIP switch "BGM" for test purposes. The RH bottom segment of the status display on the amplifier indicates "BGM active". You can adjust the volume attenuation with the pot "BGM", as long it is active.

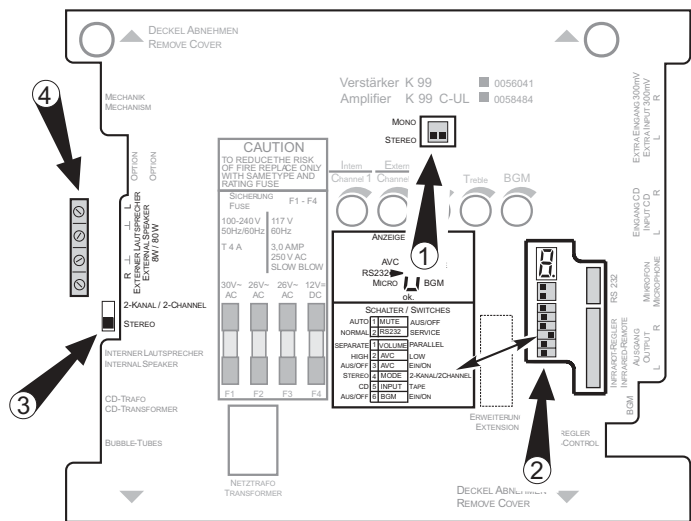


11 External speaker connection

The amplifier can operate in two different modes. The normal operation mode reproduces the music in normal stereo sound. So external speakers can be added to each channel.

The so-called 2-Channel mode uses both stereo channels like separate mono amplifiers so that the sound can be reproduced in different rooms but then in mono only.

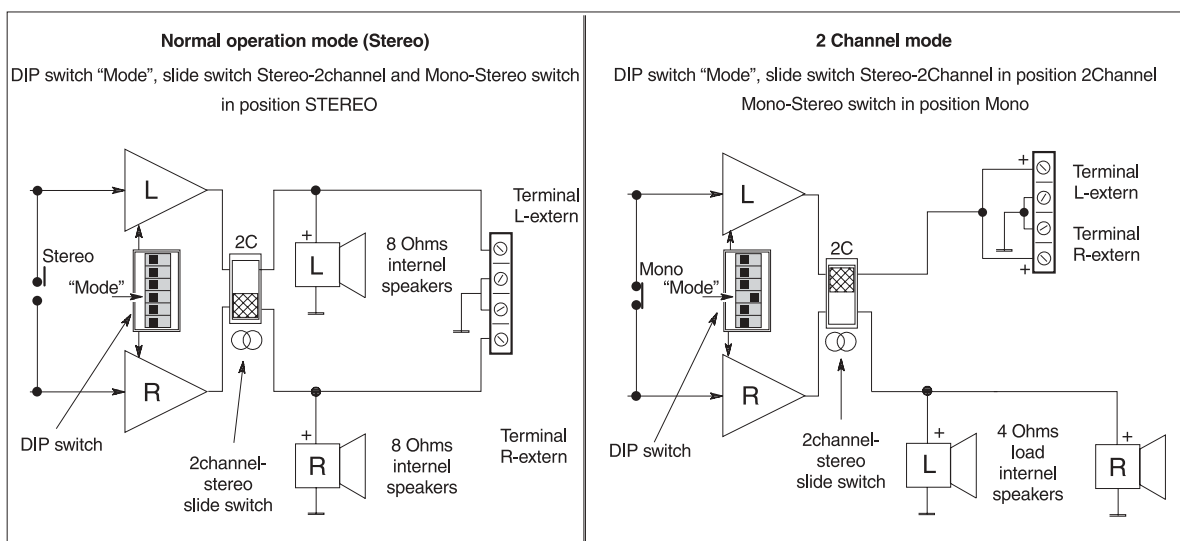
The amplifier may not be loaded with more than 4 ohms per channel (less ohms means more load!). On an overload it switches itself off. After a certain cool down time it switches itself on. So if you do not eliminate the reason for the overload the amplifier produces continuously volume drop-outs.



Position of the Stereo - Mono DIP switch (1), the mode switch in the 6 sw.group (2), the stereo - 2 channel switch (3) and the external speaker terminals (4).

The impedance of all external speakers per channel in "Stereo" mode should not be less than 8 ohms, because the cabinet speakers represent a load of already 8 ohms per channel. If the amplifier is operating in 2-Channel mode, the internal speakers are all loaded to the RH channel (Channel 1); the LH channel (Channel 2) now applying to the screw terminals "Externer Lautsprecher - External speakers" may be loaded with max. 4 ohms.

