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SERVICE MANUAL
CINEMONTA 1B-2G

N.V. OPTISCHE INDUSTRIE „DE OUDE DELFT" DELFT - HOLLAND

CONTENTS

FIGURES

I INTRODUCTION

This manual, intended as a guide for the service engineer of the

CINEMONTA 1B-2G

comprises a description of the apparatus, as well as illustrated maintenance and repair instructions.

It is necessary to read the manual very carefully prior to carry out any work on the Cinemonta. This prevents incorrect handling which may cause damage to apparatus and film. Proper functioning of the Cinemonta can be guaranteed only if the instructions in this manual are accurately adhered to.

The illustrations, specifications,etc. of the apparatus are accurate at the moment of going to press. We reserve the right to make any modifications, without being obliged to immediately complete or alter the manual accordingly. Any modifications that may occur, will, however, be incorporated in the manual soonest possible.

Should you desire any additional data concerning the Cinemonta, please consider us completely at your disposal.

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II GENERAL INFORMATION

This manual deals in the first place with the mechanical section, including dismantling, adjustment and lubrication of the various moving parts. Where these parts are electrically driven, coupled or braked, reference is made to the description of the electronic section, as regards the trimming of the control unit. The electronic section also deals with the sound amplifier and the adjustment of the sound-heads.

In the chapter covering the optical part, directives are given for the adjustment or renewal of the optics, heat filters, mirrors and the Helio screen. The spare parts list includes those parts which are more subject to wear than other parts.

III MECHANICAL SECTION (see fig. 1)

3.1 General data

For a number of activities it will be necessary to remove the plastic protection cover situated under the table. In most cases, the metal cover plate at the underside will have to be removed as well. Proceed as follows:

a. Remove the socket-head screws 20 by means of which the table-top is fitted to the frame.

b. Turn the table-top to the vertical position, taking care that the viewer does not come to rest against the intermediate beam at the rear of the frame.

CAUTION: If the table-top is turned to the vertical position, there must be no 600 m (2000 ft.) plates on the table. These plates protrude a little and may, therefore, touch parts of the frame.

c. Unscrew the four screws 23 from the plastic protection cover situated under the table-top and fold down this cover. Remove the cover from the hinges by sliding it sidewards.

d. Unscrew the six screws 13, by means of which the metal bottom-plate 12 is fitted, and remove this plate.

e. Dependent on the work that is to be carried out, the table-top may be turned back or left in turned position.

3.2 Slipping clutch of the winding plates

3.2.1 Dismantling

a. Remove the relevant winding plate(s) after having taken out the core. Also remove the nylon ring 6 (fig. 1) situated under the plate on the spindle.

b. Unscrew the three screws 47 (fig. 1) at the top and remove the strip 19 at the underside of the table after unscrewing the three screws 18. The clutch can now be dismantled further, if necessary.

CAUTION: Be careful that the steel clutch-plate 15 (fig. 3) is not turned upside-down, in view of the different roughness of the friction surfaces.

The three clutches on the left are interchangeable, as well as the three clutches on the right. The left-hand clutch and the right-hand clutch must not be interchanged, owing to the different types of springs 17 and 21 (fig. 3), used in these clutches.

The Ferrodo coupling disk cannot be renewed separately; it has to be renewed together with the pulley 14 (fig.3). The same holds good for the ball at the underside of the pulley.

3.2.2 Cleaning

a. Check that the steel clutch-plate 15 (fig.3) is free of grease. Clean with chlorothene or dry-cleaning naphta, if necessary. A greasy clutch-plate may cause excessive slipping.

b. Check also that the Ferrodo coupling-disk is free of grease. Clean with chlorothene or dry-cleaning naphta, or renew if necessary. See par. 3.2.1.

3.2.3 Lubrication

The bronze bearing in the pulley may not be lubricated. If necessary, the ball 13 (fig. 3) which comes to rest on the nylon screw 18 (fig.1) may be lubricated with some thin Molykote (Molykote BR2). To prevent vibration some Molykote grease should be applied to the bronze bearing.

3.2.4 Adjustment

The height of the winding plates with respect to the table-top can be adjusted by means of the nylon screw 18 (fig.1) or 3 (fig.4a) which presses against the ball on the pulley. The adjustment must be such that there is a distance of 1 mm(1/32") between the underside of a roll of tightly wound film without flange and the upperside of the winding plate (see fig.4a). In the case of a spool with flange the film must remain all but free from the flange.

After the adjustment of the height of the winding plate, check that the pulleys 2(fig.4a) are still in line with each other or with the running level of the belt. Apart from the pulley, the spindle may be displaced in vertical direction by displacing the catch plate on the spindle, after screw 1 (fig.4a) has been loosened.

3.3 Belt tensioners

For guiding and tensioning the driving belts of the winding plates, a fixed and a movable tensioning wheel are fitted both on the left side and the right side.

3.3.1 Disassembly

The tensioning wheels can be taken off after removing the central screw 31 (fig.1) and its washer.

3.3.2 Cleaning

Clean the bearing surface or the tensioning rollers with chlorothene dry-cleaning naphta.

3.3.3 Lubrication

In our factory, the ball-bearings of the belt tensioners have been filled with grease and they need not be lubricated, therefore. The point of rotation of the lever on which the movable tensioner has been fitted, may be greased with a thin Molykote grease (Molykote BR2).

3.3.4 Adjustment

The tensioning rollers need not be adjusted.

3.4 Driving belts of the winding plates

3.4.1 Disassembly

If the movable tensioning wheel is pressed outward, the driving belt 33 (fig.1) can be removed. Be careful that the tension spring 32 is not stretched beyond the limit! When a new belt is fitted, the rough side of the belt should be at the inside. See threading scheme fig.4a.

3.4.2 Cleaning

If necessary, aluminium grindings and grease can be removed by means of chlorothene or dry-cleaning naphta.

3.4.3 Lubrication

Do not apply grease or oil

3.4.4 Adjustment

The tensioning rollers maintain the correct tension of the belt.

3.5 Reverse gear of the winding plates (8 up to 12, fig.3)

3.5.1 Disassembly

a. Loosen a few turns the two screws by means of which the fixing plate of the reverse gear is fitted to the frame.

b. Slide the driving belt from the winding plates and slide the V-belt from the gear towards the central pulley. The complete gear assembly can now be removed.

CAUTION: Be careful not to interchange the two gears!

Any further disassembly is carried out by unscrewing the socket-head screw 9, by means of which the lower bushing is clamped on the spindle. Then the whole assembly can be dismantled. Reassemble in the correct order of sequence!

3.5.2 Cleaning

Remove any dirt from between the springs, with the aid of chlorothene or dry-cleaning naphta. If the springs are very dirty, disassemble the gear, as indicated in 3.5.1 and brush the separate components, with the aid of chlorothene or dry-cleaning naphta.

3.5.3 Lubrication

If the gear creaks or is entirely dry, disassemble the various components, as indicated in 3.5.1 and clean them. Grease with Molykote grease BR2 the bushings on which the springs are fitted.

3.5.4 Adjustment

The gear itself need not be adjusted. When mounting, the belt to central pulley must be tensioned. This is done by sliding the fixing plate of the clutch (slotted holes). The correct tension has been achieved when, at one side, the belt can be pressed in approximately 2 cm (3/4") by a finger.

3.6 Coupling belt (leads from the reverse gear to the central pulley)

3.6.1 Disassembly

Loosen the fixing screws of the reverse gear slightly and move the gear so that the belt 22 (fig.4) can be removed. Before the belt is taken from the central pulley, first remove the two geared belts from this pulley, as follows:

a. Slightly loosen the three fixation screws of the electro-magnetic clutches 7 and 27.

b. Shift these clutches so that the tension of the geared belts is reduced and remove the latter from the central pulley.

c. Remove the coupling belt and renew it, if necessary.

3.6.2 Lubrication

If the coupling belt creaks this can be remedied by applying some talcum powder.

3.6.3 Cleaning

Clean the belt by means of a brush or a dry cloth.

3.6.4 Adjustment

The coupling belt is tensioned, as indicated in 3.5.4. The two gear-wheels to the magnet clutches are tensioned as follows:

a. Slide the magnet clutches 7 and 27 (fig.4) such that all gearwheels leading to the relevant clutch (both at the under- and the upperside) are tensioned. The tension must be so that on one side the geared belts can be pressed in about $\frac{1}{2}$ cm (3/16 ") by a finger.

b. Lock the magnet clutches in position by securing the fixing screws 28.

3.7 Disassembly of the film-transport plate

For a number of proceedings described further on in this manual, it is necessary to remove the film-transport plate and the viewer. Proceed as follows:

a. Remove the six winding plates. Remove the plastic cover plate and the aluminium plate as indicated in par. 3.1 and leave the table in turned position.

b. Loosen plug 5 (fig.4). Unscrew bolt 4 a few turns, shift the pulley, and take the geared belt 6 from the magnet clutch 7 and the sprocket driving gear.

c. Lower the table-top, unscrew the two screws 2 (fig.1) at the upperside and remove the viewer.

d. Turn the table-top up again. Remove the two geared belts 9 and 10 (fig.6a) (loosen clutch 27 (fig.4) slightly and shift it), as well as the belt 6 (fig.6a) to the counter.

e. Disattach the operating rod of the speed control at the side of the switch (remove the clip and pull the rod loose). Remove the two microswitches 10 and 11 (fig.7) after having unscrewed the two fixation screws 12.

f. Disattach the wires from the slide switches 4 (fig.6a). Record the connections! Disattach the two wires 5 of the sound-lamp. Take careful note of the colours so that there is no confusion concerning the wires afterwards. Disattach the four amplifier plugs 1 and record the numbers.

g. Remove the four 6 mm socket-head screws 11 (fig.6a) from the supports of the chassis. To gain access to the socket-head screw on the underside left, first unscrew the motor control unit 7 (three screws 8) and tilt the control unit over sideways. Now the transport plate can be removed.

h. Reassemble in the reverse order. Tension - with the aid of bolt 4 (fig.4) and the corresponding pulley - the geared belt to the viewer such, that on one side this geared belt can be pressed in about $\frac{1}{2}$ cm (3/16 ") by a finger.

3.8 Electro-magnetic clutches

The apparatus contains three electro-magnetic clutches: 7, 27 and 29 (fig.4) which are exactly identical, with the exception of the pulleys on the covers. If, towards the end, the film and the tape no longer run synchronously, these couplings may have become greasy. To check this, proceed as follows:

a. Insert a sheet of paper between clutch cover 2 (fig.3) and the clutch housing 7. Press the cover down and rotate it slightly.

b. Remove the paper. The sheet of paper must not show any oil spots. If it does, proceed as indicated under "disassembly" and "cleaning".

3.8.1 Disassembly

a. Remove the clutch of the foremost magnetic tape, after the three fixation screws 28 (fig.4) have been unscrewed.

b. Disattach the geared belt 26, unscrew the socket-head screw (or screws) and remove the pulley on the side of the fixation screws. To disassemble the two other magnet clutches, first remove the film-transport plate (see par. 3.7).

c. Remove these magnetic clutches from the apparatus in the manner described above. For a complete renewal (e.g. if a coil is defect), the two connection wires must be disattached as well and removed from the cable harness.

d. Remove the two brake shoes 5 (fig.3). Now the cover 2 of the clutch must be removed. (Do not drop the ball 3 and the spring 4!)

3.8.2 Cleaning

Clean, with chlorothene or dry-cleaning naphta, the cover removed from the magnetic clutch so as to be free of grease. The matching surface, however, must not come in contact with these liquids; it must be cleaned, as much as possible, with a dry cloth.

3.8.3 Lubrication

Only the ball 3 (fig.3) under the set-screw 1 for the slip may be greased slightly. Be careful that no other parts of the magnetic clutches come in contact with oil or grease.

3.8.4 Adjustment

By means of the central screw 1 (fig. 3) on the cover, the slip of the magnet-clutch can be adjusted (in de-energized position). The slip must be so adjusted that the cover can still be rotated by hand, by exerting some force.
The brake shoes can be adjusted as follows:

a. Energize the magnet, or press the cover completely in, by hand.

b. Insert a feeler gauge of 0.2 or 0.3 mm (0.008" to 0.012") between the cover and the brake shoe. Connect the brake shoe to it and secure it with the two screws 6.

3.9 Gear box

When the main pulley 25 (fig. 4) is rotated, there must be some play in all positions. There must be no heavy points. If there is too much play or if it is not uniformly divided, proceed as follows:

3.9.1 Disassembly

Remove the viewer, as indicated in par. 3.7. The upperside of the wormwheel housing is now accessible.

3.9.2 Cleaning

Since it is a closed unit, there are no special cleaning requirements.

3.9.3 Lubrication

Lubrication is not necessary, thanks to the closed grease-filled bearings.

3.9.4 Adjustment

a. Adjust the play as follows:
Slightly loosen the four screws 24 (fig. 4) and rotate the bushing under the pulley slowly. By rotating the bushing, adjust the play so that it remains constant over a full main pulley rotation.

b. Secure the four screws 24. If necessary, readjust the tension of the geared belts and strings which lead to the main pulley. See par. 3.5.4 and 3.13.

3.10 Electro-magnetic brake

The combination main driving motor/synchronous motor is braked by means of electro-magnet 10 (fig. 4), situated on the spindle of the main motor. If the running-out time of the machine is too long (more than three images), the brake system does not operate correctly.

3.10.1 Cleaning

The exterior of the magnet system can be cleaned by means of a dry cloth. By inserting a piece of petrol-soaked paper between the braking surfaces and allowing the machine to run, the dirt is removed from the braking surfaces.

3.10.2 Lubrication

Any form of lubrication must be avoided.

3.10.3 Adjustment

The distance between the braking surfaces must be 0.2 mm ± 0.05 mm (0.008" ± 0.002"). Adjustment is carried out by means of the three socket-head screws 12 (fig. 4) in the magnet cover. Be careful that the clearance is uniform over the entire surface.

3.11 <u>Slipping-clutch of the synchronous motor</u>

The pulley on the spindle of the synchronous motor has a certain slip with respect to this spindle, in order to prevent too strong forces from occurring when the system is braked or stopped suddenly.

3.11.1 Cleaning

The combination can be cleaned by means of a brush or a dry cloth.

3.11.2 Lubrication

The spindle 17 (fig. 4) with the ring 16 must be greased slightly with thin grease (Molykote BR2).

3.11.3 Adjustment

a. Check that the slip operates correctly, by switching over immediately from high speed to the synchronous speed. When there is too much slip, the slowing down of the synchronous motor on the spindle of the main motor which runs at a speed slightly higher than the synchronous speed, is insufficient, if the speed control is set at the synchronous point (24 or 25 frames/sec.).
If there is too little slip, the double geared belt 19 (fig. 4) tends to be drawn over the teeth of the pulley when switching over immediately from a high speed to a low speed.

b. First check the belt tension. The double geared belt must be rather tight, so that it can be pressed in 1 to 2 mm (0.04" to 0.08") with the finger. Adjustment is effected by loosening the four socket-head screws 18 slightly and displacing the synchronous motor. Secure the motor again after the correct belt tension has been achieved.

c. Adjust the amount of slip by turning nut 15, situated under lock-nut 14. If the nut is tightened the amount of slip will decrease; if it is loosened, the slip will increase. Adjust the slip so that the double belt all but disengages the teeth of the pulley if the high speed is suddenly lowered down. If this position is found, loosen the clutch slightly more and secure the lock-nut 14.

3.11.4 Renewal of the double geared belt between the synchronous motor and the main shaft.

a. Unscrew slightly the four socket-head screws 18 (fig. 4). Shift the synchronous motor 21 so that the belts can be removed from the pulley.

b. Remove the geared belt by sliding it between the end of the main shaft and the bracket 11.

c. Fit a couple of new belts, proceeding in the same way; guide the belts over the pulley of the synchronous motor and tighten them by shifting the synchronous motor and securing the socket-head screws 18. Check also step 3.11.3.

If it proves impossible to remove the old belt, because there is too little space between the main shaft and the bracket, then proceed as follows:

d. Loosen slightly the four screws 9, by means of which the bracket is fixed to the worm gearbox. Shift this bracket in the screw holes. Now remove the geared belts and fit a new set. In this case the two pulleys must be aligned again as follows:

e. Stretch only one belt over the pulley of the synchronous motor and the main shaft, and let the other belt hang loose (over the housing of the magnetic brake 10, for instance).

f. Secure the screws 9 in the bracket such that the bracket can still be shifted, when some effort is exerted. Lower the synchronous motor till the belt is tight (i.e. it must be possible to press in the belt approximately 1 to 2 cm (3/8" to 3/4") with a finger). Secure the socket-head screws 18 again.

g. Allow the apparatus to operate. Push, by means of a screw-driver, the belt 19 towards the centre of the two pulleys and check that the belt remains in the centre during operation (both in forward and reverse direction).

h. If the belt does not remain in the centre, try to align the two pulleys, by shifting the bracket 11. If now the belt remains in the centre, stop the apparatus and loosen the socket-head screws 18. Then position also the other belt on the pulley and stretch the two belts again. Secure the socket-head screws 18 again.

i. If the two belts do not match beside each other any more, or if they produce noise or run annoyingly against the flange, then repeat the alignment procedure. Also check step 3.11.3.

3.11.5 Lubrication

The double geared belt must be lubricated with silicon grease, particularly when a new set is fitted.

3.12 Renewal of the driving motor

a. Unscrew the four screws 24 (fig.1) from the protection cover on the motor. Record the order of the connections below and disconnect the wires. Remove also the plug of the motor tacho-compartment.

b. Unscrew the four nuts 8 (fig.4) and carefully pull the motor towards behind out of the claw clutch. The motor can now be renewed. Fit in reverse order of sequence.

