PE

Technical Information

Service Instructions
HiFi Automatic Turntable
PE 2015
PE 2012

PE

Contents

Technical Specifications

HiFi Automatic Turntable PE 2015
PE 2012

Mode of Operation:	Automatic Single Play Manual Single Play Continuous Repeat Automatic Multiple Play
Motor 2015:	Minimum stray field four pole induction motor SPM 4/15 with vibration dampened central suspension.
Motor 2012:	Induction motor SPM 2/15-2 Mount as in the PE 2015
Power Consumption:	7 Watts
Voltage Supply:	110/220 volts AC 50 or 60 Hz
Current Drain 2015:	110 volts 50 Hz approx. 104 mA 220 volts 50 Hz approx. 52 mA 120 volts 60 Hz approx. 96 mA
Current Drain 2012:	110 volts 50 Hz approx. 120 mA 220 volts 50 Hz approx. 60 mA 120 volts 60 Hz approx. 112 mA
Speeds:	$33^1/_3$, 45, 78 RPM
Pitch Control:	± 3 %
Turntable Platter 2015:	Diameter 269 mm ($10^{19}/_{32}$″) Weight 1,9 kg (4,2 lbs.) Material cast zinc alloy
Anti-Magnetic, Balanced, Cast Platter	
Turntable Platter 2012:	Diameter 269 mm ($10^{19}/_{32}$″) Weight 1,1 kg (2,4 lbs.) Material Sheet metal
Speed Accuracy Deviation: (according to DIN 45507)	≦ ± 0,15 %
Rumble: related to 10 cm/sec velocity and 1000 Hz (according to DIN 45500)	≧ 40 db (2015) ≧ 37 db (2012)
Weighted Rumble: related to 10 cm/sec velocity and 1000 Hz (according to DIN 45500)	≧ 56 db (2015) ≧ 55 db (2012)
Tonearm Length:	208 mm ($8^3/_{16}$″)
Tonearm Head Angle:	27°
Tracking Error:	max. 1,8°
Overhang: at optimum adjustment	20 mm adjustable
Tonearm Bearing Friction:	≦ 0,08 p horizontal ≦ 0,06 p vertical
Tonearm Resonance	≦ 10 Hz (with Shure M 71 MB)
Tracking Force:	Continuously adjustable between 0 and 6 p
Anti-Skating Device:	Combined with the tracking force adjustment
Suitable Cartridges:	Crystal or Magnetic cartridges with $^1/_2$″ mount, weighing from 3 to 15 p
Chassis Dimensions: PE 2012/2015	330 x 273 mm (13″ x $10^3/_4$″)
Installation Dimensions:	Height above mounting board with automatic spindle 129 mm ($5^5/_{64}$″) Depth below mounting board 80 mm ($3^5/_{32}$″)
Weight 2015:	5,5 kg
Weight 2012:	4,6 kg

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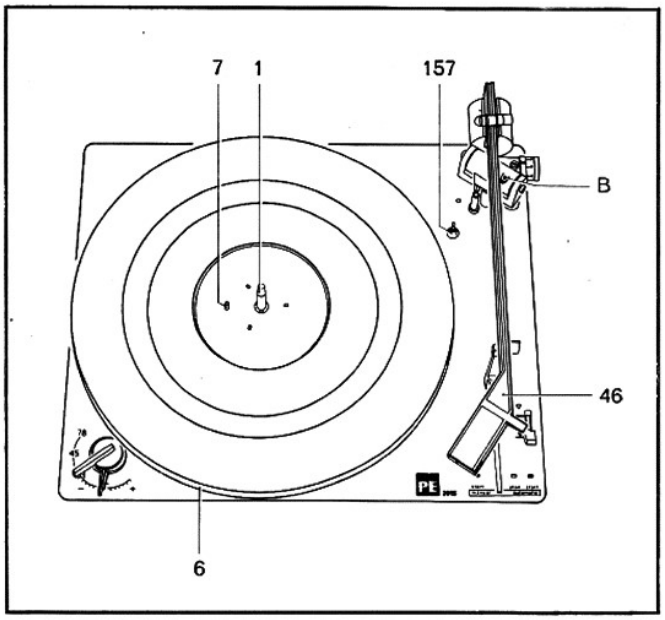
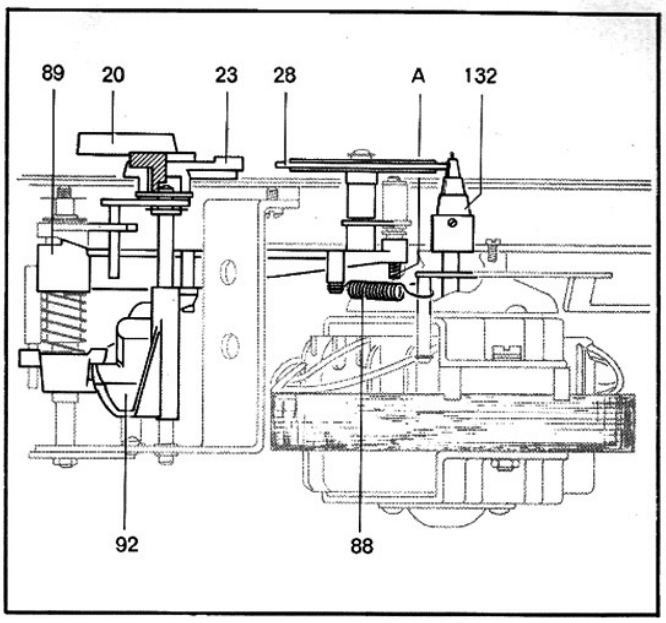




Ref. No.	Description
1	Single Play Spindle
6	Turntable Platter
7	Feeler Pin
46	Tonearm
157	Sensing Pin
B	Adjusting Screw for Tracking Force

Ref. No.	Description
20	Speed Selector Knob
23	Pitch Control Knob
28	Idler Wheel
88	Tension Spring for Idler Wheel
89	Idler Wheel Bracket
92	Speed Selector Cam
132	Motor pulley
A	Hinge Pin

Speed Control
The speed is selected by means of the speed selector knob (20) which is rigidly connected to the speed selector cam (92). The speed selector cam (92) shifts the idler wheel bracket (89) to the proper height relative to the motor pulley (132).

Pitch Control
The pitch control can be adjusted at any speed. The pitch control knob (23), directly under the speed control knob (20) regulates the idler wheel bracket (89). The motor pulley (132) is tapered at each speed. When the knob is set midway between the + and — on the scale the exact speed of the turntable platter can be adjusted by turning the hinge pin (A).

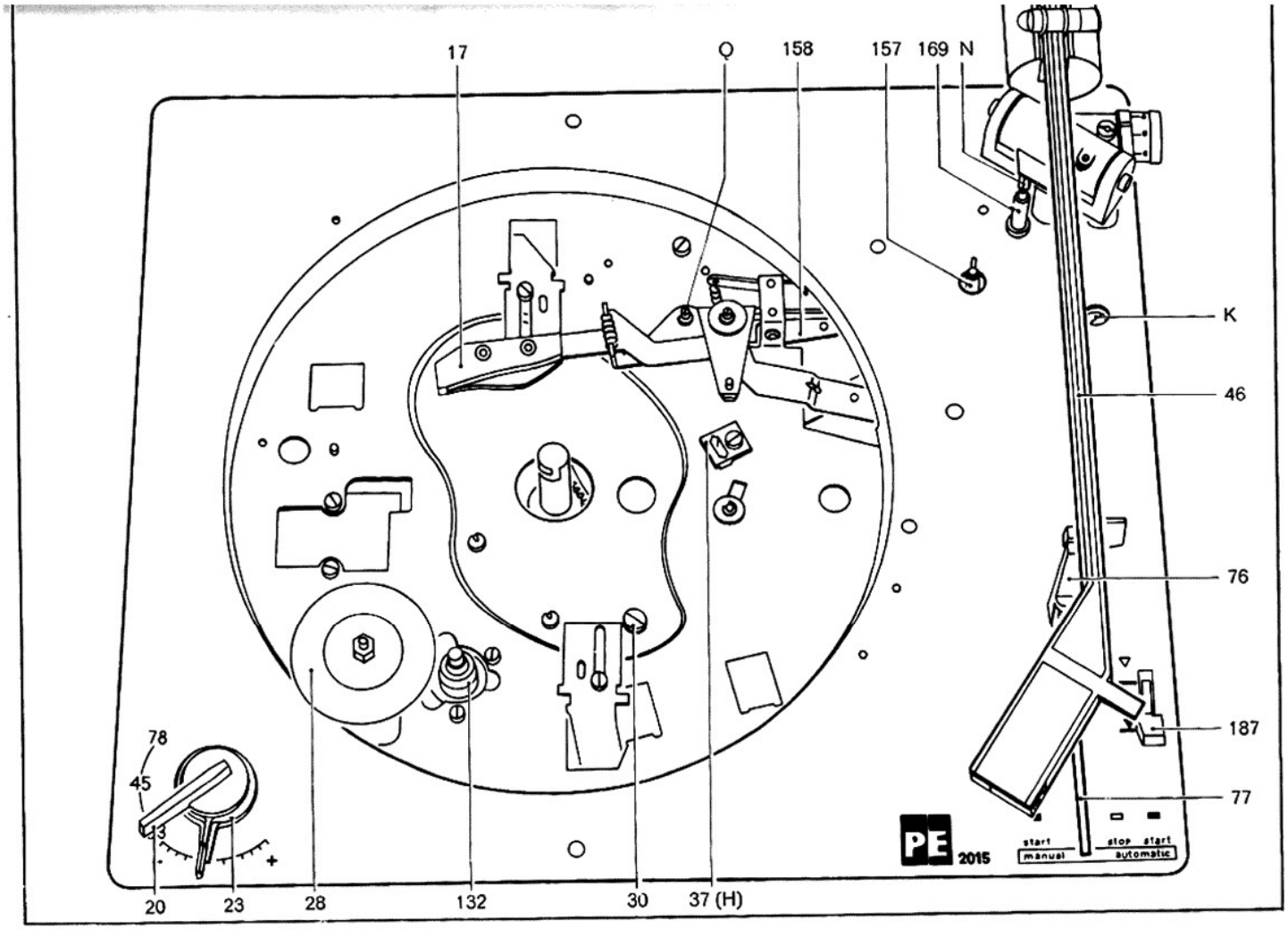
Tonearm Movement
The rising portion of the cam track on the control cam (138) causes the drive lever (154) to actuate the lifting shaft (169) which then lifts the tonearm (46). Simultaneously the tonearm (46) is frictionally engaged and caused to move by the succeeding horizontal motion of the drive lever (154). At the descending portion of the cam track the tonearm (46) drops and is disengaged from the drive lever (154).

Control Lever
By shifting the upper control lever (77), the starting lever (202) is actuated via the brass switching roller (180) mounted on the lower control lever (179). The starting lever (202) disengages the ON/OFF switch (183) so that the motor (134) becomes connected to the mains and starts to run. At the same time the idler wheel (28) is pressed against the motor pulley (132) and the inner rim of the turntable platter (6). The upper control lever (77) releases the spring loaded ratchet lever (197) which then pushes the trip link forward. The cam of the revolving turntable (6) engages the tip of the trip link in its forward position. This causes the control cam (136) to turn far enough so that the pinion (10) of the turntable meshes with the teeth of the control cam (136). At the end of the control operation, all of the control elements are brought into position required for the following functions.

