

DITCHBURN ORGANISATION

TRAINING PROGRAMME



Music Maker 200

T200 Service Engineers Manual

Also Suitable for
Tonomat Telematic 200 and MM200



This Manual is an English Translation of the Tonomat Telematic 200 Manual, many thanks to Stuart and Sue Saunders for undertaking the translation and for the assistance from Hildegard Stamann for the additional amendments, information and use of diagrams within the manual.

Various parts and complete printed and bound original manuals for Ditchburn and Tonomat Jukeboxes can be purchased from

www.jukebox-world.de/en/Onlineshop/

More information on Ditchburn Jukeboxes can be found at

www.ditchburn.co.uk

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Important data

The "telematic 200"

Dimensions:

Height: 145 cm
Width: 94 cm
Depth: approx. 73 cm

Voltage values:

220 volt amplifier

Power Supply:

Input: 220 volts
Output: = 60 volts

Command Device

Control voltage of the relays: = 60 volts
Control voltage for motors 220 volts
Operating voltage for the player engine: 110 volts
(Half of the incoming voltage is destroyed by the upstream resistor)

Service:

The records are selected using the dial disc known from the telephone.

The request to choose and the " wait " sign appears as a green or red illuminated transparency to the right and left of the dial. Another indicator lamp prompts you to "pay extra " when a long-playing record is selected. The telephone system, which has been tried and tested a million times, offers the choice of up to 40 long-playing records with more than 200 options. An error button gives you the option to undo an already initiated dialing.

Pickups:

Crystal system made by " ELAC " KST 11 with Micro-sapphire SM11.

We advise you to replace the sapphire needle after 2000 to 2500 games. On request, we can also supply diamond needles with 30 times the lifespan.

Amplifier:

30 Watt high-performance Hi-Fi amplifier with connection option for additional speakers. Tubes: 1 x EZ 81, 4 X EL 84, 2 X ECC 81. A potentiometer serves as the volume control. 50 K-ohm layer resistance. For more detailed information about the amplifier, please refer to the separate operating and service instructions enclosed with the guarantee cards for the amplifier tubes.

Speaker:

Two permanently dynamic loudspeakers with a voice coil design of 5 OHM. The tweeter has an output of 8 watts, while the low-frequency speaker, whose diaphragm is 300 mm in diameter, delivers 12 watts of power.

When connecting external speakers, please note that their voice coil design is also 5 OHM.

Fuses:

The power supply is fused with 0.5 Amp. Slow-blow, while a 0.8 Amp slow-blow fuse must be used for the amplifier at 200 volt mink voltage.

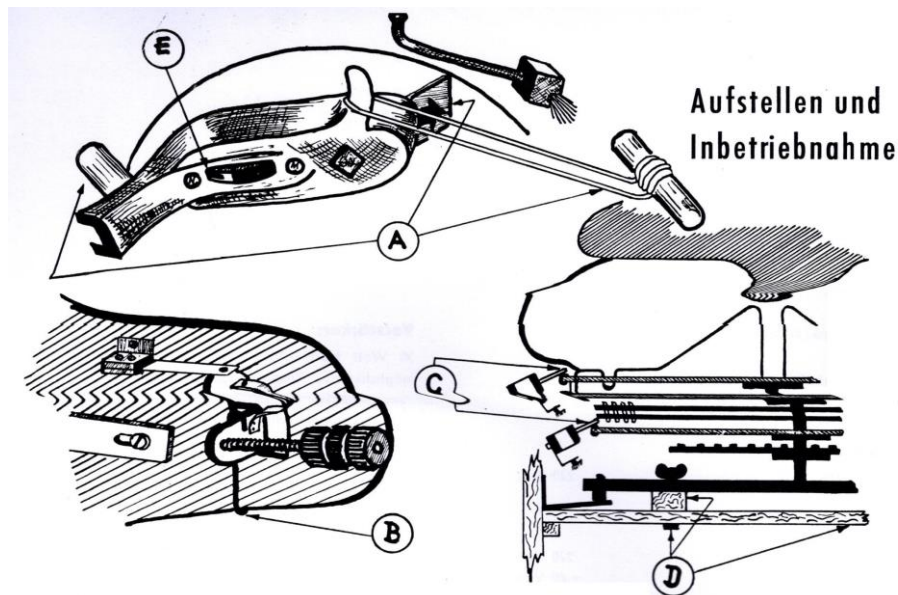
Coin validator:

The well-known National Coin Rejector with central coin slot for 0.10, 0.50 and 1. - DM is also used in our device. You can find the special details of this in the description enclosed with these operating instructions.

Lighting:

Two 16 watt HNW70 fluorescent lamps with matching chokes and starters are installed to illuminate the program board and rotating far roller.

Three telephone lamps 60 volt 0.4 Amp. Illuminate the signs: "dial", "wait" and "pay later".



Installation and operation

The delivered music automat "telematic 200" has to be checked for possible damage during commissioning. Any defects found must be reported immediately to your dealer or to us, the manufacturer. The defect notice must be received by registered letter within 14 days of receipt of the machine. Before you proceed to populate the unit with records, it is necessary to remove the fuses used for transport. We therefore ask you to use the illustration above:

A) Remove the rubber band from the sapphire treasure to be released in the direction of the arrow and remove the rubber grommet of the tonearm support

B) The counterweight of the tonearm is secured to the rear head plate with a wire clip, which must also be removed.

C) The shafts of the two drive motors for the dial and the magazine are protected by a rubber hose and attached. This fuse must also be removed.

D) To prevent the mechanics from spinning, it is secured against the intermediate floor by means of the two designated screws. Loosen the two wing nuts and take out the scrapers together with the wooden blocks underneath.

E) The position of the sapphire is crucial for the correct play of your records. Therefore, note that the swivelling marking points to "N".

Note: We advise you to keep all removed transport locks in a safe place. If you ever intend to change your TELEMATIC, then protect these things from transport disruptions. The rubber tubes pulled off the axles of the two motors are also ideal for replacing the 60 volt bulbs "choose", "wait" and "pay later"

The keys for the control panel and rear panel of an automatic machine, you will find it attached to the side handle of the rear panel.

The cash box keys are attached to the strut that supports the mechanics in the housing.

The title paper as well as the coloured information leaflets for "new appearances" and "hit song of the month" are kept safe in the cash register bag during transport.

The installation site if possible, it should not be in front of a heater or next to an oven. In any case, care must be taken that the sun cannot shine on the records at any time of the day. The back of the device should be a hand's width from the wall.

All selector pins those that may have worked their way up during transport must be pushed down again with the hand.

The operating voltage for the machine is 220 volts alternating current. For other AC voltages, a 300 watt series transformer must be used. Also make sure that the device is connected using a Schuko socket, which must be earthed.

Before inserting the vinyl records it is essential to ensure that any burr residues in the centering lock of the panels, which are caused by improper punching out of the centering hole or protruding paint marks, must be removed. In any case, it is advisable to use a scraper, knife, file or the like to clean the centering lock of each plate before use in order to avoid faults in which the records may get stuck on the centering cone of the centering plate after being removed.

The coin rejector only works one hundred percent if you set up your TELEMATIC horizontally and vertically. Do not scrub this little effort, the national rejector coin acceptor pays off with its exact way of working

Description
The electrical functions
When dialing

Relay switched on

Coin engagement (normal plate)

The coin validator gives a pulse each time a 10 Pfennig piece is inserted. The coin stacking works on the principle of the flip-flap circuit and means that the choice is only released after the second 10 pfennig coin has been inserted

I

When the 10 pfennig coin contact **MK10** is closed, the I relay picks up. If the **MK10** opens again, the short circuit of the II relay (winding I) is

II

released and this also picks up. If the second coin falls now, the **MK10** wears again, the I relay is short-circuited and falls off. In this position: II relay on, I relay off, the J relay is activated via the 212 - 1II and vIII contact. This is maintained via the il2 contact and the nsi contact on the number plate. At the same time, the lamp "select" is switched on via the ill2 and the 1III2 contact

J

V

The V relay then pulls in via the illI1 contact and the selector arm dzII and the ul1 contact.

Dial the first digit (select group 100 or 200)

(DZ)

When a 1 is selected, the circuit of the J relay is interrupted, this drops out and controls the selector DZ via the ill1 contact. If a 2 is selected as the first number, the group contact and the short-circuit contact close. The nsk contact short-circuits one of the two given impulses, so that the dialler DZ stands for step 1 in both cases after the first digit. The nsg contact allows the A relay to respond via the ill2 contact and the selector arm dzI. This stays over the al-contact and turns on the magnet for the second group of hundreds through the all-contact.

A

Dial the second digit (tens digit)

Pressing the number plate interrupts the number plate impulse contact nsi, causing the J relay to pulse. This pulse series is transferred from the ill1 contact to the DZ selector.

J

Choice of the third digit (one digit)

(DZ)

After the second number is selected, the V relay drops out.

U

Corresponding bridges in the distributor (e.g.: r, s, t, with u, o, p) connect via the vII1 contact and use the selector arm dzII U-Relay to pull in,

V

which is via the ul2 contact itself holds. The ull1 contacts, so that the next series of pulses goes from the number plate via the ill1 contact to the DE dialler, the V relay holds over the pulses and then drops out. After both diallers are set, the "wait" lamp lights up.

(DE)

M

The M and H relays are now switched on via the ull contact, and the selector and magazine motor sum is started with the ml1 and ml2

H

contact.

Pushing up the selection pin (storage)

(DZ)

The position of the two contact arms de1 and dz1 of the rotary selector, which give the previously selected number, is directly connected to the dial of the mechanics via the cable routing of the "A" connector. The selector motor previously started via the ml1 contact now brings the

(DE)

rotating one

M
H
S

Sliding contact over the attacks of the contact disc and thus short-circuits the selector outputs del and dzl, whereby the S relay is attracted via its winding I. Depending on the position of the all contact, the sl1 contact energizes the selection magnet 1 or selection magnet 2. These flip the corresponding selection pin upwards.