The amplifier applies approx. 55 watts (rms on max. 1% dist.) on a 4 ohms speaker per channel, 18 watts to a 12 ohms speaker and approx. 9 watts to a 24 ohms speaker. That means, that e.g., a 12 ohms speaker connected to the external channel at Dual Channel operation must be a type of at least 18 Watts, otherwise the speaker is in danger of destruction at higher volumes. Note that speaker groups like in hi-fi boxes may have, at certain frequencies, impedance much lower than their rating. Make sure that all speakers are connected in correct polarity.

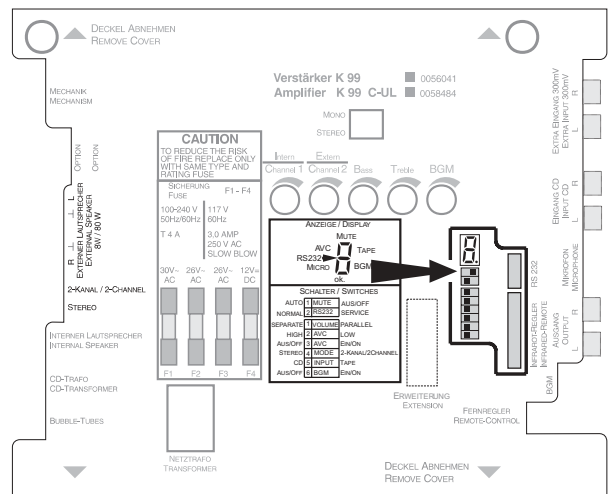


13 Disabling the internal mute circuit

With the optional BGM-Connector (part no. 0048133) you can connect an external source to the jukebox. In this case the amplifier should not be muted during standby of the jukebox.

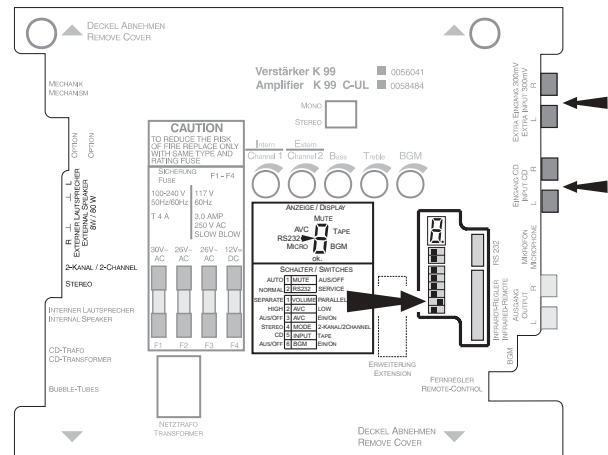
To reach this disable the internal mute circuit by setting the first DIP switch of the 2 sw. group "Mute" to OFF.

For more information order the Deutsche Wurlitzer GmbH technical information leaflets TI-MA-116 (for F91).



14 Input selector

With the 5th DIP switch of the 6 sw. group you can set either CD or tape input as active.



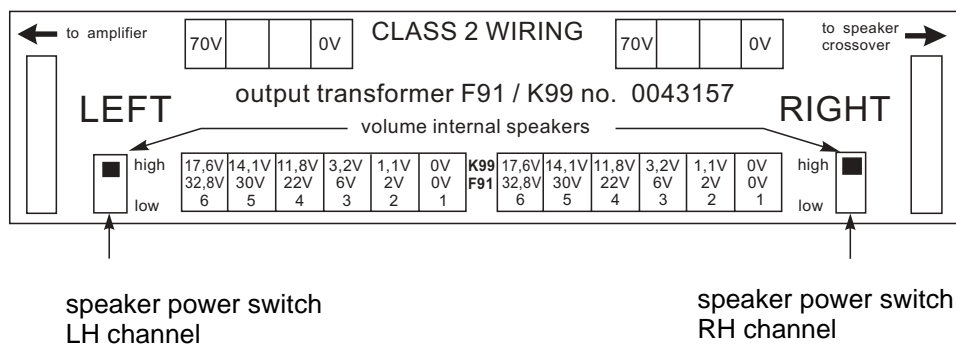
15 70V - output transformer (0043157)

If you want to work with different speakers with any other impedances or with 70V systems, we recommend to use the output transformer. You can then connect speakers between 2Ω and 16Ω together but complete independent to each other.

If you want to connect several speakers by means of an output transformer pay attention to the following hints:

- To avoid an interruption of all speakers by the overload protection circuit or a decrease of volume by the clipping stage, the total power outlet of the amplifier should not be exceeded.
- All speakers must be connected with the correct polarity.
- To work each external speaker with the desired volume level, pay attention to the respective efficiency, impedance and load limit.
- To avoid cable losses on long speaker lines (more than 60 feet) and low impedance, 70Volt-systems should be used as much as possible.
- If speakers with low impedance (2Ω, 4Ω) are used, each speaker should have its own line with sufficient cross-section.
- When an output transformer is used no speakers should be connected to the screwing terminals on the power amplifier board P4A.
- Note: The 2-channel - option can not be used in connection with an output transformer without modifying the pre amp board.