Record Dropping
The control cam (136) operates the drop lever (122) to control the automatic spindle (1). As the push rod extension (114) is pulled down, the supporting levers are retracted to release the record which then drops onto the rotating turntable.

Detecting the Record Size
The upper locating lever (17) is moved into the operating range of the feeler pin (7) which is rotating with the turntable by the control cam (136). Depending on the size of the record, the feeler pin (7) is pushed down a certain distance. The height of the feeler pin (7) limits the return movement of the upper locating lever (17) which determines the inward movement of the tonearm (46) for a 7″ or 10″ record. If a 12″ record is on the turntable, the upward motion of the sensing lever (158), having been released by the control cam (136), is limited. The upper locating lever (17) is blocked on its return stroke and stops the inward movement of the tonearm (46) above the starting grooves of the 12″ record.

Tripping
As the Tonearm (46) moves towards the center of the record, the trip link (163) mounted on the tonearm clutch (160) moves the tripping lever towards the turntable cam. After the stylus has reached a groove at a diameter of approximately 4 3/4″ (120 mm), the trip lever is contacted by the rotating cam for the first time and is forced back until until the lead-out groove with its larger pitch causes the trip lever to become engaged by the cam of the turntable and set the control cam (136) in motion.



Ref. No.	Description
17	Upper Locating Lever
20	Speed Selector Knob
23	Pitch Control Knob
28	Idler Wheel
30	Fillister Head Screw Am 4 x 8
46	Tonearm
76	Tonearm Rest
77	Upper Control Lever
132	Motor Roller
157	Sensing Pin
158	Sensing Lever
169	Lifting Shaft
187	Knob for Lift Lever
37 (H)	Trip Link Guide
K	Adjustment for Lowering Point
N	Adjusting Nut for Lifting Shaft
Q	Eccentric for Locating Lever

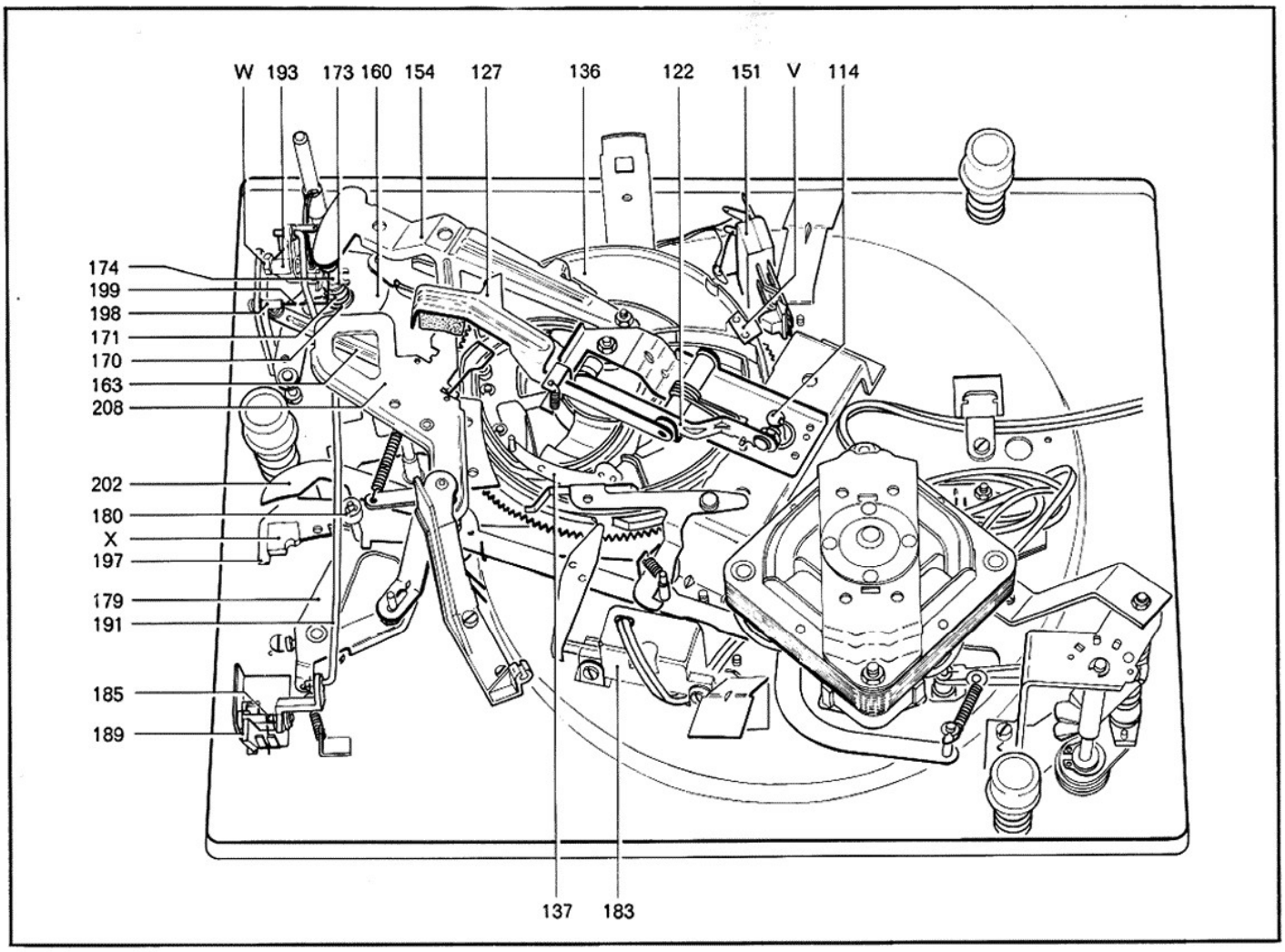
Automatic Shut-Off
After the last record has been played the tonearm (46) returns to the tonearm rest (76) and is not moved inward again. Due to the abscence of records, the final shut-off is initiated by the automatic spindle (1). This causes the Turn-off lever (127) not to actuate the stop switch (137) on the control cam (136). Due to the unchanged position of the stop switch (137), the drive lever (154) is switched into the shut-off track of the control cam (136). During the shut-off procedure the idler wheel (28) is pulled away from the motor pulley (132) and the inner rim of the turntable platter and the connection to the mains power is shut-off.

Automatic Single Play
By inserting the single play spindle (2) the automatic multiple play turntable is converted to a fully automatic single play turntable.
The tonearm lowers in the standardized zone of starting grooves of the different sized records in the same manner as for the multiple play operation.

Continuous Repeat
With the automatic spindle (1) disengaged the player will continue to repeat the same record each time it has been completed. The next record will drop only after the automatic spindle has been reengaged.

Manual Start
When the upper control lever (77) is shifted to "Manual Start" the player will be turned on via the starting Lever (202). The lower control lever (179) is then caught by the locking segment (X) which is glued onto the ratchet lever (197). The control cam (136) does not start to turn but the motor (134) is turned on. Via the starting lever (202) the idler wheel (28) is pressed against the motor pulley (132) and the inner rim of the turntable (6). After the turntable platter (6) has started to turn, the tonearm (46) can be manually placed on any desired position of the record. It is not necessary to actuate the lift lever (189).

Lift Function
When playing a record the lift lever (189) must be at symbol ▼. If the playing of the record should be stopped at any desired position, shift the lift lever (189) to the symbol ▽. In this position the tonearm (46) will be lifted approx. $^{5}/_{32}$" (4 mm) above the record. Via the actuating lever for lift (191), the lift lever (189) actuates the lift crank (193) which pushes up on the guide bushing (173) and raises the lifting



shaft (169). The cam surface of the lift crank (193) lifts the guide bushing (173) by means of the grip ring (174). After the guide bushing (173) has been raised, the compression spring (171), seated on the guide bushing (173), presses the friction bushing (170) against the tonearm clutch (160). This prevents a side-ways movement of the tonearm (46) in its lifted position. To prevent the guide bushing (173) from turning, a safety spring (199), whose safety sleeve (198) is guided in a slot in the bearing bracket for the lift crank (193), is mounted on the guide bushing (173).

The height of the tonearm can be adjusted by means of the eccentric (W) on the hinge pin for the lift crank (193).

In the position lift down (symbol ▼) the lift crank (193) releases the guide bushing (173) and the with silicon adhesive grease guided lifting shaft (169) descends. In the normal playing position of the tonearm (46), the lift lever (189) is held in its rest position (symbol ▼) by the torsion spring (185). The lift operation is automatically discontinued when the control cam (136) becomes engaged and the lift lever (189) returns to its rest position (symbol ▼).