Reset the rotary selector

S
(DZ)
(DE)
J
A
(Lp)
U
Z

With the slll2 contact or sl2 contact, the home run of the voters is controlled via their own SU contact (sudz or sude) and their own electoral roll (dzll or dell). Furthermore, the sll1 contact separates the minus line to the relays J, A, Lp, U and Z and thus they drop out. Due to the drop in the U relay, the pulse to the selector magnet is interrupted with the ulll2 contact. The S relay will hold until both diallers are set to step 0 again. When the S-Relay drops, the storage process ends and the device is free for a new choice.

Description of credit storage for 50 pfennigs and 1 DM

The credit memory section built into the command device makes it possible to play 3 to 5 records for a 50 pfennig piece and 5 to 10 records for 1 DM. The number of plays can be changed by re-soldering bridges. (See paragraph: change in the credit requirement)

50-pfennig Insertion

(DK)
Z
J

When a 50-pfennig piece is inserted, the **MK 50** closes. The **DK** selector takes a step and uses the dk1 contact to pull in the Z relay, which holds itself via the zlll2 contact. The J-relay is activated by the zl2 contact and thus the choice is released. The further selection process for the records corresponds to that of 2 x 10 pfennig insertion.

Counting Down the established frequency of selection

(DZ)
S
J
Z

After the end of the selection, the S relay picks up and switches off the Z relay via sll2 contact. After the Z relay has dropped out, the **DK** selector takes a step via the dkll selector arm and the zlll1 contact. The credit requirement is thus reduced by one choice. The previous switching process of the DK selector can now again pull the Z relay via the dkl contact and issue a new credit.

This process is repeated until the selector **DK**, with his selector arm dkl, for example (depending on the credit setting set) comes to the third step. From this position, the voter returns to the zero position via the dkl train, the kl1 contact and the sudk contact.

DM1. - Insertion

K
(DK)
J

when inserting a DM1 coin, the K relay picks up first, and the **DK** selector takes the first step via the Klll2 contact and switches on the J relay via the Zlll1 contact. This means that the first record can be selected. The further selection process corresponds to that of 2 times 10 Pfennig insert.

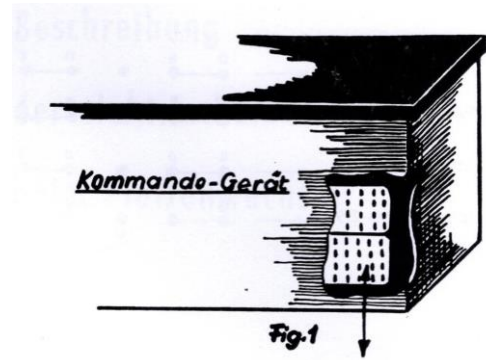
Counting Down the established frequency of selection

The reduction in the selection option corresponds to the same procedures as with the 50 Pfennig insertion. The voter now only runs after the sixth step, for example, due to the now open kl1 contact on the eleventh step. This short-circuits the K relay and drops out. The DK selector only returns to its zero position after the K relay has dropped out.

Change in Credit Settings

The desired change in the frequency of failure for 50 Pfg. and DM 1. - is carried out on the floor-facing terminal strip of the command device. (See Fig 1)

The change provided can be carried out on the two lower rows of solder pins, which are labelled A - F in our diagrams

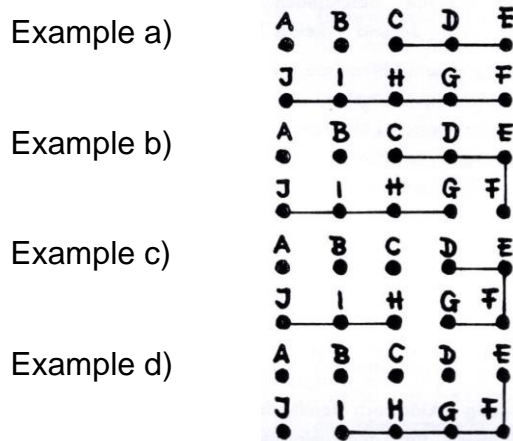


Possible credit change

- a) 2 x 10 Pfg. 1 PLAY – 50 Pfg. 3 PLAY – DM 1 – 6 PLAY
- b) 2 x 10 Pfg. 1 PLAY – 50 Pfg. 3 PLAY – DM 1 – 7 PLAY
- c) 2 x 10 Pfg. 1 PLAY – 50 Pfg. 4 PLAY – DM 1 – 8 PLAY
- d) 2 x 10 Pfg. 1 PLAY – 50 Pfg. 5 PLAY – DM 1 – 10 PLAY

With 1 play for 1 x 10 Pfg. regardless of which credit is required for 50 Pfg. or DM 1 - is selected to connect A & B of the terminal block. In addition, the two red and pink wires from the coin switch on the terminal block must be exchanged.

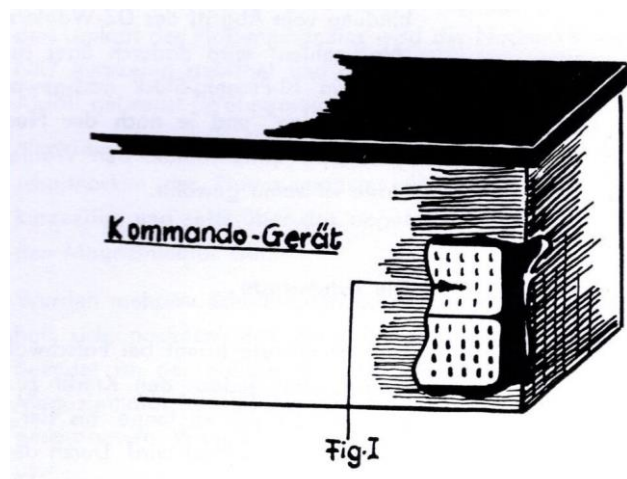
Necessary bridge connections on the terminal block



Equipping with LPs

Setting the command device

On the upper terminal block of the command device (see fig I) lie solder pins connected in pairs on the right and left. When viewed horizontally, they represent tap number 7, 8, 9 and 10 of the DZ selector. This precaution makes it possible to equip the machine with either, 10, 20, 30 or 40 long boards.



Disc Nr. 160-269



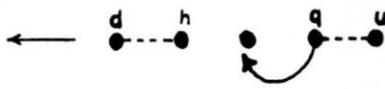
Disc Nr. 170-279



Disc Nr. 180-289



Disc Nr. 190-299



If you would like to expand your vinyl record equipment in this way, you only need to change the bridge connections on the connection strip as shown in the illustration.

As an example:

If the music machine is to be equipped with 10 LPs, the bridges between d and h and qu and u must be removed. Then qu is connected to the soldering lug on the left. With an expansion to 20, 30 and 40 LPs, the connections above can also be changed.

Description of the electrical function

When choosing a long-playing record

RELAY

I

LP

Coin insertion

If a coin insert of 3 times 10 Pfennigs is inserted before the choice of a long-playing record, the electrical switching operations up to the second 10 Pfennig piece are the same as those described under "coin insert normal record". In the order of the switching sequence, the: I, II, J, and V relays have already been actuated.

If the MK 10 opens again after the second 10 Pfennig piece, the II relay drops out and the stacking relays are prepared for receiving the third coin pulse. When the third coin is inserted, the I relay picks up again and, via the IL1 and 1III and 1III2 contacts, brings the LP relay to the suit. The LP relay maintains contact via its own LpII2 and connects the outputs of the DZ selectors. At the same time, the connection to the lamp "pay more" is interrupted via the LpIII1 contact. The selection of the record is possible.

Pay More appears

If you already select a long-playing record from an existing credit due to the previous insertion of 50 Pfennigs or 1, - DM, the lamp "pay more" lights up. This process is explained by the fact that the Lp relay (depending on the number of bridges on the connecting strip for long-playing records, with the lpI1, lpI2, lpIII1 or lpIII2 contact) interrupts the connection from the tap of the DZ selector to the dial of the mechanics. The lamp "Pay More" is switched on via the dialer dzII and the lpII1 contact. If a 10 Pfennig piece is thrown, the Lp relay responds, the lpII1 contact interrupts "Pay More" and, depending on the number of the selected plate, the lpI1, the lpI2, the lpIII1 or lpIII2 contact connects the selector output with the mechanical dial. The desired record is selected.

The error button

The error button returns the memory to the starting position in the event of a wrong choice or an operating error, but without erasing the loan. by pressing the error button, the L-relay speaks and lasts until the home run of the selector ends, S relay has dropped out and the slI1 contact is opened. The LII2 contact holds the J, V, I and II relays over the time the S relay is energized so that the credit is not lost.

Description of the electrical functions when changing records

Record Lift

When the selection of the desired record (raised selector pin) is complete, the magazine motor, controlled via the MI2 contact, moves the record magazine with the MSK contact against the selector pin raised up.

At the moment of contact between the insulated brass bracket (MSK contact) on the record magazine and the selector pin, the resulting earth connection (plus) switches on the W relay, which holds itself via the wIII2 contact. At the same time, the wIII1 contact causes the M relay to drop out.

By switching the wI1 contact to the wI2 contact, the magazine motor is switched off and the player motor is switched on. The brake connected in line with the player motor also applies. By releasing the brake, the lift spring acts, which takes over the gear transmission to transport the record into the play position.

The following electrical switching functions are carried out by the cam contacts NK1 to NK5 on the changeover gear during lifting.

- 1) By switching the NK1:
 - a) the magazine motor is interrupted again and
 - b) prepared the return of the player engine
- 2) The NK2 closes and prepares the switching on of the M relay for the later return.
- 3) By switching NK4, the centering magnet picks up.
- 4) The NK5 closes and prepares to switch on the reset magnet.
- 5) By switching back the NK4:
 - a) the centering magnet is switched off so that the record can be pressed against the turntable by the centering plate using spring pressure.
 - b) The reset magnet is switched on.
- 6) The NK5 opens and brings the reset magnet to waste.