3.13 Tensioning the driving belts to the central pulley

If the play of the central pulley has been readjusted, or if one of the magnet clutches has been disassembled, the driving belts have to be readjusted. When doing this, the following order of procedure must be adhered to:

a. Loosen slightly the three screws, by means of which the magnetic clutch 7 (fig.4) is fixed to the chassis. Displace the magnetic clutch such that the belts leading to this clutch are tensioned. It must be possible to press in about 5 mm (3/16") belt 31, that leads from the magnetic clutch to the central pulley. The geared belt 6 (fig.6) to the counter must be slightly less tight and it must be possible to press it in about 1 cm (3/8 "). For tensioning the geared belt 6 (fig.4) that leads to the viewer, see step 3.7 (h).

b. Loosen slightly the three screws, by means of which the magnetic clutch 27 (fig. 4) is fixed to the chassis. Displace the magnetic clutch such that the belts 26 and 30 to this clutch are drawn tight. After the adjustment it must be possible to press in the belt 5 mm(3/16").
Secure the clutch 27.

c. Loosen slightly the three screws, by means of which the magnetic clutch 29 (fig. 4) is fixed to the chassis. Displace the magnetic clutch such that the belts 26 (fig. 4), 10 (fig. 6) and 9 (fig. 6) are drawn tight. After this adjustment it must be possible to press in the two belts 26 (fig. 4) and 10 (fig. 6) about 5 mm (3/16"), and belt 9 (fig. 6) to the image correction about 1 cm (3/8 "). Secure the clutch by tightening the screws 28 (fig. 4).

3.14 Counter

By means of the left handwheel the counter itself is set to zero. This wheel and the counter form a complete unit. The right handwheel on which the counted frames are indicated, must not be loose from the counter. The counter combination in its entirety must be adjustable by means of this handwheel, and there must be sufficient friction with respect to the geared-belt-coupled driving mechanism of the table. The amount of slip of the driving gearwheel on the spindle of the handwheel can be adjusted by loosening or tightening up nut 5 on this spindle. Set the slip so that it is all but possible to rotate handwheel 4 with the thumb.

3.15 Flywheels

The flywheel can be taken from the relevant spindle after the screw 38(fig. 1) in the nylon lower part has been unscrewed and this lower part has been removed. Lubricate the bearing bushes with Molykote grease (Molykote BR2).

3.16 Stabilization rollers

Adjust the stabilization rollers so that they are in the middle of the stroke. This is done while there is a film in the machine, running at synchronization speed (24 or 25 fr./sec.) in forward direction. Adjust by tensioning the tension spring 23 (fig. 5) by means of nut 21 on screw 22 (one screw for each set of stabilization rollers).

3.17 Pretension of the tensioning rollers for the picture film

This pretension is adjusted by adjusting the tension of the drawing and supplying springs 8 and 10 (fig. 5) below right. Prior to tensioning these springs, the small central spring 12 has to be adjusted first. This is done by turning the round springholders 11. The pretension of this central spring, measured from the centre of the guide roller, must be 500 grammes (1.1 Lb.) towards right and 400 grammes (0.9 Lb.) towards left. If the spring is drawn out too much (resulting in drop-outs or a loss of high notes while reproducing the magnetic edge track) it must be replaced by a new one.

Now adjust the long tension spring as follows: The drawing spring 8 must be adjusted at 340 grammes (0.75 Lb.). The supplying spring 10 must be adjusted at 250 grammes (0.55 Lb.) As a rule the spring system has to be adjusted so that the two tension rollers are in a symmetrical position with respect to the black pin 9.

3.18 Pressure roller sound-optics

Check the brass pressure roller 41 (fig.1) of the sound-optics. If it is in a fixed position or makes a whistling noise, proceed as follows: Unscrew the two screws 41 from the holder, remove the holder and tap the pin 42 out. Grease the pin with a light grease. Reassemble in the reversed order.

3.19 Adjustment of the pressure rollers against the sprockets

3.19.1 Symmetrical position with respect to the outline of the sprocket. The fulcrum of the pressure roller holder is fixed in an eccentric hole. This spindle can be displaced after loosening slightly the fixation nut 24 (fig.5) of this spindle. Position a thin and a thick film (one on the other) between the sprocket and the pressure roller and press the pressure roller against it. Now secure the nut 24 again.

3.19.2 Height with respect to the sprockets

The height of the pressure roller with respect to the sprocket can be adjusted by fitting or leaving out spacers under the roller. The roller must run free during rotation and pressing down.

CAUTION: There must remain at least one spacer under the pressure roller.

3.19.3 Setting the snap-in point

Unscrew nut 2 (fig.5) slightly. Position a thick and a thin film (placed one on the other) between the sprocket and the pressure roller. Slide the snap-in point so that the pressure roller holder in pressed position all but engages. Secure the nut 2 again.

3.20 Setting the lip-synchronization control

If this control operates too easily (rotation of the handle), proceed as follows:

a. Unscrew lock-screw 17 (fig.5). Tighten up the drawing screw 20 (=central screw in the top of the handle). Resecure the lock-screw 17.

b. If the handle is still entrained: Loosen the lock-screw 17, unscrew the central screw 20, remove the handle 19 and remove the cipher-disk 16. Unscrew the two screws 18 from the steel plate under the cipher-disk.

c. Remove the gear wheel 14 after unscrewing the countersunk screw 15. Unscrew the socket-head screw 13 from the ring with the inside toothing. Remove this ring.

d. At the underside remove the geared belt 9 (fig. 6) from the geared belt pulley 3 (fig. 5) and pull the spindle assembly out.

e. Clean the spindle (clorothene or dry-cleaning naphta) and grease it again (Molykote BR2).

f. Fit the entire unit in the reversed order.

3.21 Renewal of the fan

Unscrew the two screws 27 (fig. 1) (insert the screwdriver from below between the rotor-blades). Detach the two fixation wires. Now the whole assembly can be taken from the apparatus. To disassemble further, loosen the two fixation nuts 30 and the two lock-nuts. The fan can now be removed from the assembly.

3.22 Renewal of the contact strips for the projection lamp

The contact strips 29 (fig. 1) should be renewed if they are burnt-in or bent. Dismantle the fan as indicated in step 3.21 and remove the four screws by means of which the strips are fixed. Fit the new strips.

IV ELECTRIC/ELECTRONIC SECTION

4.1 Adjusting the main motor

4.1.1 General information

The table must be adjusted always under full load. The viewer must be fitted and the film and the two perfo-tapes must have been inserted. All clutches must be operational.
Two different control prints may have been used, either a small one (type II, see fig.17), or a larger one (type I, see fig.16). The controls have been designed in the relevant printed circuit drawing by A, B, C and D respectively.

The functions of these controls are as follows:

A Integrates the control and causes a certain delay, so that a uniform control is obtained. Clockwise rotation gives maximum integration and may result in a fluctuating control (overshoot). Complete anti-clockwise rotation increases the flutter.

B Controls the amplification and, therefore, the power used to control the motor. Clockwise rotation increases the amplification.

C Minimum speed. Anti-clockwise rotation decreases the speed.

D Maximum speed. Clockwise rotation increases the speed.

4.1.2 Maximum speed

Connect a stroboscope and adjust it at a range of 2000-3000 rpm. Direct the stroboscope to the spindle of the synchronous motor 21 (fig.4). Set the potentiometer C and D at middle position. Start the apparatus and set the speed control 13 (fig.2) at maximum. Turn the potentiometer D so that the maximum number of revolutions/min. is obtained, (i.e. so far that further rotation of the potentiometer does no longer affect the speed. Now turn potentiometer D back again, a little less far than the point at which the spindle starts to slow down.

4.1.3 Minimum speed

Set the speed control 13 (fig.2) a little away from the 0-position (the slider of the large potentiometer 2 (fig.7) on the switch unit must contact the resistance track just at the beginning. Adjust the potentiometer C so that the motor runs as slowly as possible, however without shocks.

Check point 4.1.2 once again, and readjust, if necessary. Repeat the points 4.1.2 and 4.1.3 a few times till a constant has been obtained.

4.1.4 Amplification and ripple

Direct the stroboscope on to the main spindle. Set the stroboscope at 750 rpm. (or 50 Hz). Set the speed control at the lower side a little out of the snap-in position of the synchronous point (24 or 25 Fr./s). Now adjust potentiometer A so that the motor runs smoothly and shock-free. If necessary, also readjust potentiometer B. Check that the motor starts powerful enough, by rotating the speed control to the 0-position and then to the approx. 25 f/s. Readjust, if necessary, with B. Then check the setting of A once again.

4.2 Adjusting the control unit (Only after renewal)

If the complete control unit 26 (fig.1) has been renewed, proceed as follows:

a. Adjust in accordance with the procedure, described in par.4.1.

b. Remove the external resistance, belonging to the renewed unit, and situated between the points 1 and 4 (two blue wires) on the terminal block TB 7 on the relay bracket 16 (fig.1).

c. Connect a decade resistance instrument of a range of 0-1000 Ω between these blue wires.

d. Detach from connection 1 on the terminal block TB 7 the green wire coming from the switch unit. Connect an ammeter (range 0-3 A) between this wire and connection 1.

e. Start the machine and adjust it at the synchronous speed. Adjust the decade resistance instrument so that the ammeter indicates 0.80 - 0.85 A. Record the value at which the decade resistance instrument has been set.

f. Introduce between the points 1 and 4 on TB 7 a 1 W resistance in the E-range that has a value as close as possible to the recorded value.

N.B.: If during the adjustment procedure, the maximum current is exceeded the therminal safety of the motor will become operative. It may then take about one hour till the motor is ready for operation again. Try as much as possible to prevent this!

4.3 Functions of the relays

In the apparatus there are three relays for carrying out the various switch functions.
The relays K 1 and K 2 (14 and 15 on fig.1 resp.) serve for forward and reverse switching. They are energized in the "reverse" position. Relay K 3 (under the bracket 16 on fig.1) controls the synchronous motor and is energized only at 24(25) frames/second.

4.4 Functions of the microswitches

Seen from above downwards, the microswitches on the switch-unit have the following functions (see fig.7):

9 Reversal of the synchronous motor (S 16)
8 Brake (S 13)
7 220 V motor control and switch-off working-lamp (S 4)
6 Forward/reverse (S 3) (Must switch always a little earlier than 7 and 8)
5 Relay synchronous motor (S 2))
4 Switch-off series resistance (S 1)) Both at rest in synchronous position

By pressing in the speed control button 1 on the table, the following switch-connections are made:
11 brake (S 18)
10 220 V to motor (S 17)

Fig.7 shows, seen from above, the correct positions of the rollers on the microswitches with respect to the curved disks. This holds good for the control in the 0-position.

4.5 Adjustment of the sound-heads

4.5.1 Optical edge-track

The vertical displacement of the sound-optics 21 (fig.6-b) is effected by rotation of the eccentric case round the sound-optics. The gap tilt is obtained by rotation of the sound-optics. The screw 19 at the side serves for locking the sound-optics in position, the screw 22 at the top of the sound-optics serves for locking the eccentric case.
If the sound-optics are out of adjustment, proceed as follows:

a. Gap position

Insert a test film, having a so-called "Buzz-track" in the apparatus. Unscrew screw 19 and 22 a few turns. Now the eccentric case can be turned and, thus, the lightslit displaced in vertical direction with respect to the optical edge track. Transport the test film through the apparatus. Dependent on the position of the gap, a high frequency or a low frequency will be audible. Now adjust the gap so that it is positioned just between the two tracks on the test film and nothing, or a faint combination of high and low frequency, is heard.

b. Gap tilt

This is adjusted by turning the sound-optics. For this purpose insert a test film having a frequency of 7000 Hz. Set the tone controls in middle position and connect an output meter parallel to the loudspeaker. Rotate the sound-optics till maximum output is obtained. Secure the two lock-screws and check once more with the aid of the two test films.

4.5.2 Magnetic edge-track

a. Remove the milled cap with the indication "Mag" written on it, after having unscrewed the socket-head screw 15 (fig. 6) at the side. Two socket-head screws and two slotted pins become visible. The two socket-head screws serve for the gap tilt adjustment. The two slotted pins serve to displace the complete head with respect to the films. The gap tilt is adjusted as follows:

b. Insert a test film with a tone frequency of 7000 Hz. on the edge-track (this may also be the perfo-tape that is used for the adjustment of the other magnetic sound-heads).

c. Connect an output meter in parallel with the loudspeaker output and start the apparatus. Set the tone control in middle position and adjust the gap tilt to maximum meter deflection.

4.5.3 Perfo-tape

Remove the cover from the sound-head in the middle or the foremost sound-head after having unscrewed the screws 11 (fig. 1). Now the adjusting screws are accessible. The height of the head with respect to the perfo-tape can be adjusted by means of the central screw. The gap tilt is adjusted by means of the three socket-head screws. The adjustment is carried out in the same way as described in step 4.5.2. It is recommended to use a test-tape according to DIN 15638 for this purpose.

4.6 Audio-amplifiers

The signal that comes from the sound-head along, which the foremost perfo-tape runs, is supplied to PC-board 1 (fig. 10). The signal is amplified and the reproduction characteristic is adapted by this printed circuit. The amplification is adjusted by means of potentiometer 11 (fig. 2). Then the signal is

supplied to the tone control PC-board 5 (fig. 12). At the input of this PC-board the signal of the middle perfo-tape arrives as well. After the sound-head this signal has been amplified and adapted with the aid of PC-board 2 (fig. 10) and adjusted with potentiometer 10 (fig. 2).
The signal emanent from the magnetic edge-track of the film is amplified and adapted by PC-board 3 (fig. 10) and adjusted by potentiometer 9 (fig. 2) and is then supplied also to the tone control PC-board 5 (fig. 12). The three pre-amplifiers described above are of identical construction and their PC-boards are interchangeable. The signal that is taken up from the optical edge-track by the photodiode, is supplied to PC-board 4 (fig. 11). This PC-board too is provided with a circuit for the adaptation of the frequency characteristic. The signal is amplified and can be adjusted with potentiometer 8 (fig. 2). Then it is supplied to the tone-control PC-board.
Therefore the signals of all four pre-amplifiers arrive together at the input of the tone-control PC-board 5 (fig. 12). By means of this PC-board the high and low frequencies can be atenuated or amplified. Regulation by means of the potentiometers 7 (fig. 2) for the high notes and 6 (fig. 2) for the low notes.
The signal trimmed and amplified in this way travels to PC-board 6 (fig. 13 or 14, dependent on the design), where the output amplifier is situated.
All printed circuits described before are fed by the supply PC-board 7 (fig. 15) which supplied 36 VDC to feed the output amplifier and 20 VDC (stabilized) for the pre-amplifiers. The supply PC-board itself is connected to 24 VAC, obtained from the supply transformer T 3 (36, fig. 1, see also the schematic diagram on fig. 18). This transformer is safeguarded by a slow-blow fuse of 0.2 A (F 4, fig. 18).

4.7 Voltage supply of the relays and electromagnets

Transformer T 2 (35, fig. 1, see also the schematic diagram on fig. 18) supplies the voltages necessary for the sound-lamp, the relays and the electromagnets. These voltages are led from T 2 to PC-board 8 (fig. 9) where they are rectified and stabilized in the following way:

9 VAC (taken from the transformer between the 15 V and 24 V terminal) is supplied via a fuse F 2 (2 A) to a rectifier circuit (CR 1 - C 4) and then to a stabilization circuit. This circuit supplies the 5 VDC for the supply of the sound-lamp. A series resistor R 3 serves for decreasing the voltage on the sound-lamp in order to obtain the correct colour temperature.

24 VAC, emanent from transformer T 2, is supplied to the rectifier circuit CR 3 - C 5 (fig. 9, fig. 18), via fuse F 3 (2 A). This circuit supplies 24 VDC for the supply of the relays K 1, K 2, K 3 and the electromagnetic brake L 4.
The 15 VAC from transformer T 2 is rectified by CR 2 (fig. 9, fig. 18) and then supplied to the magnets L 1, L 2 and L 3.

4.8 Voltage supply of the projection lamp

The 12 VAC supply for the projection lamp (DS 2) is obtained with the aid of transformer T 1 (34, fig.1). The filament current is safeguarded by means of fuse F 5 (10 A, see 37, fig.1).

V OPTICAL SECTION

5.1 Renewal of the condenser and/or heat filter

Remove the two caps 25 and 26 (fig.6) which together form the lamp housing. For removal of the inside cap, screw 27 must be unscrewed. Then loosen the 2 mm socket-head screw 24 on the left side of the codenser holder. Now the condensers and the heat filter can be removed and renewed, if necessary.

5.2 Viewer

5.2.1 General

In the viewer housing mirrors are fitted which project the image on to the Helio screen, via the projection optics. The loudspeaker unit is also situated in the housing. This unit consists of a large loudspeaker (woofer) and a small one (tweeter), as well as a cross-over filter. The components in the viewer housing are accessible after removal of the rear wall (screws 12, fig.6).

5.2.2 Renewal of the mirrors

If one of the mirrors has to be renewed, only loosen the screws with clamps, by means of which the defective mirror is fitted on plate 1, 4 or 5 (fig.8).
Fit the new mirror in the same way. Be careful that the mirror-layer is situated at the image side. In most cases the image will not be correctly positioned. If the projection on the Helio screen is not yet correct, readjust the mirror, as indicated in step 5.2.3.

5.2.3 Adjustment of the mirrors

Set the framing control 13 (fig.6) and sharpness control 14 (fig.6) in middle position. Have a film run through the apparatus and re-adjust the new mirror with the aid of the adjusting screws on the supporting plates 1, 4 or 5 (fig.8) such that the image is projected sharp and undistorted on the Helio screen.

5.2.4 Renewal of the Helio screen

a. Unscrew screw 6 (fig. 8) from the point of rotation of the large mirror 2 and tip the mirror up.

b. Remove the three screws 1 (fig. 1) from the bottom of the protruding part of the viewer housing.

c. Remove the strip in the viewer housing, which strip retains the lower side of the Helio screen in position.

d. Fit a new Helio screen and replace the retaining strip.

