

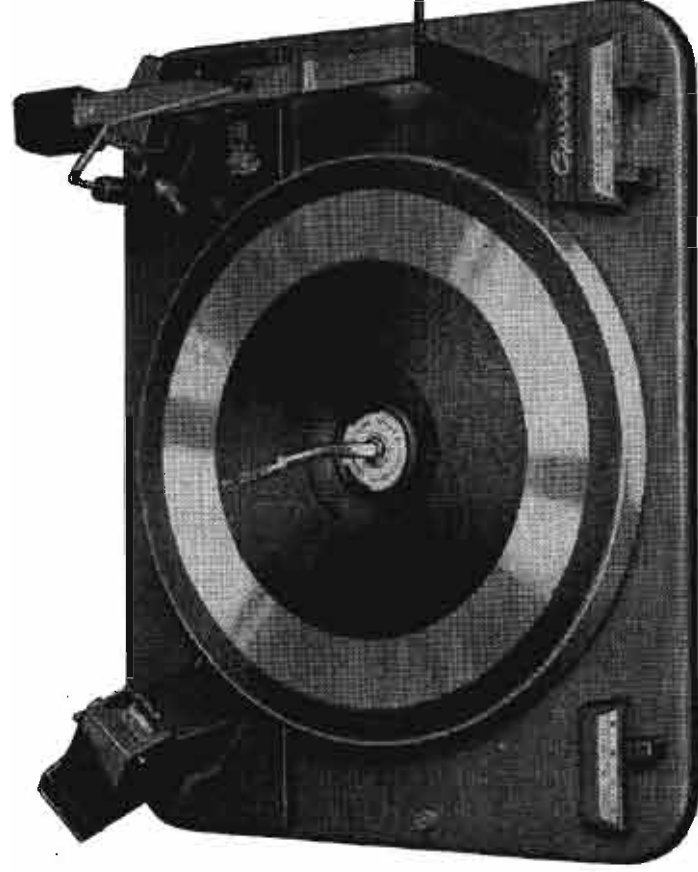
Garrard Service Sheet – Number 450

Model: Laboratory Series Auto Turntable
Type A.70

Subject: Index

Complementary to
Sheets No.

..... 451
to
..... 464
.....



INDEX

Sheet No.	Subject
451	Operation
452	Installation
453	Maintenance
454	Adjustments
455	Auto Trip
456	Turntable Speed
457	Auto Switch
458	Record Selection
459	Record Dropping
460	Noise
461	Pickup Head
462	Motor
463	Pickup and Arm
464	Exploded View and Spare Parts List

Garrard Service Sheet – Number 452

Model: Laboratory Series Auto Turntable

Type A.70

Complementary to
Sheets No.

..... 461

.....

Subject: Installation

UNIT ALREADY INSTALLED IN CABINET

Carry out the instructions given by the manufacturers of the complete instrument which may include those concerning the auto turntable; in any case, the following points should be checked.

See that all string, cardboard etc. used for packing purposes are removed, then release the transit screws by screwing them down clockwise until the unit is floating freely on its suspension springs.

Due to its weight the heavy outer turntable may be packed separately and this should be placed in position on the plastic foam mat over the inner turntable with the triangular mark on each turntable facing the other. The triangular marks indicate the position at which the turntable assembly is in balance and the correct assembly is shown on Diagram 3.

For transit purposes the heavy outer turntable should be removed.

TO ASSEMBLE TURNTABLE MAT

Lay the mat flat on the turntable taking great care not to buckle the trim ring. Next, carefully stretch the centre hole over the retaining ring in centre of turntable as shown in Diagram 4. If located correctly the mat will run true.

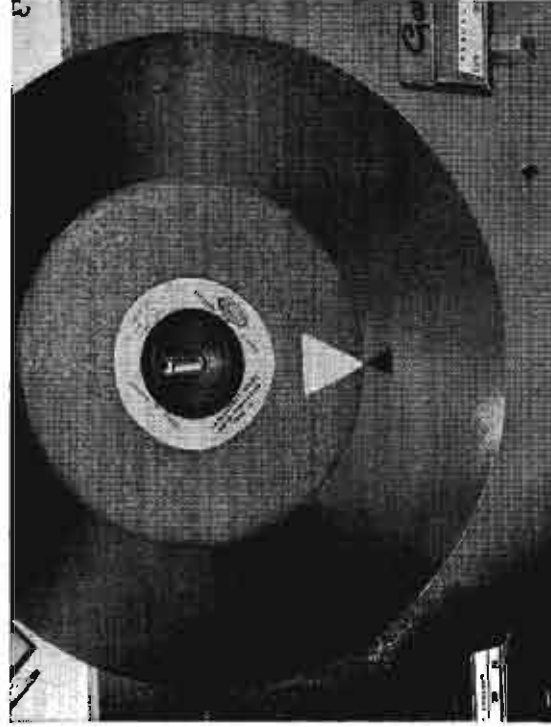


Diagram 3

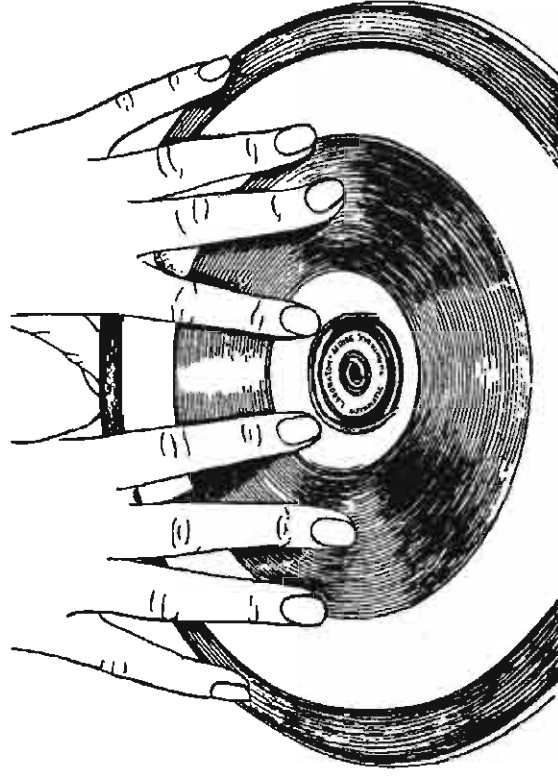


Diagram 4

FITTING TO CABINET

The Auto Turntable Type A.70 is 15" long by 12 $\frac{1}{4}$ " back to front and 2 $\frac{3}{8}$ " below and 5 $\frac{1}{2}$ " above top of motor board. An additional $\frac{1}{4}$ " on the height and all round the edges is required to permit the unit to float freely on its suspension springs. Also an extra 1 $\frac{1}{4}$ " is required at rear and right hand side of pickup arm to allow clearance for counterbalance weight, see template or refer to Diagram 7.

The cabinet motor board should be drilled and cut out to the template supplied. Do not moisten template but fix it to motor board with self-adhesive tape. A dimensional drawing of the template is given on Diagram 7 in case the one supplied with the unit has been used or mislaid.

The recommended motor board thickness is $\frac{1}{2}$ " but if a thicker board is used it will be necessary to recess the holes for the transit screws on the underside to $1\frac{1}{4}$ " diameter to clear the clips.

Open the carton and remove the top cardboard packing and accessories. Lift out unit with the fingers under front and back edge of unit plate and remove all rubber bands. Remove the side and bottom liner from carton and the heavy outer turntable and its rubber mat will be revealed.

Before assembling to cabinet, the power supply, audio and earthing leads should be connected, if not already fitted. The power supply connecting block is adjacent to the motor and the position of the voltage changeover links, if a dual range model, should be checked and if necessary set to correspond to the voltage of the power supply. Connection details are shown on cover of block and on Diagram 5.

Diagram 6 shows the connections to the muting switch tags.

The unit should be placed on the board so that the spring mountings engage their recesses in the motor board, and the transit screws go through their respective holes. When in position the spring clips on the ends of the transit screws should be turned through 90° so that they lie parallel to the motor board.

Set up the unit as already described under "Unit already installed in Cabinet".

Before connecting the pickup leads, make sure that the pickup circuit of the radio or amplifier to which it is to be connected is isolated from the power supply. If it is not, then it is essential for isolating components, condensers or transformers, to be incorporated in the pickup circuit. The screening of the pickup leads connected to the record changer must be connected to a true earth and not to the amplifier chassis; they should also be kept as short as possible to avoid hum pickup.

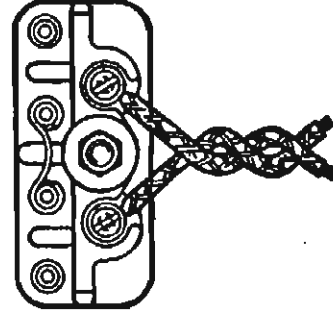
Spring clips are supplied to hold the adaptor and record spindles not in use, and they should be fixed in any convenient position with the wood screws provided.

NOTE:

Additional clearance will be needed at the top right hand corner of the motor board if the cartridge in use is sufficiently heavy to require greater extension of the pickup arm counterbalance weight.

In order to be certain that enough cabinet space is available to accommodate full extension of the counterbalance weight and permit the unit to vibrate on its springs an extra radius measurement of $\frac{2}{16}$ " must be allowed within the arc through which the weight swings, shown on Diagram 7.

Connect both clips thus for 200/250 volts A.C.



Connect clips thus for 110/130 volts A.C.

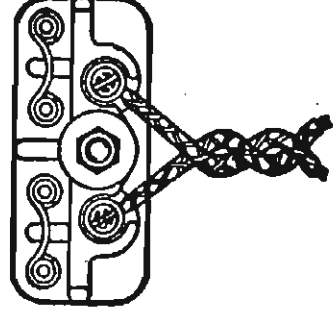


Diagram 5

POWER SUPPLY VOLTAGE AND FREQUENCY

On dual voltage range models, check that the voltage changeover links in the power supply connecting block are correctly set to correspond to the voltage of the power supply, Diagram 5.

Also check that the driving motor pulley is correct for the frequency of the power supply; the pulley is colour finished for identification, Nickel for 50 cycle and Brass for 60 cycle power supply.

PICKUP LEAD CONNECTIONS TO AND AMPLIFIER CONNECTIONS FROM TAG STRIP

4 Wire Stereophonic System

R.H. Channel—Red with Green Common.
L.H. Channel—White with Blue Common.