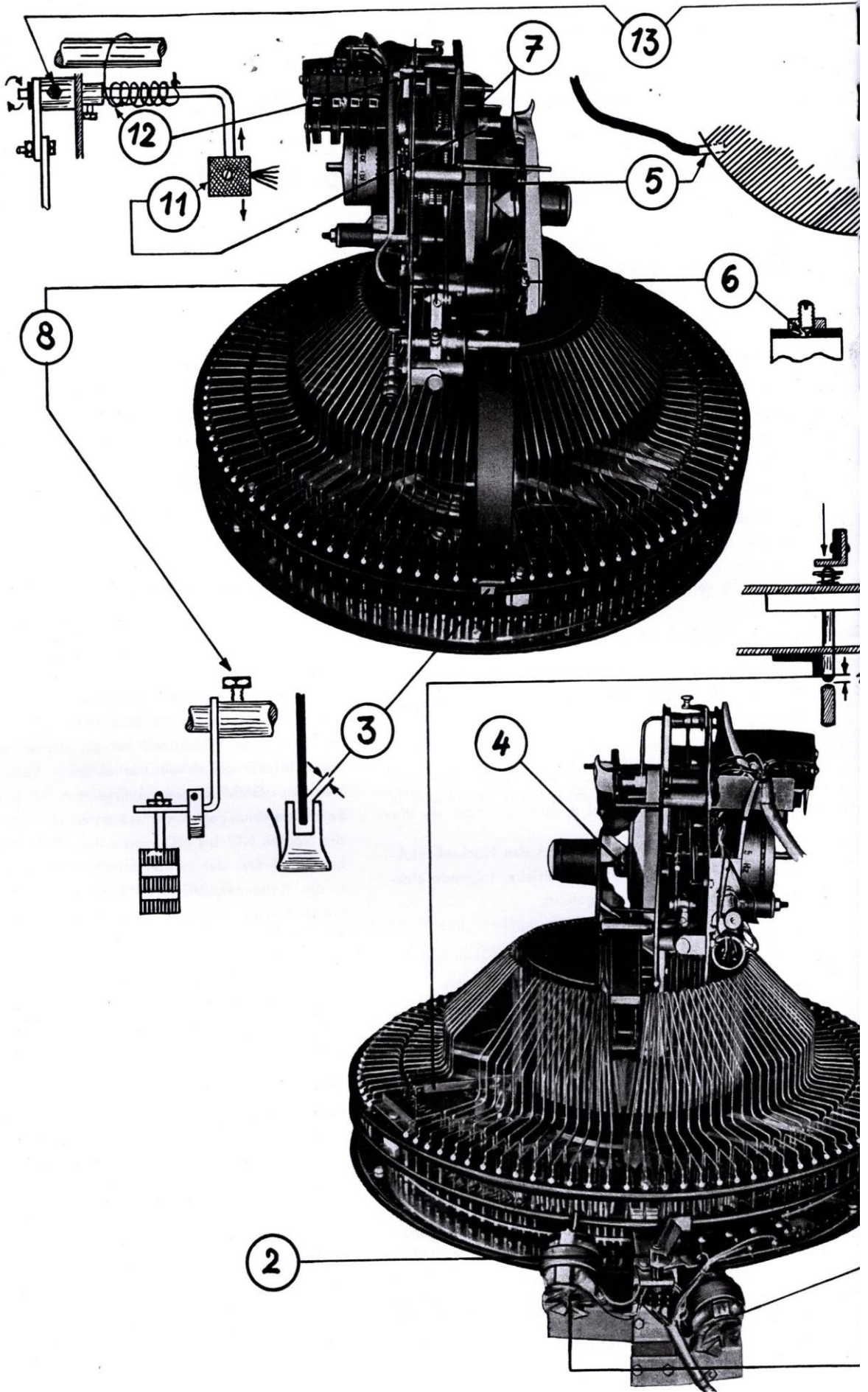
7) The NK3 controls the muting of the amplifier when the plate is changed, so that the placement of the tonearm and the brushing of the sapphire are not transferred. As a last function, when a plate is placed on the NK3, a relay in the amplifier is interrupted, which drops out after a delay and switches on the anode voltage.

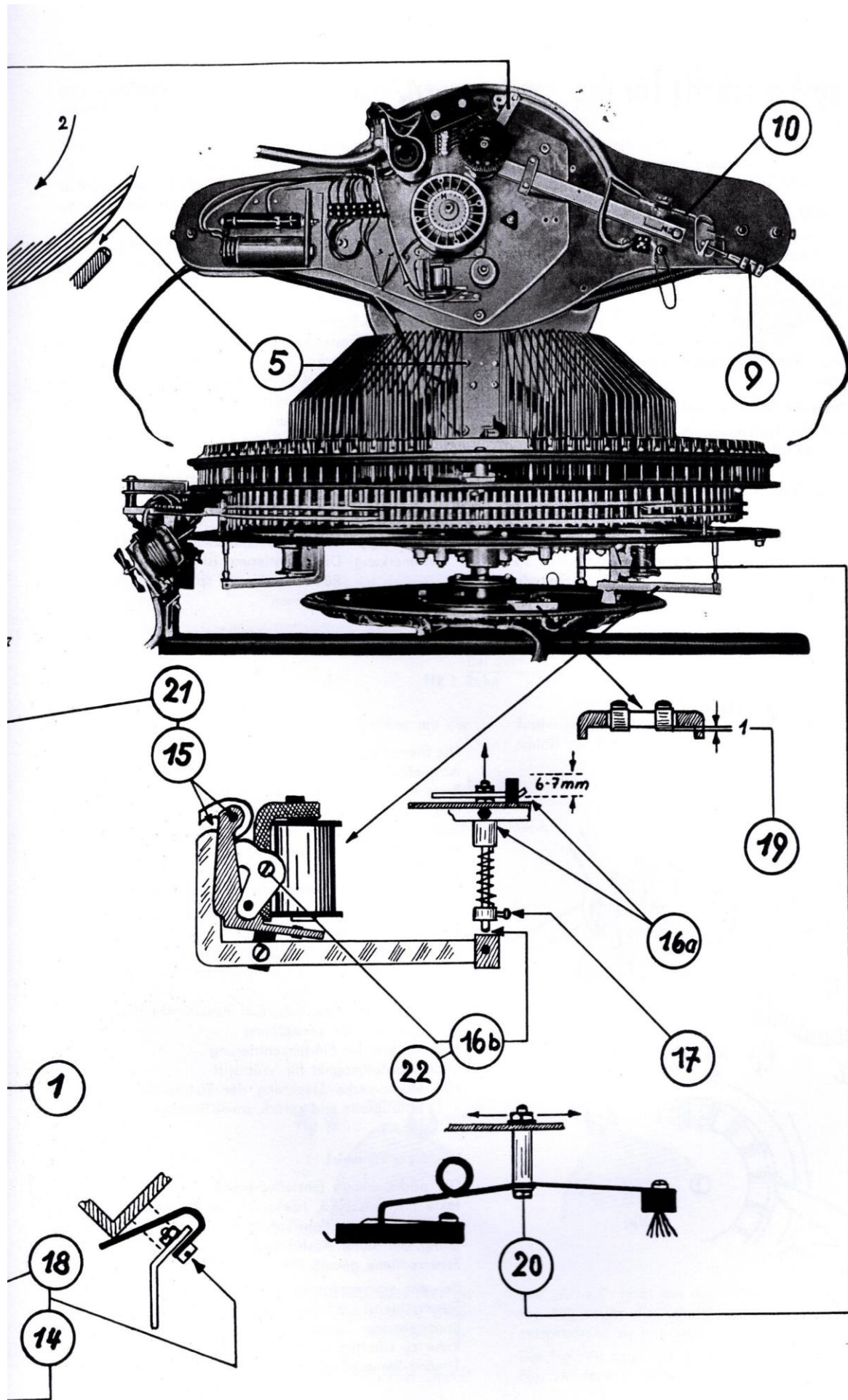
Return the played record

The tonearm switch-off contact is located on the back of the pickup. When the record is played, i.e. when leaving the lead out groove, the switch-off spring touches the TA contact and causes the W relay to drop out due to the resulting mass connection by short-circuiting it via a resistor. The M relay receives voltage via the wIII1 contact and picks up. At the same time, the player motor is repositioned via the wI1 contact, which in turn actuates the cams NK1 to NK5 and the cams NM via the gearbox. In that the returning lifter returns the records to the record magazine, the switching sequence of the cam contacts is in the reverse order to when the records were placed. When the player motor runs out, the NK1 switches over and starts up via the mI2 contact the magazine motor, and also moves the selector motor via the mI1 contact. When the record magazine rotates, the NK7 cam contact is opened briefly, causing the M relay to drop out (selector motor switched off).

After a further full turn, the shut-off cam of the record magazine actuates the NK6, opens it briefly, and also stops the magazine motor via the deactivated relay.

If several records have been selected, the same procedure as described will be repeated after the return of the first record has ended. The magazine motor moves the MSK contact against the high-positioned selector pin, the W relay picks up again, etc.





Adjustment regulation for the "telematik 200"

(The numbers of the individual positions refer to the picture on page 10/11)

RAISING AND LOWERING THE RECORD

(Adjustments 1 - 5 are follow-up adjustments and must be done in the specified order)

1. The record bracket:

the record brackets should stand vertically on the record magazine while the front part of it should lie horizontally to the magazine.

Adjustment: Align to the side or to the front with adjusting pliers.

2. Setting the drum:

While the record magazine is hitting a selection pin the record should be parallel to the chassis.

Adjustment: Adjust the anchor bracket of the selection drum in the slot.