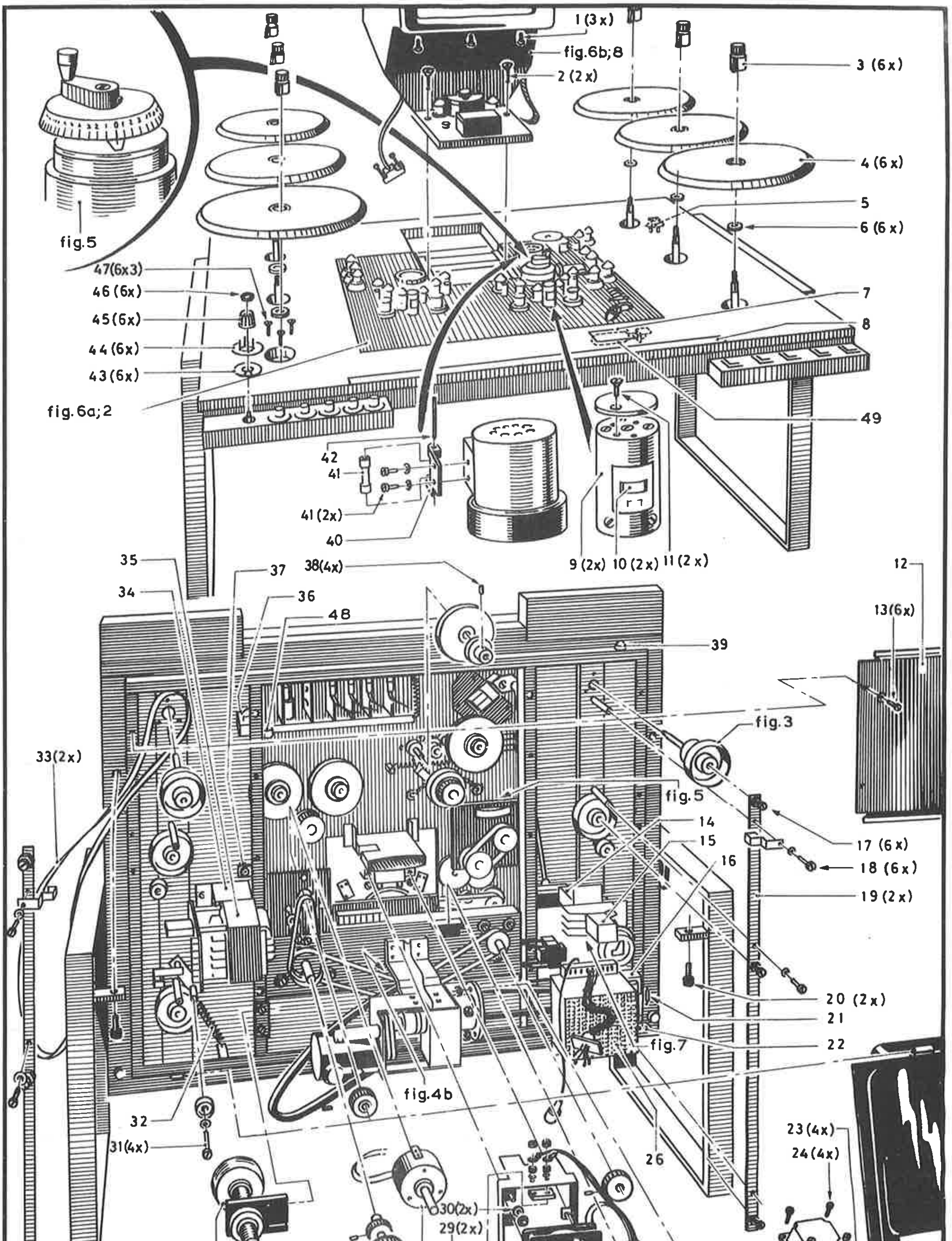
VI RECOMMENDED SPARE PARTS

Fig.	No.	Part	Order number
1	3	Knob assy	057R 39000
	4	Winding plate assy	057R 38900
	4	Winding plate assy 600 m	057R 39800
	5	Mains receptacle	057R 38300
	8	Rule for 25 fr/sec.	057R 84300
	8	Rule for 24 fr/sec.	057R 84200
	9	Reproduction head assy (sepmag, centre track)	057R 40200
	9	Reproduction head assy (sepmag, edge track)	057S 09100
	10	Reproduction head (sepmag, centre track)	057P 63700
	10	Reproduction head (sepmag, edge track)	057S 08900
	14	Relay	057R 24300
	15	Relay	057R 24300
	16	Relay	057R 24300
	17	Nylon screw	057S 26600
	22	Accessory receptacle	057R 38200
	25	Main motor	057R 35700
	26	Motor control assy	057R 36100
	28	Fan 220 V 50/60 Hz	057R 35000
	29	Contact strip for lamp (2x)	057R 34800
	33	Driving belt	057P 62400
	34	Transformer (T 1)	057R 38100
	35	Transformer (T 2)	057R 37000
	36	Transformer (T 3)	057R 36800
	37	Fuse 10 A (F 5)	R851 1110E
	39	Fuse 6 A (F 1)	057S 09700
	43	Indication plate for knob	057R 37500
	44	Stator plate for knob	057R 37800
	45	Knob	057R 37600
	46	Cover for knob	057R 37700
	48	Fuse 0.2 A (F 4)	P851 1200C
	49	Tube lamp	057R 40400
2	3	Sprocket for sepmag transport	057R 38400
	12	Viewer glass	057R 40300
	15	Connector for headset, female, chassis-part	057R 37900
	16, 21	Illuminated panel switch	057R 38500
	17-20	Panel switch	057P 62900
	25	Sprocket for comopt and commag transport	057R 38600

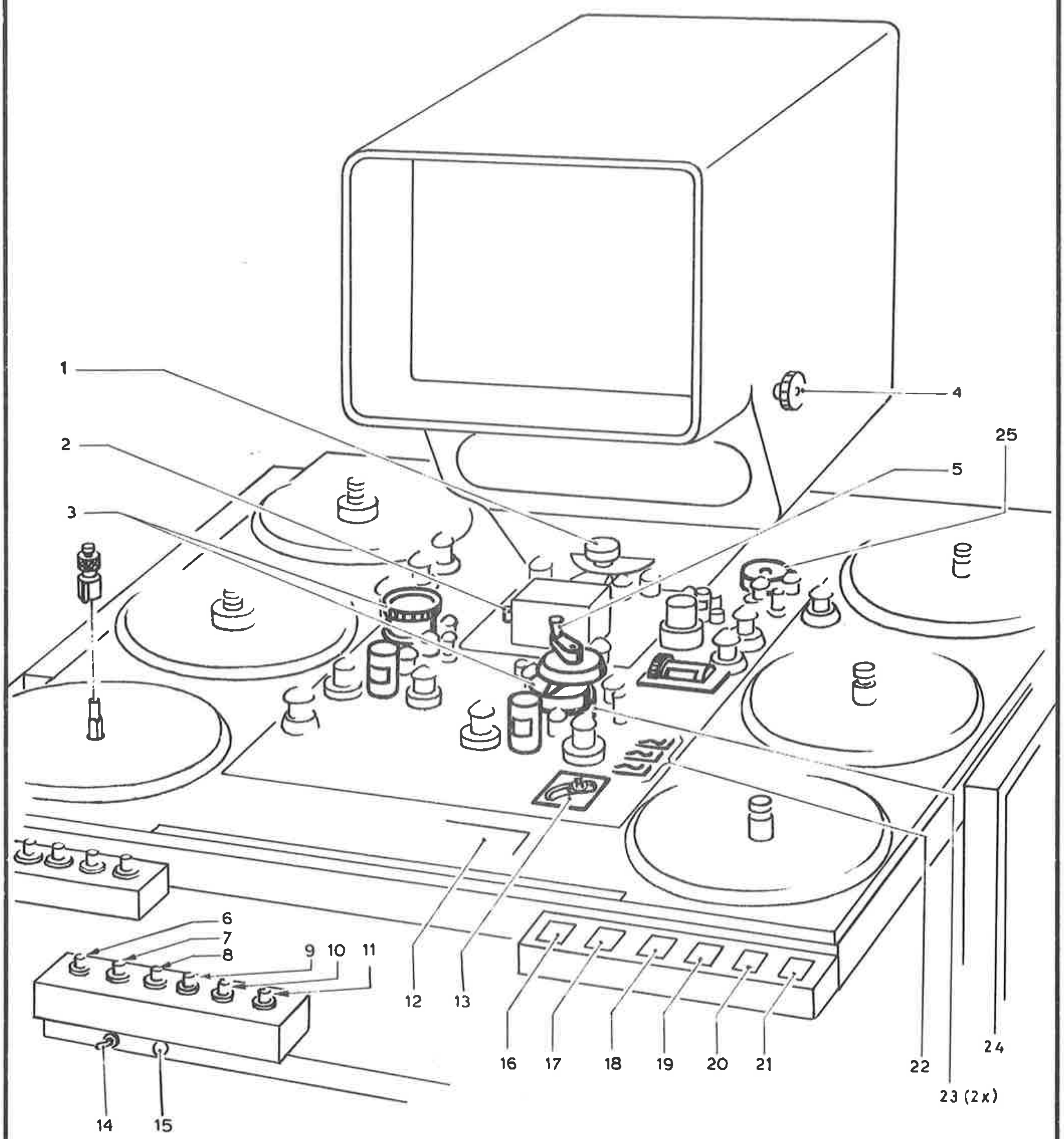
Fig.	No.	Part	Order number
3	5	Brake shoe assy	057R 36400
	7	Coil assy	057R 36500
	8	Coupling spring (right)	057S 23900
	12	Coupling spring (left)	057S 09900
	14	Pulley assy	057R 39200
	15	Disk	057R 39700
	16	Coupling bushing assy	057R 39400
	20	Bearing holder assy	057R 39300
	22	Spindle	057R 39100
	23	Driving roller (complete) left	057R 39600
	24	Driving roller (complete) right	057R 39500
	V	Reverse gear (complete) right	057R 38800
	VI	Reverse gear (complete) left	057R 38700
4	4	Magnetic brake	057S 09400
	19	Geared belt, to be used per pair	057R 35900
	20	Motor capacitor	057R 36000
	21	Synchronous motor	057R 38500
	22	V-belt	057P 62300
	26	Geared belt → T5-300 SE	057R 24000
	30	Geared belt	057R 23900
	31	Geared belt	057R 23900
	32	P.c. board (complete)	057R 36600
5	7	Geared belt	057P 62500
	12	Spring for film tensioner	057S 09600
6	4	Decoupling switch (3x)	057S 09800
	6	Geared belt → T5-420	057R 23800
	9	Geared belt	057R 24100
	10	Geared belt	057R 23700
	17	Guide roller assy	057S 09500
	20	Exciter lamp 6 V 1 A	057P 61900
	23	Halogen lamp 12 V 100 W	057P 61800
	28	Reproduction head assy (commag)	057R 40100
	28	Reproduction head (commag)	057R 40000
7	1	Knob (speed control)	057R 39900
	2	Potentiometer	057R 36200
	4, 5	Microswitch	057P 63500
	6-9	Microswitch	057R 36300
	10, 11	Microswitch	057P 63500

Fig.	No.	Part	Order number
8	2	Mirror	057R 34900
	7	Mirror	057R 34700
	8	Helio screen	057S 09200
	9	Mirror	057R 34600
	10	Mirror	057R 34800
9	-	P.c.board (complete)	057R 36700
	CR 2	Diode	057P 62600
	CR 3	Diode	057R 36900
	F 2	Fuse 2 A	P851 1200D
	F 3	Fuse 2 A	P851 1200D
	Q 1	Transistor	057R 32700
10	-	P.c. board pre-amplifier magnetic sound	057P 62000
	Rp	Potentiometer 10 kΩ	057R 37400
11	-	P.c. board pre-amplifier optical sound	057R 23500
	Rp	Potentiometer 10 kΩ	057R 37400
12	-	P.c. board tone control (complete)	057P 62100
14	-	P.c. board power amplifier (complete)	057P 62200
15	-	P.c. board power supply (complete)	057R 26300
16	-	P.c. board motor control type 1 (complete)	057P 63400
17	-	P.c. board motor control type 2 (complete)	057S 09300

- - -



N.V. Optische Industrie OLD DELFT „de oude delft"	CINEMONTA Location diagram	Fig. 1	Nr 4 TC 4048 Date 24 – 11 – 75



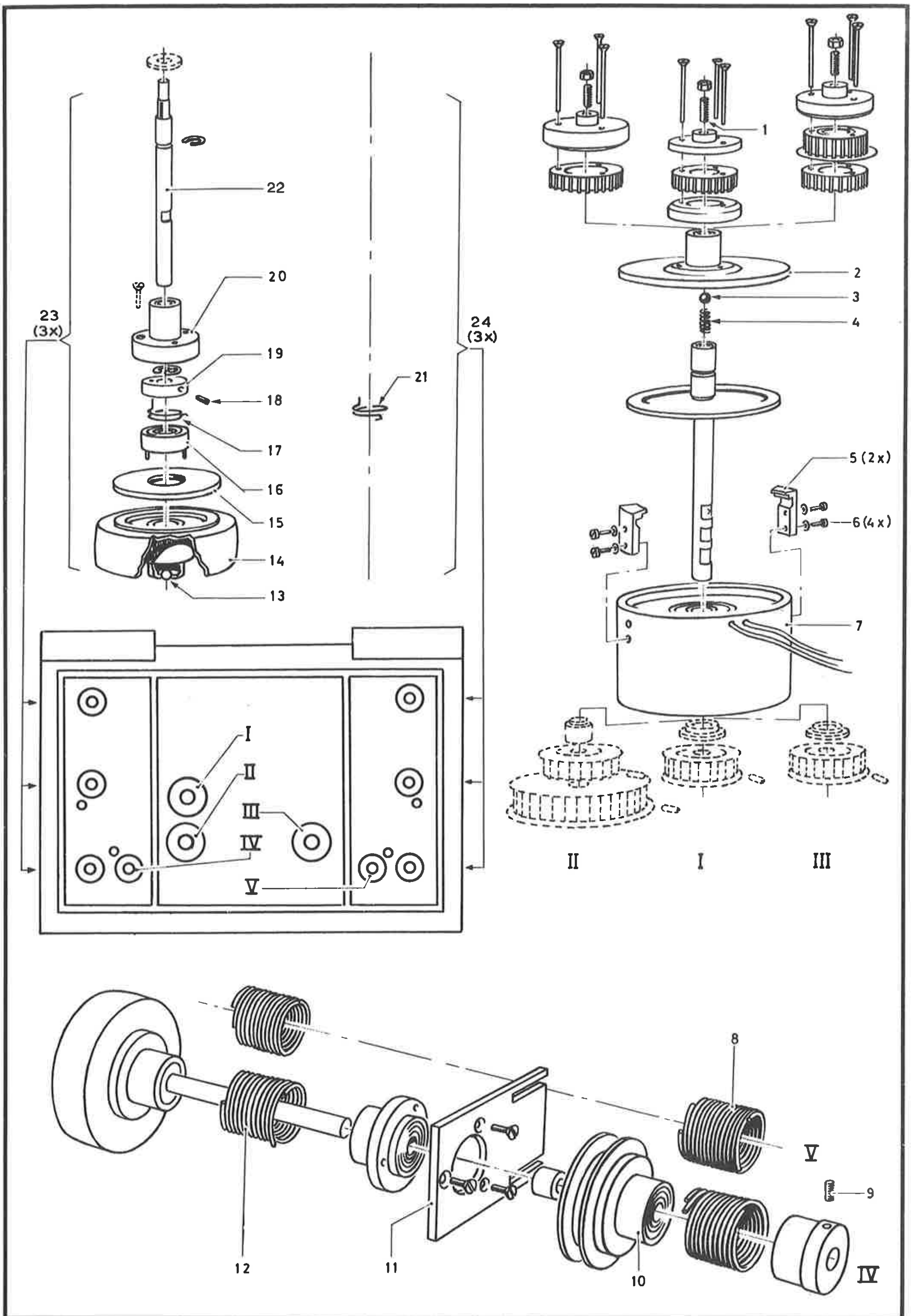
N.V. Optische Industrie „De Oude Delft"
OLD DELFT