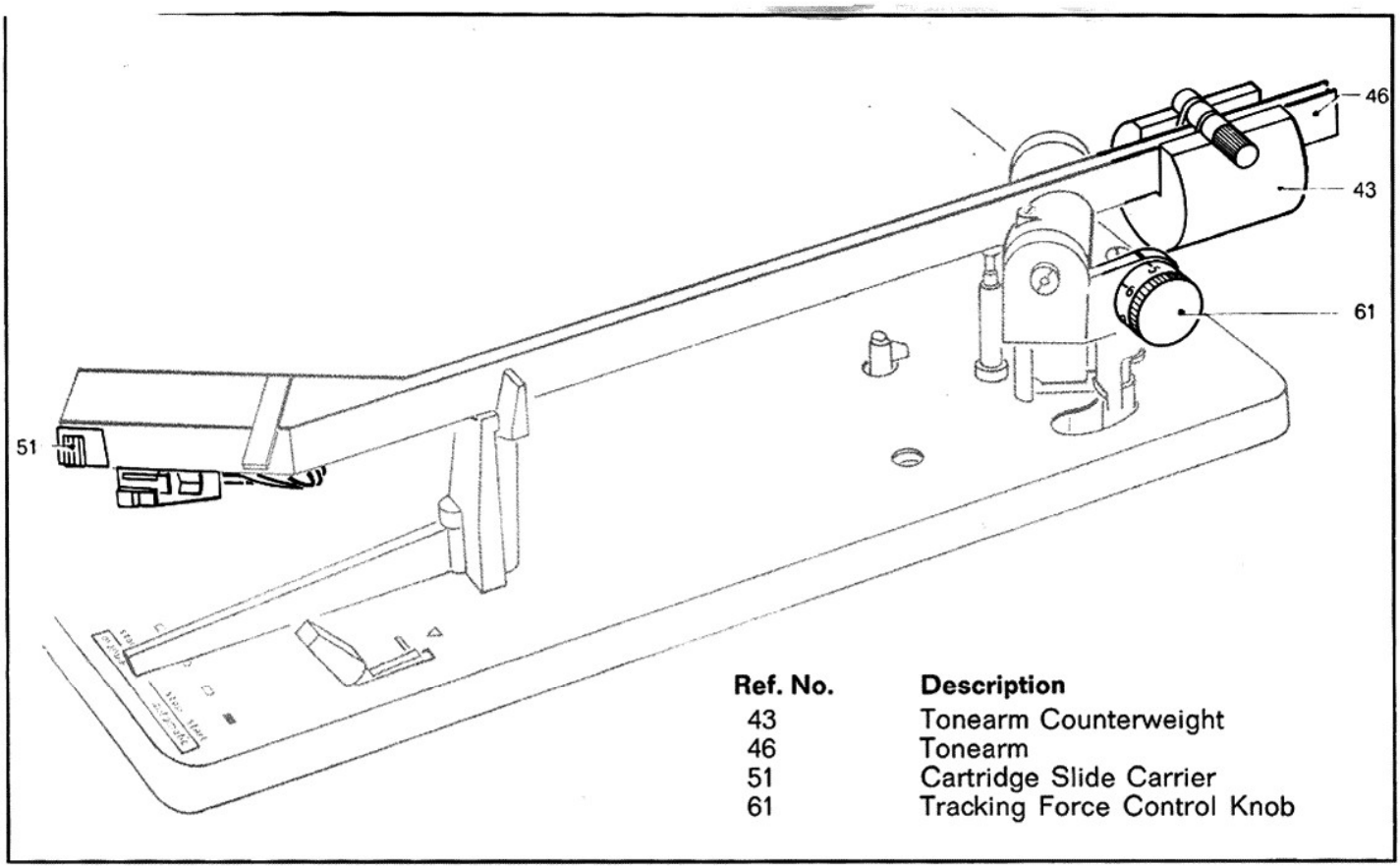
Stop

When the control lever (77) is shifted to stop, the shifting lever (208) disengages the drop mechanism so that no additional records drop. The turn-off lever (127) does not move into its operating position, the stop switch (137) is not actuated and frees the cam track for automatic final shut-off.

Short Circuit Switch

During the changing operation, the two channels are shorted to the ground to prevent annoying extraneous noises in the loudspeaker. The short circuit switch (151) is actuated by a cam segment (V) on the rim of the control cam (136).

Ref. No.	Description
114	Push Rod Extension
122	Drop Lever
127	Turn-off Lever
136	Control Cam
137	Stop Switch
151	Short Circuit Switch
154	Drive Lever
160	Tonearm Clutch
163	Trip Link
170	Friction Bushing
171	Compression Spring for Guide Bushing
173	Guide Bushing
174	Grip Ring
179	Lower Control Lever
180	Switching Roller
183	ON/OFF Switch
185	Torsion Spring for Lift
189	Lift Lever
191	Actuating Lever for Lift
193	Lift Crank
197	Ratchet Lever
198	Safety Sleeve
199	Safety Spring
202	Starting Lever
208	Shifting Lever
V	Cam Segment
W	Eccentric
X	Locking Segment



Ref. No.	Description
43	Tonearm Counterweight
46	Tonearm
51	Cartridge Slide Carrier
61	Tracking Force Control Knob

Tonearm

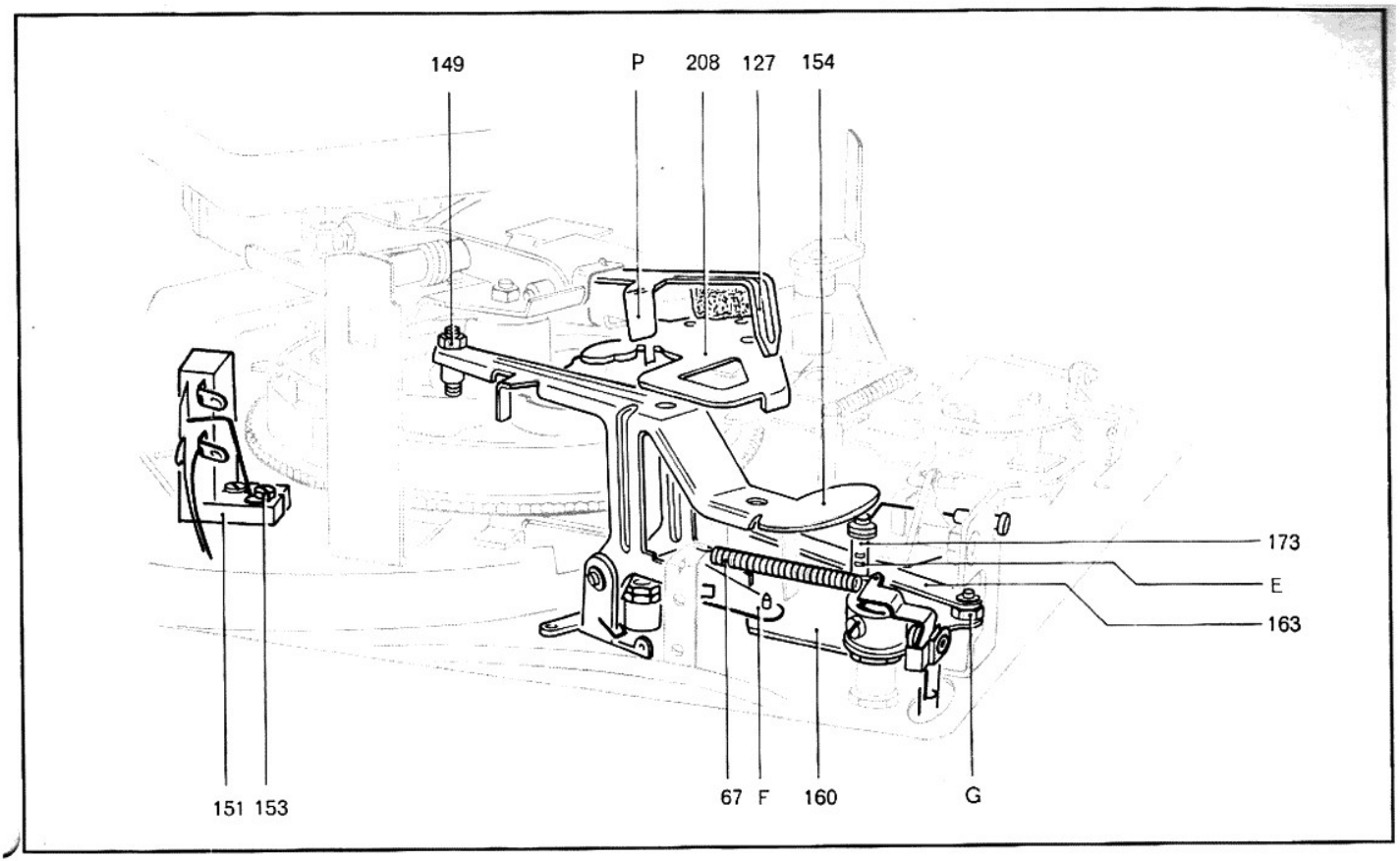
The tonearm is balanced by sliding the tonearm counterweight on the rear part of the tonearm. The pick-up cartridge with the cartridge carrier must be installed for this purpose. To protect the tonearm bearing from shocks and to absorb vibrations the tonearm counter weight is elastically mounted on the tonearm. The tracking property and thereby the important qualitative characteristics of the tonearm are determined by the tonearm bearings. To reduce friction to a minimum a super fine twin ballbearing, whose races have an extra fine finish, have been employed for the horizontal motion. For the vertical movement two super fine ballbearings with specially treated surfaces have also been incorporated. The low frictional forces of the tonearm are of great importance for the anti-skating device.

Anti-Skating Device

Since the tonearm is not infinitely long and the tonearm head is at an angle with the tonearm itself, a small force results which tries to swing the tonearm towards the center of the record. This force is called the skating force and causes the stylus to exert more pressure on the inside surface than on the outside surface of the record groove.
The skating force is dependent on the tracking force, the radius of the stylus tip, and the friction between the stylus and the record. The antiskating adjustment is made by adjusting the tracking force. This is done by means of a spring in axial alignment with the tonearm,

Safeguards and Protective Features

If the horizontal movement of the tonearm (46) is stopped, or if the unit is started with the tonearm (46) locked, this has no detrimental effect, since during the horizontal movement the tonearm (46) is engaged with the switching mechanism by means of a friction clutch (160). The tonearm lifting elements are resilient to allow the tonearm (46) to be depressed without causing any permanent deformation which would interfere with the proper operation of the unit. When the unit is started without a record on the turntable, the tonearm (46) remains on its rest. The feeler pin (7) and sensing lever (158) are not actuated by a record during the sensing operation. The lower locating lever (155) is not pushed back and the tonearm (46) is prevented from moving because the feeler pin (7) remains in its original position.



Ref. No.	Description
67	Antiskating Spring
127	Turn-off Lever
149	Guide Pin for Drive Lever
151	Short Circuit Switch
153	Fillister Head Screw M 3 x 8
154	Drive Lever
160	Tonearm Clutch
163	Trip Link
173	Guide Bushing
208	Shifting Lever
E	Slot in Guide Bushing
F	Friction Spring
G	Eccentric Pin for Trip Link
P	Turn-off Lever Ear

Adjusting Instructions

Tonearm lift is not consistent.
Cause: Drive lever (154) is not properly adjusted.
Remedy: Adjust guide pin for drive lever (149).