The internal speakers can be operated with lower volume (switches on the connecting board). In position HIGH power consumption of the internal speakers is approx. 32W, in position LOW approx. 10W.



15.1 Hints of connectable speaker loads

The maximum power output per channel is 55 Watts (rms). The power consumption of the connected speakers can be higher (i.e. 200 W) than the maximum remaining power outlet of the amplifier. If the power consumption is lower (i.e. 10 W) than the maximum remaining power outlet of the amplifier, it can be adapted by means of the output transformer.

15.2 Determination of the connectable speaker power

The real power consumption of a speaker equals the square of the voltage applied to the speaker terminals divided through the speaker impedance ($P = U^2 / R$). The power values calculated in this way are shown in the table below. The volume level really delivered depends also on the speaker efficiency and varies from type to type, but it is possible to even out these differences in certain limits.

15.3 Hints for speaker connection

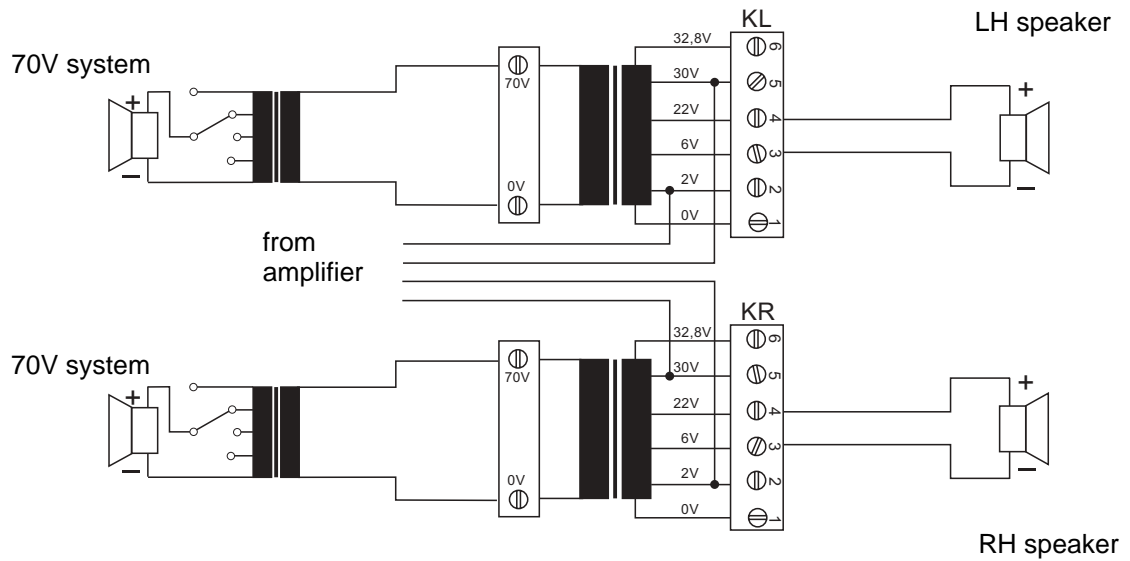
- How much amplifier output will be used for the additional speakers, high or low.
 - 45W are available, if the speaker power switch is in position LOW.
 - 23W are available, if the speaker power switch is in position HIGH.
- The load of all speakers has to be added.
 - If the total load of all speakers per channel is higher than the delivered amplifier outlet power, not all speakers may work with the maximum power.
 - If the total load of all speakers per channel is lower than the delivered amplifier outlet power, all speakers may work with the maximum power, a power reserve additionally.
- For an efficient use of the speaker power the optimum impedance in conjunction with the output transformer connection possibilities has to be determined.

		Delivered maximum power in Watt if speakers with an impedance of xx Ohm are connected						Voltage applied to the terminals in Volt _{rms}	Terminal number and polarity	
		16Ohm	12 Ohm	8 Ohm	6 Ohm	4 Ohm	2 Ohm		pos	neg
LOW				0.2	0.3	0.6	1.1	2	1	
				0.4	0.6	1.1	1.5	6	5	
		0.4	0.5	0.7	1.1	2.2	2.1	3	2	
		0.6	0.85	1.3	1.7	2.6	3.2	3	1	
		1.2	1.5	2.3	3.1	4.6	4.3	5	4	
		2.1	2.8	4.2	5.6	8.4	5.8	6	4	
HIGH		4.6	6.2	9.3	12.3	18.5	37	8.6	4	3
		7.2	9.5	14.3	19.1	28.6	57.2	10.7	4	2
		8.7	11.6	17.4	23.2	34.8	*	11.8	4	1
		10.4	13.9	20.8	27.7	41.6	*	12.9	5	3
		14.1	18.8	28.1	37.5	56.25	*	15	5	2
		16.2	21.6	32.4	43.2	*	*	16.1	5	1
		17.4	23.2	34.9	46.5	*	*	16.7	6	2
	19.4	25.8	38.7	51.6	*	*	17.6	6	1	