3. Lateral position of the lifters:

The turntable rotating with the record should be in the middle the lift fork run. When entering the record

compartment should do not touch the lifting fork on the side of the plate bracket.

adjustment: lift axis within the lift drive lever move axially or bend the lifter accordingly to adjust.

Note: To make this adjustment easier, too adjustment no. 2 should be corrected

4. Press on the record:

When the plate is in the play position, the magnetic core of the centering plate should have a lot of tolerance on all sides, up and down.

Adjustment: Loosen the two fastening screws of the heart disk and adjust the heart letter with the centering magnet.

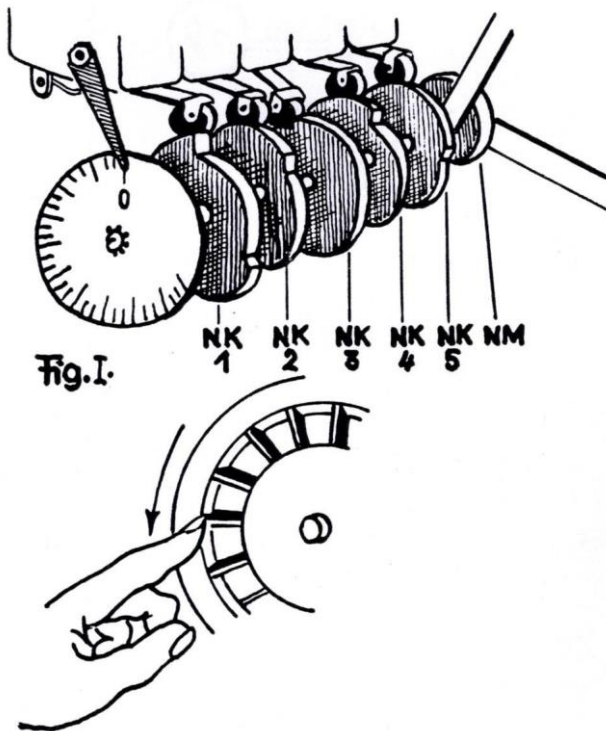
5. Centering the record:

In the play position, the distance between the edge of the plate and the lifter or tipper should be 2-3 mm.

Adjustment: adjust the lift stop screw and the eccentric tipper stop accordingly.

Note: This adjustment is for the front and back of the make playing plate.

ADJUSTMENT OF THE SWITCHING CAMS



The control of important electrical switching sequences when playing and changing the records is done by the cam contacts NK1 - NK7 (microswitches) attached to the rear of the playing chassis and to the side of the record magazine. The mechanical cam for actuating the tonearm and the sapphire brush, which is called NM in our explanations, is also attached behind the switch NK5.

The switching functions of the respective cams are:

NK1 switching magazine - player motor

NK2 timer in conjunction with switches NK6 and NK7 (dial and record magazine run out)

NK3 mute (turn on and off the anode voltage of the amplifier)

NK4 magnet for plate centering

NK5 reset magnet for selector pin

NM Mechanical control of the tonearm movement to the record and back as well as actuation and the sapphire brush.

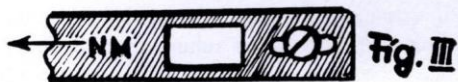
Important NOTE!

The setting instructions below for the cam contacts NK1 to NK5 and for the cam NM are only valid for devices with a manufacturing number exceeding 11500. In this version, the tonearm control rail according to Fig. II is changed at the same time.

In the previous series with the tonearm control rail according to Fig. III, deviating from the specified adjustment regulation, the NK4 has to switch to 48° at rest, while at 25° the cam NM should move the tonearm control rail so far that the inner one.

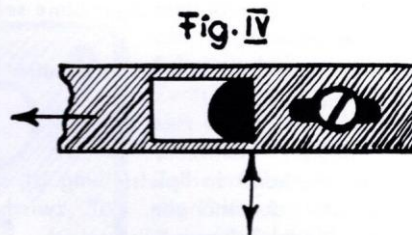
Cut out the same with the tip of the tonearm control cone (see Fig IV)

A check of the correct switching torques of the individual cam contacts and the prescribed triggering of the tonearm control rail by the cam NM must be carried out using the setting pointer and the dial.



At 10°
NK3 work
NK5 rest
 At 55°

For this purpose, let a record run in the playback position and then interrupt the power supply to the device. If, as in Fig. I, the player changer motor turns in the direction of the arrow, the following switching torques must result in the range of 10 – 240°:

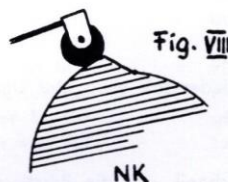
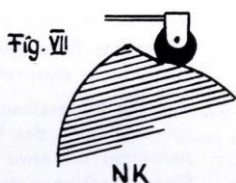
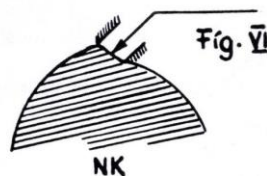
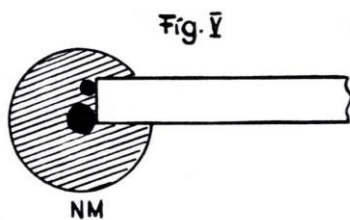


Tonearm control lever aligns with the camshaft and switching pin of the NM. See Fig V

At 68°
NK4 rest
 At 230°
NK2 rest
 At 240°
NK1 rest

In addition, in this position the lifters should end with the outer edge of the record magazine.

At 250°
 End of lifting spout



A necessary adjustment of the cam contacts **NK1** to **NK5** is done by adjusting and the shutter cams, the two pressure screws of which must be tightened firmly against the camshaft after the setting has been completed.

Is the trigger point of the switch between "rest"

and "work" is not on the middle of the support surface (see Fig. VI), the shifting tongue of the same must be adjusted accordingly by bending.

Figure VII shows the rest position of the **NK**, while its working position can be seen in Figure VIII.

STONE ARM ADJUSTMENTS

(Adjustments 6 - 13 are follow-up adjustments and must be carried out in the order listed)

6. Tonearm tip bearing:

The tonearm must be slightly stored in the tip bearing without any play on the side.

Adjustment: After loosening the lock nut, adjust a bearing screw.

7. Sagging of the tonearm:

When the mechanics are in the playing position, the tonearm should sag so that there is a 3-5 mm distance between the record and the needle.

Adjustment: adjust the height adjustment screw of the tonearm accordingly.

8. Point of attachment of the needle:

The needle should be placed 2 - 3.5 mm from the edge of the plate.

Adjustment: Loosen the pressure screw of the balance flange and change the angular position of the balance weight flange to the tonearm accordingly.

Note: Make sure that the tonearm axis has enough axial play when making this adjustment.

9. Tonearm-balance weight:

The tonearm should always have a small torque upwards, just enough to move it back to its original position when it is lifted off the plate.

Adjustment: shift balance weight accordingly.

Note: It is important to ensure that due to probable mechanical inhibitions, the balance weight is not being adjusted too tight to satisfy this adjustment.

10. Switch-off position of the tonearm:

The tonearm should switch off when the needle is 35 mm from the edge of the plate.

Adjustment: Swivel the switch-off contact accordingly.

11. Brush distance:

When the mechanism is at the rest position, the needle should just pass the brush.

Adjustment:

a) Adjust the brush holder with adjusting pliers accordingly.

b) Move the brush on the holder accordingly.

12. Brush reset force:

Adjustment: The torsion spring should be pretensioned about five turns.

13. End position of the brush:

When the mechanism are at rest, the brush should be pivoted about 3 mm past the needle.

Adjustment: Twist the brush holder within the operating lever.

14. Contact pressure of the magazine motor:

The magazine motor should press so hard on the rubbing edge of the magazine that it is driven safely. The contact pressure must not be so strong that the motor can no longer start when the magazine is locked.

Adjustment: Adjust the fastening screw of the pressure leaf spring accordingly.

15. Selector magnet working position:

When the selection magnet is actuated, the selector plunger should be raised about 6 - 7 mm above the selector disc.

Adjustment: After loosening its fastening screw, adjust the push lever in the hole.

16. Selector magnet rest position:

a) When in position, the tappet should rest about 0.5 mm above the dial, so that the tappet can pivot without touching the dial.

b) There should be a tolerance of approx. 5 mm between the tappet and the push lever.

Adjustment:

a) Move the bearing bush of the selector plunger axially after loosening the pressure screw.

b) After loosening its fastening screw, adjust the back stop on the selector magnet accordingly.

17. Reset force and torque of the tappet:

After actuation, the selector plunger should safely return to its initial position. If it is influenced laterally, it should also swivel back safely.

Adjustment: Turn and move the adjusting ring of the plunger spring on the selector plunger accordingly.

18. Contact pressure of the selector motor:

The selector motor should press so hard on the rim of the dial that it is driven safely. The contact pressure must not be so strong that the motor can no longer start when the selector is locked.

Adjustment: Adjust the fixing screw of the pressure leaf spring accordingly.

19. Selection contact loop:

The two sliding contacts should sag about 1 mm. The contact pressure of the grinding wheel must be slightly stronger than the contact pressure of the sliding contacts.

20. Contact disc:

The plunger should shoot up the selection pin cleanly without touching the previous or subsequent selection pin.

Adjustment: Move the fastening bolt of the sliding contact in the slot accordingly.

21. Return magnet stroke:

When the reset magnet is actuated, the reset plunger should bump up to about 1 mm below the magazine stop.