Tonearm Lift

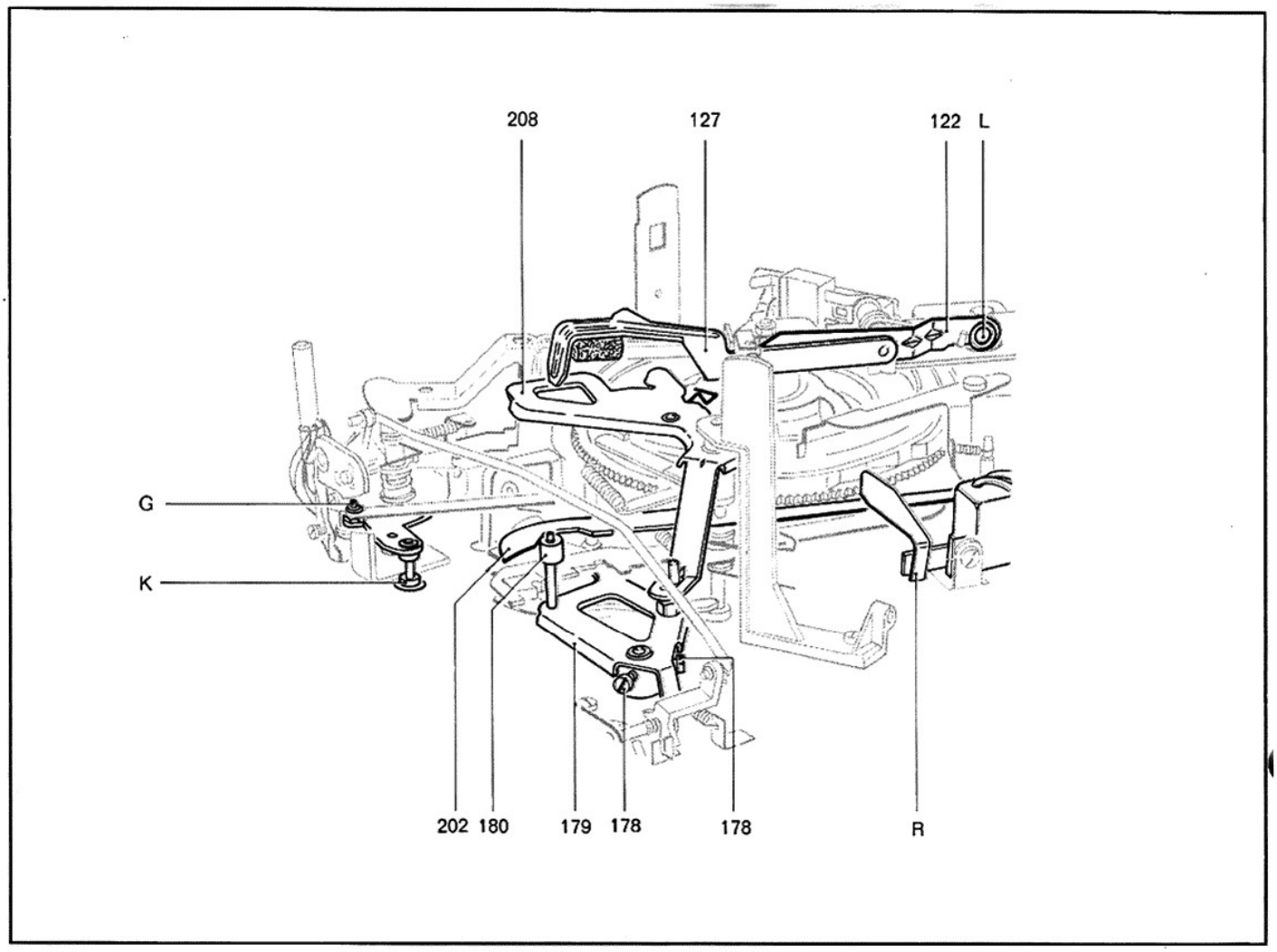
The tonearm lift is adjusted by the guide pin (149) on the drive lever (154). The amount of tonearm lift can be observed at the lower slot (E) in the guide bushing (173). With the automatic record spindle installed, the end of the pin should be in the center of the lower slot (E). After the adjustment has been completed, the guide pin (149) must be secured by the lock nut. This adjustment must be made with the tonearm unlocked. By the final check, control the drive lever (154) to insure that it has a limited amount of play in its bearing. The friction shoe on the friction spring (F) should contact the tonearm clutch (160) with the center of its pin.
Adjusting tools: screwdriver, 5,5 mm hexagon wrench, pliers.

Changing Occurs to Early

Cause: Trip link is set too close to the tripping lever,
Remedy: Adjust the trip link as required by means of the eccentric on the tonearm clutch.

Start of Tripping Cycle

The eccentric pin (G) on the tonearm clutch enables the position of the trip link to be changed and thus advance or retard the start of the tripping cycle. The start of the tripping cycle should occur at a diameter of $4^{23}/_{32}''$ (120 mm) $\pm$ $^{13}/_{64}''$ (5 mm). The position of the trip link (163) relative to the trip pin can be altered by shifting the trip link guide (H). To accomplish this, first loosen the securing screw (35). The trip link guide (H) can be shifted in the longitudinal slot until the trip link remains in position when the control cam continues to turn.
Adjusting tools: 5,5 mm hexagon wrench, screwdriver.



Ref. No.	Description
122	Drop Lever
127	Turn-off Lever
178	Flat Head Screw 3 x 6 with Cup Point
179	Lower Control Lever
180	Switching Roller
202	Starting Lever
208	Shifting Lever
G	Eccentric Pin — Trip Link
K	Landing Point — Eccentric
L	Eccentric — Dropping Mechanism
R	Adjusting Point — Starting Lever

Stylus Landing Point Incorrect

Cause: Adjustment of the eccentric (K) on the tonearm clutch (160) is incorrect.

Remedy: Turn the eccentric (K) clockwise to move the landing point to the right (outward), counter clockwise to move the landing point to the left (inward).

Landing Point

The stylus landing point can be adjusted by turning the eccentric (K) through a hole in the chassis. Turn clockwise to move the landing point outward and in the other direction to shift it inward.
Adjusting tool: screwdriver.

Record is not Dropped from Spindle

Cause: Eccentric (L) on drop lever (122) is improperly set.

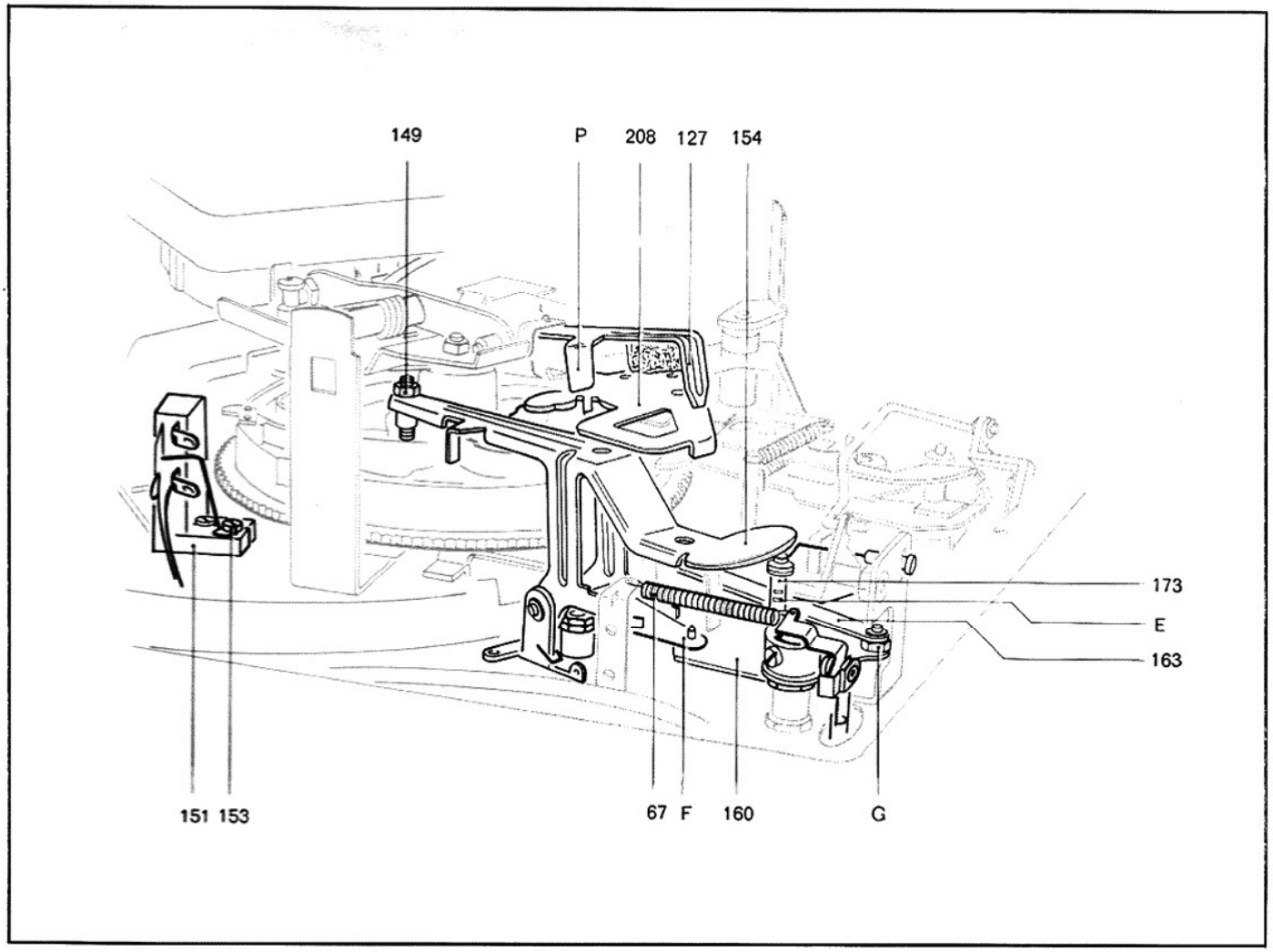
Remedy: Adjust the eccentric (L) so that the record supporting fingers are flush with the out side diameter of the automatic record spindle.

Dropping Mechanism

Adjust the push rod extension by means of the eccentric (L) so that the record supporting fingers are flush with or slightly withdrawn from the outside diameter of the automatic record spindle.
Adjusting tool: 7 mm hexagon wrench.

Control Lever

After loosening the set screws (178) in the lower control lever (179), adjust the control lever so that it is in agreement with the operating symbols on the chassis.



Ref. No.	Description
67	Antiskating Spring
127	Turn-off Lever
149	Guide Pin for Drive Lever
151	Short Circuit Switch
153	Fillister Head Screw M 3 x 8
154	Drive Lever
160	Tonearm Clutch
163	Trip Link
173	Guide Bushing
208	Shifting Lever
E	Slot in Guide Bushing
F	Friction Spring
G	Eccentric Pin for Trip Link
P	Turn-off Lever Ear

Tonearm fails to swing in after record has dropped.
Cause: Turn-off lever ear (P) bent, stop switch (137) is not shifted.
Remedy: Adjust turn-off lever ear (P).

Tonearm Height Incorrect

Cause: Lifting shaft out of adjustment.
Remedy: Adjust lifting shaft by turning adjusting nut (N).

Tonearm Height Adjustment

The tonearm height is adjusted on the lifting shaft. The adjusting nut can be turned to move up or down. The height of the tonearm from the chassis can be measured with a tonearm height gauge.
Adjusting tools: 5,5 mm hexagon wrench, tonearm height gauge.

Final Shut Off

In the positions "Stop" and "Start Manual" the turn-off lever (127) must be blocked by the shifting lever (208). In the normal position and the position "Start", the turn-off lever (127) should not contact the shifting lever. Without a record spindle in place, the oblique ear (P) of the turn-off lever must actuate the stop switch. The adjustment can be made on the turn-off lever.
Adjusting tool: flat nose pliers.

Tonearm has no Friction

Cause: Pressure of spring (F) on tonearm clutch (160) in sufficient.
Remedy: Adjust friction spring (F).

Tonearm Friction

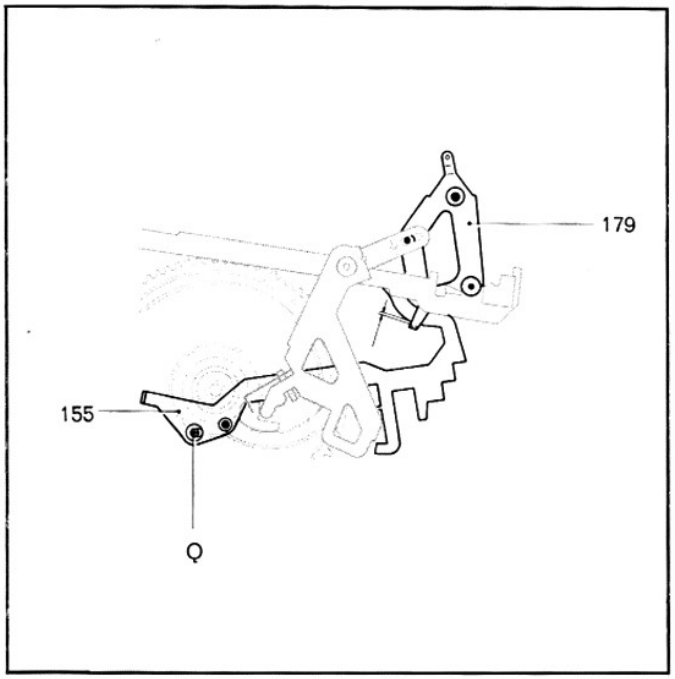
The tonearm friction is 20 to 40 p. Bending of the spring (F) alters the position of the spring friction shoe to the tonearm clutch (160). Care should be taken to insure that the distance between the underside of the tonearm clutch (160) and the chassis is 0,571″ (14,5 mm).
Adjusting tools: pliers, gauge.