CINEMONTA
Control Desk

Fig. 2

Nr.: 4 TC 3880,1

Date: 29-11-'75



N.V. Optische Industrie
,,de oude delft''
OLD DELFT

CINEMONTA
Couplings

Fig.	Nr 4 TC 4049
3	Date 24-11-'75

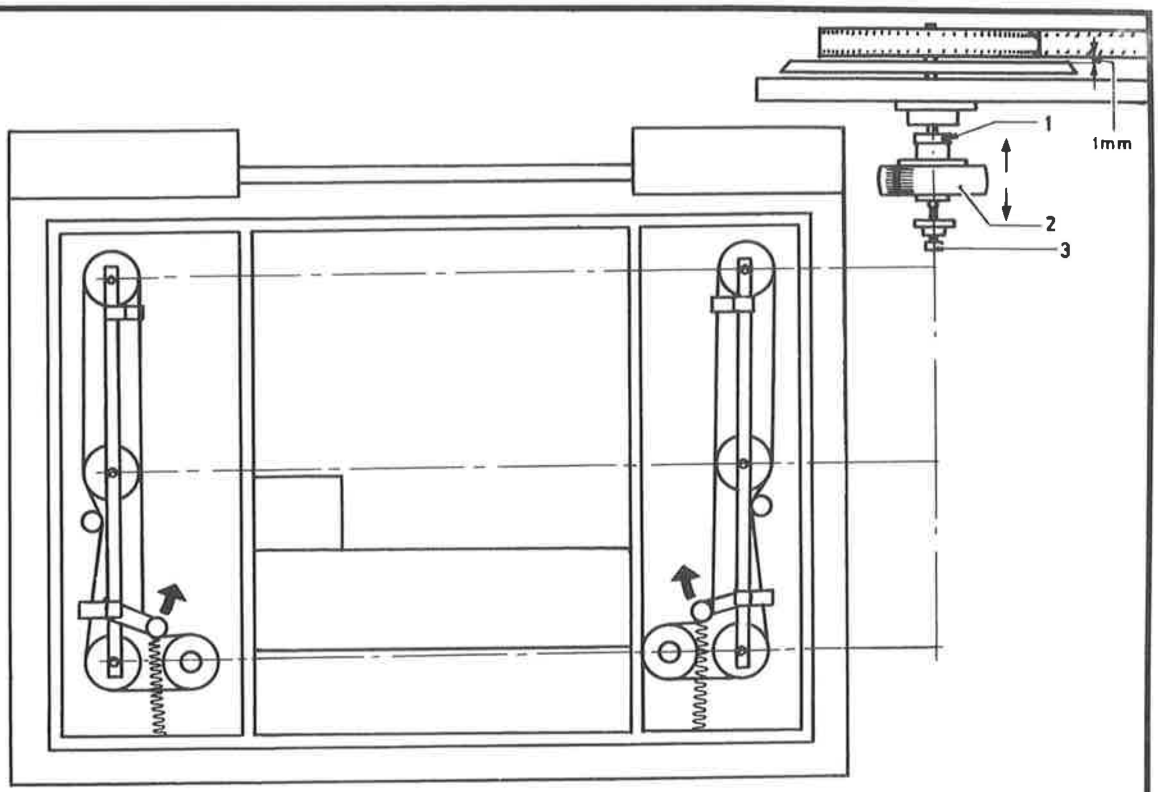


Fig.4a

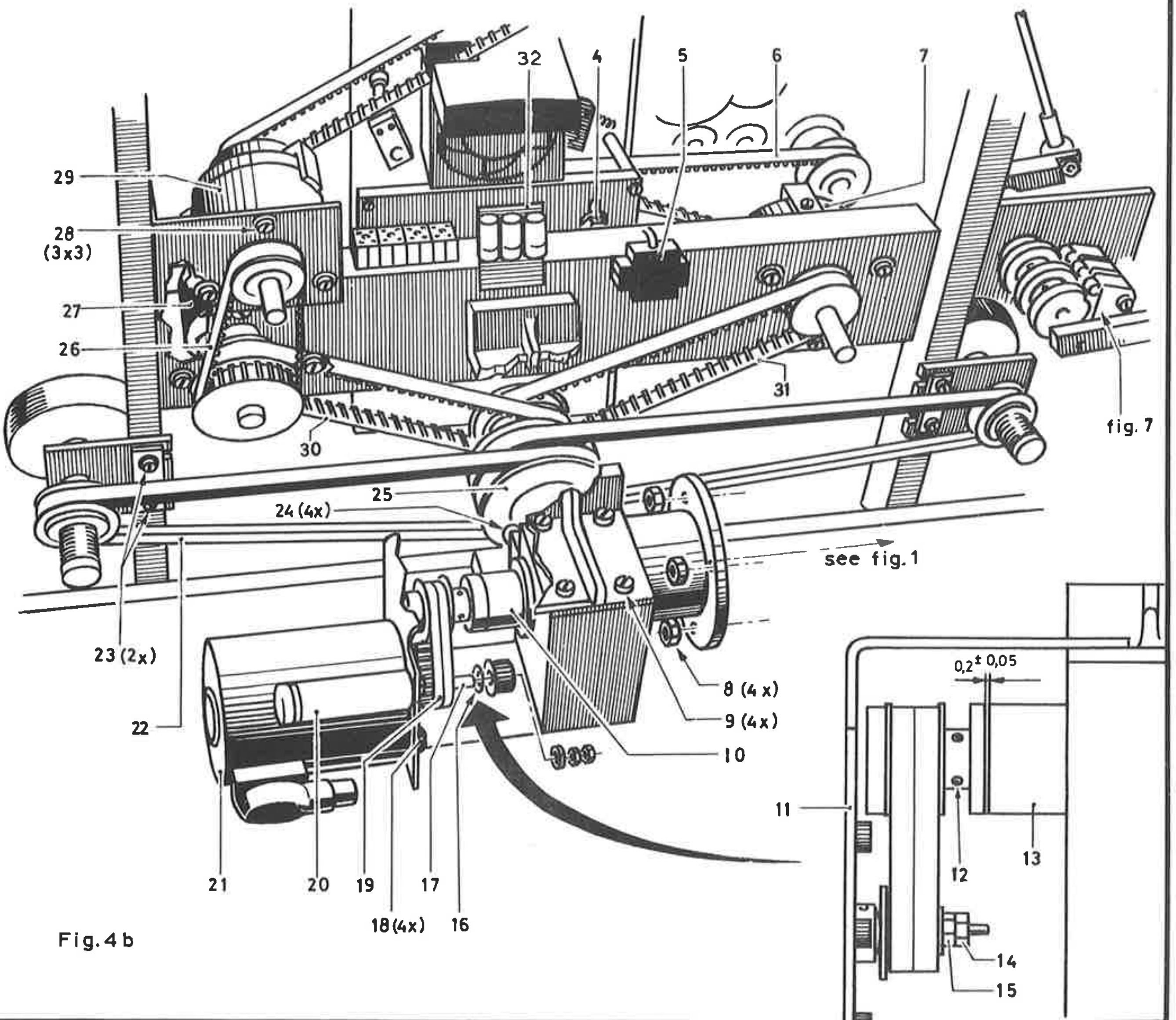
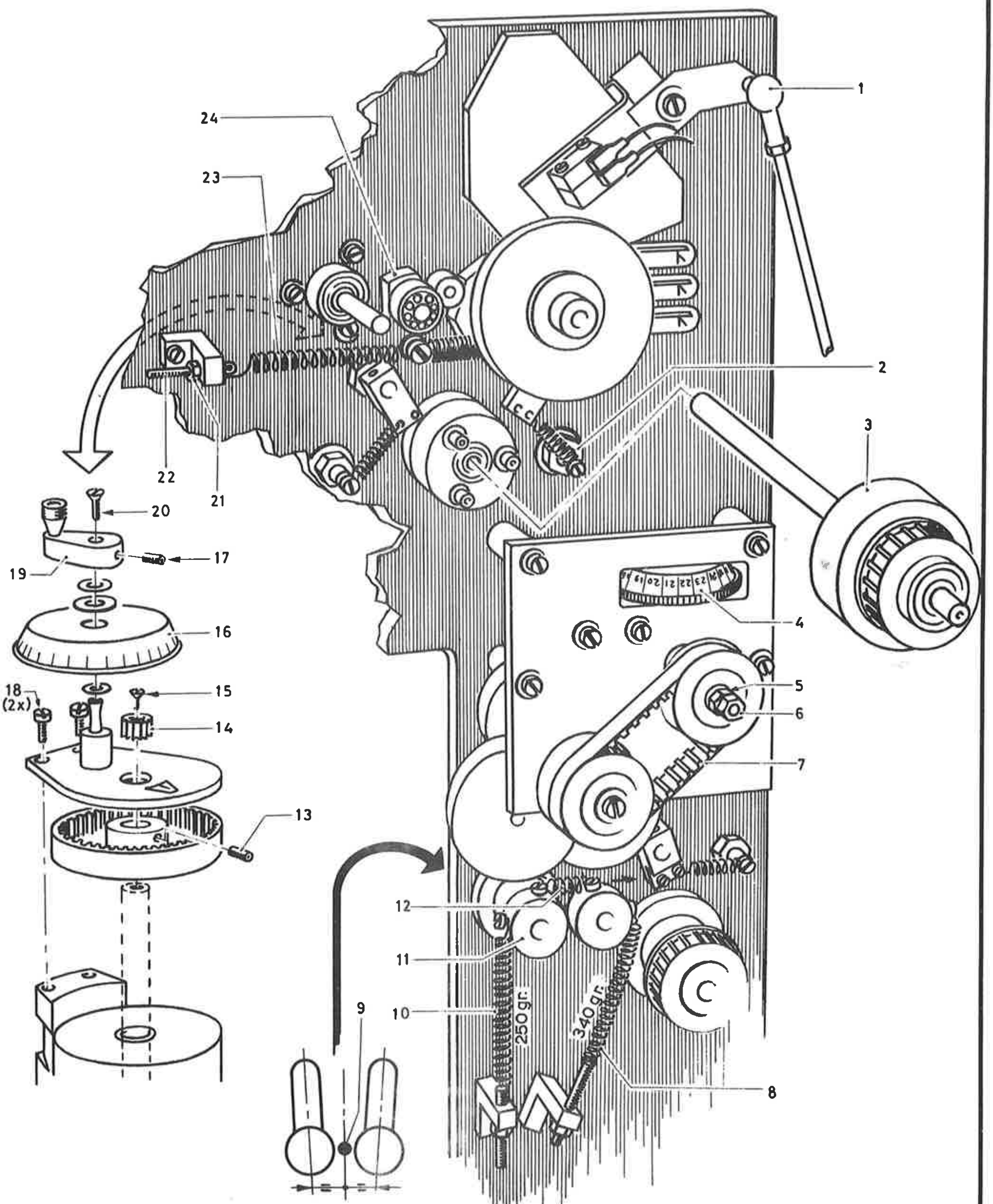


Fig.4b

N.V. Optische Industrie „de oude delft"	CINEMONTA Main drive	Fig. 4	Nr 4 TC 4050 Date 15 – 11 – '75



N.V. Optische Industrie „De oude delft"	CINEMONTA Sync. control & roller tension adjustment	Fig. 5	Nr 4 TC 4051 Date 24-11-75

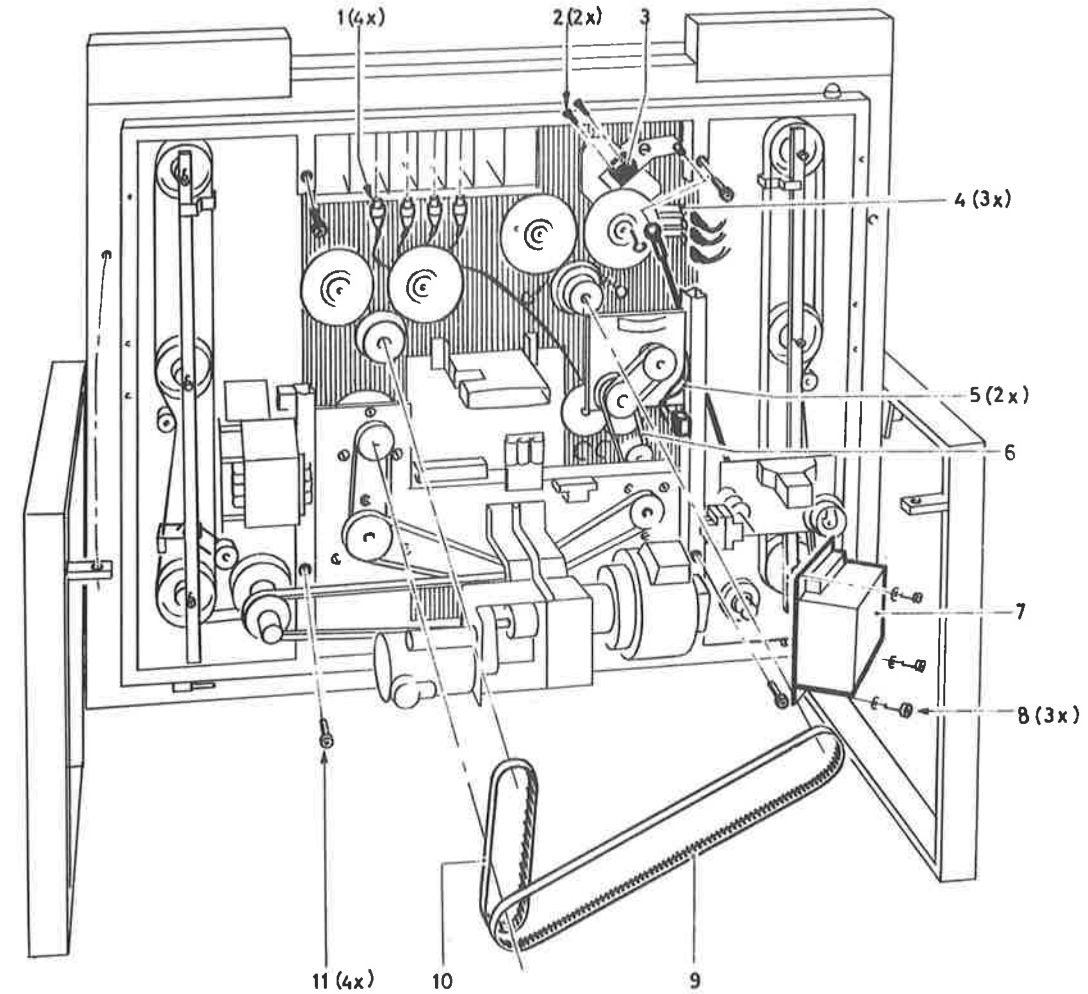


Fig. 6a

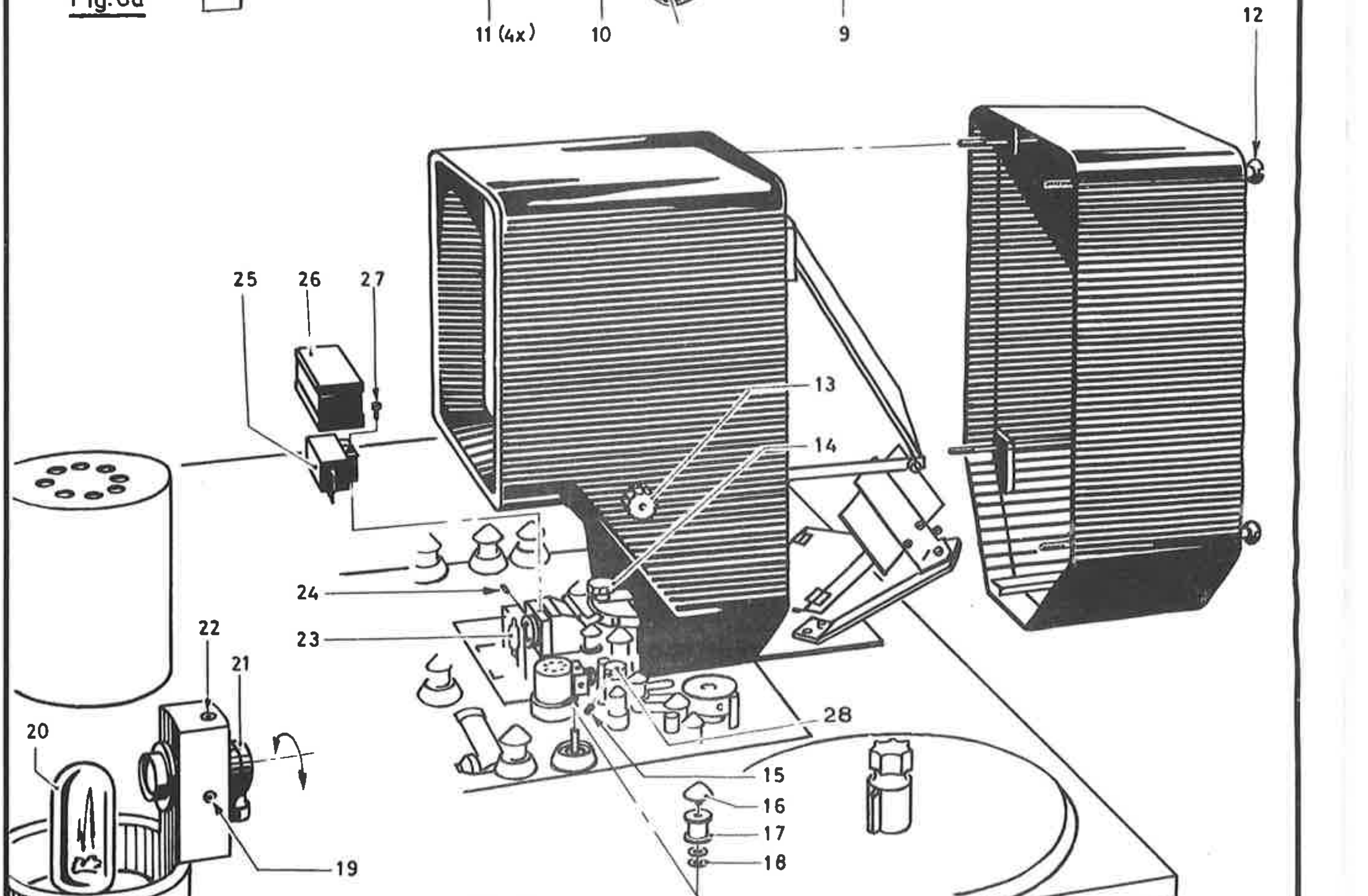


Fig. 6b

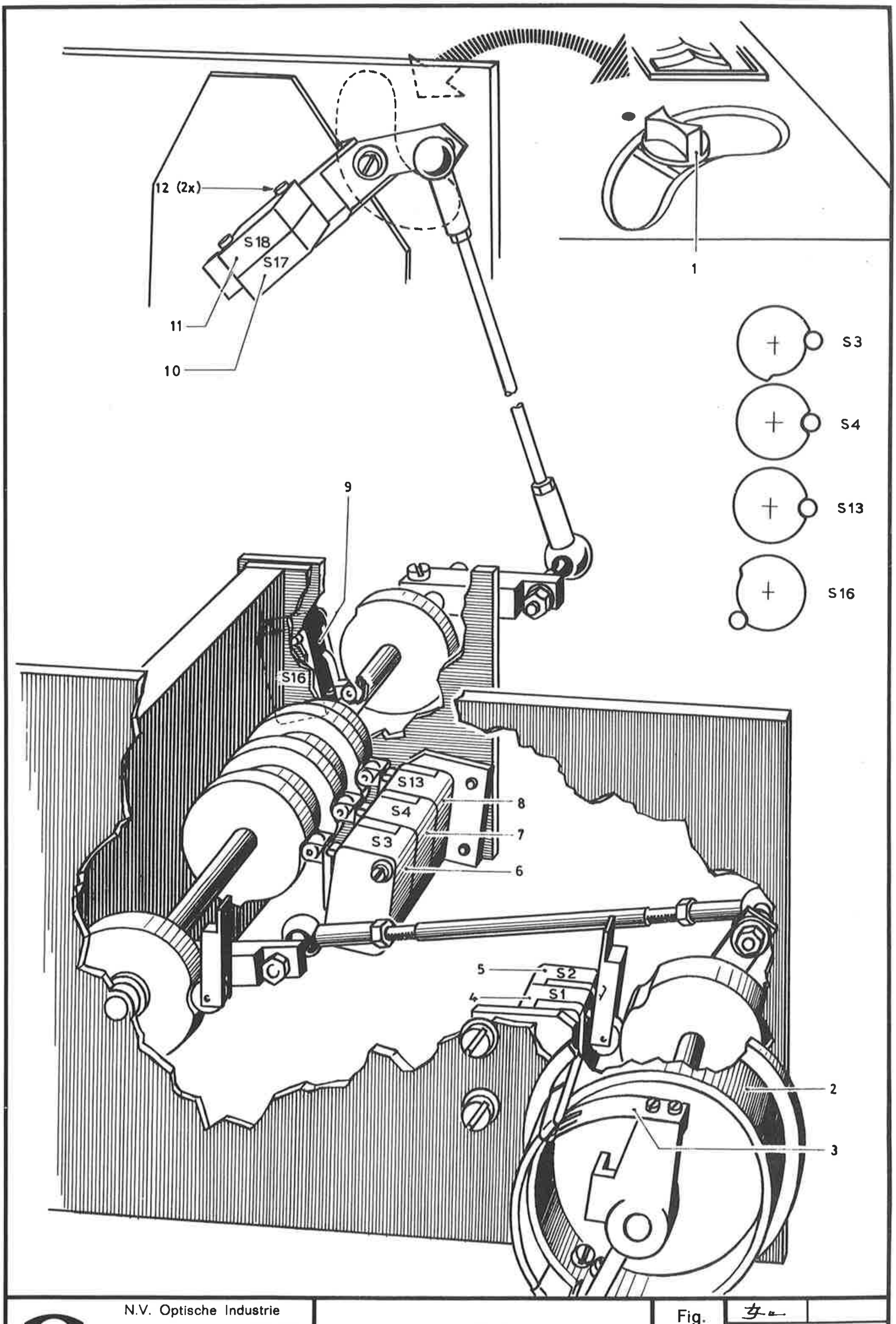
N.V. Optische Industrie

,,de oude delft''