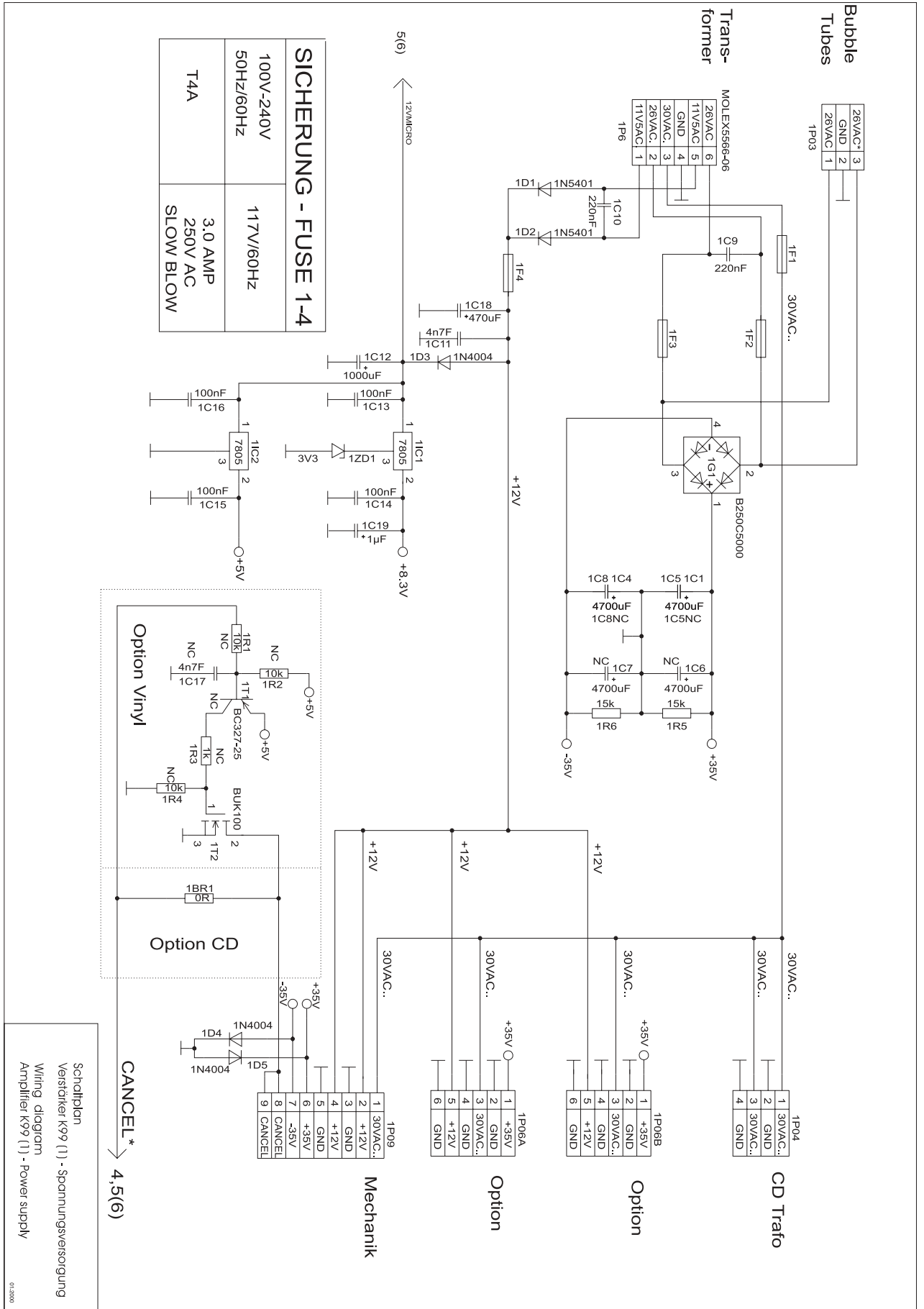
15.4 Connection of 70V systems

70V systems are intended for transmissions over long distances. They also have their own transformer in front of the speakers. The primary (input-)side of this transformer has to be connected in correct polarity with the 70V terminals of the Deutsche Wurlitzer GmbH output transformer. It is not allowed to consume more power than the amplifier is able to supply (23W or 45W), minus the additional speakers eventually connected to the output transformer.