3 Wire Stereophonic System

R.H. Channel—Red } Green Common.
L.H. Channel—White }
Use Blue for Earth (Ground) if required.

2 Wire Monophonic System

Red and Green.

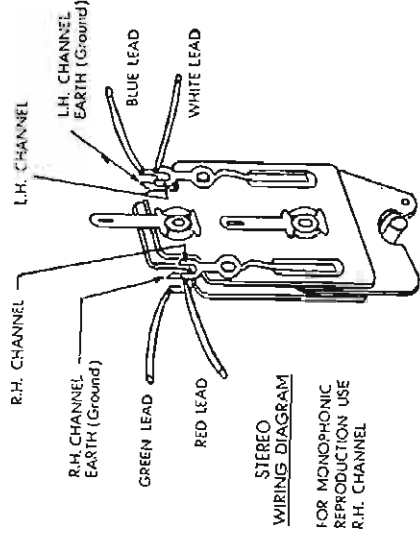


Diagram 6

If your unit is fitted with phono leads, the above diagram may be ignored and these connections made:

Brown phono lead to R.H. Channel.

Grey phono lead to L.H. Channel.

For monophonic play use Brown phono lead.

EARTH LEAD

The motor should be earthed (grounded) by connecting the earth lead to a good earthing point, or, if the lead is not fitted, one should be connected to the earthing tag located at rear of bracket holding the power supply connecting block.

Garrard Service Sheet – Number 451

Model: Laboratory Series Auto Turntable
Type A.70

Complementary to
Sheets No.

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Subject: Operation

DESCRIPTION

This model has been designed to play records singly with a high standard of performance, at the same time having the advantage of being able to play a number of records automatically when desired.

The Garrard Auto Turntable Type A.70 will play records manually, or any number up to six of the same size and speed, automatically. It will play 7", 10" and 12" records at 16 $\frac{1}{3}$, 33 $\frac{1}{3}$, 45 or 78 r.p.m.

Supplied with a short record spindle and adaptor for playing records manually and a sloping record spindle for playing records automatically. For automatic playing of 7" 45 r.p.m. records having a large centre hole, a large record spindle Type LRS3 is used, Diagram 1. This may be an optional extra.

TO OPERATE FOR MANUAL PLAY

- (1) See that correct stylus is in position for type of record to be played.
- (2) Check that speed change control is set to correct speed.
- (3) Place short manual play record spindle in position, also adaptor if playing 7" 45 r.p.m. records with large centre holes.
- (4) Move record platform to rear position.
- (5) Place record on turntable.
- (6) Switch manual control to "On", unclip pickup arm from rest and place pickup on record.

TO OPERATE FOR AUTOMATIC PLAY

- (1) Proceed as for 1 and 2 above.
- (2) Place the appropriate automatic play record spindle in position.
- (3) Set record platform. Rear position for 12" and forward position for 10" records. For 7" records, use large record spindle; platform position does not matter.
- (4) Place any number of records up to six of the same speed and size on the record spindle step. Support them with the record platform clip if the sloping record spindle is used.
- (5) Unclip pickup arm and switch on by moving automatic control to "On".

TO UNLOAD

When the unit has stopped after playing records automatically, remove the record spindle and lift off records. 7" 45 r.p.m. records having a large centre hole may be removed by lifting over the large record spindle, placing the thumbs on the spindle top and lifting the records with the fingers.

REJECT

To reject a record, move the automatic control to "Reject". The pickup will immediately rise and return to its rest position and the motor will switch off. If more than one record is loaded switching to "Reject" causes the next record to play.

STOP

To stop, leaving the pickup on the record, move the manual control to "Off". The same record will continue to play if the manual control is then switched to "On". To stop the unit with the pickup on its rest, move the automatic control to "Off". The pickup will immediately rise, return to its rest and the unit switch off.

After use it is recommended that the pickup arm be secured on its rest by means of the clip provided.

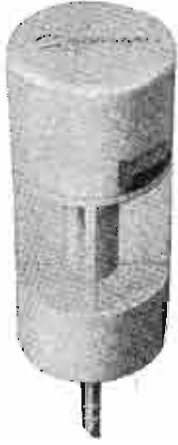


Diagram 1

Large Record Spindle Type LRS3



Diagram 2

Garrard Service Sheet — Number 453

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

Type A.70

..... 452

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Subject: Maintenance

LUBRICATION

The bearings in the motor, turntable spindle and intermediate wheel are of the oil-retaining type and rarely need lubricating. However, when the need for oil is apparent the bearings should be lubricated very sparingly, particularly the intermediate wheel bearing, to avoid oil getting on to the rubber thereby causing the drive to slip. The main oiling points are indicated on Diagram 8; after lubrication remove all traces of surplus oil before running the unit.

It is essential that the motor pulley, rubber intermediate wheel and inside rim of the turntable be kept free from oil or grease to prevent slipping.

A smear of light grease should be applied occasionally to all cam faces, pins and rollers and a spot of oil to all lever pivots. Thin, high-grade machine oil such as that used for sewing machines, and grease similar to, or lighter than, petroleum jelly is suitable for lubrication.

REMOVING TURNTABLE

To gain access to the mechanism on top of the unit plate for lubrication and service purposes, the turntable assembly must be removed as follows:—

First, remove the rubber mat by carefully pulling it off the centre boss taking care not to distort the trim ring if fitted, then lift off the outer turntable. Next, remove the name plate in the centre, by levering it upwards with a screwdriver or penknife blade placed in one of the slots. The flat spring turntable clip is then accessible and should be removed. Remove the inner turntable with the plastic foam mat attached, by lifting with the fingers, applying equal pressure on diametrically opposite sides.

Should the inner turntable be difficult to remove, place the short manual record spindle in position and while lifting the inner turntable as described, get an assistant to give the top of the record spindle a gentle tap with a piece of wood, such as the handle of a screwdriver.

ASSEMBLING TURNTABLE

With the changer in the switched off position, fit the inner turntable complete with foam mat on the turntable spindle and retain it by fitting the flat spring clip in the groove of the projecting portion of the turntable spindle, Diagram 10. Replace the centre name plate by pressing it in position with the fingers.

Next, carefully place the heavy outer turntable over the inner turntable on the plastic foam mat making sure that the triangular markings on both turntables coincide.

The two turntables are carefully balanced and they are in balance when the triangular markings coincide as described and illustrated on Sheet Number 452.

Finally, fit the rubber turntable mat by stretching the hole over the centre boss as described and illustrated on Sheet No. 452.

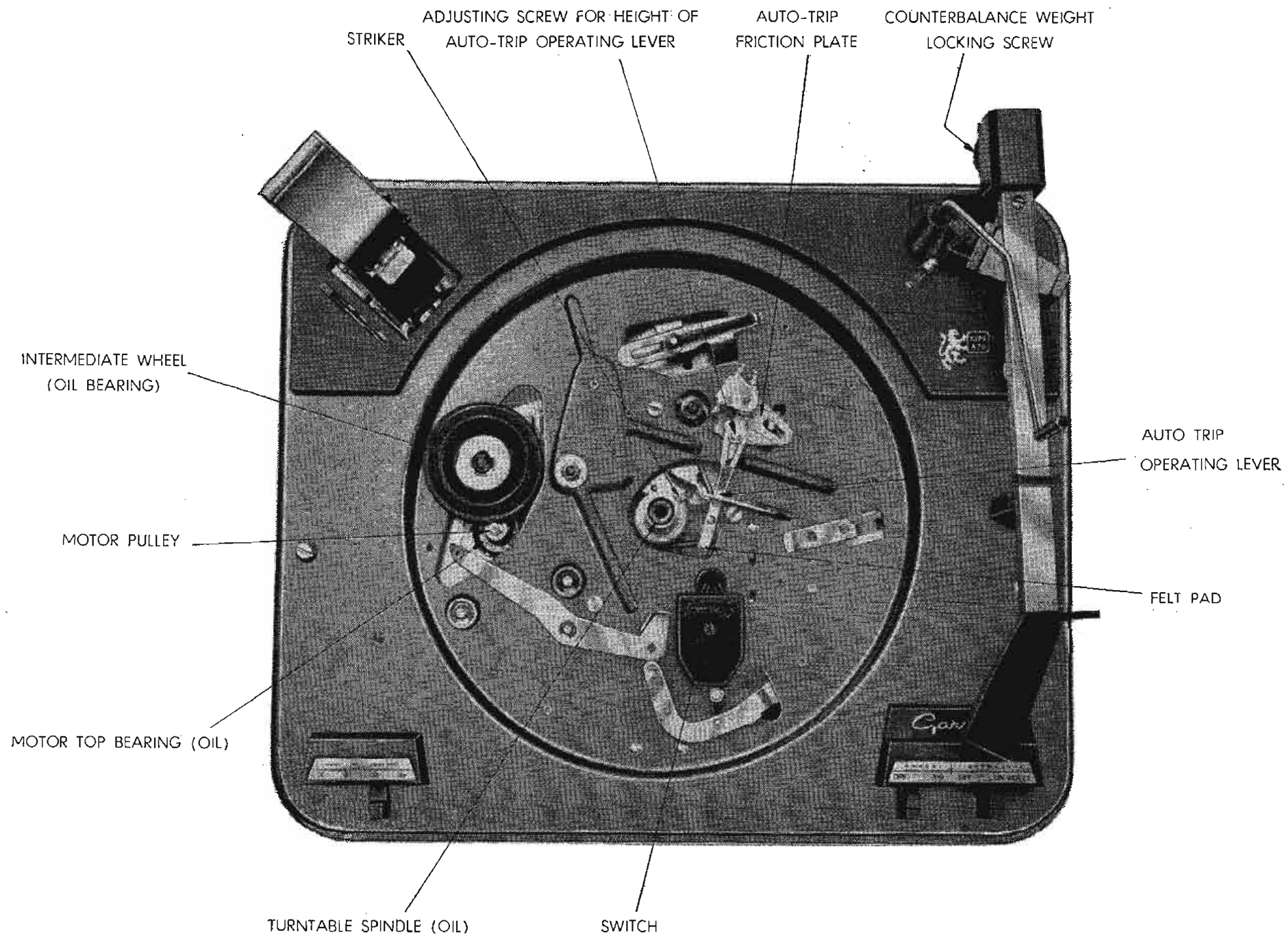


Diagram 8

Garrard Service Sheet – Number 454

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

Type A.70

..... 451
..... 452
..... 453

Subject: Adjustments

DESCRIPTION

The adjustments described on this sheet are those for which provision is made on the unit. If these are insufficient please refer to the sheet relating to the fault occurring. **When making any adjustment take care to protect the pickup and its stylus.**

PICKUP DROPPING ARM POSITION

When the pickup lowers on to a record, the stylus point should land near the inside of the record rim; it will then be picked up by the lead-in groove and so guided into the playing groove.