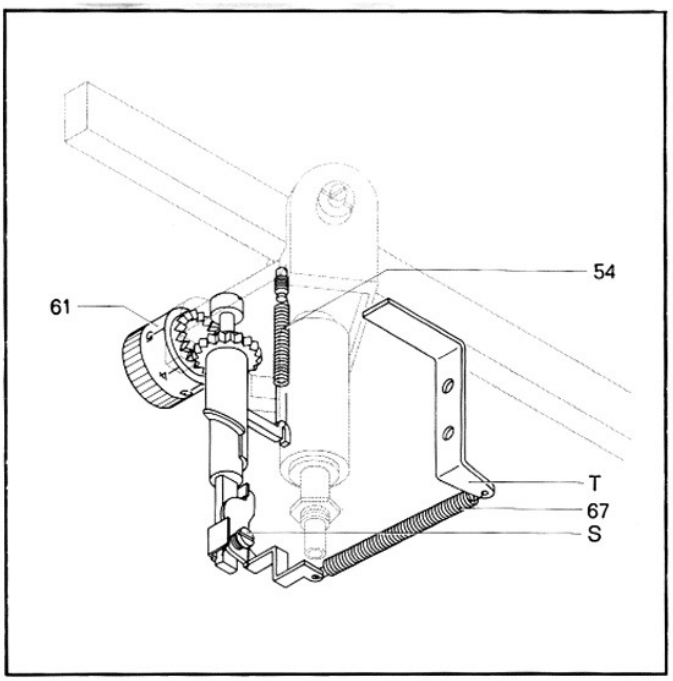
Operating Noise During Changing Cycle

Cause: Short circuit switch fails to close properly.
Remedy: Adjust short circuit switch.

Short Circuit Switch

During operation of the record player, the distance between the grounding springs and contact bars should be 0,020″ (0,5 mm). Loosen the securing screws (153) and turn the short circuit switch (151) until this clearance is obtained.
Adjusting tool: screwdriver.





Ref. No.	Description
155	Lower Locating Lever
179	Lower Control Lever
Q	Eccentric — Locating Lever Adjustable from Above

Ref. No.	Description
54	Tension Spring for Tracking Force
61	Tracking Force Control Knob
67	Antiskating Spring
S	Eccentric-Arm
T	Bracket — Antiskating-Fine Adj.

Turntable Bearing Bracket

After loosening the screws (30), shift the bearing bracket as required to ensure easy engagement of the turntable pinion.

Control Lever will not Shift to "Start Manual"

Cause: Distance between lower locating lever (155) and the bent portion of the lower control lever (179) too small.
Remedy: Adjust eccentric (Q) on locating lever.

Position of Lower Locating Lever

The distance between the curred extension of the lower locating lever (155) and the lower control lever (179) can be adjusted by means of the eccentric (Q) to the left of the pivot. For this purpose the control lever must be shifted to the "Manual" position. The distance should be between 0,02″ and 0,04″ (0,5—1,0 mm).
Adjusting tool: screwdriver.

Starting Lever

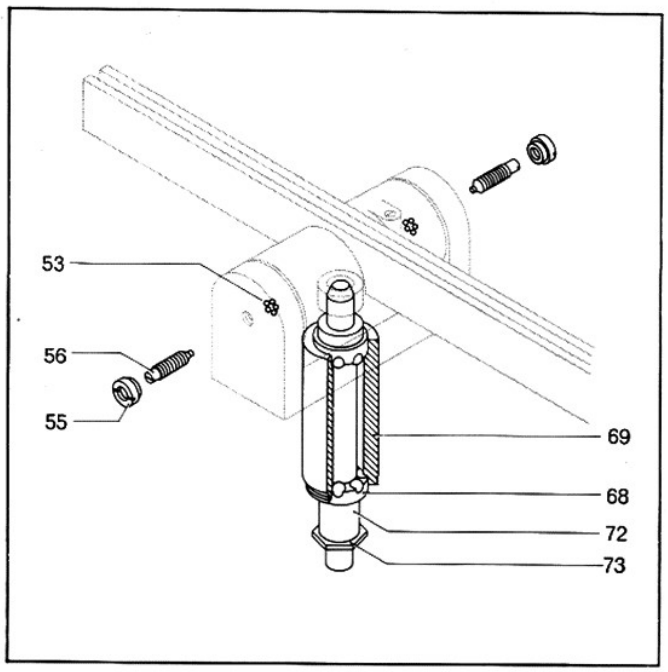
In the normal position of the control cam, the ear (R) on the starting lever must clear the ON/OFF switch by about 0,02″ (0,5 mm).
When shifting the control lever to "Start" or "Manual" the red lever of the ON/OFF switch should contact the rest stop. If the starting lever (202) is engaged with the stop pawl, the switching roller (180) should clear the starting lever (202) by 0,008″ (0,2 mm) when the control lever is in any position.
Adjusting tool: flat nose pliers.

Antiskating

First set the tracking force control knob at "0" (zero). Then adjust the setting arm by means of the eccentric (S) beneath the chassis so that eye for the spring is directly below the tonearm pivot. If, when adjusting the tracking force an over compensation of the skating force is found to exist, the spring length tolerance can be corrected by bending the bracket (T).

Sensing Lever

In the normal position of the unit, the sensing pin (157) must be located in the center of the hole. An adjustment can be made in the middle of the sensing lever. Without a record on the turntable the sensing pin should not rub on the outer rim of the turntable.



Ref. No.	Description
53	Steel Ball
54	Tension Spring for Tracking Force
55	Cap for Bearing Screw
56	Bearing Screw
68	Ball Bearing
69	Bearing Bushing
72	Lower Tapered Bushing
73	Hexagon Nut M 5,8 x 0,35

Tonearm Replacement

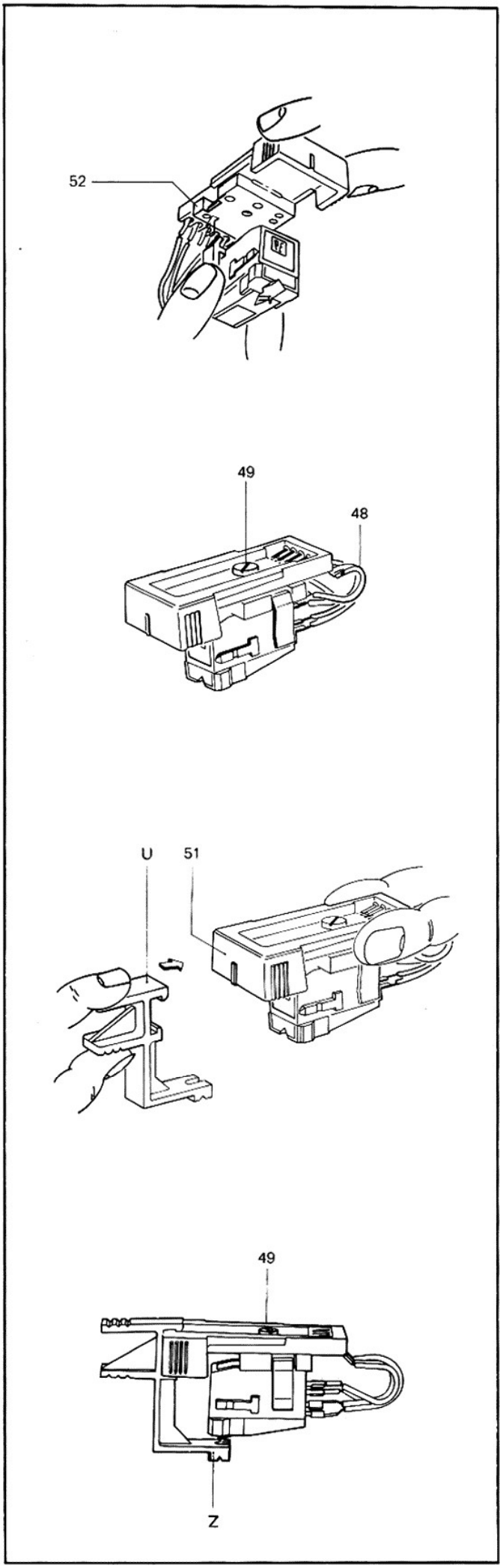
The tonearm is to be replaced as a unit with its traverse. After loosening the caps (55), turn the bearing screws (56) out so far that the tonearm can be lifted out of its bearing. Before removal of the tonearm, unsolder the leads from the short circuit switch and unhook the tension spring for tracking force (54) from the antiskating device. The tension spring for the tracking force (54) is hooked to the antiskating device beneath the tonearm base. The most favorable condition for unhooking the spring can be achieved by turning the control knob (61) to "0" (zero). When replacing the tonearm take care to insure that the seven steel balls (53) on each side of the traverse are seated in Apex grease. The friction of the bearing must be very low. A special screwdriver permits adjustment of the bearing screws (56) through the caps (55).
When replacing the entire tonearm with its bearings and the antiskating device as a unit, insure that the ball bearing (68) is clean, free of dust, and lubricated with Abrol oil upon installation. Particular care must be taken when adjusting the friction of this bearing. The bearing friction is obtained by tightening the hexagon nut 5,8 (73) with a special wrench. Insure that the antiskating spring (67) is replaced in its proper position without any change.

Lifting Shaft Replacement

The lifting shaft (169) can be reached only after the drive lever (154) and tonearm clutch (160) have been removed. Unscrew adjusting nut (167) and pull the lifting shaft (169) out to the rear. Add silicon grease to the lifting shaft only when absolutely necessary. Care should be taken to see that enough silicon grease is applied to the lifting shaft. Attention should also be given to insure that the compression spring (168) is mounted on the lifting shaft (169) from above.

Control Cam Replacement

After loosening the screws (30) for the turntable bracket and removing the nut (138) the control cam can be lifted upwards. It should be noted that for this purpose the drive lever (154) as well as the shifting lever (208) must be disengaged from the control cam.



Ref. No.	Description
52	Cartridge Slide Plate
48	Leads
49	Mounting Screw
51	Cartridge Slide Carrier

Cartridge Slide Carrier PE 2015

Equipped with the original PE snap-lock that accepts the cartridges M 71 MB and M 73 MG. In addition all cartridges having the standard ½" mount can be used.

Mounting the Pick-up Cartridge

(Applies only to turntables without cartridge.)