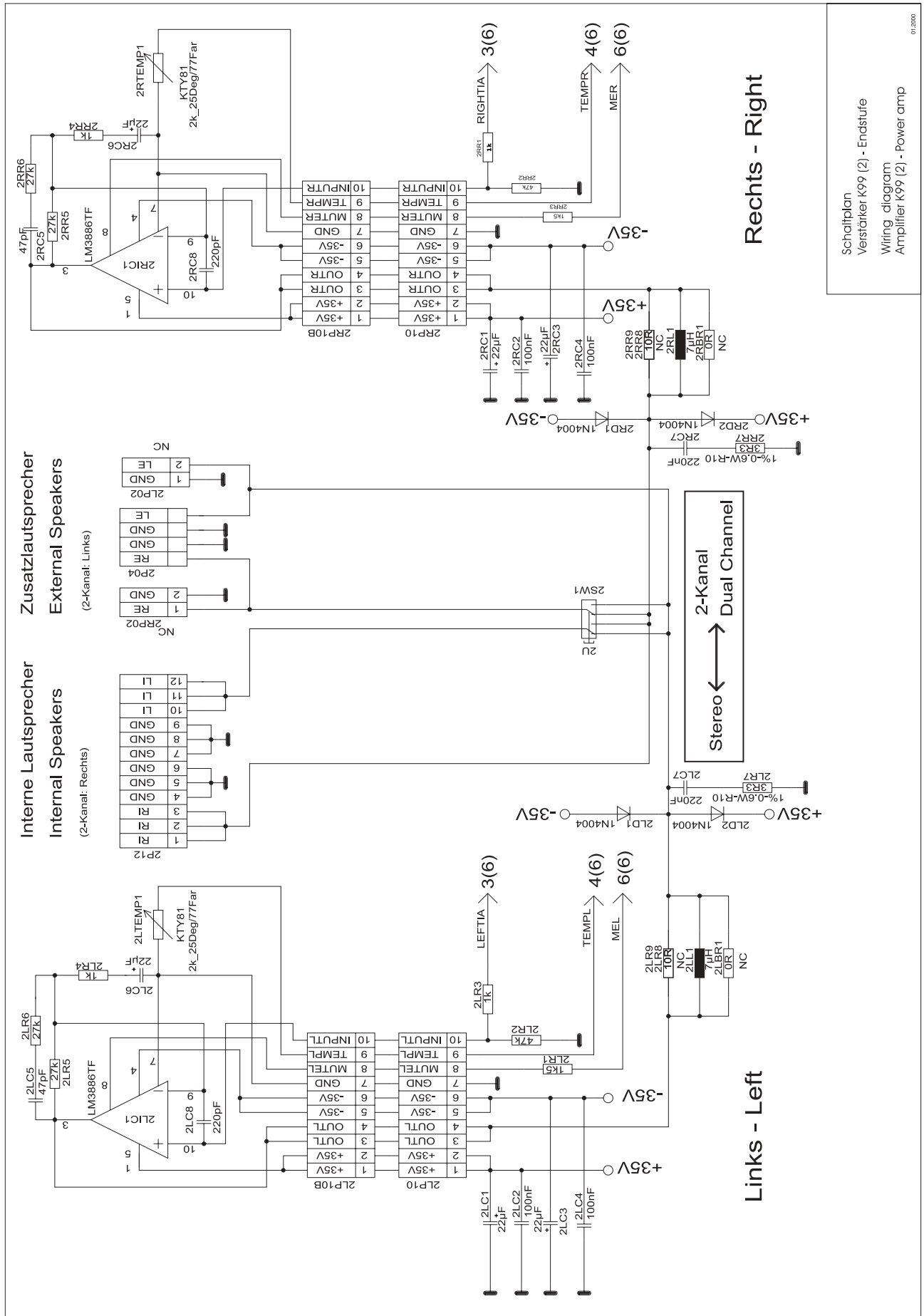
At some 70V - systems the load is capable of variation.