Should a new cartridge be fitted the stylus dropping position may require adjustment as follows:—

Place a record, say a 10", on the sloping record spindle, and switch on by the Auto Control. Immediately the record drops, switch off by means of the Manual Control. Slowly rotate the turntable by hand until the stylus point is about $\frac{1}{8}$ " above the record. By viewing from the front, the position of the stylus in relation to the record can be seen.

To adjust, turn the screw located on the front of the pickup arm bracket immediately under the pickup arm cross pivot, clockwise to move pickup inward and counterclockwise to move outward.

Position of screw shown on Diagram 2, Sheet Number 451.

PICKUP LIFT

The distance the pickup lifts when on Auto can be adjusted by turning the screw located on top of the pickup arm just behind the cross pivot, Diagram 2, Sheet Number 451. Turning the screw clockwise raises the pickup and counterclockwise lowers it. The correct height can be checked by placing a 12" record on the turntable when the stylus tip should be clear the top surface by $\frac{3}{4}$ " as it passes over it when returning to its rest position.

To prevent the pickup arm from being lifted too high, causing the counterbalance weight to touch and possibly damage the back of the unit, a stop screw is provided. This screw is located on the rear right hand side of the pickup arm bracket underneath the cross pivot and is fixed by means of a locknut. To adjust, loosen the locknut and turn the screw. When correct, the top of the pickup head should clear the underside of a record on the record spindle by about $\frac{3}{16}$ " when pickup is lifted to its maximum extent in centre position. When pickup is raised automatically there must be a small clearance between pickup arm and stop screw.

PICKUP STYLUS PRESSURE

The stylus pressure is adjusted as described on Sheet Number 452 under "Installation".

AUTO TRIP

Adjustment is provided to raise or lower the auto trip operating lever in relation to the striker cam on the turntable spindle. Should the trip fail to operate leaving the pickup running in the centre of the record, remove the turntable as described on Sheet Number 453. Next, turn the screw for adjusting the height of auto trip operating lever, Diagram 8, Sheet Number 453, about half a turn in a clockwise direction to raise the lever so that it is engaged by the striker cam on the turntable spindle as the pickup movement accelerates.

Also check that the auto trip friction plate is clean and free from oil and dust.

Garrard Service Sheet – Number 455

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

..... 453

Type A.70

Subject: Auto Trip

Caution: Protect the stylus before making any adjustment

DESCRIPTION

The auto trip is a velocity type of advanced design having a very light action which operates when the inward motion of the pickup arm is accelerated when the pickup reaches the lead-out groove in the centre of the record.

The trip is set to commence operation when the pickup reaches a radius of $2\frac{3}{8}$ " and should operate on an accelerated movement of not less than $\frac{3}{32}$ " with a minimum of one revolution of a record.

The trip mechanism is accessible on removing the turntable (Sheet Number 453).

Symptoms

Pickup remains in centre of record.

Fault

- (1) No lead-out groove on record.
- (2) Pitch of record lead-out groove less than $3/32$ ".
- (3) Auto trip operating lever incorrect for height.
- (4) Operating lever not free.

- (1) Check that the record has a lead-out groove.
- (2) The auto trip is designed to operate on records complying with B.S. 1928: 1965, I.E.C. Publication 98 and similar standards. There are, however, a few old records where the lead-out groove has a very small pitch and this may not be sufficient to give enough acceleration to the pickup to operate the trip. On records of this type the "Reject" Control should be operated when the pickup reaches the centre of the record.
- (3) With the changer in the playing position remove the turntable (Sheet Number 453) and check the position of the auto trip operating lever in relation to the cam face on the striker. Move the pickup arm inward to do this. The operating lever is correctly set when it clears the underside of the stop lever by approximately $\frac{1}{16}$ ". To obtain the correct setting, turn the screw for adjusting the height of operating lever, Diagram 9, to raise or lower the lever as required. See also that the felt pad in the end of the operating lever is projecting a small amount from the lever face, $\frac{3}{4}$ " maximum and that its surface is clean and free from ragged edges. If not projecting enough, it can be pushed or prised to project the correct amount.
- (4) Examine the operating lever to ensure that it is perfectly free on its pivot by lifting it off the friction plate. The surface of the friction plate should be perfectly clean and the use of oil at this point is not recommended, as it may produce a sticky surface and make the action of the auto trip heavy.

Symptoms

Pickup repeats in record groove when nearing centre of record.

- (1) If, when examined microscopically, the stylus is seen to be worn or chipped, replace it. A stylus suspected of being the wrong size or type should have any identifying marks checked.
- (2) Check stylus pressure (Sheet Number 452) and, if necessary, set to that recommended by the pickup cartridge manufacturer.
- (3) Check that the pickup leads at rear of pickup arm are not strained in any way and move freely in the slot of the pickup base. Should the leads touch the sides or end of the slot during the extent of the pickup travel, move them so that they are clear and do not bias the free movement of the pickup arm. Also see that the pickup leads are held in the guide clip which is just under the slot at the rear of the pickup arm pedestal, and make sure that the guide clip does not touch the adjacent casting during its travel.
- (4) Refer to Fault 4 under "Pickup remains in centre of record".
- (5) Check the freeness of the auto trip levers and pickup arm by moving it inward slowly by hand as if playing a record. Should any stiffness be felt, carefully check all associated levers for freeness, see also that their movement is not obstructed by any leads. Check the clearance between the pickup arm counterbalance weight and the cabinet sides making sure there is ample clearance at all positions of the arm, making due allowance for the movement of the unit on its spring suspensions.
- (6) An accumulation of dust around the stylus can be brushed away, a hardened deposit may require more careful attention.

Auto trip operates before completion of record.

- (1) Surface of friction plate contaminated.
 - (2) Operating lever or associated linkage not moving freely.
 - (3) Operating lever set so high that it touches the underside of stop lever.
 - (4) Stop lever failing to fall freely to engage slot in cam gear.
 - (5) Auto control knob binding.
- (1) Remove all traces of oil or grease from surface of the friction plate with a clean, dry cloth. This face must not be lubricated.
 - (2) Clean lever pivots and lubricate sparingly with fine machine oil.
 - (3) Reset height of operating lever in accordance with instructions in paragraph (3) under the heading "Pickup remains in centre of record".
 - (4) Clean and oil pivot.
 - (5) Clean and oil pivots. Carefully reshape any damaged lever.

Fault

- (1) Stylus worn, damaged or of wrong size.
- (2) Stylus pressure too low.
- (3) Pickup leads strained tight or not in the guide clip.
- (4) Operating lever incorrectly set.
- (5) Levers not free.
- (6) An accumulation of dust around the stylus.

AUTO TRIP

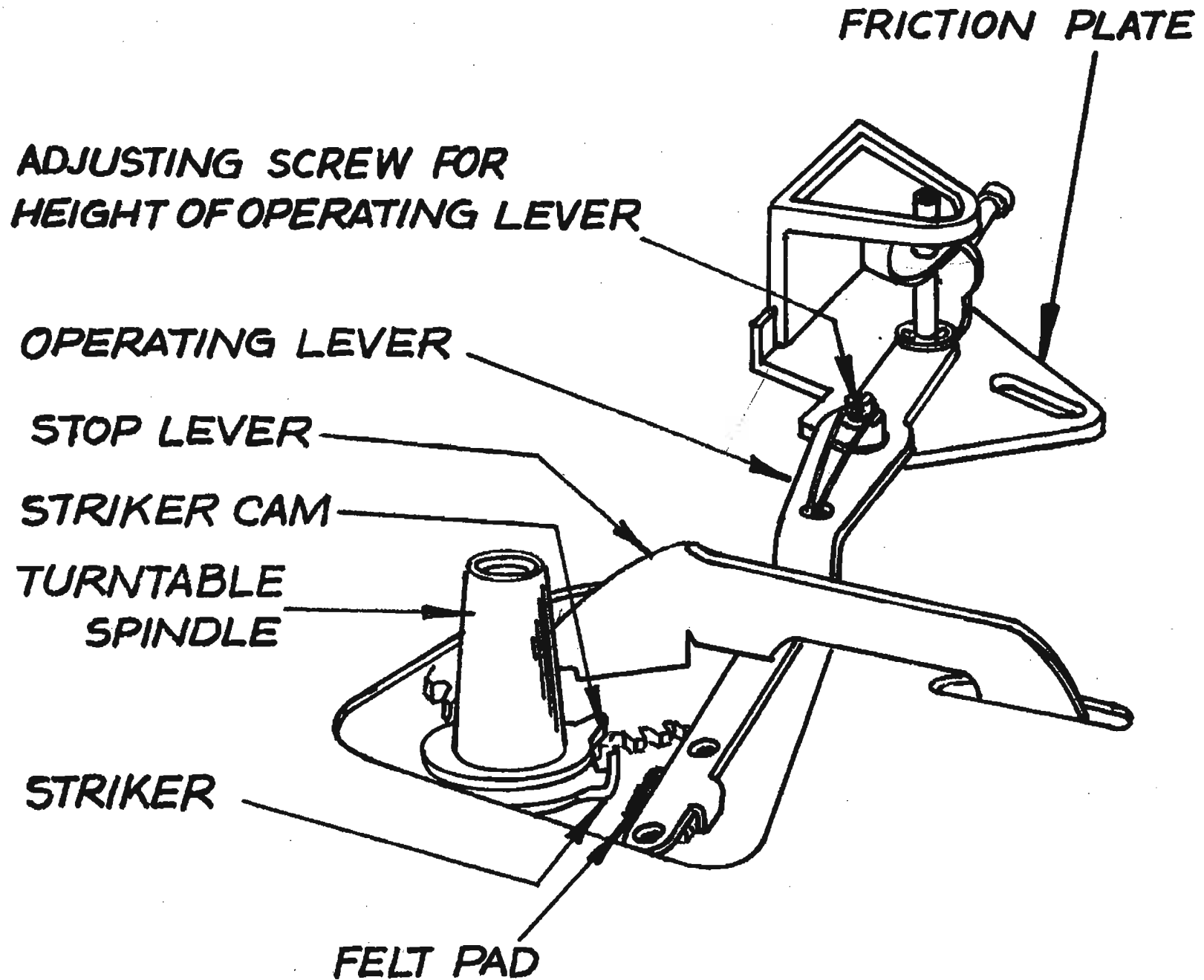


Diagram 9

Garrard Service Sheet – Number 456

Model: Laboratory Series Auto Turntable

Type A.70

Complementary to
Sheets No.