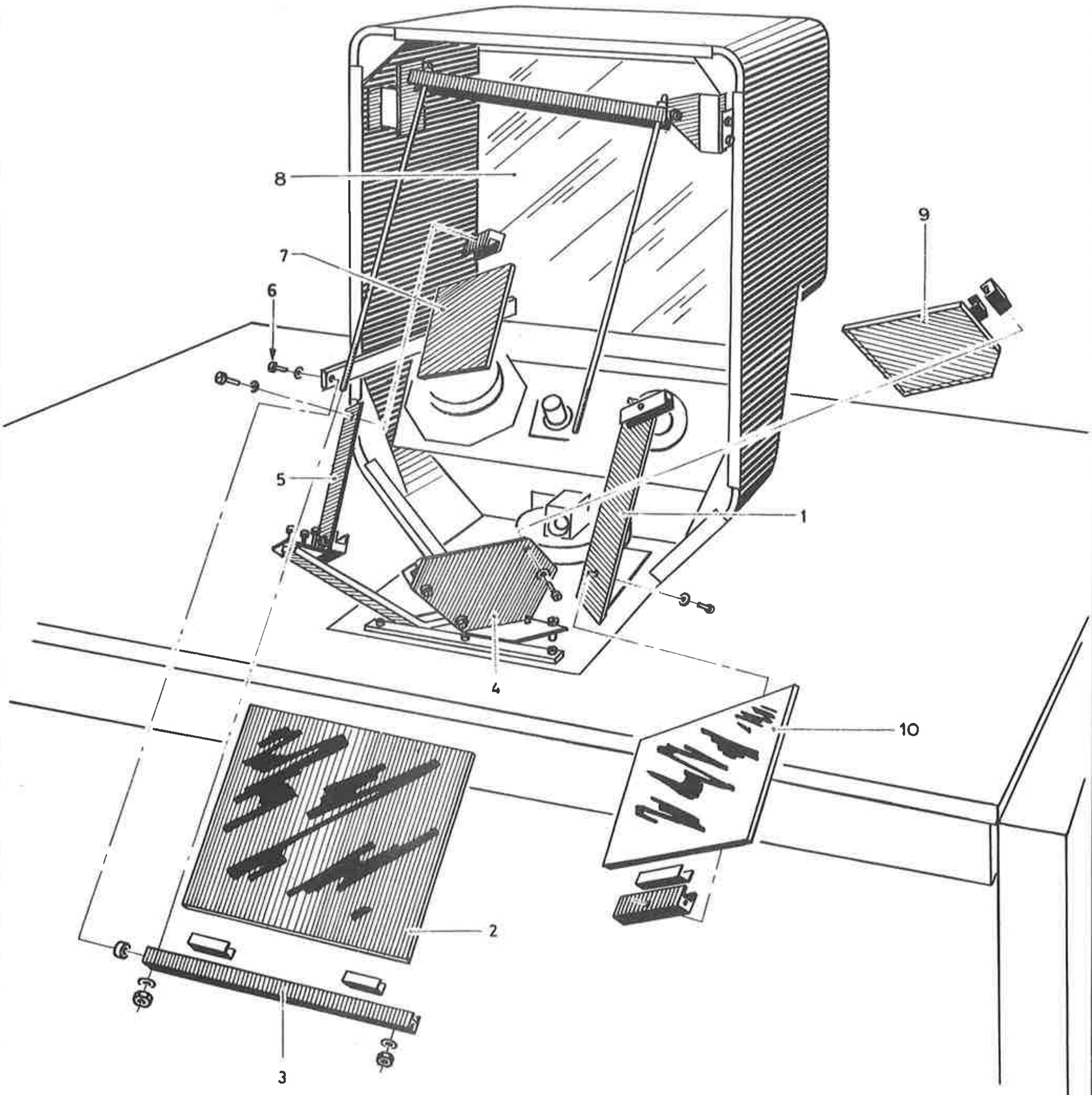
OLD DELFT

CINEMONTA
Upper plate & sound optics

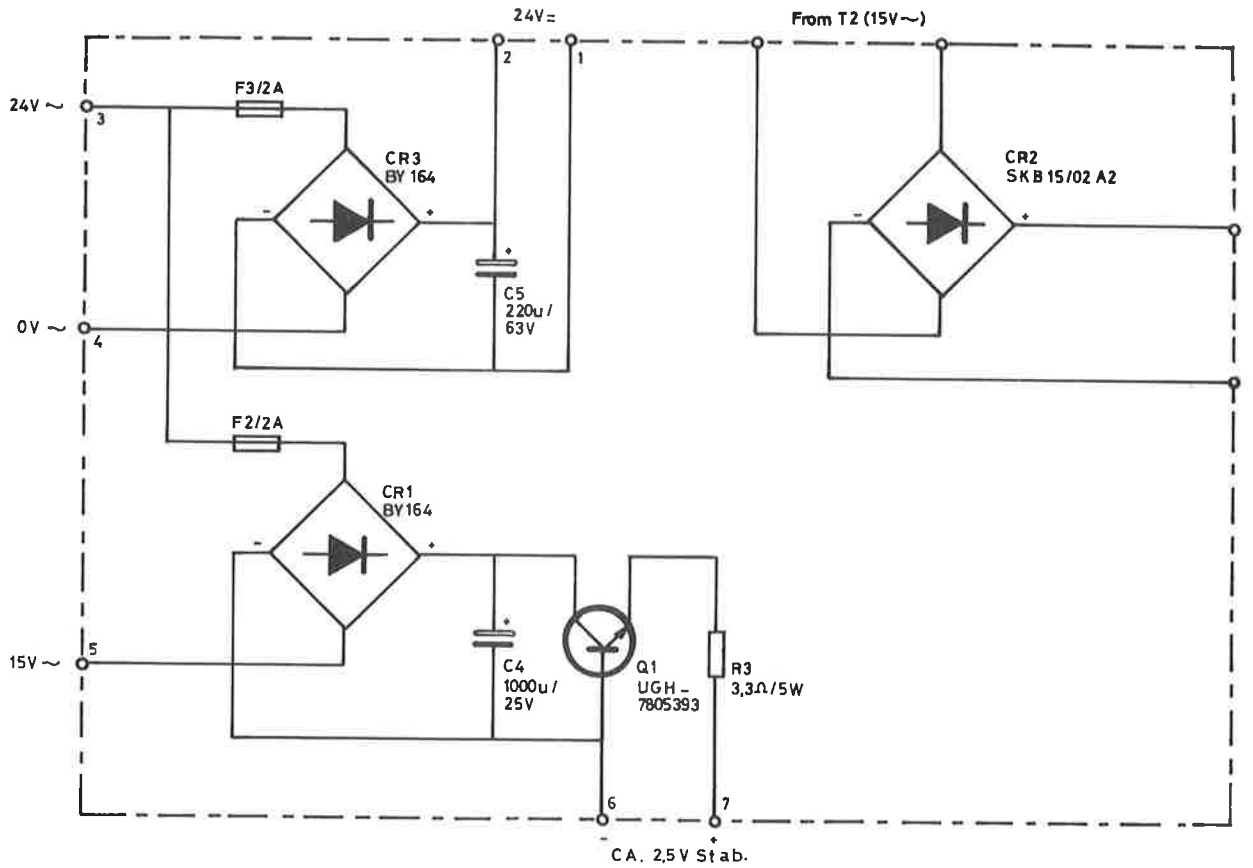
Fig. 6	Nr 4TC4052
	Date 24–11–'75

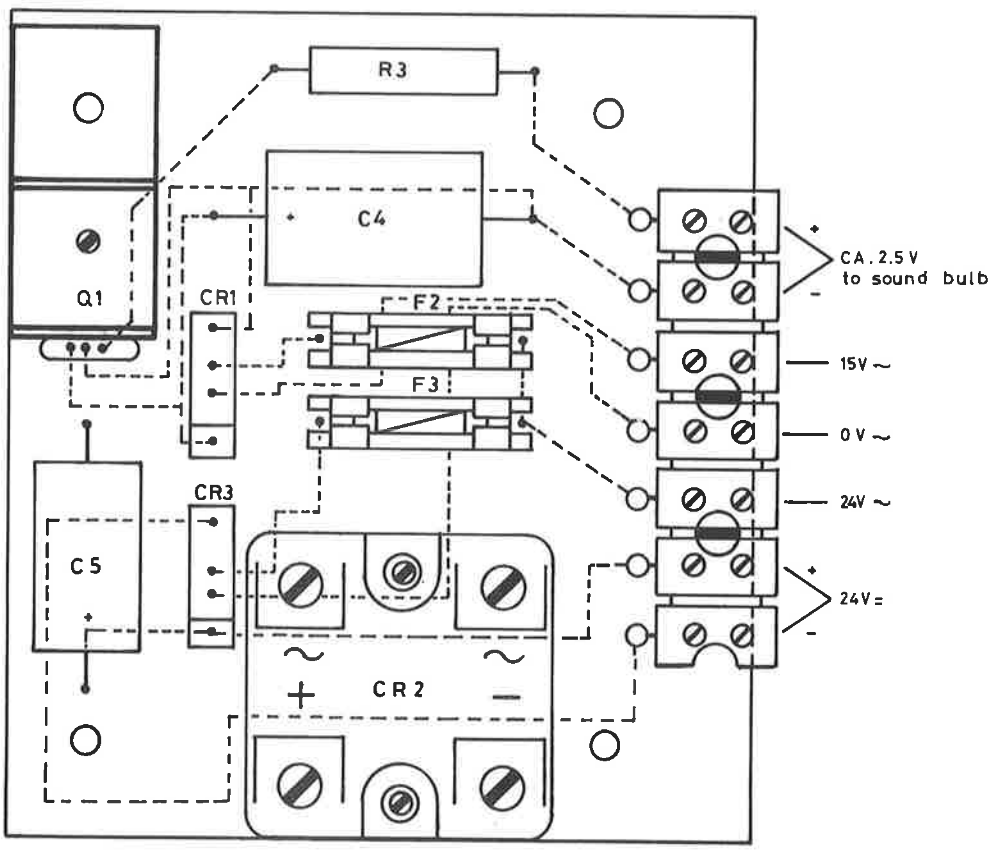


N.V. Optische Industrie ,,de oude delft''	CINEMONTA Speed control	Fig. 7	Nr 4 TC 4053 Date 24 – 11 – 75



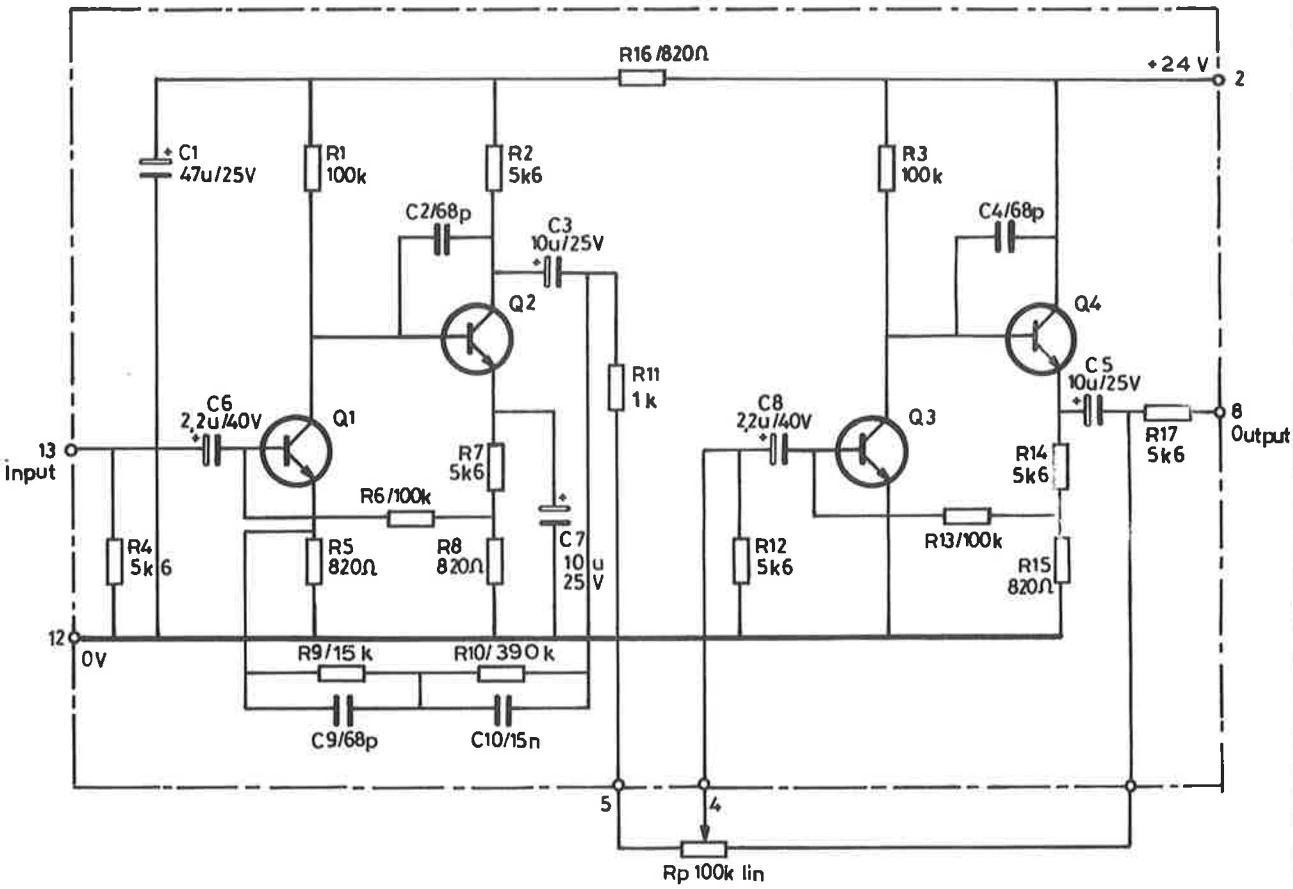
N.V. Optische Industrie ,,de oude delft''	CINEMONTA Viewer	Fig. 8	Nr 4 TC 4054 Date 24–11–'75

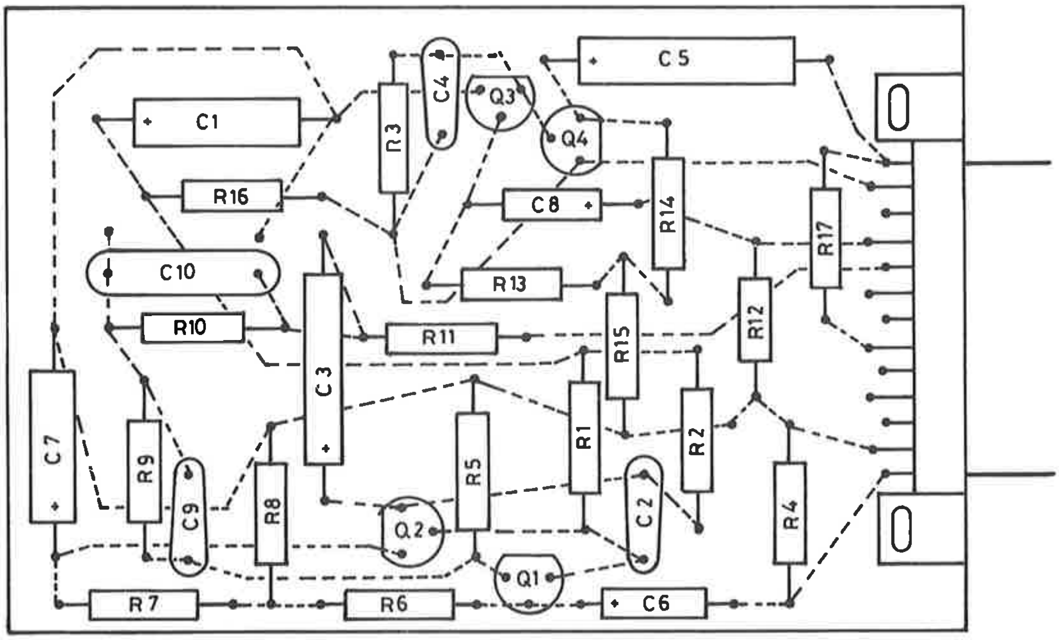




PC 8

N.V. Optische Industrie „de oude delft"	CINEMONTA Rectifier circuit	Fig. 9	JM Nr.: 4 TC 3908 Date: 11-9-'74