Assemble the cartridge as follows:

1. Clamp the pick-up cartridge onto the cartridge slide plate (52). Clamp the mounting gauge over the guide on the cartridge slide carrier. The stylus tip should be in the center of the "U" formed notch in the gauge as well as in line with the "V" shaped notch on the underside of the gauge.
2. Loosen the mounting screw (49) and shift the cartridge until the stylus tip is centered in the "U" formed notch of the mounting gauge. Retighten the screw.
3. Loosen the mounting screw (49) and shift the cartridge to the front or rear until the stylus tip is aligned with the "V" shaped notch of the mounting gauge. Retighten screw.

The pick-up cartridge is now properly adjusted and this insures that the stylus tip will always lower into the start groove of the record when the turntable operates automatically.

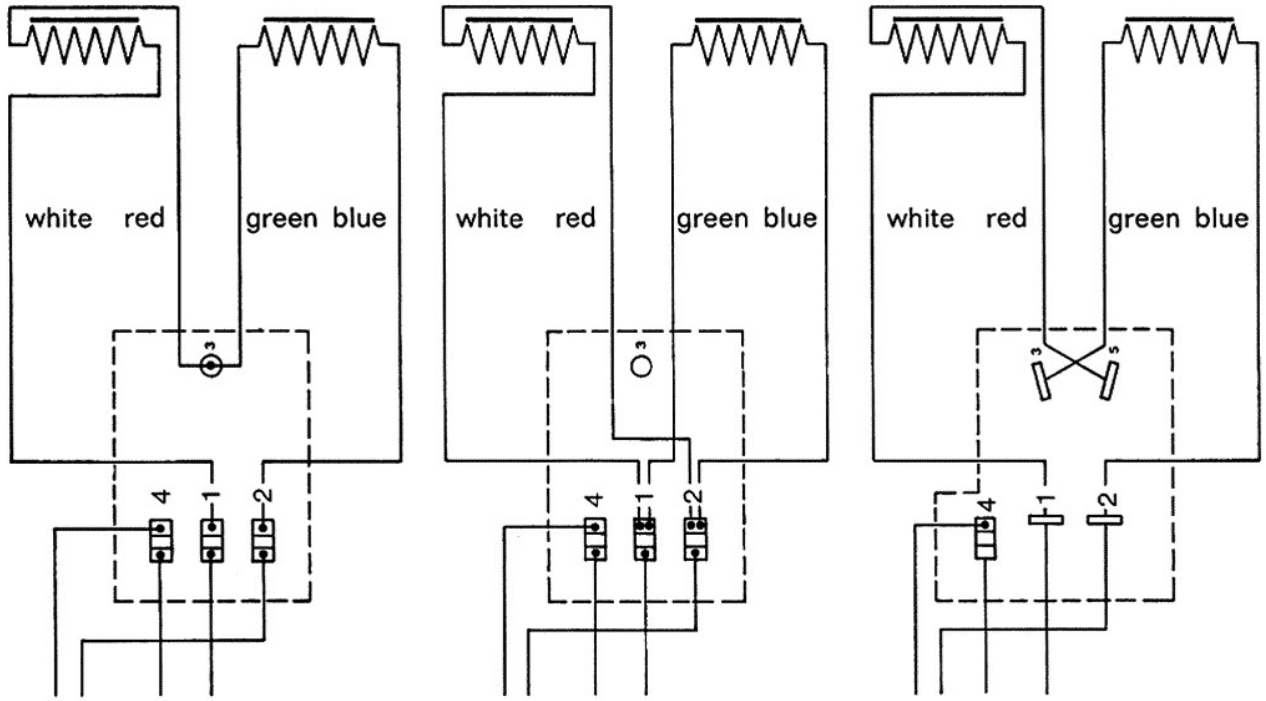
The cartridge slide carrier is fitted with five pick-up prongs. Both ground as well as both channel leads can be separately connected. In the case of a regular unit, i. e. when the screening in the cartridge is connected to a ground pin, connect the leads (48) as follows:

red	=	right channel
white	=	left channel
green	=	right ground
blue	=	left ground

Tracking Control

To prevent geometric playback errors, the horizontal distance of the stylus tip must also be properly adjusted. In the tonearm, this is the case when the stylus tip is properly aligned with the mounting gauge. If the cartridge is installed by the customer, adjustment to the optimum conditions is possible.

Motor Schematic SPM 2-15/2

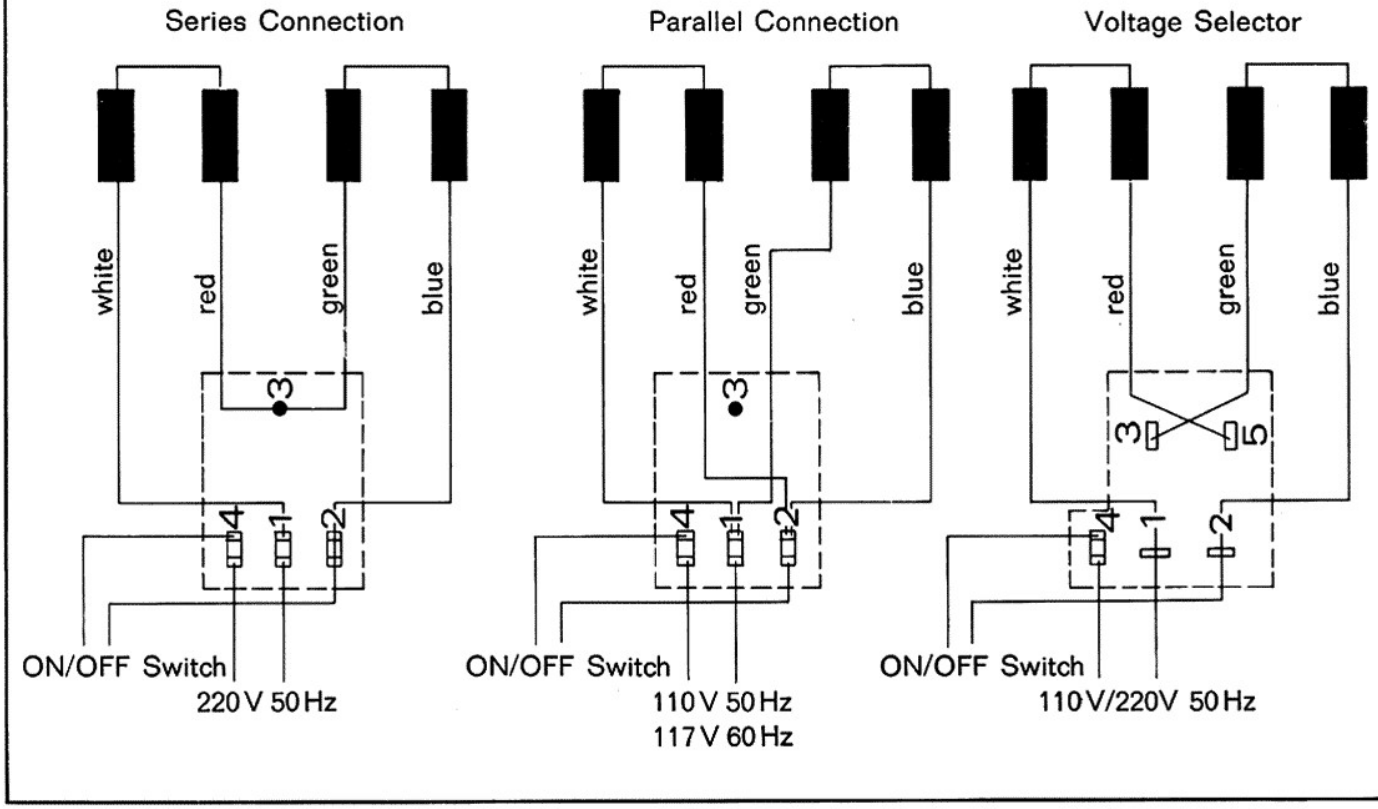


Motor Schematic SPM 4/15

In the case of 220 volts connect the two associated windings in series. For 110 volts connect the windings parallel. The windings are automatically switched to 110 volts or 220 volts by the voltage selector.

Replacing the 50 Hz Motor pulley with a 60 Hz Motor Roller

The motor roller (132) is fastened by a set screw (131). The position of the motor pulley (132) on the motor shaft can be altered. The idler wheel (28) must contact the individual steps of the motor pulley exactly in the middle. The pitch control should be in the middle of its range. A change from 50 Hz to 60 Hz can be made by exchanging the motor roller.