..... 452
..... 453
..... 462

Subject: Turntable Speed

DESCRIPTION

The four speeds 16½, 33½, 45 and 78 r.p.m. are obtained by means of a stepped pulley fixed to the motor shaft by two screws and the drive is transmitted to the turntable by a rubber idler called the intermediate wheel.

Symptoms

Turntable runs excessively fast or slow.

Fault

- (1) **Incorrect size motor pulley.**
- (2) **Voltage range of motor set incorrectly.**
- (3) **Wrong stroboscope being used.**

(1) Remove turntable (Sheet Number 403) and check the motor pulley. For 50 cycles it should be nickel plated and for 60 cycles brass. If incorrect, change it for one obtained from our Spares Department. Please give model number and frequency of power supply when ordering.

(2) Disconnect the power supply and if a dual voltage range motor is fitted, check the connections inside the voltage change-over block, they should be as shown on the block cover corresponding to the voltage of the power supply. These connections are also shown on Diagram 5, Sheet Number 452. Check that the links are tight and making good contact. If single voltage range, check that the voltage is correct for the motor, details of which will be found stamped on the flange of the bottom bearing cover.

Speed slightly too fast or slow.

(1) **Pulley size.**

(1) Should it be found impossible to obtain the correct turntable speed within $\pm 2\%$ by the preceding instructions, carefully check the speed of the turntable with a watch while playing a record. Write to our Technical Service Department giving the model number of the unit, the speed of the turntable in revolutions per minute at each speed setting and return the existing motor pulley which will be replaced with one to give the correct speed.

Speed varies erratically.

- (1) **Oil on driving surfaces.**
- (2) **Loose motor pulley.**
- (3) **Motor pulley out of position.**
- (4) **Motor shaft tight.**

(1) Remove the turntable (Sheet Number 453) and with a clean cloth wipe the motor pulley, rubber intermediate wheel and inside rim of turntable, also remove any surplus oil which may be observed.

the 'On' position, then the stationary intermediate wheel will remain in contact with the motor pulley and turntable rim and may be indented at the points of contact. If this has occurred, try running the unit for a few hours, this will roll out the indents if not too severe. If this is not effective, a new intermediate wheel should be fitted. On fitting the new intermediate wheel, clean its periphery with a clean rag and make sure that it spins freely on its bearings when not in contact with the motor pulley. It may be necessary to re-set the motor pulley position on fitting a new wheel and this is described in Item 3, under "Speed varies erratically".

- (5) Check the motor pulley and tighten both its screws; it is important that both are equally tightened. If one screw is loose it may cause the pulley to run out of truth and so produce flutter in the reproduction.
- (6) A bent motor shaft or a rotor out of balance could be caused by bad handling in transit or installation. Should the motor vibrate badly or the shaft with pulley removed be more than .0005" out of truth, total indicator reading, the rotor and shaft assembly should be replaced. The rotor and shaft are integral and no attempt should be made to separate them.

Symptoms

Turntable does not revolve when motor is running.

Fault

- (1) Oil on driving surfaces.
- (2) Intermediate wheel bracket not free.

- (1) Refer to Fault 1 "Speed varies erratically."

- (2) With the turntable removed (Sheet Number 403) check that the intermediate wheel and its pivot is free to swing on its supporting bracket. The intermediate wheel should firmly engage the motor pulley when the motor is switched on and freely retract when switched off. If not free, lubricate the bracket pivots and move to and fro to allow the oil to reach the bearings; use light machine oil. Check that the motor leads are not touching the intermediate wheel bracket.

Speed change control tight to operate.

- (1) Lubrication required.

- (1) The speed change control lever where it extends underneath the unit plate has a slot which engages with a pin in another lever; well grease the pin and slot.

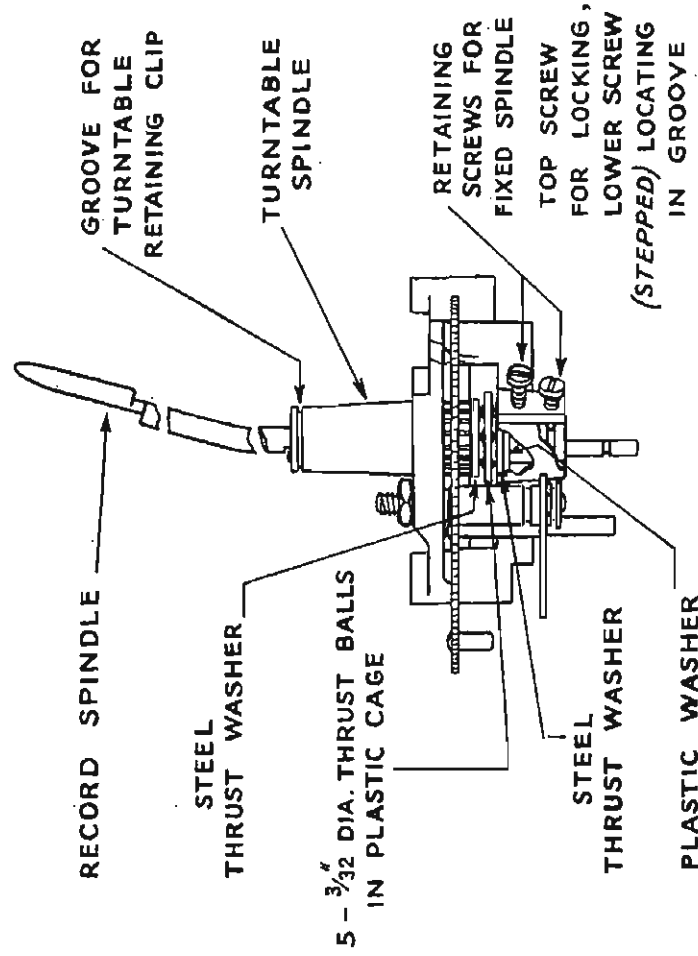


Diagram 10

- (2) The motor pulley is held on the shaft by two small screws and both of these screws should be equally tight. Check that the motor pulley is in its correct position as described below before tightening both screws, which should be tightened an equal amount.
- (3) The position of the motor pulley on the motor shaft should be such that when the intermediate wheel is in contact with it on either the $16\frac{2}{3}$, $33\frac{1}{3}$, or 45 r.p.m. steps, the lower face of the intermediate wheel is about $\frac{1}{8}$ " clear of the adjacent pulley step. As the hole in the motor pulley is blind, there may be a tendency for it to rise on the shaft due to air in the hole being unable to escape; this will be so if oil is present. Clean the shaft and hole in pulley, and on assembly, push it right down on the motor shaft to exclude the air, then raise it and fasten in its correct position. Tighten the two screws equally.
- (4) If the motor shaft is tight in its bearings, it will not spin freely when spun with the fingers. This may be caused by too heavy a lubricating oil having been used, or the motor bearings being out of alignment. Instructions for correcting these points are given on Sheet Number 412.

Symptoms

Speed varies consistently (Wow and Flutter).

Fault

- (1) Outer turntable not in correct position.
- (2) Dirt on inside of turntable rim.
- (3) Tight turntable spindle.
- (4) Flats on intermediate wheel.
- (5) Loose motor pulley.
- (6) Bent motor shaft or unbalanced rotor.

- (1) Remove the turntable mat and check that the triangular mark on the heavy outer turntable coincides with that on the inner turntable as shown on Diagram 3, Sheet Number 452.
- (2) Consistent speed variation, if at turntable speed, may be caused by dirt on the running surface of the inner turntable rim. Remove turntable (Sheet Number 403) and run the fingers round the inside rim of the inner turntable and remove any roughness or dirt that may be felt.
- (3) With both turntables removed, revolve turntable spindle with the fingers; without the mechanism in engagement, it should run freely and smoothly. If rough or sticky, the spindle assembly should be removed and thoroughly cleaned. The fixed spindle is held in position by two screws at the bottom of the spindle housing, Diagram 10. Loosen these two screws and lift out the spindle assembly, being careful not to lose any of the ball bearings; there are five ball bearings $\frac{3}{2}$ " diameter. Clean the fixed spindle and the bearings in the revolving spindle with a clean rag and lubricate with thin machine oil before reassembly. The bearing and spindle assembly is shown on Diagram 10. On reassembly check the correct location of the thrust washers as shown, and see that the lower retaining screw locates in the groove in the turntable spindle shaft.
- (4) A fast rate of speed variation (Flutter) can be caused by flats on the periphery of the rubber intermediate wheel. With normal conditions of use it is not possible for flats to appear on the running surface of the intermediate wheel as it is retracted from contact with the turntable rim and motor pulley on switching off at the unit. If, however, the unit is switched off from, say, the power supply point with its own switch left in

Garrard Service Sheet – Number 457

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

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.....
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Type A.70

Subject: Auto Switch

DESCRIPTION

The unit switches off automatically when the last record has played, this operation being controlled by the record selector arm. On each cycle of the mechanism, the selector arm moves inward to measure the size of the next record to drop. If the last record has already dropped or there is no record on the step of the record spindle, the selector arm, meeting no obstruction, will move inward to its maximum extent and set the mechanism so that the unit will automatically switch off when the pickup arm reaches its rest.

Symptoms

Fails to switch off when last record has played.