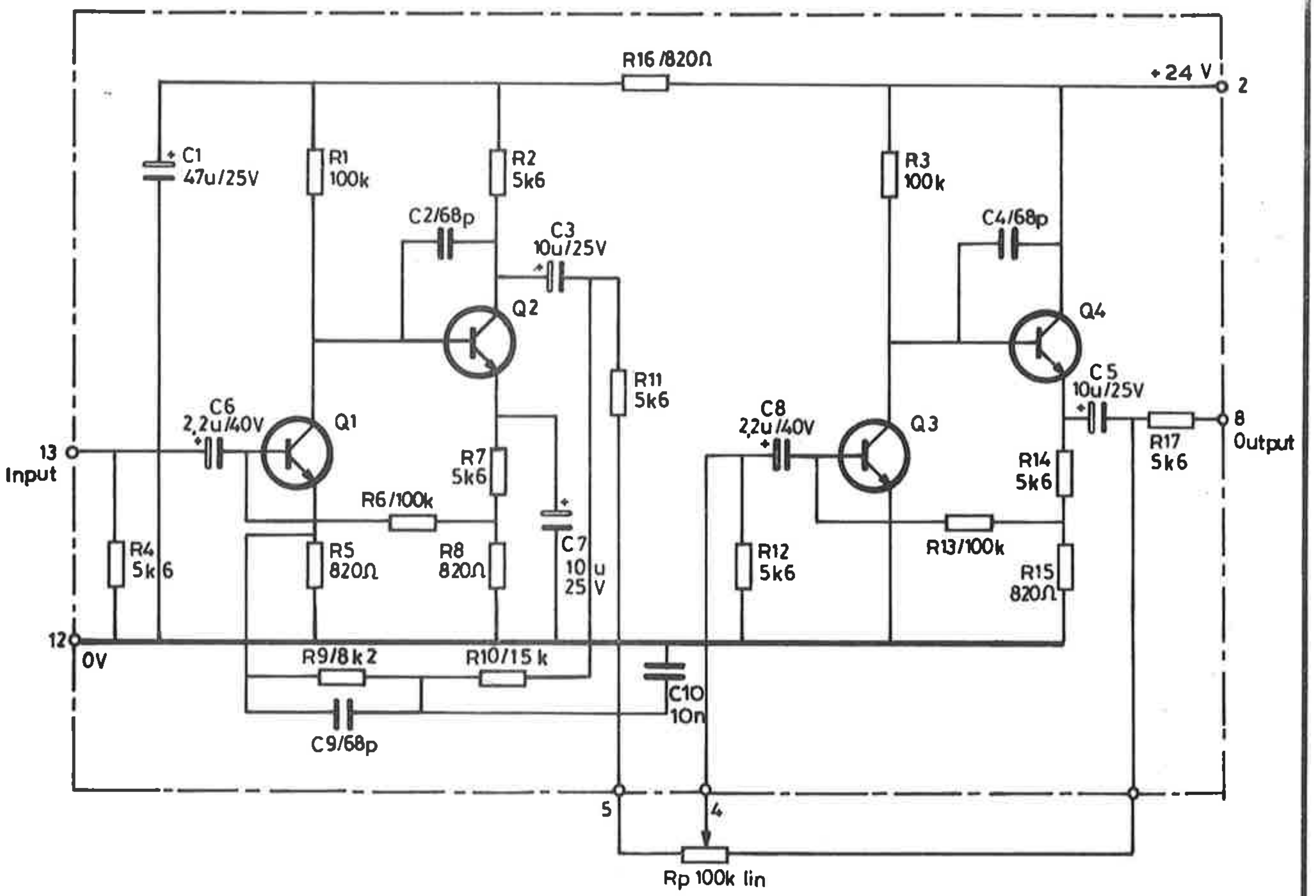


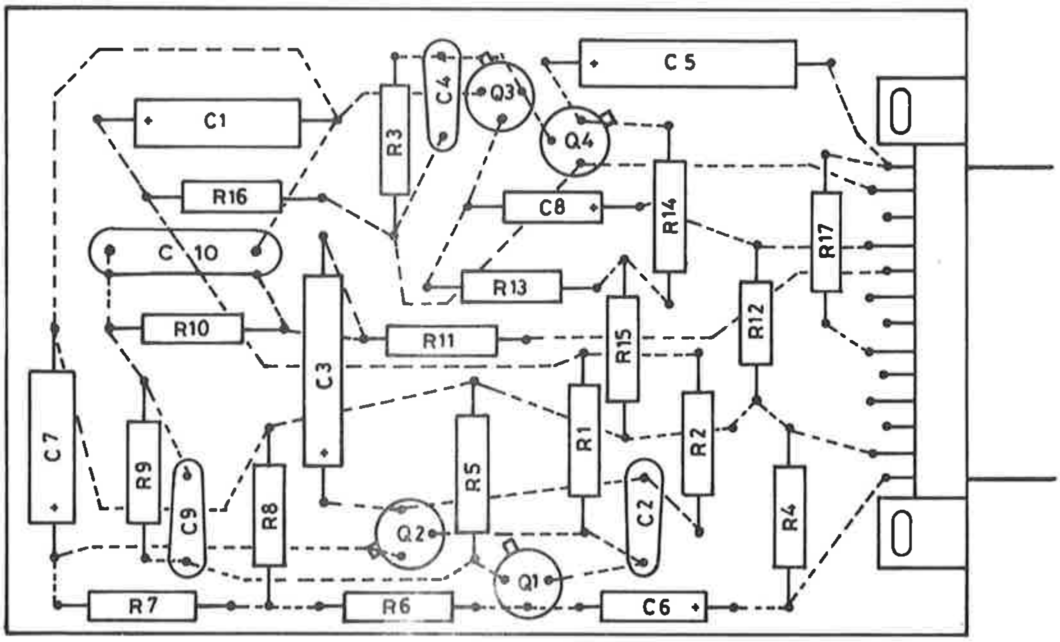


ALL RESISTORS 0,25W
Q1 - Q4 BC549C

PC 1, PC 2, PC 3

N.V. Optische Industrie „de oude delft"	CINEMONTA Pre-amp. for magnetic sound	Fig. 10	JM Nr.: 4 TC 3907 Date: 3-9-'74

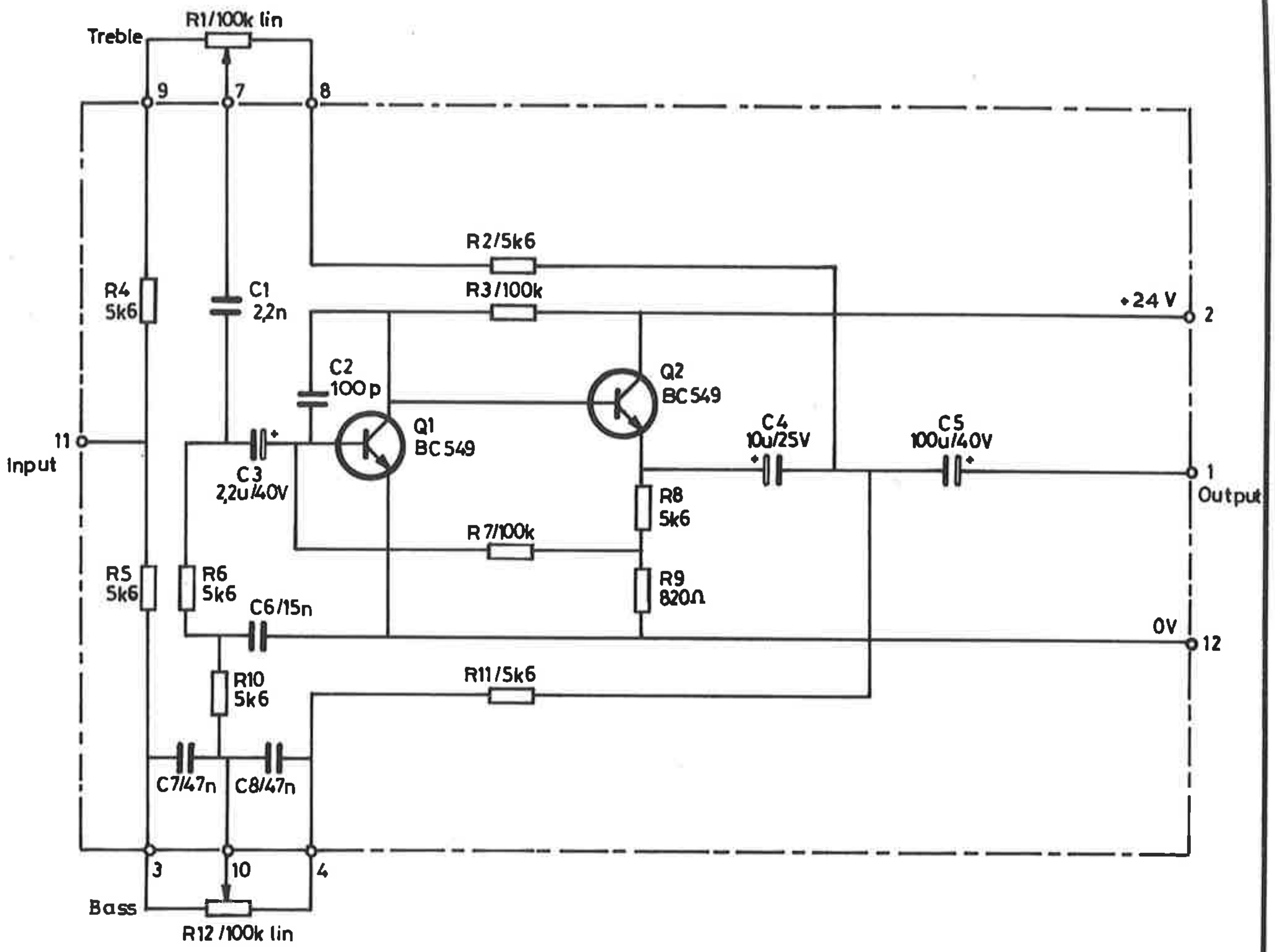


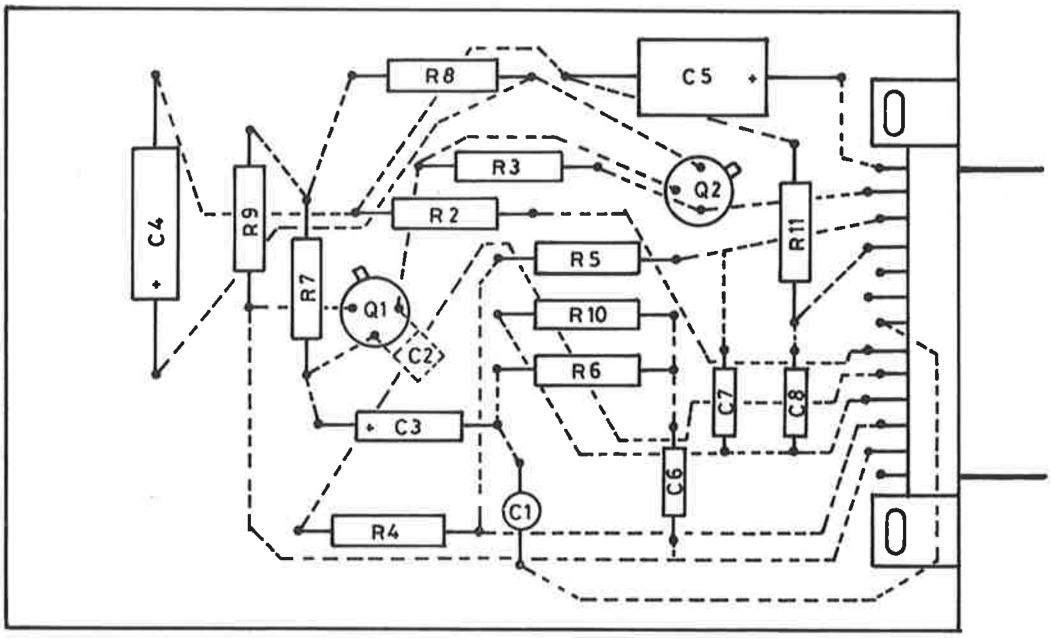


ALL RESISTORS 0,25W
Q1 - Q4 BC109C

PC 4

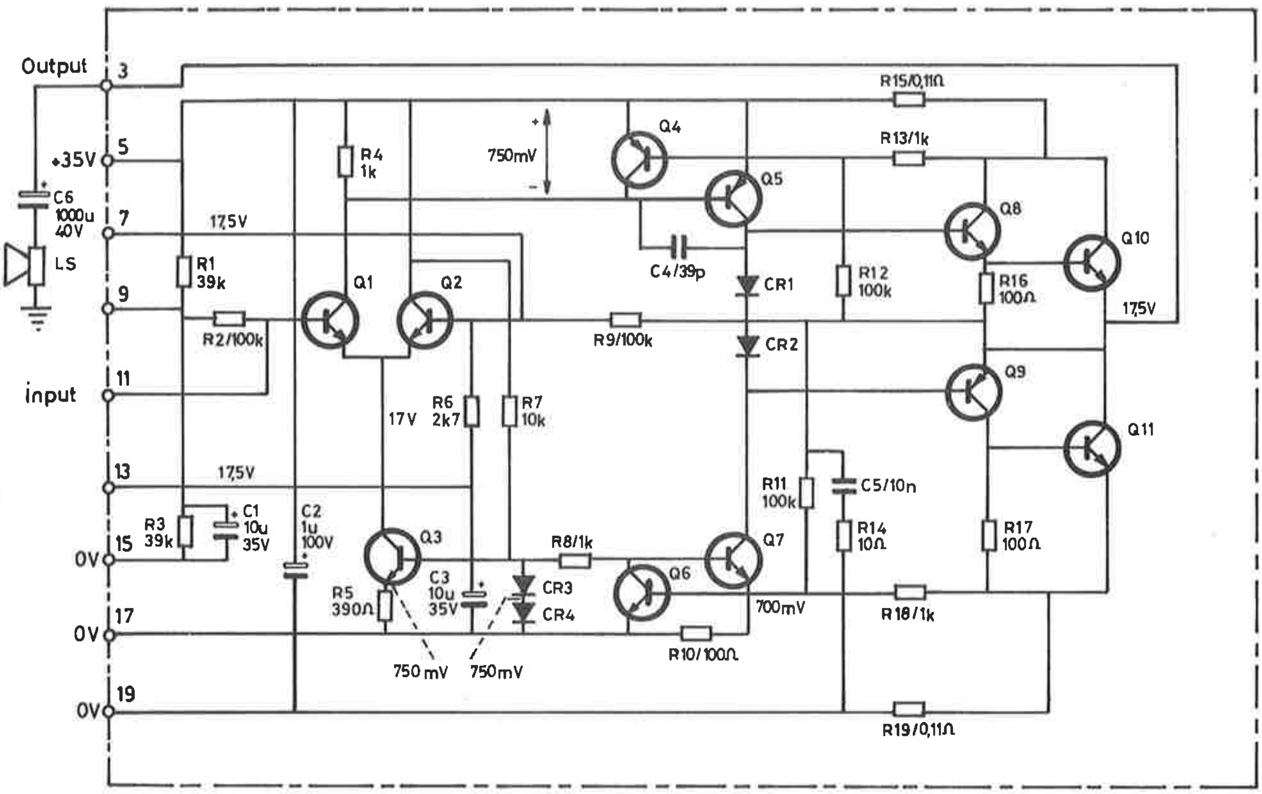
N.V. Optische Industrie „de oude delft"	CINEMONTA Pre-Amp. for optical sound	Fig. 11	JM Nr.: 4 TC 3905 Date: 3-9-'74

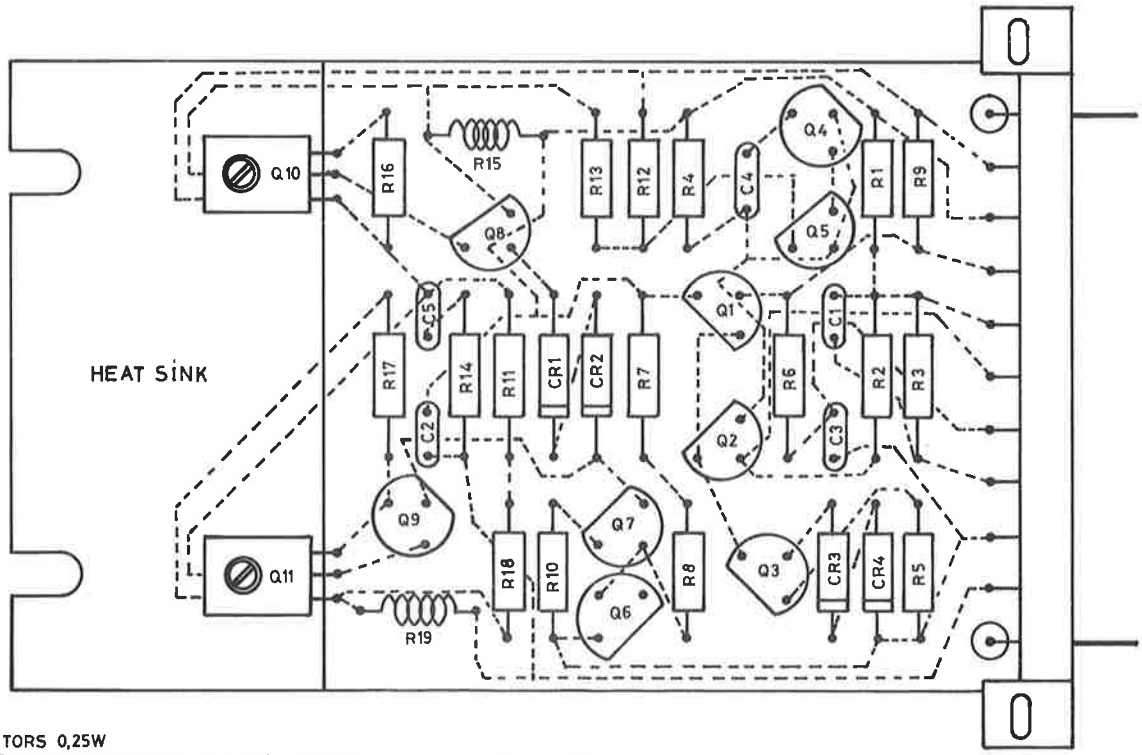




PC 5

N.V. Optische Industrie ,,De oude Delft"	**CINEMONTA** Tone Control	Fig. 12	JM Nr.: 4 TC 3906 Date: 5-8-'74