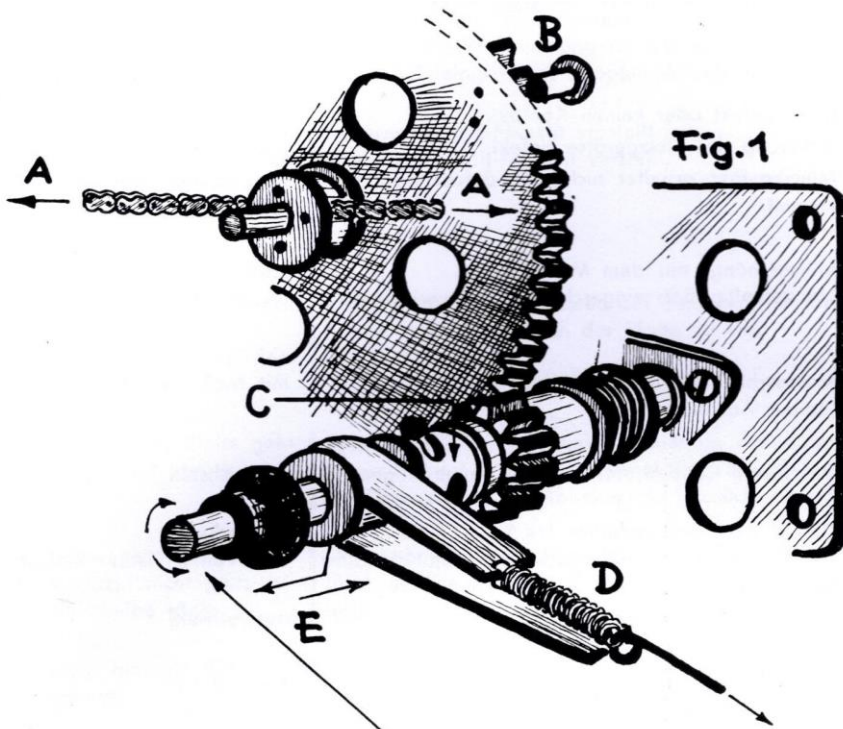
Adjustment: When the reset magnet is actuated, adjust the push lever in its slot accordingly.

22. Return magnet rest position:

In the rest position, there should be a tolerance of around 0.5 mm between the push lever and the return push rod.

Adjustment: After loosening its fastening screw, adjust the back stop of the reset magnet

Description of the mechanical functions when changing records



Centre

the upward movement of the lifter is limited by the lifter stop screw which, in conjunction with the setting of the eccentric tipper stop, enables the centering of the record. The centering hole of the record should be slightly below the centering cone of the centering plate so that the plate is lifted off the lifting fork and the tipper when it is mounted on the plate.

Clutch pinion and turntable drive

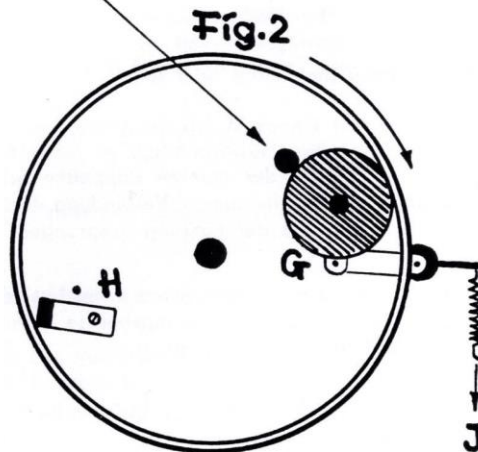
After the lifter is pivoted into the play position, the further drive on the gear is taken over by the tension spring which is hooked onto the stop angle of the gearwheel shown in FIG. 1.

The stop of the large gear is limited by the stop pin B. The coupling sleeve C (FIG. 1) is now screwed out of the engagement of the large gearwheel like a screw by the constantly acting friction of the felt strip D. The player motor now has the task of driving the turntable via the axis F and the rubber intermediate wheel G (Fig. 2). The drive surface of this friction wheel is inside the platter.

The idler gear is pulled against the drive shaft of the motor and the running edge of the platter via the spring shown under J (Fig. 2). If the player motor is reversed after the record has been played, the brake H (Fig. 2) mounted inside the turntable prevents it from rotating in the normal direction.

How the plate lifters work

The drive of the plate lifter, which takes over the transport of the record into the play position, is taken over by the tension spring connected to the two lifter drive levers. In the rest position of this spring is tensioned on train. When the plate magazine with the MSK contact that rotates after the selection touches the shifted stylus, relays switch on the player motor and apply the magnetic brake. the axis of the player motor moves the two gearwheels from the transmission via the clutch sprocket C (see Fig. 1) and allows the wound-up pull chains A (see Fig. 1) of the lifters to run off. At the same time, the lifter tension spring starts to operate and, depending on the traction chain that is running, pulls the lifter inwards.



While one lifter now runs against a plate bracket and thus locks the plate magazine, the other lifter lifts a plate out of the magazine and pushes it upwards on the tipper. If necessary, the tipper is swivelled from the plate to the corresponding side

Returns

With the polarity reversal of the player motor and due to the brake loop D, the clutch pinion moves back into the engagement of the large drive gear. the motor now acts via the gearwheel gear winds the lift pull chains onto the roller of the large gearwheel and thereby returns the plate lifter to the starting position. Due to the return of the lifters, the played record is placed in the plate magazine and the lifter tension spring is preloaded again. The magnetic brake, which has now fallen off, prevents the spring-loaded mechanism from moving the plate lifter inwards again thanks to the brake rubber placed on the jacket of the player's motor.

Interference sources – Diagnosis

Before dialling		
Lights up after inserting money "Select" lamp not on.	Bulb broken or no contact. Power supply fuse defective. Coin contact does not work because it is defective or jammed.	change change replace or readjust if necessary
"Select" lamp burns constantly and you can play without money.	Coin hangs on the coin switch. Coin switch always switched on because it is jammed.	Remove readjust or replace
The record lifter runs upwards without a selection being made.	Ground connection of the MSK contact (yellow connecting wire)	check with measuring instrument
Selector magnet attracts continuously.	Defect at the condenser C4 in the command device.	change
Reset magnet is attracted	Defective cam switch NK5. Switch burnt due to missing spark suppressor capacitor. Reset button stuck on the cabinet is stuck	Install spark suppressor if necessary change
The fuse of the power supply blows continuously	The two sliding contacts under the tipper bracket are connected (plus with minus). Centring solenoid or reset solenoid defective.	readjust change
Both record lifters swing against the plate magazine and back.	The magnetic brake on the player motor is too low. Brake pad damaged or loose	readjust change
After dialling		
Both selection magnets fire at the same time.	The contact fingers of the lower double sliding contact have a connection. Possibly. jumped out of the track during transport.	readjust
Dial magnet No. 100 or No. 200 shoots without pushing up a dial pin.	The locking spring of the switching pin has broken off or slipped out of the guide bush. The plunger flag is therefore transverse.	replace or readjust
The dial disc or record magazine does not start	Broken rubber buffer to fasten the selector or magazine motor. Drive rubber on the dial or magazine disc defective. Leaf spring, the motor presses, too little tension.	change readjust
The centred plate does not pick up the record.	Adjustment 4 and 5 is not correct, lift stop screw and tipper stop adjusted. The centre hole of the record was not cleaned of any burrs or varnish residues before using -	Check adjustment no. 4 and 5 Clean the centre hole of the plate
Centering magnet does not respond	Coil defective (fuse of the power pack blows). Cam contact NK 4 does not switch.	Readjust or replace
Selection pin does not raise	Contact disc dirty. Sliding contact on one side no support	Clean and readjust with switch cleaner spray
Tonearm jumps when it touches the record.	The clutch pinion is too quickly removed from the engagement of the large gear due to the felt of the brake rod, which is too tight. Mechanical jamming in the gearbox, for example, tooth engagement of the clutch pinion too deep	relax the brake rod Move the player engine sideways accordingly
Tonearm sets down too early or too late or switches off too early or too late	Tonearm-balance-flange misadjusted. Tonearm switch-off contact misadjusted	readjust readjust

When changing		
The record returns to the wrong compartment. Two records clamp on to the centering plate	When lowering, the plate remains on the centering plate, the centre hole of the plate is too tight.	scrape out
Tonearm switches off, record does not go back with the lifter	Brake rod has too little tension, the clutch sprocket is not deflected and does not bring the lifters back via the gear ratio.	tighten slightly
Lifts don't move out of the record magazine all the way back and the selection disc runs	The clutch gear is not sufficiently firmly gripped by the compression spring on the clutch sleeve	Tension the spring or replace it
Sapphire is not cleaned from the brush.	Thrust shackle pin of cam NM slipped, torsion spring broken.	Mount change
While playing		
Sound fluctuates, even though the record plays correctly centred.	Rubber idler gear oiled or stiff on bearing axle. Running rim in the turntable dirty or oiled. Greased axis of the player motor, tension spring for friction wheel too little tension	Remove clean with tetra change tighten
Strong humming while playing	Transport security of the mechanism not loose. Bass adjustment too strong in relation to the volume.	Remove or adjust
Played disc runs backwards.	Return stop in turntable defective	replace
Disc does not switch off.	Tonearm switch-off contact dirty	clean with tetra
Dialler is not deleted.	Reset magnet coil defective. Cam contact NK 5 does not work. Switch pin worn	change adjust if necessary lightly grease

General electrical switching problems

We recommend a routine check in the following order:

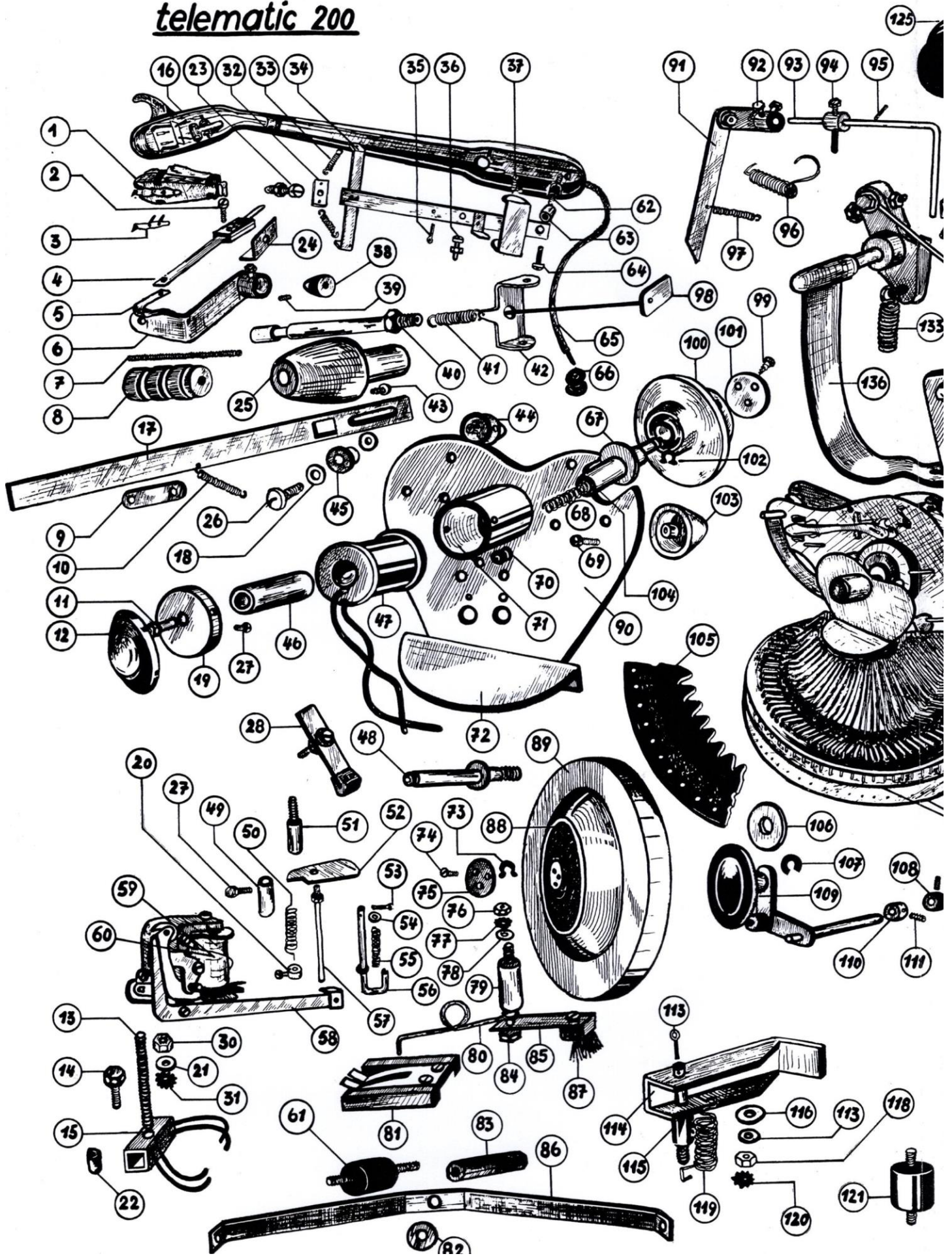
1. Check the defective switching element, such as the motor or solenoid, for mechanical jamming.
2. Check the faulty switching element for electrical interruption or short to ground.
3. Check the relevant lines, especially the clamp connections, sliding contacts and plug connections for loose contacts, wire breaks and short to ground.
4. Using the description of the "electrical functions" when selecting or changing, check whether the designated relays pick up in the corresponding changeover position.
5. Check whether the normally open contacts of the relays close properly and sufficiently interrupt the normally closed contacts.
6. Check whether the working contacts of the relays that have not been energized interrupt sufficiently and the rest contacts of the relays close properly.

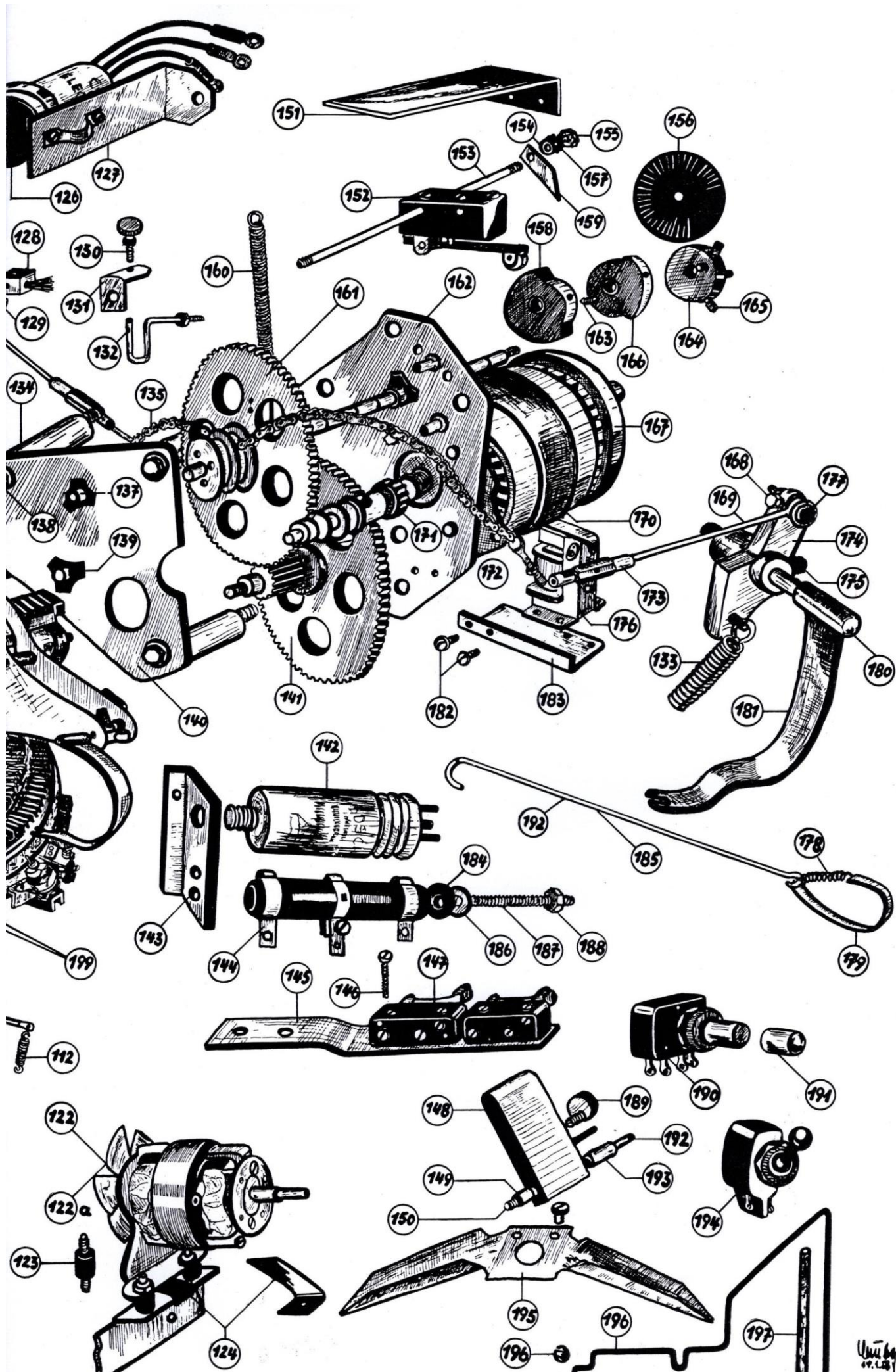
Individual parts of the mechanics "telematic 200"

- 1 KST 11 crystal system
- 2 Screw M2 x 12 DIN 85A
- 3 Micro sapphire SM11
 - Diamond needle for KST 11 crystal system
- 4 Contact spring
- 5 Contact sheet
- 6 Compensation lever
- 7 Threaded rod M4 x 60
- 8 Counterbalance
- 9 Sliding plate
- 10 Tension spring (valid until serial number 11 499)
- 11 Guide bolts
- 12 Coil cover
- 13 M4 x 55 threaded rod
- 14 S.K. Screw M4 x 20 Din 933
- 15 Contact holder cpl. with contact finger
- 16 Tonearm
- 17 Tonearm rail (valid up to serial number 11 499)
 - Tonearm rail (valid up to serial number 11 500)
- 18 U-washer 6
- 19 Coil cap
- 20 Collar with screw
- 21 U-washer 4
- 22 D socket
- 23 Screw M3 x 15 DIN 85 A
- 24 Angle
- 25 Tonearm bearing
- 26 Screw M4 x 12 DIN 85 A
- 27 Screw M3 x 3 DIN 86
- 28 Brake
- 29 S.K. Screw M3 x 8 DIN 933
- 30 Nut M4 DIN 934
- 31 Toothed washer F.Z.A. 4 DIN 6797
- 32 Holding Brackets
- 33 Tension spring
- 34 Tonearm carrier
- 35 Spin 1 x 5 DIN 94
- 36 M 3 x 10 DIN 85 A screw
- 37 Tonearm centering screw
- 38 Tonearm cones (valid up to serial number 11 499)
 - The tonearm cone 4 - 17 is omitted for devices from serial number 11 500
- 39 Setscrew M2 x 4
- 40 Threaded tube (valid up to serial number 11 499)
 - Threaded tube (valid from serial number 11 500)
- 41 Tension spring
- 42 Tonearm holder
- 43 Screw M3 x 6 DIN 85 A
- 44 Plate guide with lateral Hole for the cable passage d. centering magnets
- 45 D sleeve
- 46 Core sleeve
- 47 T 200 centering coil
- 48 Axis for turntables
- 49 Guide sleeves for lower switching pin
- 50 Compression spring (W magnet No. 100)
 - Compression spring (W magnet Nr 200)
- 51 Stop bolt
- 52 Pestle flag
- 53 Split pin 1 x 8 DIN 94
- 54 U disc 3
- 55 Compression spring
- 56 Upper switching pin
- 57 Lower switching pin
- 58 Shift lever assy.
- 59 Coil for reset magnet 60 Ohm
- 60 Coil for optional magnet 90 Ohm
- 61 Conti buffer 21 239
- 62 Mega buffers
- 63 Threaded tube
- 64 M 3 x 4 DIN 85 A screw
- 65 Tonearm braided flex
- 66 Rubber grommet
- 67 Felt ring
- 68 Coil spring
- 69 Phillips screw 4.2 x 13
- 70 Rubber grommet
- 71 Coil sheath cpl
- 72 Cover plate
- 73 Seeger ring 6 x 0.7 DIN 471
- 74 Countersunk screw M3 x 5 DIN 63
- 75 Turntable disc
- 76 Mother M4
- 77 Tooth lock washer F.Z.A. 4 DIN 6797
- 78 Washer 4
- 79 D - sleeve
- 80 Spring hooks
- 81 Contact rotor cpl
 - Contact spring
- 82 Washer 25 x 6 x 1
- 83 Intermediate piece
- 84 S.K. M4 x 40 screw
- 85 + 87 brush holder cpl. with brush
 - Brush
- 86 Strut
- 88 Rubber ring
- 89 Turntables
- 90 Front cover plate
- 91 Bracket compl.
- 92 S.K. Screw M3 x 8
- 93 Brush rod
- 94 Collar with screw
- 95 S - dowel pin 1 8 DIN 1481
- 96 Torsion spring
- 97 Tension spring
- 98 Pressure piece cpl. (valid until serial number 11 499)
 - Push pin (valid from serial number 11 500)
- 99 Self-tapping screw 4 x 6.5 DIN 7975
- 100 Plate centering
- 101 Disc
- 102 Seeger ring 6 x 0.7 DIN 471
- 103 Plate guide (metal coating)