Fault

- (1) **Lubrication required.**
- (2) **Levers out of position.**
- (3) **Levers rubbing.**
- (4) **Excessive friction on switch-off lever.**

- (1) Lubricate with light machine oil the bearing faces of all pins and levers associated with the movement of the switch.
- (2) Check that all levers move freely and are in their correct position. Should a lever be distorted reshape it sufficiently to restore its correct action.
- (3) With the unit switched off, the pickup arm on its rest, and no records on the record spindle, the record selector should move with a light spring resistance toward the record spindle and readily return on being released. If excessive stiffness is felt, examine its associated levers beneath the unit to make sure they are not rubbing or caught together and put a spot of light lubricating oil on the pivot of the selector arm immediately under the rear of arm.
- (4) Turn the small brass friction adjusting screw, located immediately to the left of the record selector arm spindle when viewed from underneath the unit, a small amount clockwise to reduce the friction.

Switches off without playing record.

- (1) **Plastic cap missing from record selector arm.**
- (2) **Control knob not free.**

- (1) See that the plastic cap is in position on the turned-up end of the record selector arm as shown in the illustrations. Make sure it is firmly in position by pressing it downward while supporting the arm underneath with the fingers.
- (2) Check that the movement of the Auto Control Knob is perfectly free, also the levers associated with it. Put a drop of light machine oil on the pivot points and the places where the levers slide, particularly the long lever reaching into the mechanism.

Garrard Service Sheet – Number 459

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

Type A.70

..... 406

Subject: Record Dropping

DESCRIPTION

To play automatically 10" or 12" records, the sloping stepped record spindle is placed in position with the sloping portion leaning toward the record platform. The record platform position is set for the diameter of the records to be played, forward for 10" and back for 12" records. Any number of records up to six can be placed on the spindle with the record edge resting on the platform. The lower record is pushed off the step by the platform pawl on each operation of the mechanism.

Records having a large centre hole, i.e. 7" 45 r.p.m. can be played by using a large record spindle Type LRS3. This spindle is used by placing it in the centre hole and turning up to half a turn until it drops into position. Any number of large hole records up to six can be placed on the spindle and dropped one at a time by the retraction of the supporting members. Two blades extend to hold the records while the lowest record drops.

Symptoms

Records do not drop.

Fault

- (1) Record spindle not in line with platform.
- (2) Record pushing pawl not free.
- (3) Non-standard records.
- (4) Records not flat.
- (5) New records.
- (6) Record platform position incorrect.

- (1) Check that the stepped sloping record spindle when in position, slopes toward the centre line of the record platform. Should it be out of position, loosen the two retaining screws for fixed spindle. Diagram 10, Sheet Number 456, rotate the record spindle until it is in line with the platform then tighten the screws.
- (2) The record pushing pawl which moves forward to push a record off the step of the record spindle may become tight, possibly due to the presence of dirt or dust. Clean the platform face and sparingly lubricate with light machine oil.
- (3) This unit is designed to handle records made to comply with B.S.S. 1928: 1965, I.E.C. Publication 98 and similar standards. There are, however, some old records still in existence which are outside the agreed dimensions for diameter and thickness and these records should be played manually.
- (4) Examine the records for flatness by placing a straight edge across them; should they be concave or convex this may be the cause of them not dropping correctly. Badly warped records can also give trouble by erratic dropping. These records should be avoided, since in addition to dropping trouble, the warp may affect reproduction.

- (5) New records may be reluctant to drop due to burrs in the hole usually from the label. Carefully remove these burrs and any ragged edges of the label with a penknife.
- (6) Place a 10" or 12" record on the record spindle with its edge resting on the record platform, set to the appropriate record diameter. Examine the position of the record edge resting on the platform, it should be on the platform at least $\frac{1}{8}$ " from the front edge and well clear of the record pushing pawl when in its retracted position. Should the position of the platform require adjustment to meet these conditions, turn the eccentric adjusting screw located immediately underneath the platform, Diagram 11, until the platform position is correct.

When in its forward position, the edge of the record pushing pawl should be level with the front edge of the record platform. If it is not, then the position of the record pushing pawl may be adjusted by turning the eccentric screw on the assembly of levers which operates the pushing pawl from the main cam underneath the unit.

Symptoms

Two records drop together.

Fault

- (1) **Non-standard records.**
- (2) **Damaged record spindle.**

- (1) There may be records which do not comply with the latest manufacturing specifications. Should two records drop together, or consistently fail to drop, examine their thickness around the centre hole. The thickness should not exceed 0.100" or it will not pass through the gap in the record spindle, nor should they be thinner than 0.053" or two records can pass through the gap together. Records having badly worn or oversize centre holes may also give trouble in dropping. Any non-standard records of this type may successfully be played manually.
- (2) Check the profile of the stepped sloping record spindle with the outline of Diagram 13. It may be found, especially if the spindle has been dropped, that the top portion is more in line with the shank than it should be, allowing the gap to be too wide. Carefully bend the top of the spindle so that it lines up with Diagram 12.

Records do not drop using large record spindle—Type LRS3.

- (1) **Weak springs.**
- (2) **Rough surface on spindle.**
- (3) **Non-standard records.**

- (1) Remove the top cap by unscrewing the two screws located immediately below it in the spindle recesses. Two compression type coil springs will be seen, one each side of the record supporting members. Check that these springs are not damaged and are strong enough to return the record supporting members positively when they are compressed. If suspect, these springs should be replaced by new ones.

Also see that the assembly is clean and is free from grit or dirt which may prevent supporting members and blades from operating freely.

- (2) Should records drop, but tend to stick on the spindle, carefully examine the surface of the spindle for damage or blemishes on the surface of the enamel finish. Carefully remove any projecting burrs or blemishes.
- (3) There may be records which do not comply with the latest manufacturing specifications. Should two records drop together, or consistently fail to drop, examine their thickness around the centre hole. The thickness should not exceed .036" nor should they be thinner than .024". Any non-standard records of this type may successfully be played manually, using adaptor provided.

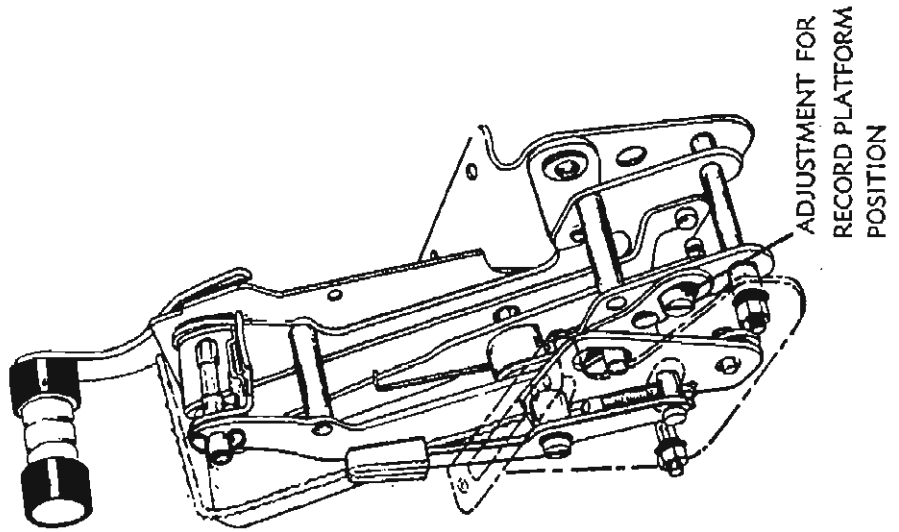


Diagram 11

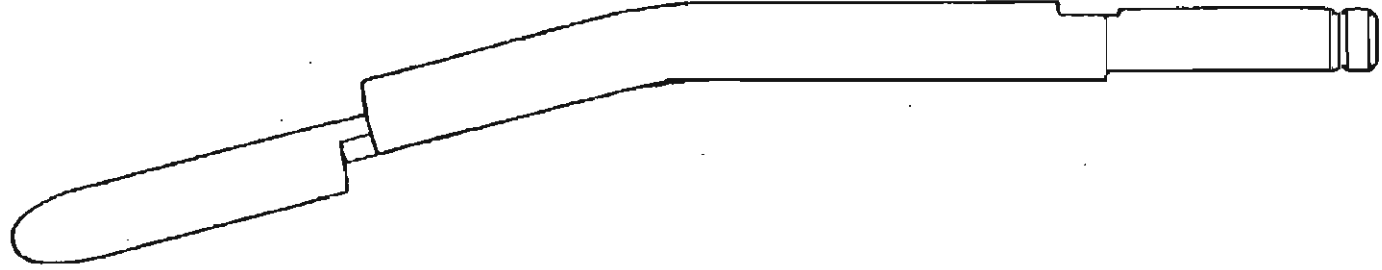


Diagram 12

Garrard Service Sheet – Number 460

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

Type A.70

..... 453

Subject: Noise

Symptoms	Fault
Mechanical noise.	(1) Lack of lubrication.
	(2) Intermediate wheel indented or not smooth.
	(3) Loose lever.

- (1) Lubricate all bearings, cam faces and operating pins, as described on Sheet Number 453.
- (2) Check the running face of the rubber intermediate wheel for any roughness which may be due to patches of dirt, in which case carefully remove by lightly scraping the surface with a penknife. Also make sure that the running surface is free from indentations. The wheel should be replaced if the running surface is badly marked.
- (3) A buzz or chattering noise when the unit is playing could be caused by a loose lever which can be located by touching the levers in turn with a finger. When the offending lever is found, a spot of fine machine oil on its pivot and points of contact usually clears the trouble.

Rumble.

- (1) Lack of lubrication.
 - (2) Motor mountings.
 - (3) Power supply cable.
 - (4) Dirt on rubber tyre of intermediate wheel.
 - (5) Rubber tyre perished.
 - (6) Motor pulley out of position.
 - (7) Excessive tension on intermediate wheel.
 - (8) Bent rotor shaft or out of true motor pulley.
- (1) Lubricate all bearings as described on Sheet Number 453 paying particular attention to those of the turntable spindle, intermediate wheel and motor.
 - (2) If, after years of use, rumble becomes noticeable, the cause may be the hardening of the resilient motor mountings. If this is suspected, fit new mountings.
 - (3) Check that the motor is perfectly free on its suspensions and is not biased in any way by the attachment of heavy power supply cable. The cable from the motor connecting block should not be heavy or pulled tight.
 - (4) Examine the running face of the intermediate wheel and remove any obvious dirt; it may be necessary to scrape the surface lightly to remove it.
 - (5) Should the rubber appear to have hardened, evidence of this may be a crack or cracks on the running surface; the wheel should be replaced.