16 Wiring diagram K99 - power supply



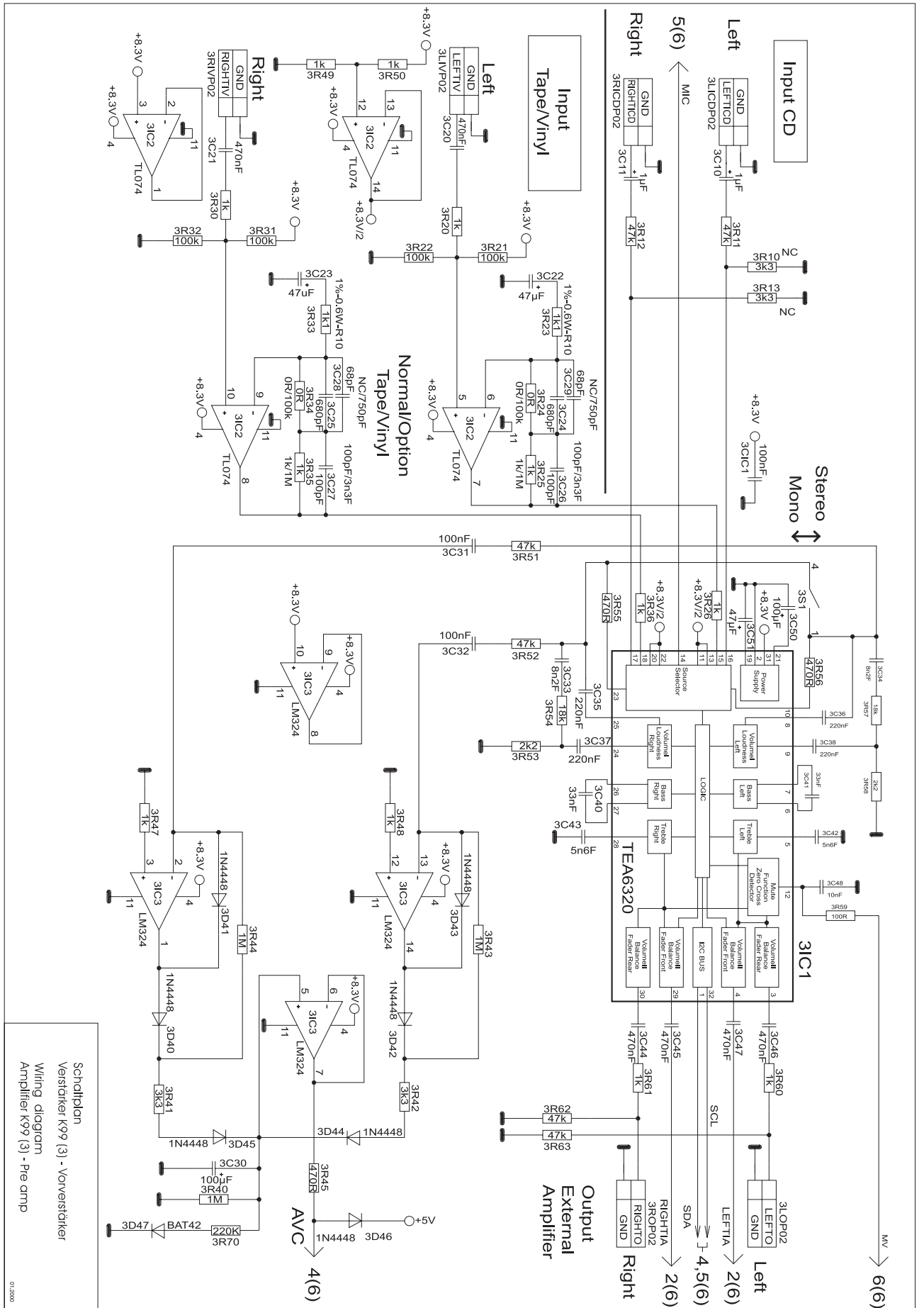
17 Wiring diagram K99 - power amp



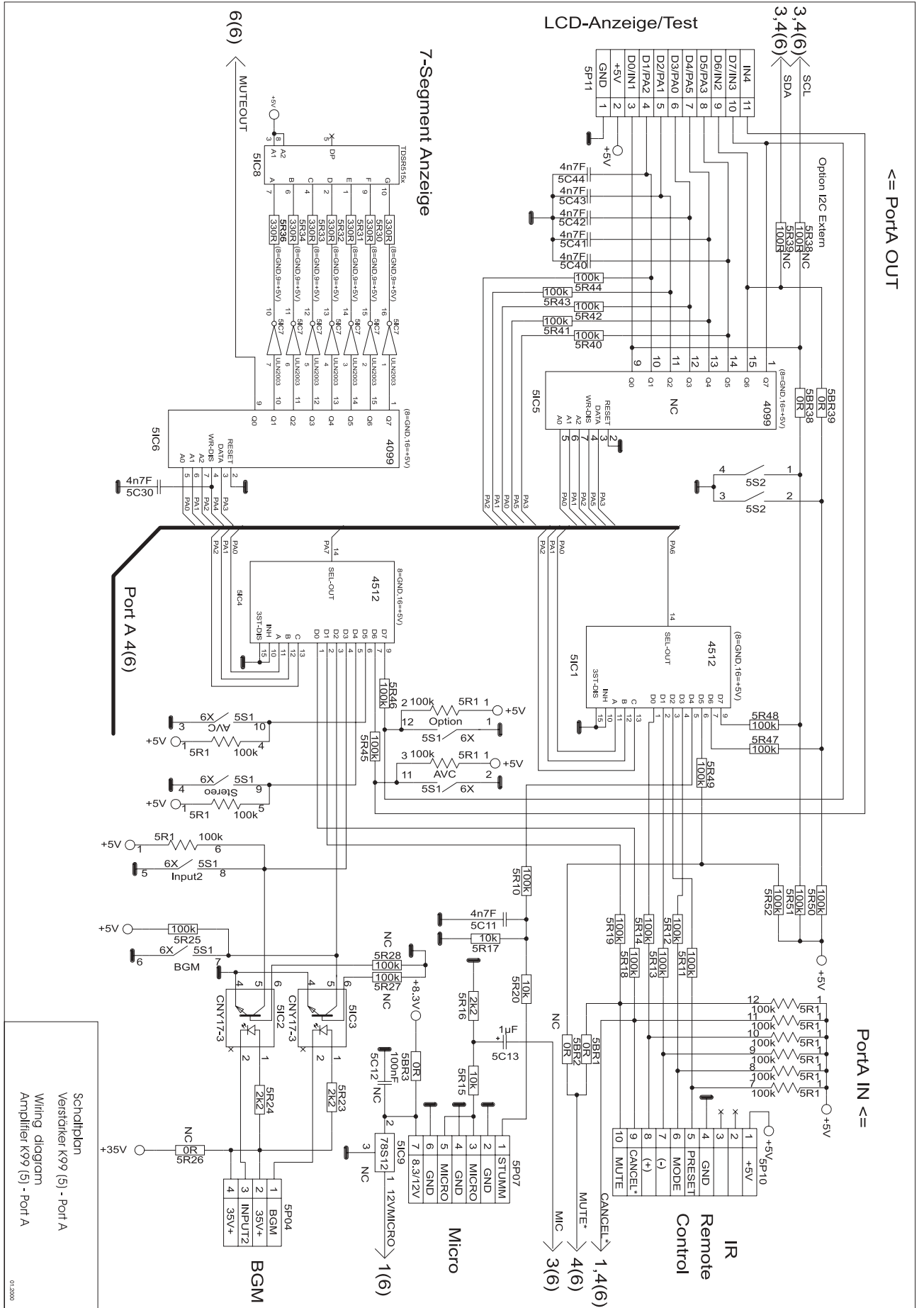
Schaltplan
Verstärker K99 (2) - Endstufe
Wiring diagram
Amplifier K99 (2) - Power amp