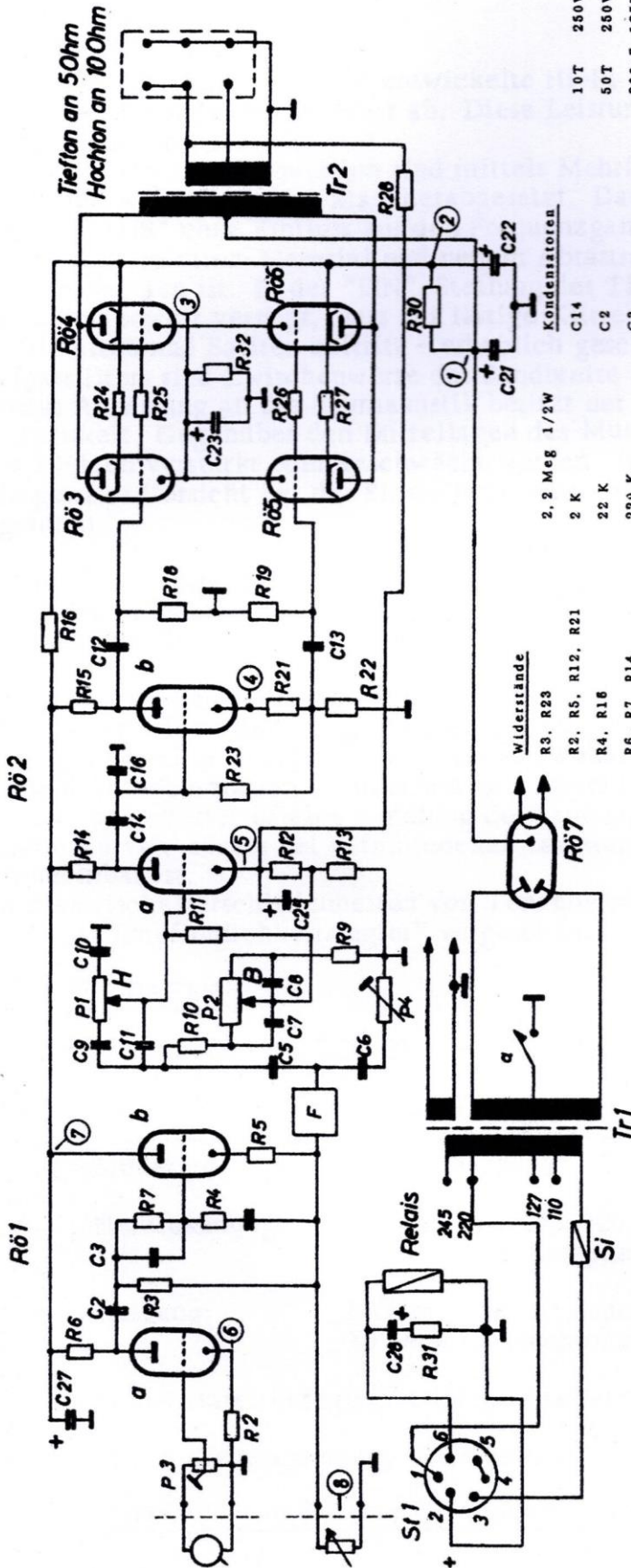
104 Coil core	161 Gear w. chain roller
105 Upper plate holder segment (Specify number range)	162 Gear plate
106 Felt disc	163 Setscrew M4 x 10 DIN 553
107 Seeger ring 4.5	164 Control disc
108 Collar	165 Square screw
109 Intermediate wheel cpl.	166 Cams
110 Collar	167 Papal motor without clutch
111 Setscrew M3 x 5	168 Adjusting screw
112 Tension spring	169 Pull rod
113 Split pin 1 x 15 DIN 94	170 Brake ring
114 Locking lever	171 Clutch with pinion
115 Bearing bolts	172 Coil for magnetic brake 5 - 55
116 U disk 16 x 5.2 x 1	173 Turnbuckle nut
117 Washer 5	174 Lever (valid for serial number 11 499)
118 Nut M5 DIN 934	174a Lever (valid for serial number 11 500)
119 Torsion spring	175 Grub screw M6 x 15 DIN 913
120 Tooth washers F.Z.A. 5 DIN 6797	176 Magnetic brake
121 Conti buffer 20 292 FJ 95	177 S.K. Screw M4 x 20 DIN 933
122 T 200 magazine motor (shaft offset at the front)	178 Tension spring
122a T 200 selector motor (cylindrical shaft)	179 Felt
123 Mega buffer 781 002	180 Cap for lift
124 Leaf spring	181 Lifter (right) cpl.
125 Clamp	182 Screw M3 x 6 DIN 85 A
126 Quenching capacitor 2 x 0.5 MF	183 Mounting bracket
127 Bracket for wiring harness	184 Insulating washer 16 x 1
128 Brushes	185 Brake rod cpl.
129 Grub screw M3 x 5	186 U disc 1 x 6 x 20
130 Knurled screw M3 x 5 DIN 464	187 Threaded rod M4 x 100
131 Angle bracket	188 Mother M4
132 Chain holder	189 Eccentrics
133 Tension spring	190 2-pole push button switch
134 D sleeve	191 Push button
135 Pull chain	192 Brake rod
136 Lifter (left) cpl.	193 Large spacer sleeve
137 Bearing bush	194 Toggle switch (Marquard) No. 100 NT
138 S.K. Screw M5 x 50 DIN 931	195 Plate baffle
139 Circlip D8 (seeger)	196 Plate bracket
140 Gear plate	197 Holding tube
141 Gear	198 Pearl
142 Condenser CO - MP 35 - 4.5 C - 220 V. (BOSCH)	199 Drive rubber f. Record magazine u. dial
143 Angles	
144 Sliding resistance 1000 ohms 12 watts	
145 Holders	
146 M4 x 10 DIN 85 A screw	
147 Microswitch 925 R	
148 Tippers	
149 Small spacer sleeve	
150 Tipper axle	
151 Cover plate	
152 Microswitch 925 R	
153 Threaded bolts M 3.5	
154 U washer 3.7 DIN 433	
155 Nut M 3.5 DIN 934	
156 Adjusting washer	
157 Tooth lock washer F.Z A. 3.7 DIN 6797	
158 Cams	
159 Hands	
160 Tension spring	

telematic 200





U.S. Pat. 2,811,117



Widerstände		Kondensatoren	
R3, R23	2, 2 Meg 1/2W	C14	10T 250V
R2, R5, R12, R21	2 K	C2	50T 250V
R4, R16	22 K	C3	200pF 125V
R6, R7 R14	220 K	C4	5T 125V
R9, R28	10 K	C5	0,1uF 250V
R10, R11, R18, R19	100 K	C6	30T 125V
R13	150 Ohm	C7	2T 250V
R15, R22	68 K	C8	20T 125V
R24, R25, R26, R27, R31	220 Ohm	C9	.150pF 125V
R30	470 Ohm 1W	C10	1, 5T 125V
R32	100 Ohm 4W ±5%	C11	50 pF 125V
<u>Potentiometer</u>		C12, C13	0,1uF 500V
P1, P2	1 Meg lin	C16	500pF 125V
P3	1 Meg log	C21, C22	50uF 350/385V
P4	10 K	C23	50uF 20/30V
<u>Röhren</u>		C25	16uF 6/8 V
R01, R02	ECC 81	C27	16uF 350/385V
R03, R04, R05, R06	EL 84	C28	16uF 110V
R07	EZ 81		

Nachbau ohne Genehmigung nicht gestattet

Spezialteile

- TR1 Netztransformator nach BV 1976
- TR2 Ausgangsübertrager nach BV 1769 c
- F Filter in Mummetropf nach BV 24886
- REL Schaltrelais nach BV 11957
- St 1 Hirschmann-Mehrfachstecker Mes 60 z

Lautehreger

Veränderlicher Schicht-Drehwiderstand 50K log. Eine Abschirmung der nur 2-adrigen Zuleitung erübrigt sich im Allgemeinen. In ungünstigen Fällen verwende man zwecks Vermeidung störender Brummen ein abgeschirmtes Kabel.