- (6) Rumble may be caused by the side of the intermediate wheel rubbing on a step on the motor pulley. Check the motor pulley position as described in paragraph 3, "Speed varies erratically", Sheet Number 456.
- (7) Reducing the tension of the spring which pulls the intermediate wheel into engagement may reduce rumble, so try stretching the spring a very small amount. If stretched too much it will not hold the wheel in engagement, and a new spring will be required.
- (8) The motor pulley may not run true due to its fixing screws not being equally tightened. Make sure that they are both tightened up an equal amount. If the true running of the rotor shaft is suspected, a new rotor assembly should be obtained and fitted.

Garrard Service Sheet – Number 461

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

.....
.....
.....
Type A.70

Subject: Pickup Head

DESCRIPTION

A plug in pickup shell, designated M8, is used on the Type A.70. This may be supplied with or without a pickup cartridge. The pickup head kit, part number 71208, consists of a pickup shell and an accessory kit, part number 71216, which allows a wide range of cartridge to be fitted. The M8 pickup shell is shown on Diagram 13.

The accessory kit consists of four pairs of screws of different lengths, two washers, two spacers and a weight. The cartridge should be held centrally in the pickup shell using screws of the appropriate length. Use the washers under the screw heads if the holes in the cartridge harness are larger than the screw heads and the spacers between cartridge and pickup shell if more clearance is required. Use the weight as ballast if a cartridge weighing less than 5 grammes is fitted.

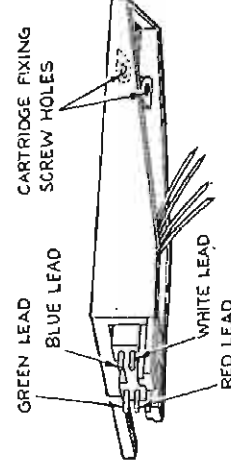


Diagram 13

Pickup Head fitting Instructions

1. Release locking screw approximately two turns. See Diagram 14.
2. Line up track on pickup head with underside of arm and push gently into position, do not use force in this operation as it is completely unnecessary.
3. Retighten locking screw (finger tight only).

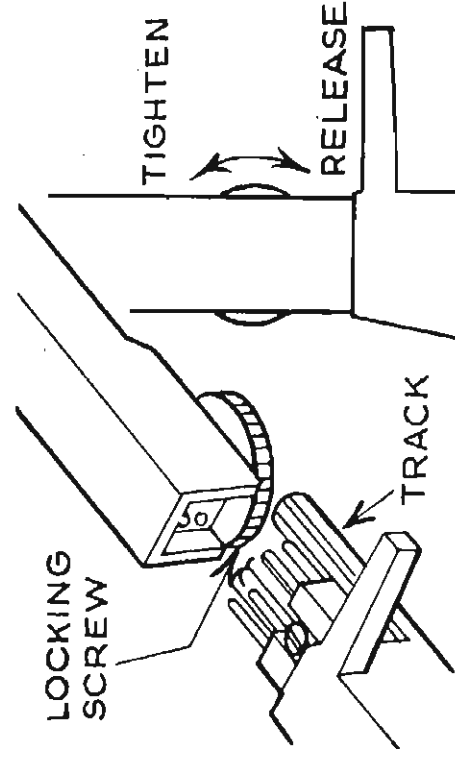


Diagram 14

Pickup Connecting Instructions

The Garrard Type M8 pickup shell has a 4 pin connection and is suitable for use with monophonic and stereophonic pickup cartridges, when connected as follows:—

Right Hand Channel—Red with Green Common.

Left Hand Channel—White with Blue Common.

Unless specifically instructed otherwise by the cartridge manufacturers, the green and blue leads may be joined together and used as a common lead for both channels.

Only two leads are required for connecting a monophonic cartridge, the red and the green. Any other leads should be insulated and coiled out of the way in the back of the shell.

When using a stereophonic cartridge only for monophonic reproduction its output channels should be connected in parallel, either inside the pickup shell or at the muting switch tags.

Garrard Service Sheet — Number 462

Model: Laboratory Series Auto Turntable

Complementary to
Sheets No.

Type A.70

..... 452
..... 453
.....

Subject: Motor

Caution: Disconnect the power supply before examining motor leads, switch or power supply connecting block.

Symptoms

Motor will not start.

Fault

- (1) No power supply.
- (2) Loose connections.
- (3) Bad switch contact.
- (4) Open circuit coils.

- (1) Check that the current is reaching the terminals in the power supply block by removing its cover and applying a test lamp or voltmeter. Extreme care must be taken.
- (2) With the power supply switched off examine all connections. Tighten the power supply terminals and see that the voltage change-over links are tight and making good contact with their studs. Scrape the studs with a penknife blade to remove any tarnish which may be preventing good contact with the links.
- (3) Remove turntable, Sheet Number 453, then the switch cover, see that both switch contacts are clean and move outward approximately $\frac{1}{2}$ " when the contact roller moves between them on switching on. Clean the blades and roller and adjust if necessary by bending the blades. Disconnect from the power supply before doing this.
- (4) Check the coils for continuity. When connected for high voltage range the total resistance should be 780 ohms and for low range 195 ohms. The coils can be replaced by dismantling the motor, noting the lead connections, and the faulty coil removed from the stator pack by tapping out the two pins locating the pole piece on which the coil is assembled.

Motor runs slow.

- (1) **Lubrication.**
- (2) **Bearings out of line.**
- (3) **Coils incorrect polarity.**
- (4) **Coil open circuit.**

- (1) It is important that only fine oil be used to lubricate the motor bearings. If a thick oil or one that congeals has inadvertently been used, then the motor shaft will not spin freely and the motor will run slowly.

In this case the motor should be dismantled, the bearings and shaft thoroughly cleaned, lubricated with fine machine oil and reassembled. Should the motor shaft still not spin freely follow the instructions in the next paragraph.

- (2) If the motor shaft does not spin freely, as may occur after reassembly or mishandling, give the body of the motor a sharp blow with a piece of wood such as the handle of a screwdriver; this should shock the self-aligning bearings into line and free the shaft. If this treatment proves ineffective, the spring in one of the bearing housings which holds the bearings in place may be broken. Check this by removing the bearing covers and moving each bearing with a circular motion by means of the rotor shaft. Should the bearing feel tight in some positions, replace the whole cover and bearing assembly with a new one.
- (3) On the type of motor used, the polarity of the poles on which the coils are assembled should be the same, that is, both north or south, the opposite polarity being induced in the poles between the coils. Should a coil have been replaced and the motor runs slowly, check the polarity and correct if necessary by changing over the leads to one coil.
- (4) When a dual range model is connected to run on the low voltage range, 100/130 volts, the two bobbins are in parallel and should one become open circuit, the motor will run, but only slowly. Check bobbins for continuity as advised in paragraph 4, "Motor will not start". On single voltage range models the bobbins are connected in series.

Symptoms

Fault

Motor runs hot.

- (1) **Normal running conditions.**
- (2) **Short circuit in coils.**
- (3) **Incorrect voltage.**
- (4) **Insulation, leakage to earth.**

- (1) It may be found that after running for long periods the motor becomes rather hot to the touch. Provided the current does not exceed 0.08 amps on 230 volts or 0.16 amps on 115 volts this would be its normal running temperature. The motor is designed to run under unventilated conditions although as much ventilation as possible is beneficial.
- (2) Check the coils for a short circuit with an ohmmeter; the correct resistance readings are given in paragraph 4, "Motor will not start."
- (3) Check that the voltage changeover links are correctly set for the voltage of the power supply, Sheet Number 452, Diagram 5. Should the links be set for a low voltage power supply range and the motor be connected to a higher voltage, it would become extremely hot and the coils may burn out.
- (4) Test the insulation between the coil windings and frame with a 500 volt insulation test meter. The resistance should not be less than 2 megohms. An earthing tag is provided at the rear of the plate holding the power supply connecting block and this tag should be used to connect the motor frame to a good earthing point.

Garrard Service Sheet – Number 463

Model: Laboratory Series Auto Turntable
Type A.70

Complementary to
Sheets No.

..... 452
..... 454
..... 455

Subject: Pickup and Arm

Symptoms	Fault
Pickup lands on record and jumps the first few grooves.	(1) Worn or wrong size stylus.
	(2) Pickup lead biasing movement of arm.
	(3) Groove guard on record.

- (1) Check that the stylus is correct for the type of record being played. A stylus for 78 r.p.m. coarse groove records may not track if inadvertently used on fine groove (L.P.) records. Check stylus for wear or damage, replace if suspect. See Fault (1) under Pickup repeats in record groove. Sheet 455.
- (3) See that pickup lead is free in the slot in the rear of pickup arm base and is clipped into the lead guide just below it. Also see that the lead is not strained in such a way as to bias the free movement of the pickup arm.
- (3) Some records are now made with the playing surface below that of the remainder of the record; this leaves a raised rim around the outer edge. This is known as a groove guard, and should the pickup land on the outer edge of this and not be immediately picked up by the lead-in groove, the pickup can slide down the slope and jump the first few grooves. To prevent this, set the dropping position of the pickup so that the stylus lands well inside the raised rim. Instructions for this adjustment are given on Sheet Number 454.

Pickup does not lower on to record.

- (1) Stylus pressure too low.
- (2) Tight pickup arm pivot.
- (3) Lubrication.
- (4) Pickup lifting height incorrect.

- (1) Check the stylus pressure, it should be that recommended for the particular pickup cartridge fitted. Adjust as described on Sheet Number 452.
- (2) See that the pickup arm is perfectly free in a vertical direction and that the lifting link at rear of arm is central in the fork to which it is connected and is perfectly free when the pickup arm is in the playing position. Also see that the lever attached to the horizontal counterbalance spring underneath the pickup arm is free on its pivot.
- (3) Check that the pickup lifting rod, down the centre of the pickup arm vertical pivot, is free; put a spot of light machine oil on the top and move it up and down against the tension of its spring to spread the oil. Also put a little grease on the cam plate which lifts this rod.
- (4) Set lifting height in accordance with the instructions on Sheet Number 454.

Symptoms

Pickup begins to lower, then swings inward.

- (1) Well grease the face of the cam which raises the pickup arm lifting pin, also oil the roller on the pin riveted to it, which moves the pickup arm outward. Also grease the edge of the pickup lever which the roller contacts.
- (2) Check that there is not an excessive amount of end-play in the vertical pivot of the pickup arm, it should not exceed .005". If excessive, loosen the screw in the U-shaped lever underneath the pivot, move it upward on the spindle and retighten the screw. Make sure that the movement of the pickup arm is perfectly free after making this adjustment.