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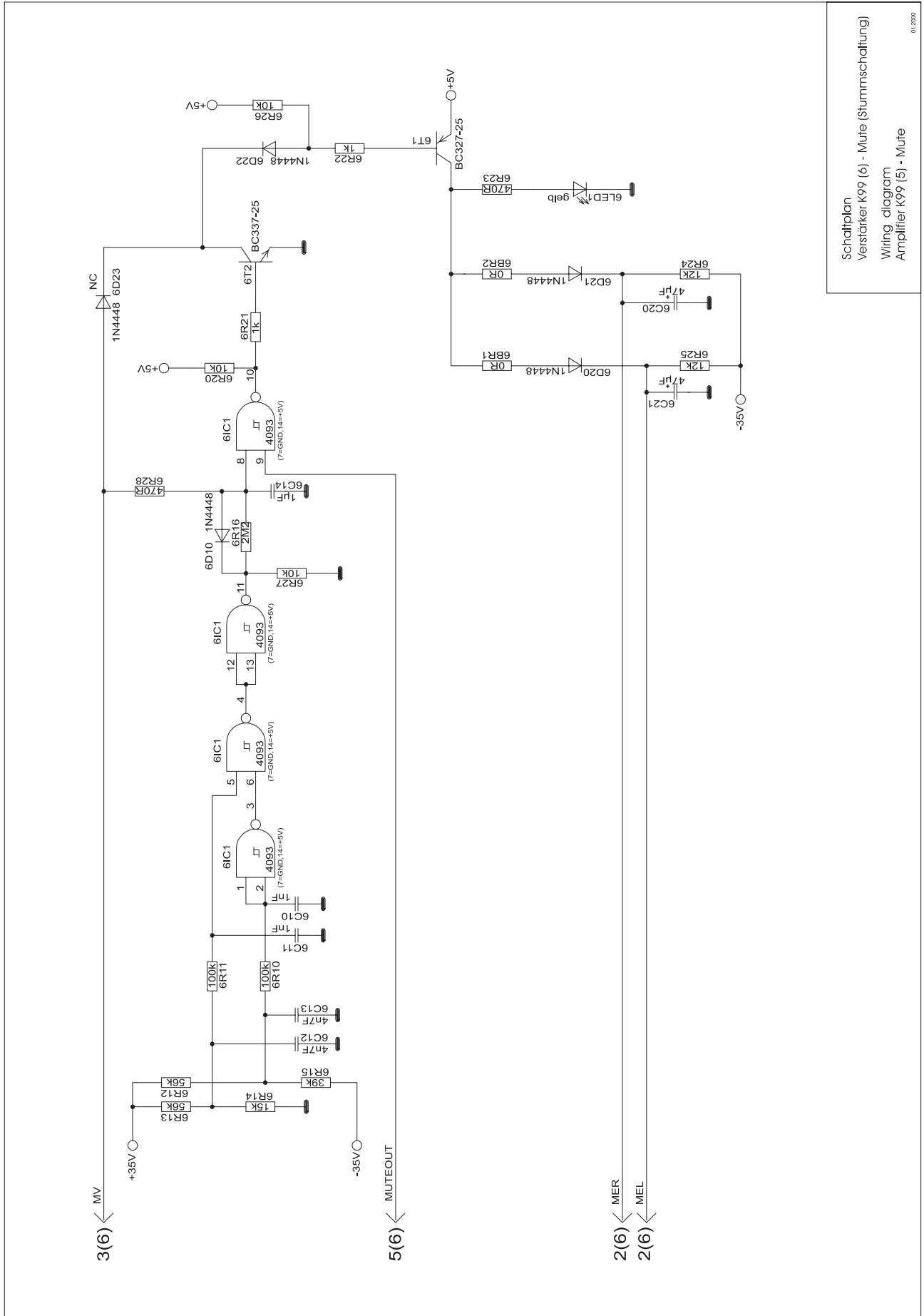
18 Wiring diagram K99 - pre amp