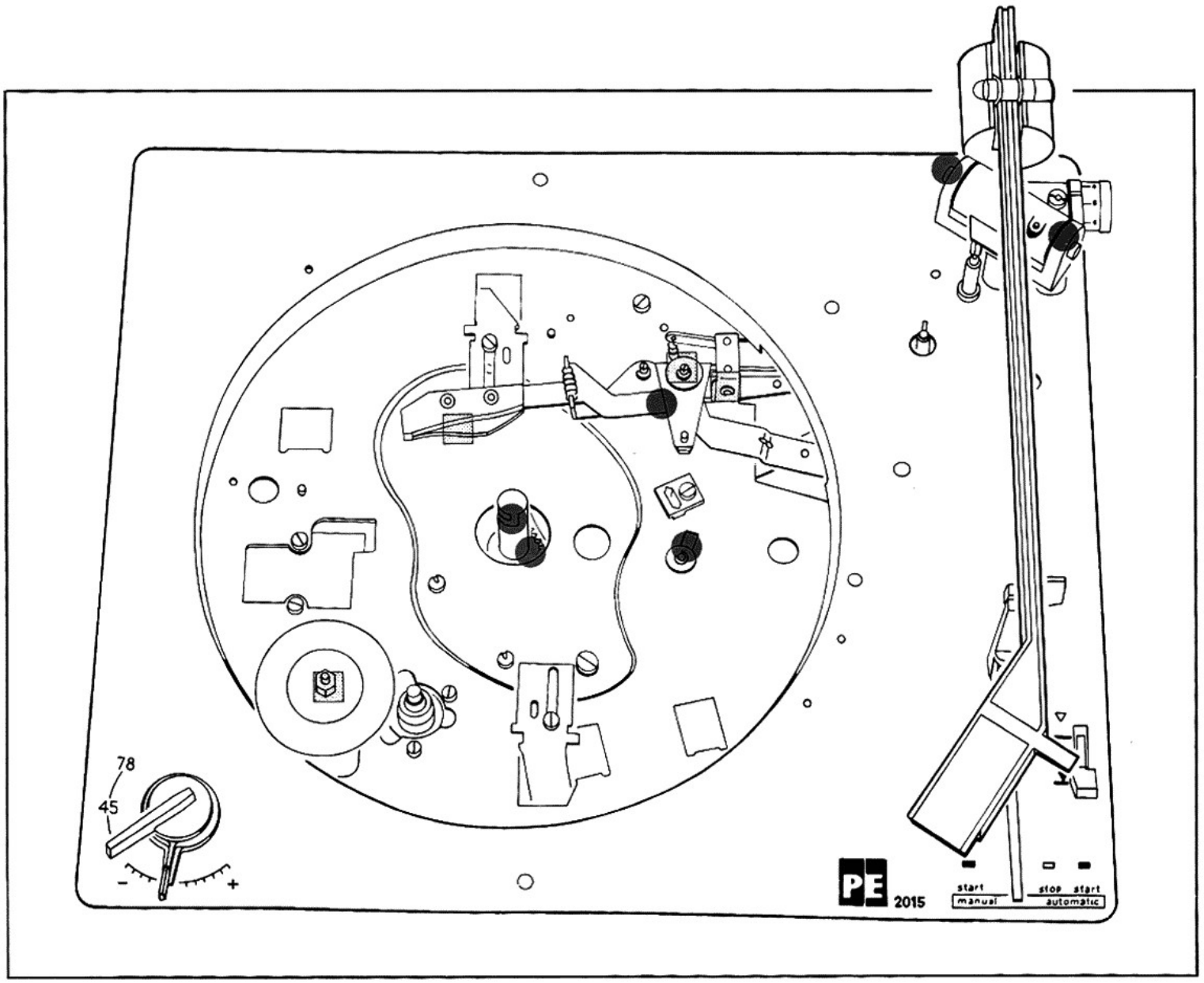


Lubricating Instructions

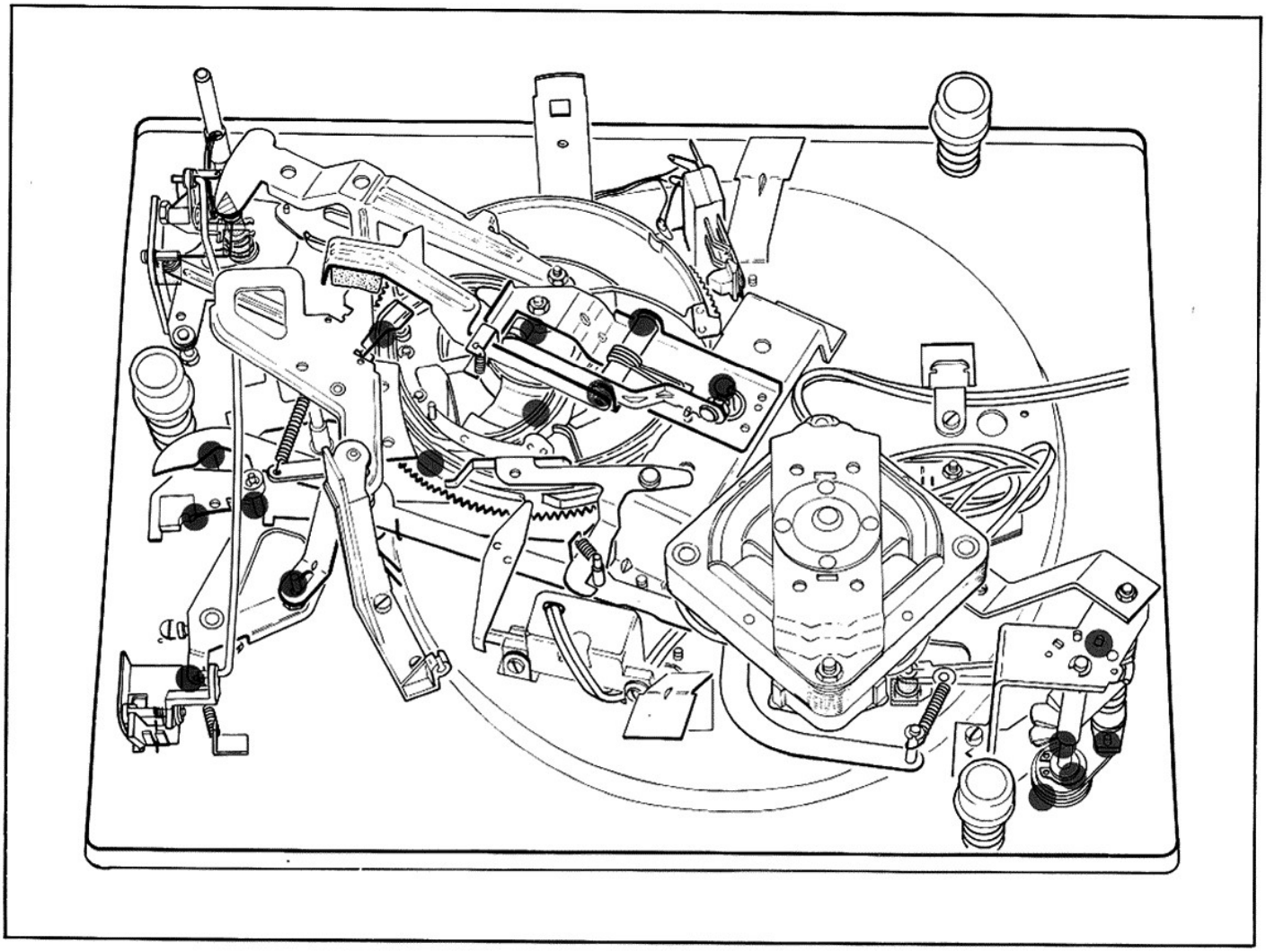
During the assembly the unit is sufficiently lubricated at all points of sliding contact and at all bearings. The points should be relubricated after approximately 1000 hours of normal operation. The following lubricants should be used when relubricating:

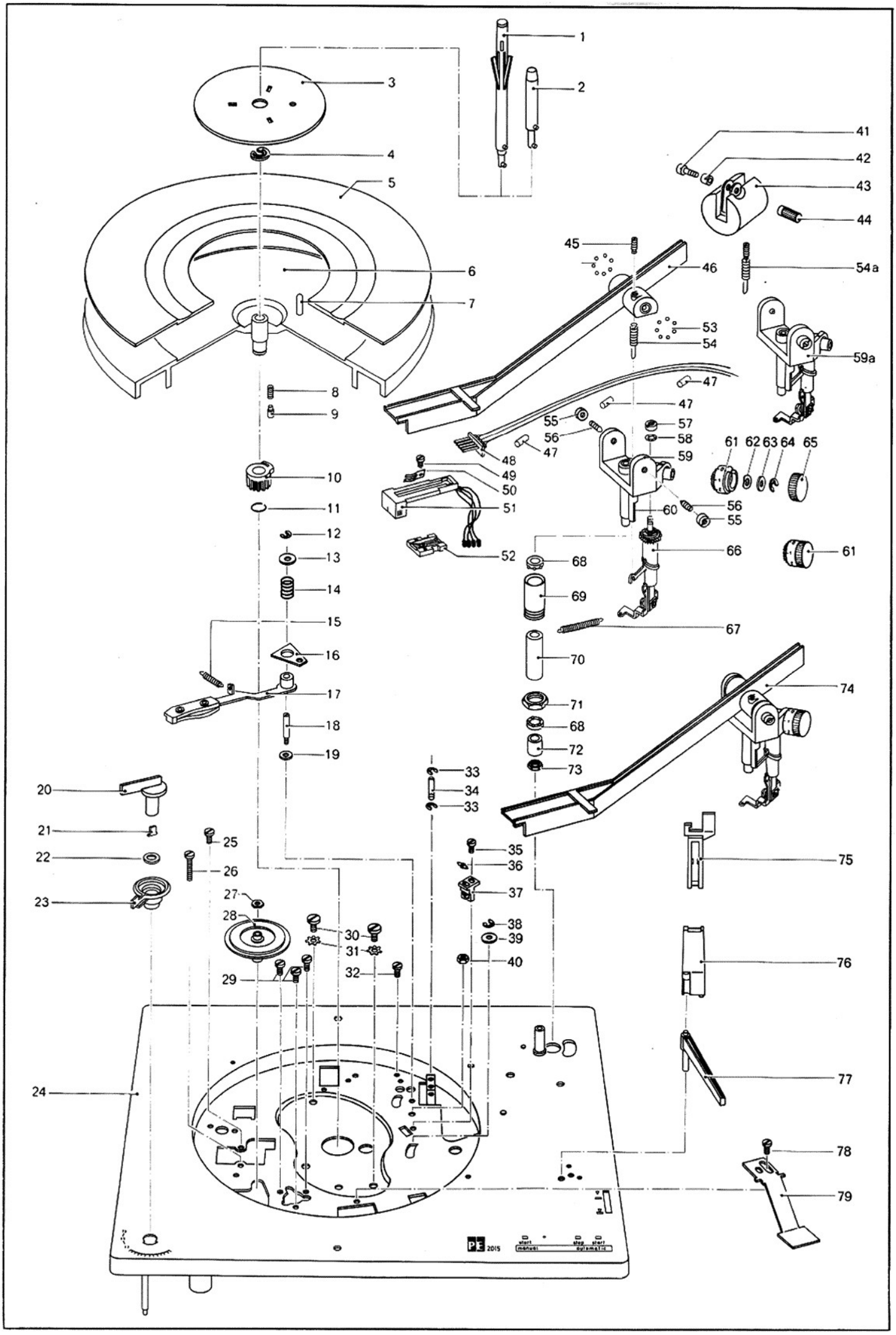
It is important that the friction surfaces of the idler wheel, the turntable platter, and the motor pulley remain free of oil and grease. If other lubricants are used, chemical decomposition can occur. For this reason only the recommended original lubricants should be used.

= Abrol Oil = Apex Grease = Molykote



Lubricating Points	Ref. No.
■ Upper Control Lever - Bearing	77
■ Idler wheel Bracket - Hinge Pin	
■ Idler wheel Arm - Bearing	109
● Speed Selector Cam - Bearing	
● and Cam Surface with Ball	92-97
■ Vert.Tonearm Bearing(small amount only)	68-73
■ Ratchet Lever - Bearing at Hinge Pin	197
■ Sensing Lever - Bearing	158
■ Lower Locating Lever - Bearing	155
■ Trip Link - Bearing at Eccentric	163
■ Starting Lever - Bearing	202
■ Locking Pawl - Bearing	206
■ Shifting Lever - Bearing	208
● Speed Selector Knob - Bearing	20
■ Lifting Shaft - in Area of Guide Bushing	169
■ Drive Lever - Bearing	154
● Setting Arm - Slot	
● Adjusting Arm - Bearing	87
■ Lifting Shaft - Ground Area	169
● Horizontal Tonearm - Bearing	53
▲ Bearing Bracket for Drive Lever	143
● Ratchet Lever - Slot in Chassis	197
■ Upper Locating Lever - Cam Surface and Bearing	17
● Control Cam - Bearing, Cam Track, Gear	136
● Push Rod Extension	114
● Drop Lever - Eccentric	122
● Turn-off Lever/Drop Lever - Bearing	127/122
● Turntable Platter - Bearing w. Ball Bearing	115-117
● Slide Surface of Ratchet and Starting Levers near Switching Roller	197/202
● Shifting Lever - Slot	208
● Lifting Shaft - Friction Surface	169
● Idler wheel - Bearing	28
▲ Drive Lever - Surface for Guide Bushing	154
● Lower Control Lever - Hole for Tension Spring	179