Pickup will not remain on its rest, and/or pickup arm not free during its horizontal traverse.

- (1) The guide clip for the pickup lead, which is situated just below the slot in rear of pickup pedestal, may be bent and rubbing on the adjacent casting.

- (1) Check that the pickup lead guide clip is well clear of the casting. If not, carefully bend it to give ample clearance.

Pickup does not track

- (1) Levers not clearing.
- (2) Bias compensator setting incorrect.

- (1) Make sure that the top of the roller on the lever attached to the lower end of the vertical spindle of the pickup arm is clear of the lever immediately above it at all positions of the arm. If necessary, bend to clear.
- (2) Check that setting corresponds with stylus pressure. See 'Pickup Arm and Bias Compensator' on Sheet Number 452.

Pickup arm does not lower, but remains in raised position.

- (1) Lifting rod return spring not central.

- (1) Check the position of the small compression spring at the lower end of the pickup arm lifting rod. If it has been pushed to one side, it can hold the lifting spindle, and prevent the pickup arm from lowering. Centralise the spring around the lifting spindle and make sure the spindle is free to move upwards when pushed, and readily returns when released.

Fault

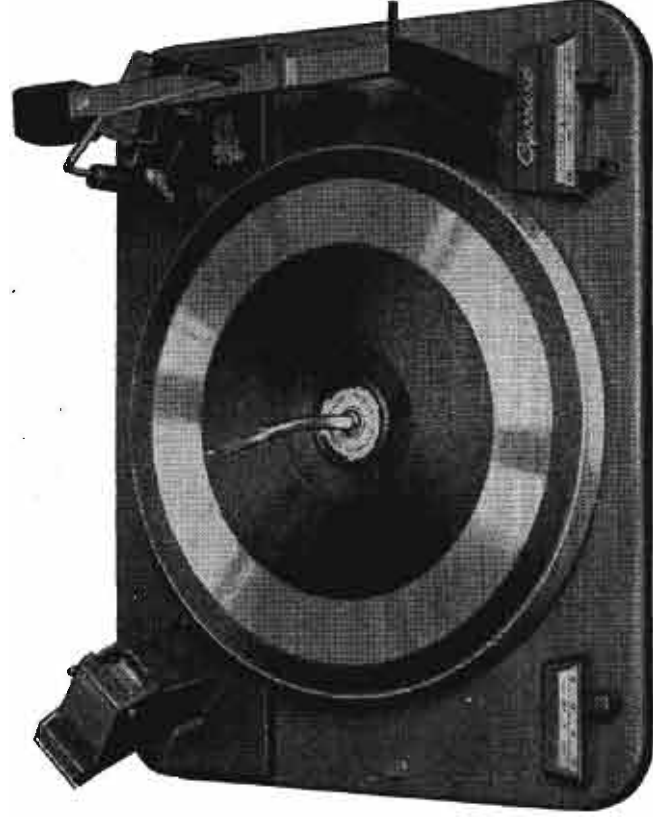
(1) Lubrication.

(2) Excessive play in pickup arm vertical pivot.

Garrard Service Sheet – Number 464

Garrard

**LABORATORY SERIES
AUTO TURNTABLE TYPE A.70**



**EXPLODED VIEW
AND
SPARE PARTS LIST**

GARRARD ENGINEERING LIMITED

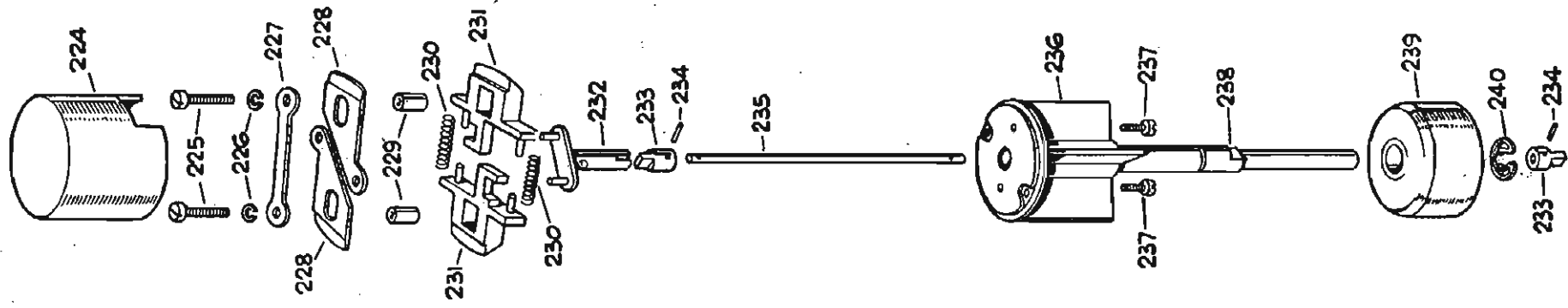
NEWCASTLE STREET - SWINDON - WILTSHIRE - ENGLAND

Telephone: Swindon 5381

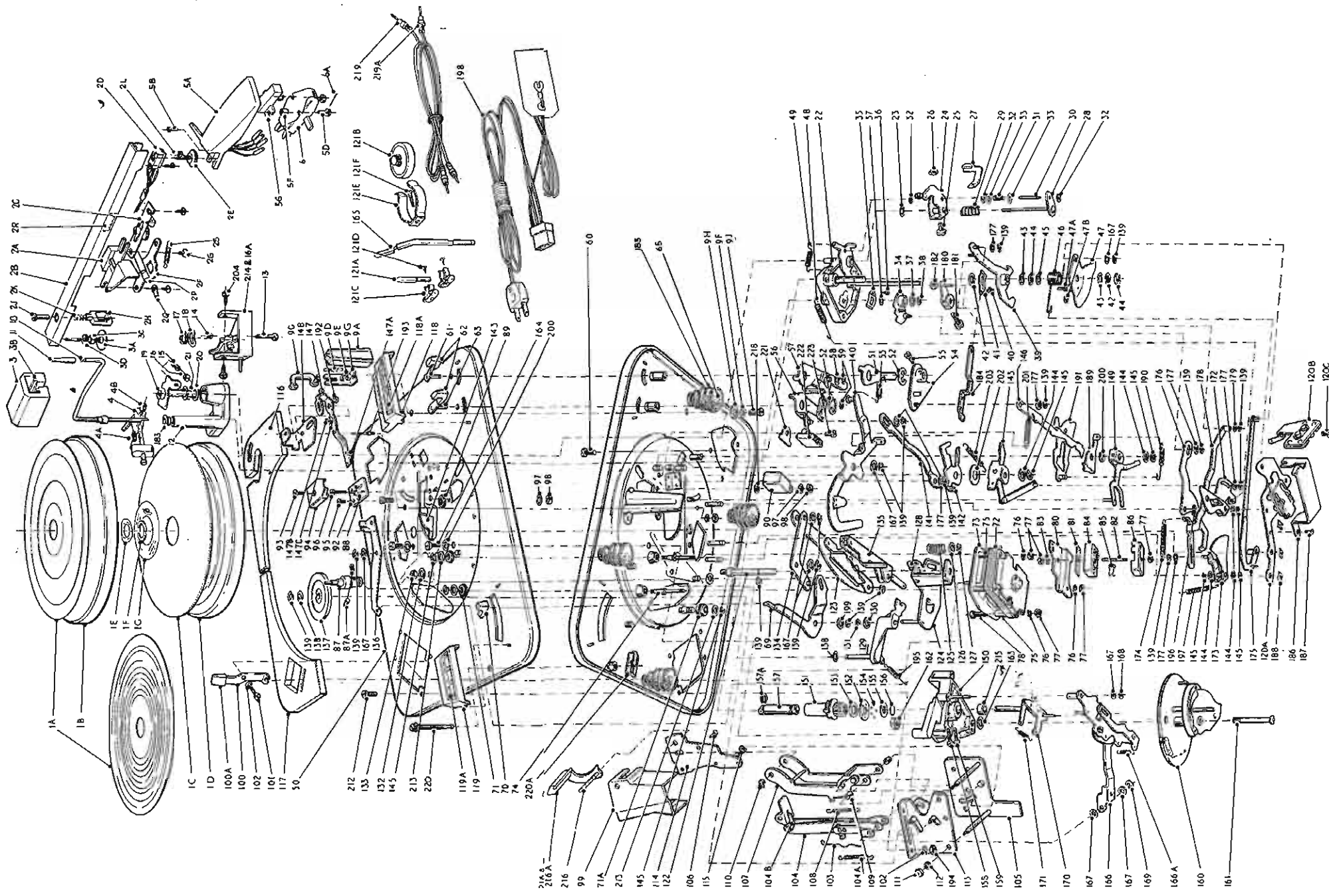
Service and Spares Department:

RADNOR STREET - SWINDON - WILTSHIRE - ENGLAND

Telephone: Swindon 22606



Large Record Spindle, Type LRS3



SPARE PARTS LIST

When ordering Spare Parts quote Type A.70, Code (from Inspection Label), Part No. and description. Please mention colour also, when applicable.