General

The hi-fi amplifier "TELEWATT T 32" developed for the Telematic 200 delivers an output of at least 30 watts. This performance guarantees high reproduction, good power reserves. Distortion and inter modulation are reduced to a level that is no longer perceptible by normal standards by means of multiple negative feedback. The adjustable low-pass filter is in the "OFF" position without influencing the frequency response of the amplifier, so that a perfect "high-fidelity" reproduction can be achieved with flawless vinyl material and new scanning safes. In the "ON" position of the low-pass filter, the bandwidth of the amplifier is narrowed to such an extent that the heavy clanking and noise - as occurs with played vinyl records and sapphire tips - is considerably weakened. Intermediate values of the bandwidth can be set with the trimmer of the low-pass filter.

The T32 bass and treble controller is particularly effective for adaptation to the room acoustics. Compared to the middle layers of the music spectrum, the bass and trebles can be amplified or reduced about 10 times. Because of this great effectiveness, a certain degree of caution is advised when setting, over-emphasizing the bass is not recommended.

The mechanically controlled switching relay in the T32 switches off the output tubes during breaks, so that the life of the output tubes that are most subject to wear is extended.

The volume remote control can be carried out with a simple layer of rotation resistance attached at any point. A 2-core cable of any diameter is sufficient as a line to the controller, although shielding of this cable is only necessary in a few exceptional cases. Although the installation of the remote control is very easy, it allows you to regulate the volume according to the "Listening curve" (Fletcher Munson curve), so that at different volume levels there is no perceptible change in sound. In order to be able to compensate for electrical differences in pickups, a "sensitivity regulator" is provided in the T-32.

IMPORTANT DATA

Tube set: 2 x ECC 81 – 4 x EL 84 – 1 x EZ 81

Current consumption: ca. 90 VA

Fuse: 0.8 A for 220 V

Mains voltage: set to 220V as standard (mains transformer has taps 110, 127, 220 and 245 volts)

Output: 5 ohms for bass speakers, 10 ohms for tweeters

Remote volume controller: layer resistance 50K Ohm log

Relay control voltage: = 60 volts

The circuit diagram and parts list are located in the removable floor plan of the amplifier
SERVICE MANUAL

A) No sound - tubes don't glow

- 1 - Check fuse. Use only the prescribed 0, 8 A fuse, otherwise no warranty claim. If newly inserted fuses blow out repeatedly, then troubleshooting according to B) – 2
- 2 - Mains voltage present? Does the "Hirschmann Mes 60 z" multiple connector have perfect contact with the socket?

B) No sound - tubes glow

- 1 - Do plugs for bass and tweeters have perfect contact with output sockets? Woofer at 5 ohms, tweeter at 10 ohms.
- 2 - Replace 2 tubes with new ones in the following order: EZ 81 - ECC 81 - EL 84. If the fuse blows after a flawless EZ81 has been inserted, the following possible errors exist:
 - a) Tube failure EL 84
 - b) Electrolyte charging capacitor C21 defective
 - c) Fine closure of the coupling capacitors C12, C13
 - d) Mains over voltage. Solder the transformer to 245 V.
- 3 - Check and clean the relay contact
- 4 - The wire to the remote volume control has mutual or ground short (in contrast to this, the full volume is always available when the line is interrupted).

C) Insufficient Volume

- 1 - Crystal pickup of cartridge in order? Sensitivity control set correctly? Do not open too much when adjusting, otherwise distorted playback due to input overload.
- 2 - Trial replacement of the tubes ECC81 - EL84 - EZ81
- 3 - Check the speaker connections as in B) - 1
- 4 - Remote controls ok?

D) Distorted playback

- 1 - Tip pf sapphire in order? Sensitivity control set correctly? If turned up too far, dirty playback of loudly recorded vinyl records.

2 - Trial replacement of the tubes according to B) – 2

3 - Check the speakers according to B) – 1

E) background noise

1 - Net hum:

a) Replace ECC81 tubes on a trial basis, in rare cases EL 84 as well

b) Check the pickup cable for the contact of the shielding and ensure the most possible distance to mains cable

c) Ground the amplifier if longer remote control lines are in operation. Shield remote control lines in exceptional cases and use Hirschmann pickups "Ts 10", cable shielding on centre pin.

d) Try reversing the polarity of the plug

e) Electrolytic capacitors C21, C22, C27 defective?

2 - Deep rumble noises:

a) Non-circular or non-flat records

b) Bass control set to high bass amplification

c) Volume control opened too much when the record is recorded quietly

d) Defective anti-rumble capacitor C25?

3 - Noise and sizzling noises:

a) Replace ECC81 tubes on a trial basis, in rare cases EL 84 also. In many cases, disruptive tubes can be determined by tapping them gently. (Tubes with glass damage are not covered by the guarantee)

b) Checking all connection sockets for contact and firm seating

IMPORTANT MEASURED VALUES T32 amplifier

Determined with Universal tube voltmeter UVA Gossen based on that wiring diagram in the amplifier 57-4000/T-32

Measuring point	Nominal value volt =	Measuring range
1	320	600
2	315	600
3	12,5	30
4	55	300
5	1	6
6	1	6
7	215	600
8	2 mA	L-controller on zero
9		
10		

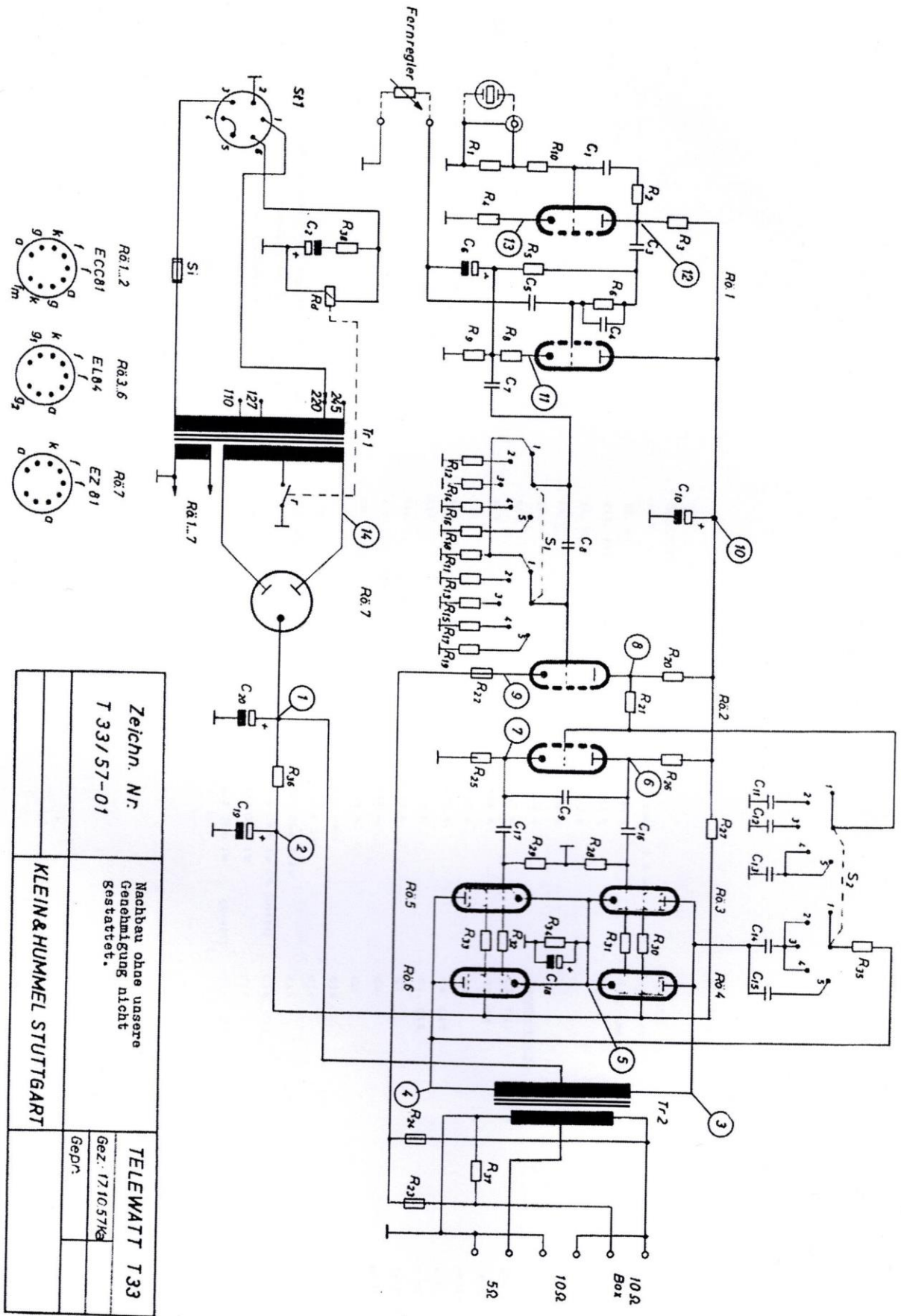
Important note: If the amplifier has to be handed over to the factory for inspection, a detailed error report must be enclosed. If warranty service is used, this is only possible if the associated warranty documents are handed over to the amplifier at the same time.

IMPORTANT MEASURED VALUES T33 amplifier

Determined with universal -tube voltmeter based on the wiring diagram T 33 / 57-01 in the amplifier

Measuring point	Setpoint volt =
1	330
2	320
3	322
4	325
5	12,5
6	210
7	70
8	67
9	1,2
10	281
11	89
12	105
13	1,8
14	2 x 280 V (Alternately pg.)

Important note: If the amplifier has to be handed over to the factory for inspection, a detailed error report must be enclosed. If warranty service is used, this is only possible if the associated warranty documents are handed over to the amplifier at the same time.



Zeichn. Nr. T 33/57-01		Nachbau ohne unsere Genehmigung nicht gestattet.		TELEWATT T33	
		KLEIN & HUMMEL STUTTGART		Gez.: 17.10.57/K	
				GedDr	