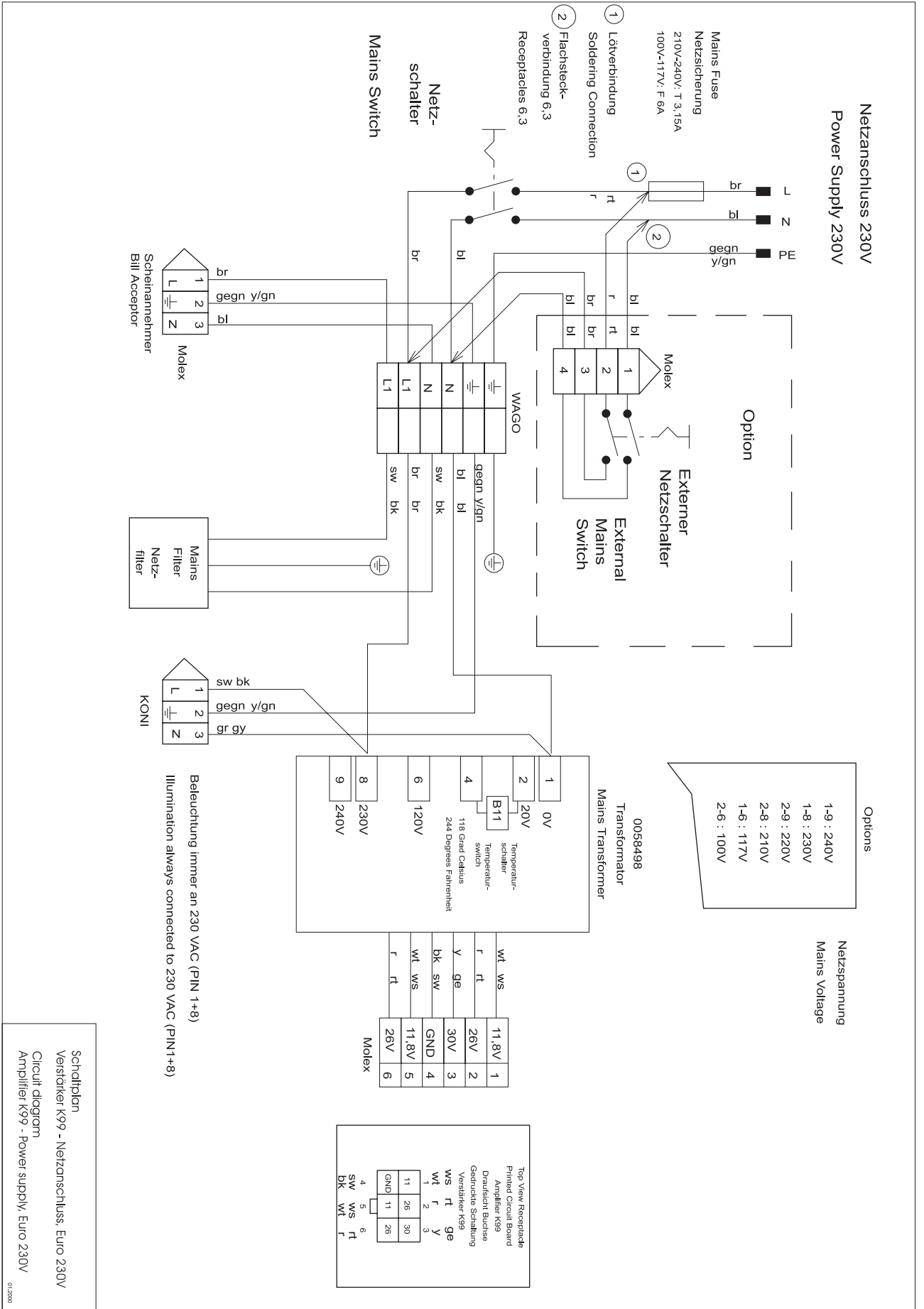
20 Wiring diagram K99 - port A



21 Wiring diagram K99 - mute



Wiring diagram K99 - power supply Euro 230V



Schaltplan
Verstärker K99 - Netzanschluss, Euro 230V
Circuit diagram
Amplifier K99 - Power supply, Euro 230V
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