ALL RESISTORS 0,25W

Q1 - Q3	ME 4101,2,3 or BC107,8,9 or BC148,9 or BC182				
Q4	BC 158,9	,, BC186,7			
Q5	ME 0411,2,3	,, BC157	,, Z 132		
Q6	BC 107,8,9				
Q7	ME 4101,2,3	,, BC107	,, BC147	,, Z131 or BC182	
Q8	ME 6101,2	,, BC107	,, BC147	,, Z131	,, BC182
Q9	ME 0401,2	,, BC157	,, Z 132		
Q10, Q11	BD 131	,, BD155	,, BD187		

CR1,2	1N4148
CR3,4	1N4148

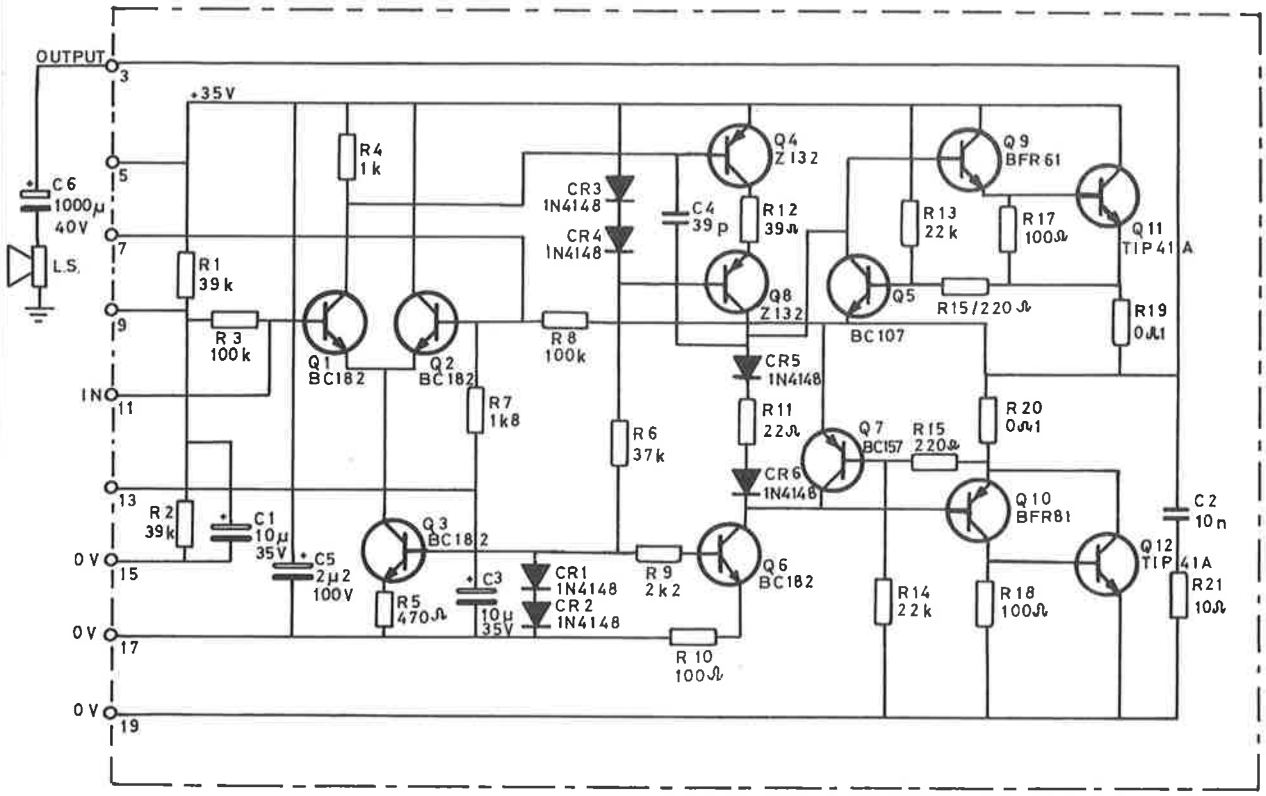
PC 6a

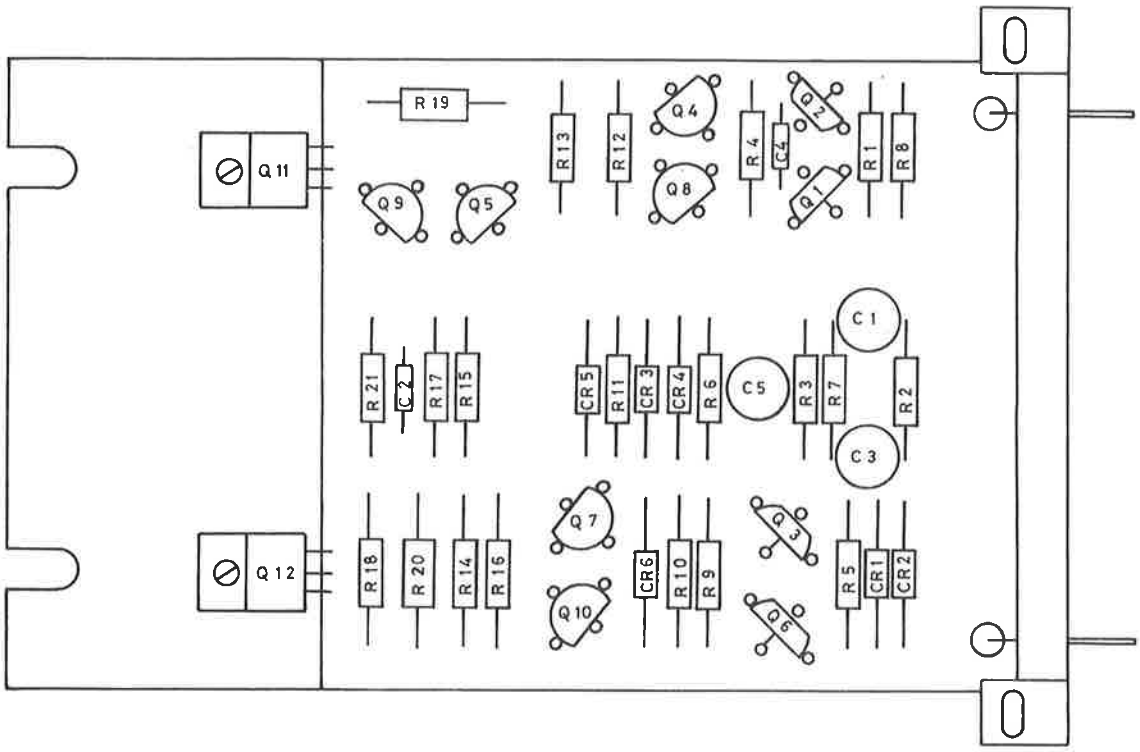
N.V. Optische Industrie
„de oude delft"
OLD DELFT

CINEMONTA
Power amplifier mod. 1

Fig. 13

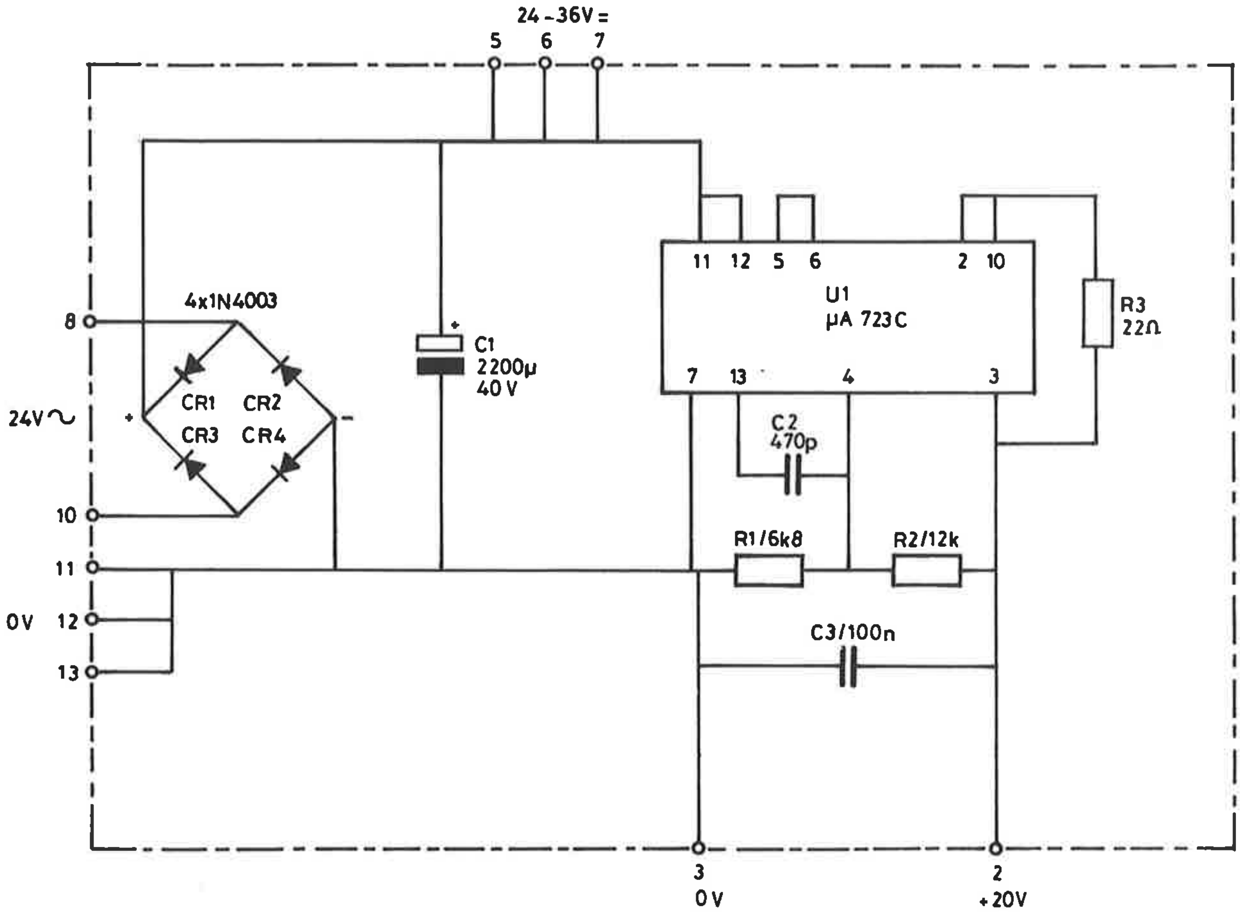
JM
Nr.: 4 TC 3904
Date: 10-9-'74

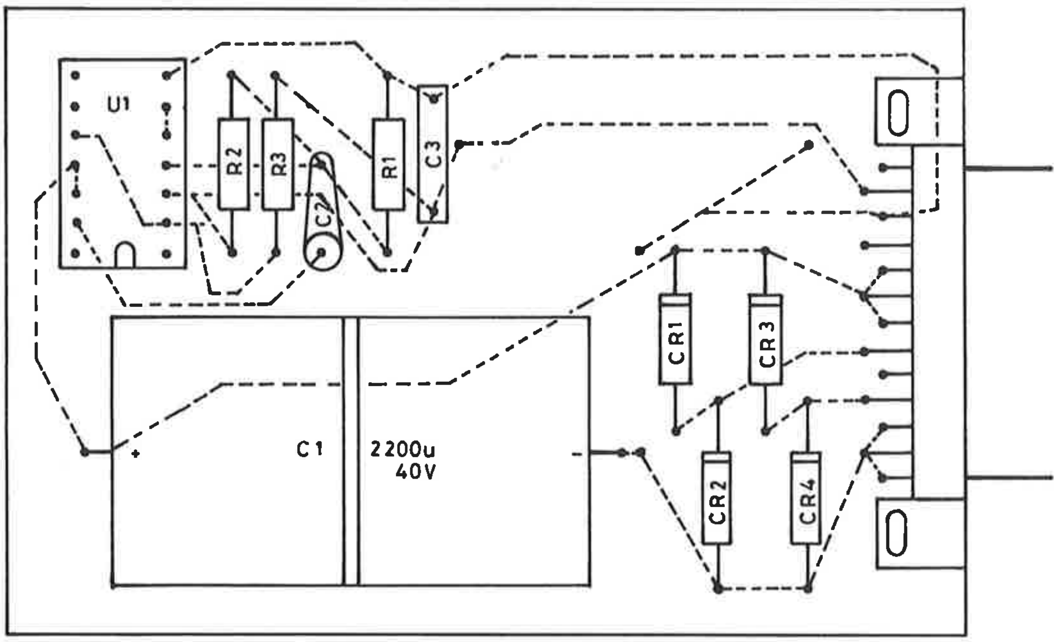




PC 6b

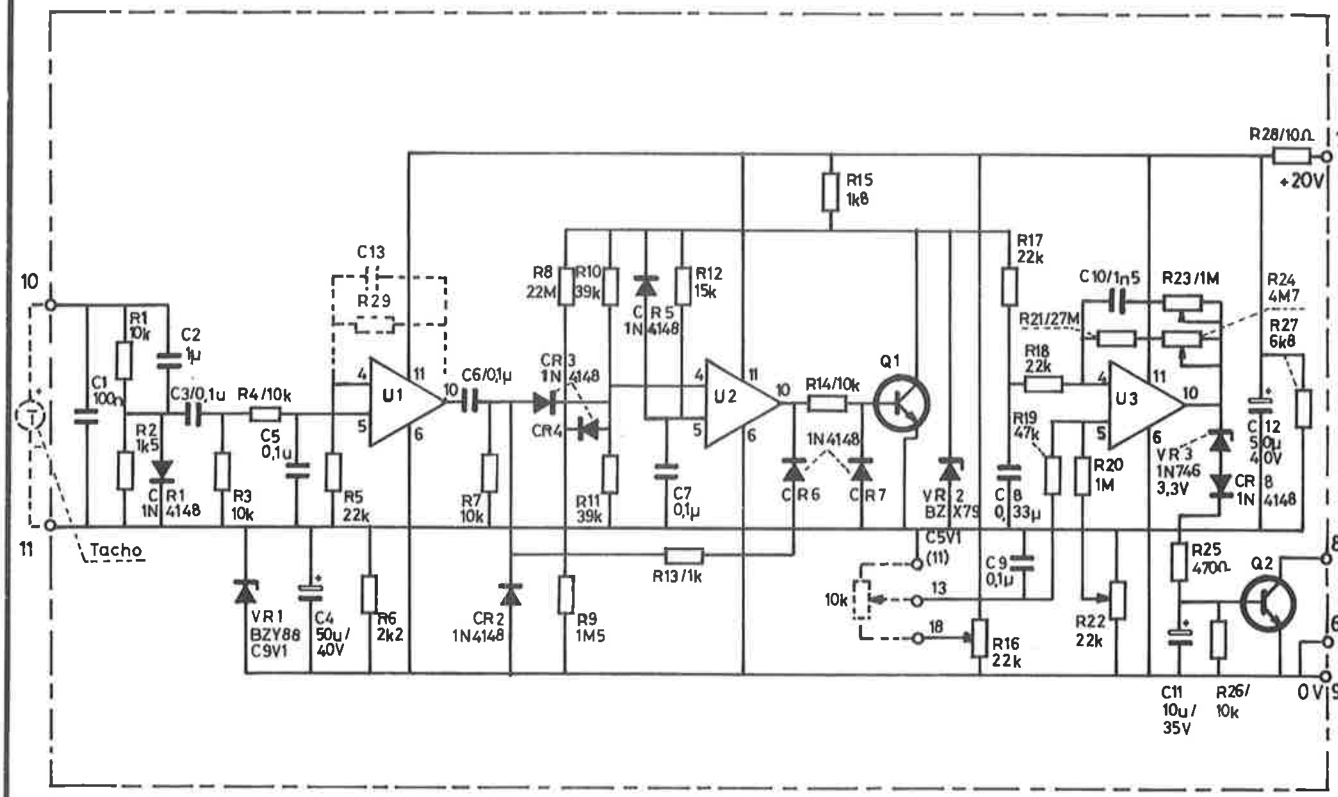
N.V. Optische Industrie „de oude delft"	CINEMONTA Power amplifier mod. 2	Fig. 14	d.Bo Nr 4 TC 4056 Date 1-12-'75

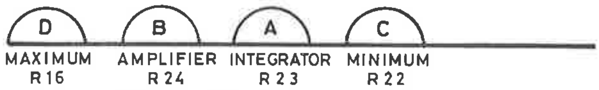


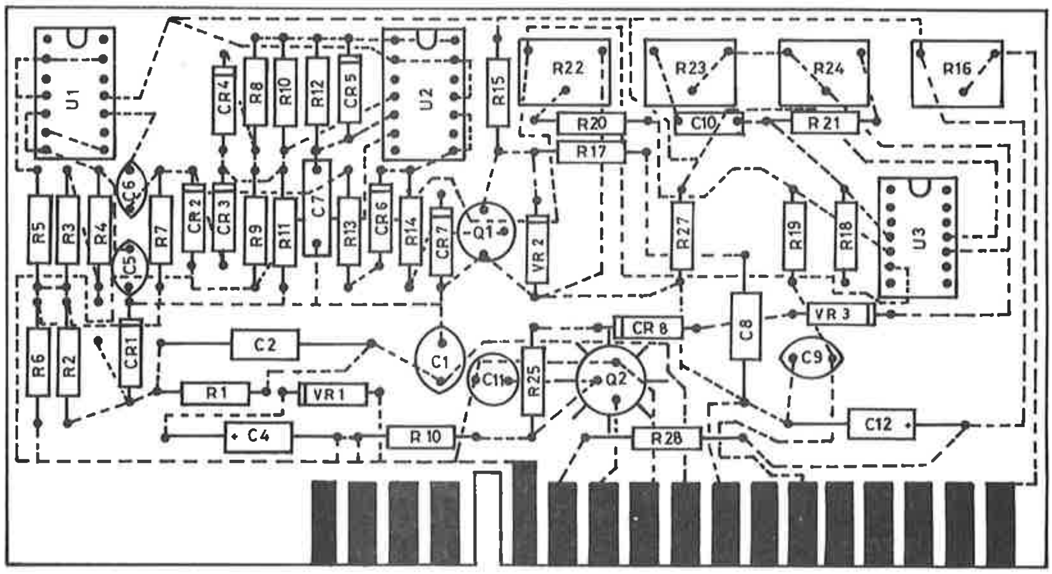


PC 7

N.V. Optische Industrie „de oude delft"	CINEMONTA Power Supply	Fig. 15	JM Nr.: 4 TC 3909 Date: 30-8-'74