Ref.	Part No.	Description	Ref.	Part No.	Description
1	53917/02	Turntable Assembly (exploded)	6		Cartridge (state type)
1A	59790/01	Turntable Mat Assembly	6A		Stylus (state type)
1B	59071/02	Heavy Turntable Assembly	9	71072/01	Pickup Rest Assembly (exploded)
1C	57753	Cushion	9A	54773/03	Body Moulding
1D	53394/01	Turntable unit	9C	71073/01	Latch Unit
1E	71197/01	Name Plate	9D	41635	Spring
1F	53176	Turntable clip	9E	41012	Nut
1G		Specification Label (State Voltage Range)	9F	42501	Spring Washer
2	70975/01	Pickup Arm Assembly (exploded)	9G	54716	Bracket
2A	70981/01	Body	9H	40515	Washer
2B	70976/01	Pickup Arm	9J	40155	Screw
2C	71085	Stylus Pressure Adjustment Assembly	10	57486	Selector Arm Unit
2D	71209/01	Pickup lead and Connector Assembly	11	57491/01	Selector Cap
2E	44198	Clamp Screw	12	71094/01	Cover
2F	70997	Retaining Plate	13	40332/01	Screw
2G	40340/01	Screw (3)	14	41032	Nut
2H	71091	Adjusting Nut	15	41850	Spring
2J	44104/01	Screw	16	40220/01	Screw
2K	41883	Spring	16A	40906	Locking Washer
2L	44211/01	Screw (2)	17	43814	Retaining Clip
2P	70994	Pivot Case Assembly	18	42548	Spring Washer
2Q	43012	Tag	19	71070	Pickup Spindle Unit
2R	71213	Transfer	20	40843	Washer (2)
2S	44827	Spring	21	43204	Steel ball (15)
3	71369/01	Counterbalance Weight	22	70984	Pickup Base Unit
3A	71368	Counterbalance Nut Assembly	23	40852	Washer (leatheroid)
3B	71451	Rubber Pad (2)	24	57471	Pickup Lever Assembly
3C	71407	Rubber Collar	25	44041/01	Screw
3D	40945	Cup Washer	26	41006	Nut
4	70988/01	Bias Compensator Assembly (exploded)	27	57723	Lead Guide
4A	71098	Pivot Spindle	28	70668	Lifting Spindle Unit
4B	71099	Spacer	29	41833	Friction Spring
5	71208/01	Pickup Head Kit (Items 5a-5g)	30	54685	Lifting Pin
5A	70739/01	M8 Pickup Shell	31	41796	Return Spring
5B	44211/01	Screw for Connector Block	32	43803	Spring Clip (3)
5C	71216	Pickup Head Accessory Kit	33	40831	Washer (2)
5D	These parts		34	57455	Selector Lever Unit
5E	form Kit 71216.		35	41878	Friction Spring
5F	State cartridge	Washer (not shown)	36	40035	Adjusting Screw
5G	type when	Spacer	37	40760	Washer (2)
	ordering kit.	Weight	38	43810	Spring Clip

Ref.	Part No.	Description	Ref.	Part No.	Description
39	58482	Switch-off Lever Unit	72D	58655	Bobbin Assembly, Right (not exploded)
40	44084	Adjusting Screw	72E	53963	Bottom Cover, Dual Range (not exploded)
41	41844	Friction Spring	72F	57977	Bottom Cover, Low Range (not exploded)
42	40503	Washer	72G	53962	Top Cover, Dual Range (not exploded)
43	40536	Washer	72H	57978	Top Cover, Low Range (not exploded)
44	41788	Spring Clip (2)	72J	54929	Rotor Assembly (not exploded)
45	40881	Washer	72K	40436	Stud (2) (not exploded)
46	41882	Spring	72L	43209	Thrust Ball (not exploded)
47	56584	Pickup Cam Assembly	72M	50648	Dowel (4) (not exploded)
47A	54714	Roller	73	57521	Motor Plate
47B	41723	Spring Clip	74	55398	Pillar Assembly (2)
48	41792	Spring	75	57456	Spacer (3)
49	41630	Spring	76	42501	Spring Washer (4)
50	70971/01	Plate Assembly	77	41012	Nut (4)
51	56331	Return Lever	78	40118/01	Screw through Pack—Long
52	41764	Spring Clip (2)	79	40085/01	Screw through Pack—Short (not shown)
53	41630	Spring	80	57548	Bracket
54	56322	Control Lever Unit	81	51333	Cover Plate
55	44076	Screw	82	40443/01	Stud
56	56385	Manual Lever Unit	83	40515	Washer
57	56408	Start Lever Unit	84	54981	Changeover Block Body
58	40537	Washer	85	54926	Connector Link (2)
59	41723	Circlip (2)	86	58179	Cover for Changeover Block
60	40183/01	Fixing Screw (3)	87	58942	Pulley Assembly 50 Cycle
61	56319/03	Control Arm Assembly	87A	44052/01	Screw (2)
62	56393/03	Knob (2)	88	41686	Contact Spring (2)
63	56325/03	Manual Control Arm Assembly	89	43102	Grommet for leads
65	71084	Damping Pad (4)	90	53571	Suppressor
69	57405/03	Speed Lever Unit	91A	53110/10	Earth Lead Assembly (not shown)
70	56316/03	Knob			motor to Amplok (not shown)
71	43128	Motor Mount (2)	91B	52677/51	Lead, red, from Amplok to switch
71A	43136	Motor Mount (1)			(not shown)
72	57520	Motor complete	91C	52677/52	Lead, brown, from Amplok to switch
72A	58653	Stator Assembly complete (not exploded)			(not shown)
72B	58656	Stator Pack Assembly (not exploded)	92	51322	Switch block
72C	58654	Bobbin Assembly, Left (not exploded)	93	40343/01	Screw

SPARE PARTS LIST

Ref.	Part No.	Description	Ref.	Part No.	Description
94	51327/02	Cover for switch	121	59602/03	45 r.p.m. Adaptor kit (comprising 121a-121f)
95	40130/01	Screw	121A	51347	Manual Spindle
96	44075/01	Screw	121B	50391/01	45 r.p.m. Adaptor
97	42526	Spring Washer (2)	121C	41702	Spring Clip (2)
98	41008	Nut (2)	121D	40450/01	Screw (2)
99	51420/03	Platform Cover	121E	41703	Spring Clip
100	57503/03	Platform Control Lever Unit	121F	40245/01	Screw
100A	57526/03	Knob	122	56570	Spindle Unit
101	40029	Screw	123	56309	Speed Cam Unit
102	42501	Spring Washer (4)	124	56345	Support Lever Unit
103	41713	Return Spring	125	41841	Lifting Spring
104	59895	Platform and Lever Assembly	126	40867	Washer
104A	41506	Spring	127	43813	Spring Clip
104B	50752	Pawl	128	57705	Roller
105	57558	Rear Bracket Unit	129	56381	Support Bracket Unit
106	44034	Screw (3)	130	40773	Washer
107	57540	Platform Support Unit	131	41723	Spring Clip
108	41506	Spring	132	40512	Washer
109	50914	Collar (2)	133	41006	Nut
110	41696	Spring Clip	134	57506	Inter Speed Lever Unit
111	41012	Nut (2)	135	56306	Index Lever Unit
112	42501	Spring Washer (2)	136	57816	Tension Lever
113	57441	Front Bracket Unit	137	53883	Interwheel Unit
114	59894/03	Cover Plate Unit	138	40774	Washer (2)
115	41787	Spring Clip	139	41723	Spring Clip (16)
116	70998/01	Pickup Base Cover	140	70973	Switch Lever Assembly
117	57440/04	Platform Base Cover	141	57434	Switch Link
118	56317/03	Control Cover Unit	142	57418	Catch Lever
118A	56429/01	Control Plate	143	57896	Stop Cam Lever Assembly
119	56318/03	Speed Cover Unit	144	40864	Washer (4)
119A	56430/01	Speed Plate	145	43800	Spring Clip (9)
120	71173	Bridge, Muting Switch and Phono Socket Assembly (not shown)	146	57421	Control Link
120A	71065	Bridge and Muting Switch Assembly	147	71498	Operating Lever Unit
120B	59611	Twin Phono Socket Assembly	147A	48834	Felt Pad
120C	44126	Fixing Screw	147B	44221	Friction Screw
			147C	41735	Locking Spring

Ref.	Part No.	Description	Ref.	Part No.	Description
148	71619	Friction Plate	191	71528	Stop Catch Lever Unit
149	71462	Inter Lever Unit	192	41723	Spring Clip
149A	71010	Bush for Inter Lever Pivot (2) (not shown)	193	71469	Pivot Pin
150	57428	Turntable Spindle Housing Unit	194	41012	Nut (5)
151	52762	Turntable Spindle Unit	195	41792	Spring
152	51224	Cage for Ball Race	196	40863	Washer
153	40713	Washer	197	41848	Spring
154	43201	Balls (5)	198	71399	Line Cord Assembly and Strain Relief
155	40804	Washer	199	40836	Washer
156	58174	Cushion Ring	200	42520	Spring Washer (3)
157	52899	Fixed Spindle Unit	201	41631	Spring
157A	45372	Retaining Coil	202	40965	Washer
158	40155	Fixing Screw	203	41503	Spring
159	40317	Fixing Screw	204	70967	Pivot Screw Assembly
160	57430	Cam Assembly	211	53110/02	Lead Assembly, Motor to Earth
161	50732	Cam Stud Unit	212	40182/01	Screw (4)
162	41029	Nut	213	40828	Washer (3)
163	40612	Washer	214	71554/01	Pivot Bracket Assembly
164	40183/01	Screw (3)	215	53113	Collar
165	52764	Record Spindle Assembly	216	59897/03	Record Arm Assembly
166	52865	Platform Link Assembly	216A	59776	Pressure Strip
166A	41759	Spring	218	40514	Washer
167	40695	Washer (9)	219	59028	Phono Lead Grey
168	43819	Spring Clip	219A	59029	Phono Lead Brown
169	41696	Spring Clip	220	44120/01	Transit Screw (2)
170	53087	Centre Lever Assembly	220A	41977	Transit Screw Clip (2)
171	41506	Spring	221	59310	Amplok Insulation Plate
172	71067	Impulse Lever Unit	222	59001	Amplok Plug
173	57518	Cam Selector Lever Unit	223	44154	Screw Fixing Amplok
174	41631	Selector Spring	224	55801	LRS3 Spindle Top
175	57895	Cam Lever Unit Assembly	225	40218	Screw
176	57481	Resetting Lever	226	42526	Spring Washer
177	40537	Washer (5)	227	48502	Retaining Plate
178	57756	Selector Link Unit	228	48501	Separator
179	40503	Washer	229	48500	Pawl Bush
180	57454	Selector Arm Lever Unit	230	41731	Spring
181	40018/01	Screw	231	55977	Pawl Assembly
182	41006	Nut	232	48503	Crank Unit
183	57525/01	Cap	233	48491	Operating Collar
184	54662	Stop Link	234	48492	Pin
185	44752	Spring Mounting (4)	235	52954	Operating Spindle
186	71212	Muting Switch Cover	236	52951	Support Unit Complete
187	44006	Screw	237	40130	Screw
188	43821	Spring Clip (3)	238	52952	Support Spindle
189	56359	Fixing Plate	239	48494	Record Centre
190	41845	Spring	240	45087	Spring Clip