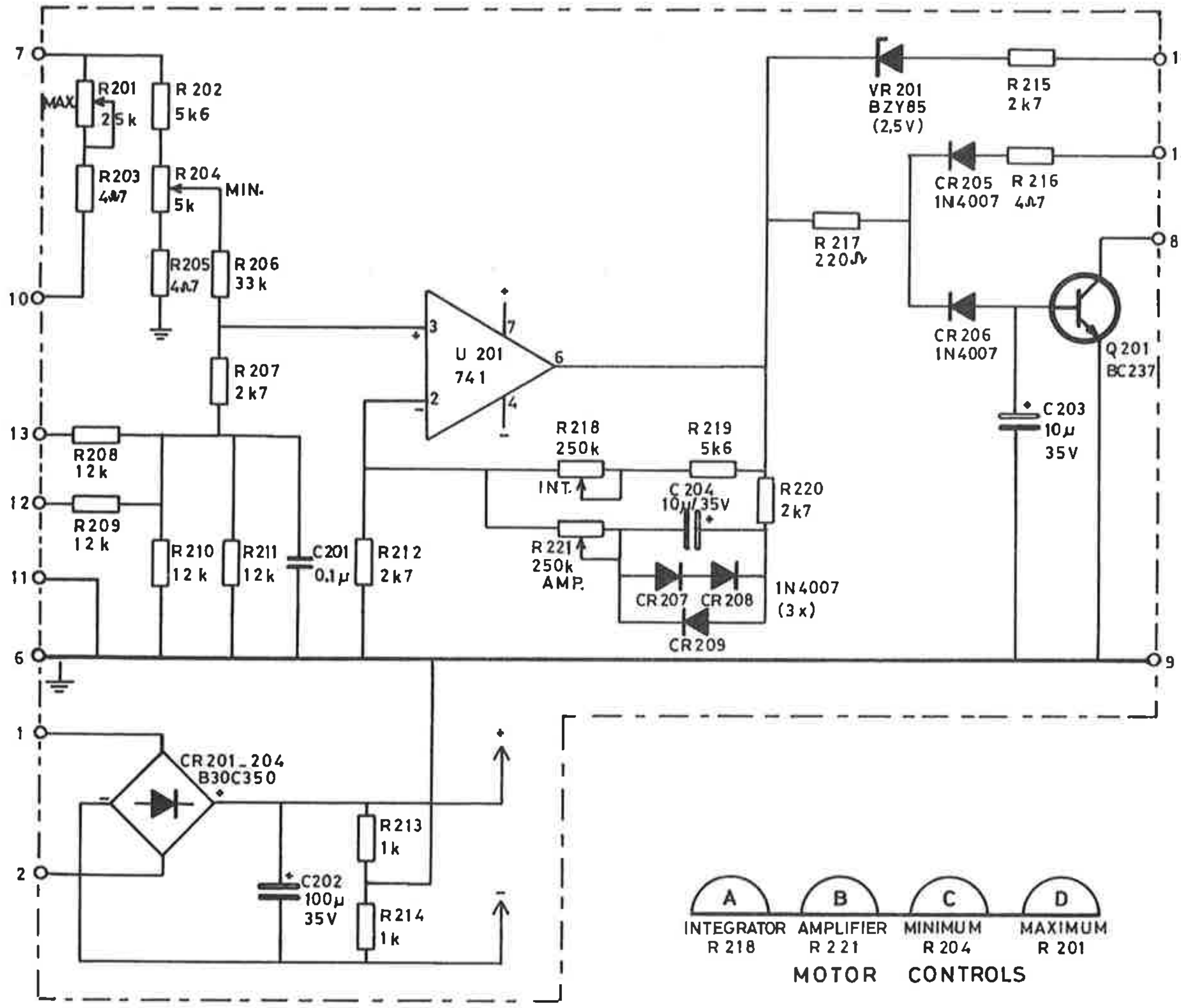




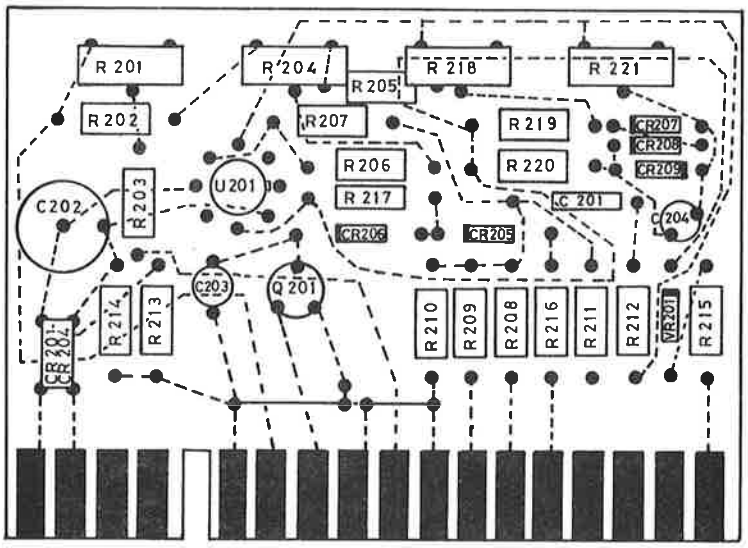


U1-U3 SN 72741N
Q1 2N2219
Q2 BF257
ALL RESISTORS 0,25W
Add. C13 and R29 if the amplification of U1 is to much

N.V. Optische Industrie „de oude delft"	CINEMONTA Motor Control Type I	Fig. 16	JM Nr.: 4 TC 3910 Date: 16-9-'74



ALL RESISTORS 0,25 W
Q 201 BC 237
MC 201 741



P7

1

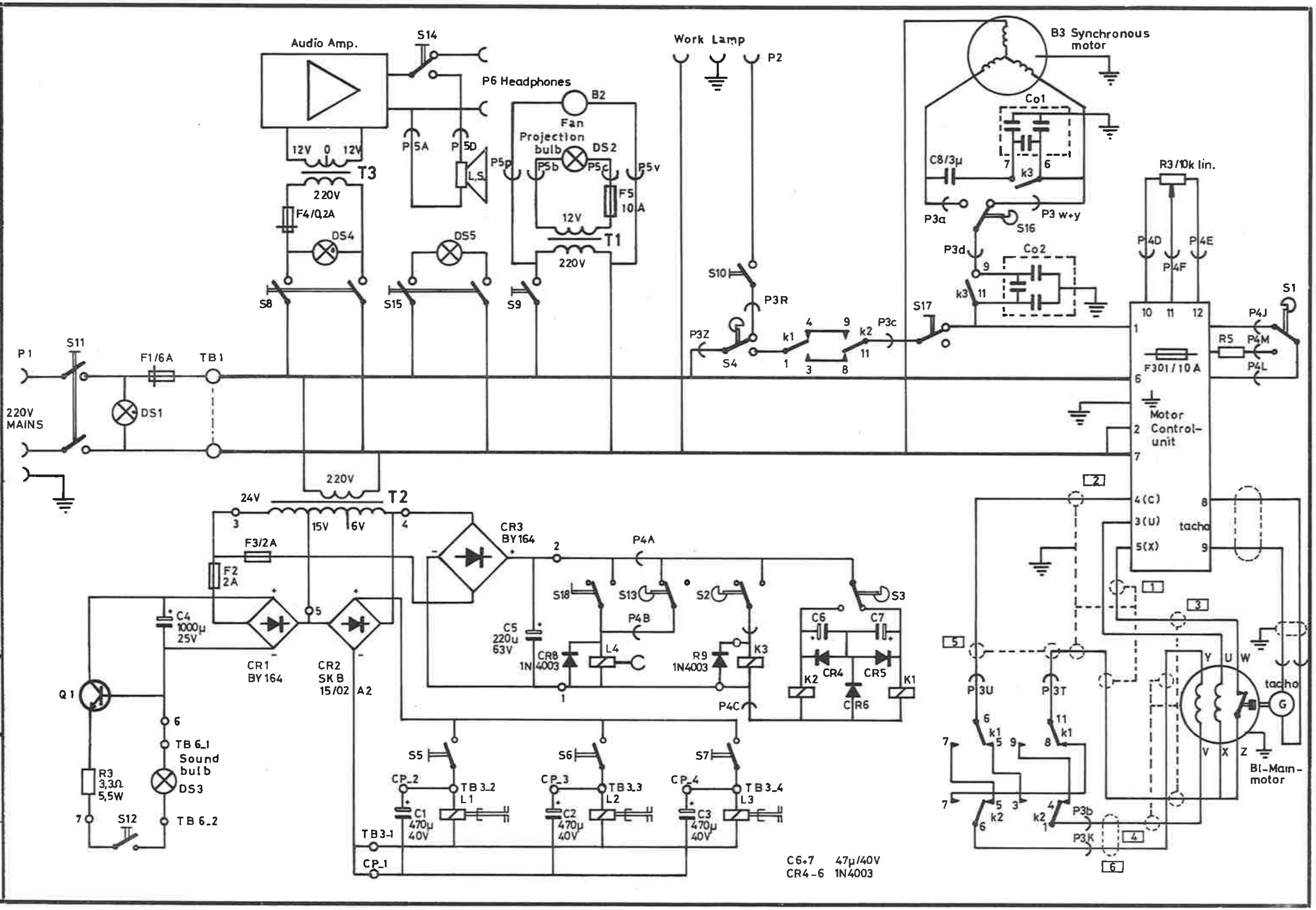
18

N.V. Optische Industrie
„de oude delft"
OLD DELFT

CINEMONTA
Motor Control Type II

Fig. 17

d.Bo.
Nr 4TC 3988
Date 13-10-75



N.V. Optische Industrie

„de oude delft"

OLD DELFT

CINEMONTA

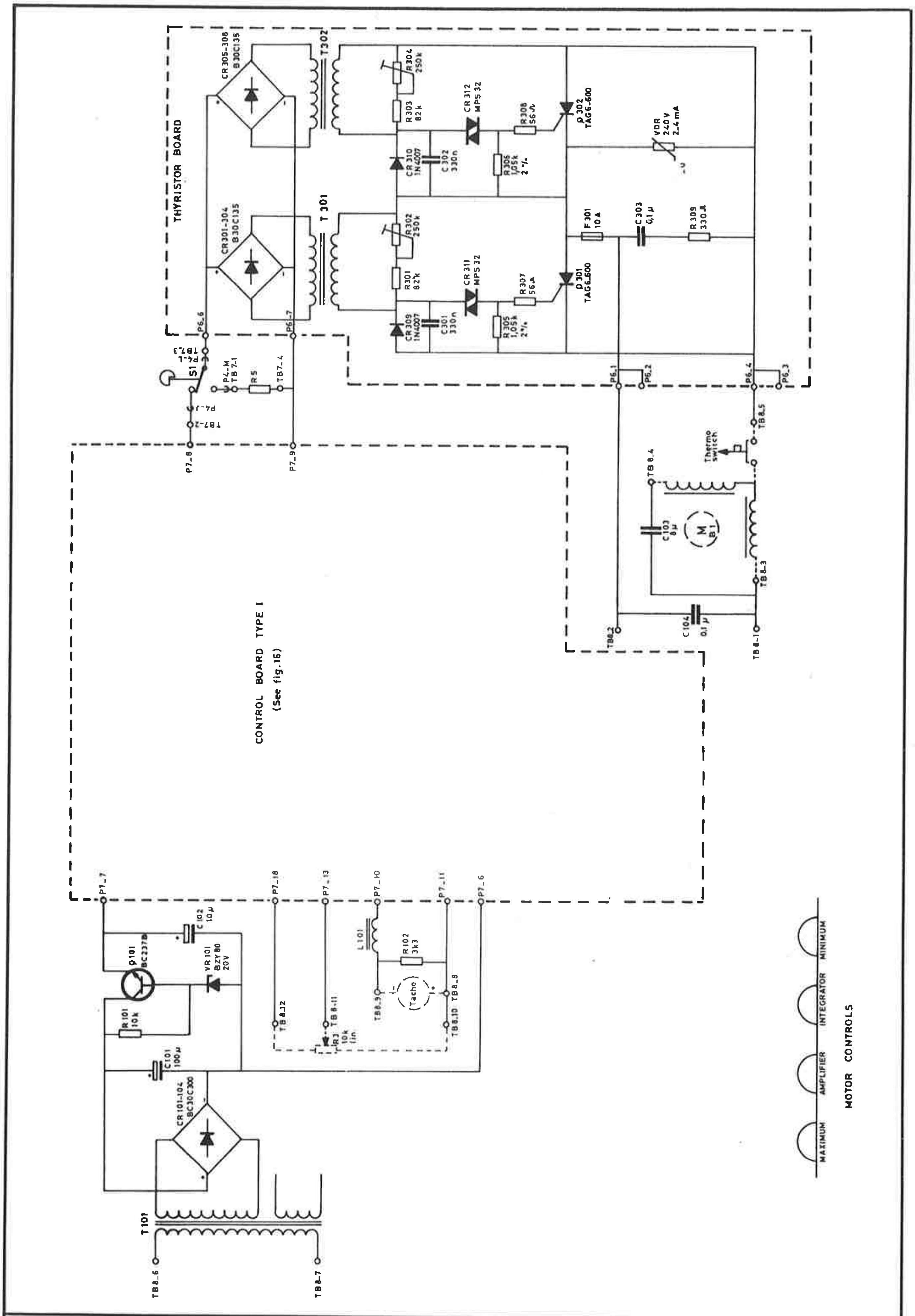
Interconnection Diagram

Fig. 18

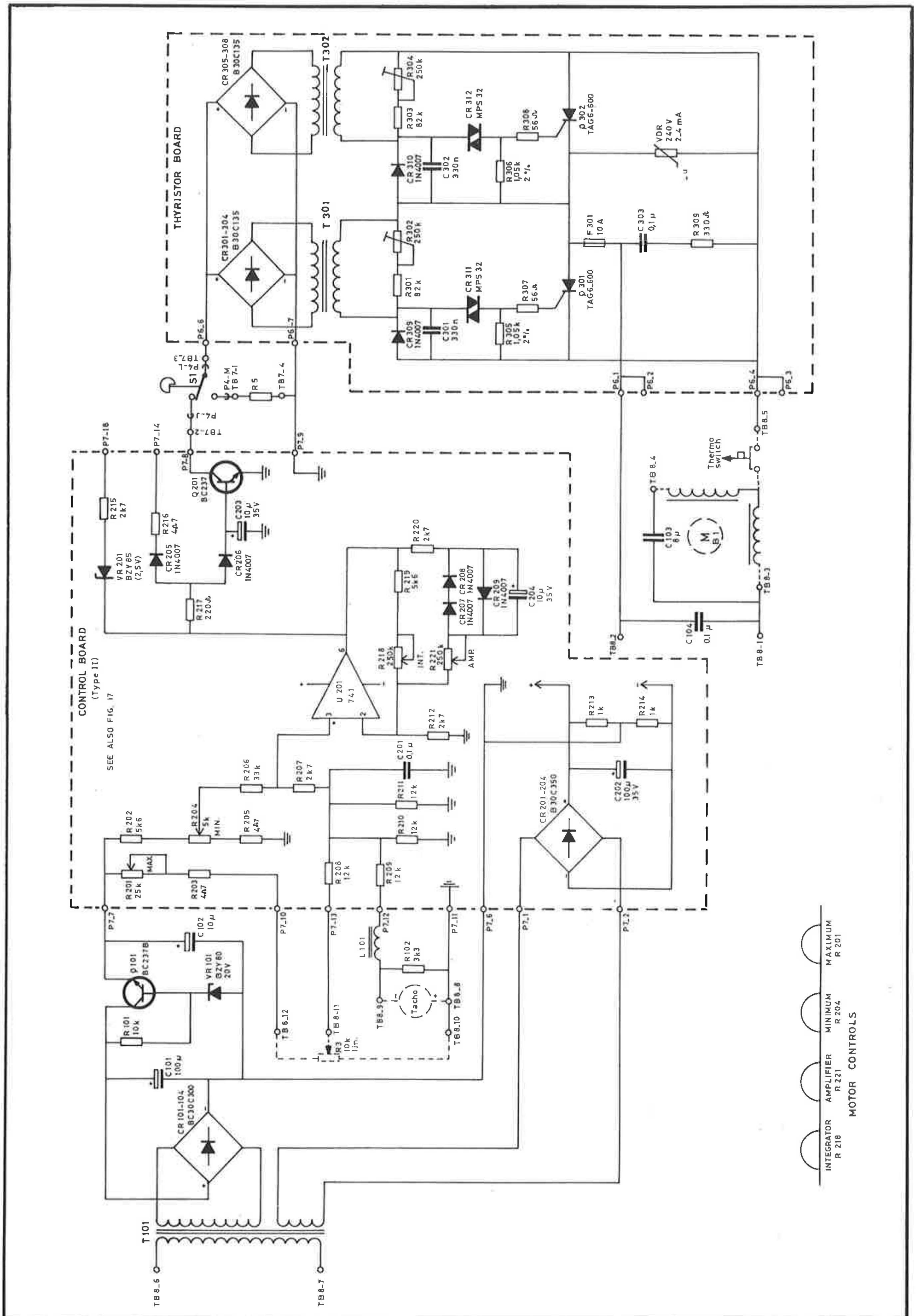
JM

Nr.: 4 TC 3911

Date: 17-9-'74



N.V. OPTISCHE INDUSTRIE „de oude delft"	CINEMONTA Motor Control System mod. 1	Fig. 19	d.Bo Nr : 3TC4057 Date : 4-12-'75



N.V. OPTISCHE INDUSTRIE

„de oude delft"

OLD DELFT

CINEMONTA
Motor Control System
mod. 2

Fig. 20

d.Bo

Nr : 3TC3987

Date 29-9-'75