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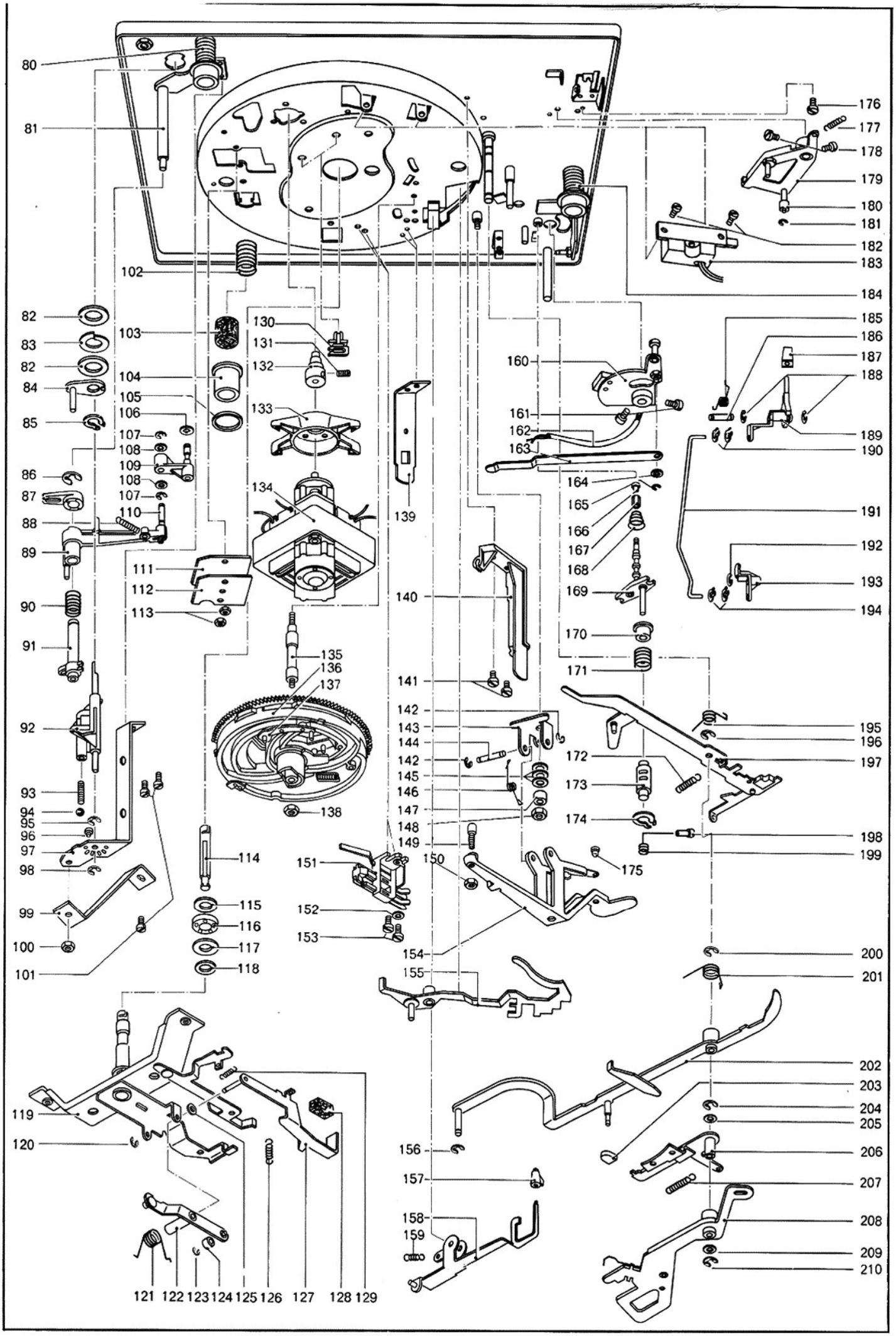
PE 2015
start manuel
stop start automatic

Replacement Parts List
PE 2015
PE 2012

Ref. No.	Part No.	Description	Price Class
1	14 0600 0	Automatic Record Spindle 7 mm	12
2	14 1551 0	Single Play Spindle	3
3	16 3022 0	Ornamental Ring	3
4	01 312 1	Turntable Retainer	1
5	16 3021 0	Turntable Matting 2015	6
	14 3254 0	Turntable Matting 2012	6
6	16 0621 0	Turntable Platter 2015	17
	14 0681 0	Turntable Platter 2012	10
6a	13 1170 3	Turntable Platter compl. 2015	18
	13 1170 4	Turntable Platter compl. 2012	12
7	14 3026 0	Feeler Pin (not available as separate part)	1
8	00 383 0	Compression Spring	1*
9	02 396 0	Drive Pin	1
10	04 452 0	Pinion Gear	1
11	00 384 0	Retaining Spring	1*
12	794 708	Retaining Ring 2,3	1*
13	01 464 0	Washer 10 x 3,2 x 0,5	1*
14	00 358 0	Compression Spring	1
15	00 366 0	Tension Spring for Upper Locating Lever	1
16	14 3079 0	Retaining Plate	1
17	14 1520 0	Upper Locating Lever sub assembly	3
18	14 3074 0	Hinge Pin	1
19	01 465 0	Washer 8 x 3,2 x 1,5	1*
20	15 1540 0	Speed Selector Knob sub assembly	3
21	14 3057 0	Leaf Spring for Speed Selector Knob	1*
22	01 513 0	Washer	1
23	16 3009 0	Pitch Control Knob	1
24	16 0636 0	Chassis Board Assembly	12
25	791 628	Fillister Head Screw M 3 x 8	1*
26	791 648	Fillister Head Screw M 3 x 20	1*
27	01 482 0	Washer for Idler Wheel	1*
28	04 083 0	Idler Wheel Assembly	5
29	792 402	Fillister Head Screw for Motor Suspension M 3 x 5	1
30	791 672	Fillister Head Screw AM 4 x 8	1*
31	794 618	Toothed Washer	1*
32	791 622	Fillister Head Screw for Supporting Foot AM 3 x 4	1*
33	794 708	Retaining Ring 2,3	1*
34	14 3085 0	Hinge Pin for Sensing Lever	1
35	791 624	Fillister Head Screw AM 3 x 5	1*
36	15 3076 0	Guide Roller	1
37	15 3075 0	Trip Link Guide	1
38	794 706	Retaining Ring 1,9	1*
39	01 498 0	Washer for Ratchet Lever	1*
40	794 167	Hexagon Nut M 3,5	1*
41	16 3106 0	Clamping Screw	1
42	16 3108 0	Spacer	1
43	16 1525 0	Tonearm Counterweight subassembly	5
43a	13 1170 5	Tonearm Counterweight compl.	6
44	16 3107 0	Clamping Nut	1
45	15 3179 0	Mounting Screw for Spring	1
46	16 3075 0	Tonearm	8
46a	16 0631 0	Tonearm compl. without Base	12
47	05 411 0	Rubber Stopper	1*
48	16 0632 0	5 Pole Audio Cable with Carrier Plate	6
49	791 279	Cap Screw	1*
50	16 3140 0	Leaf Spring	1
51	16 1521 0	Cartridge Slide Carrier subassembly	5
52	04 467 0	Cartridge Slide Plate	1
53	798 010	Steel Ball 1 mm	1*
54	16 3082 0	Tension Spring for Tracking Force	2
54a	16 1518 0	Tension Spring for Tracking Force subassembly	3
55	16 3095 0	Cap for Bearing Screw	1
56	16 3094 0	Bearing Screw	1
57	794 273	Slotted Nut	1
58	794 428	Spring Washer	1*
59	16 1519 0	Tonearm Base subassembly	7
59a	16 0633 0	Tonearm Base compl. with Antiskating Assembly	11
60	16 3093 0	Covering Sleeve for Tracking Force Spring	1
61	16 0654 0	Tracking Force Control Knob compl. (Ref. No. 61—65)	3
62	794 431	Spring Washer	1*
63	794 340	Washer	1*
64	794 712	Retaining Ring 4	1*
65	16 3097 0	Ornamental Cap	2
66	16 0634 0	Antiskating Assembly	6
67	15 3126 0	Antiskating Spring	2
68	798 103 0	Ball Bearing	2
69	15 3034 0	Bearing Bushing	4
70	16 3121 0	Sleeve for Bearing Bushing	1
71	15 3038 0	Hexagon Nut M 13 x 0,5	1
72	15 3037 0	Lower Tapered Bushing	3
73	15 3039 0	Hexagon Nut M 5,8 x 0,35	1
74	16 06 53 0	Tonearm compl. With Base and Antiskating Assembly	15
75	16 3101 0	Tonearm Lock	1
76	16 1524 0	Tonearm Rest subassembly	2
77	16 0637 0	Upper Control Lever Assembly	4
78	791 624	Fillister Head Screw AM 3 x 5	1*
79	14 3164 0	Chassis Securing Bracket	1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Ref. No.	Part No.	Description	Price Class
80	14 3276 0	Suspension Spring — Front Left	1
81	14 3058 0	Guide Pin	2
82	01 509 0	Spacer Washer	1*
83	15 3024 0	Lock Washer	1*
84	15 1506 0	Lower Locating Lever subassembly	1
85	794 722	Grip Ring 9	1*
86	794 716	Retaining Ring 6	1*
87	15 3022 0	Adjusting Arm	1
88	00 352 0	Tension Spring	1
89	16 0612 0	Idler Wheel Bracket Assembly	4
90	00 377 0	Compression Spring	1
91	15 1503 0	Shifting Fork subassembly	4
92	16 0613 0	Speed Selector Cam Assembly	4
93	00 347 0	Compression Spring	1*
94	795 045	Steel Ball 4 mm	1*
95	794 710	Retaining Ring 3,2	1*
96	16 3008 0	Stop Pin	1*
97	14 3047 0	Holding Bracket	2
98	794 710	Retaining Ring 3,2	1*
99	14 3288 0	Supporting Bracket	2
100	794 165	Hexagon Nut M 3	1*
101	791 622	Fillister Head Screw AM 3 x 4	1*
102	14 3275 0	Suspension Spring — Rear Left	1
103	05 310 0	Vibration Absorbing Pad	1*
104	04 439 0	Spring Cup	1
105	01 514 0	Spacer Washer — required only by unequal spring pressure	1
106	01 460 0	Washer	1*
107	794 708	Retaining Ring 2,3	1*
108	01 315 0	Washer	1*
109	14 1516 0	Idler Wheel Arm subassembly	3
110	15 3021 0	Hinge Pin for Idler Wheel Arm	1
111	01 316 0	Insulator Plate	1
112	01 201 0	Terminal Plate	1
	10 120 0	Voltage Selector Assembly	4
113	794 165	Hexagon Nut M 3	1*
114	14 3145 0	Push Rod Extension	3
115	01 497 0	Upper Washer	1
116	798 102	Ball Bearing	2
117	01 496 0	Lower Washer	1
118	01 306 0	Vibration Absorbing Washer	1
119	16 0641 0	Turntable Bearing Bracket with Drop Lever Assembly	9
120	794 708	Retaining Ring 2,3	1*
121	00 365 0	Torsion Spring	1
122	14 1537 0	Drop Lever subassembly	4
123	794 708	Retaining Ring 2,3	1*
124	14 3150 0	Roller for Drop Lever	1
125	794 313	Washer 3,2	1*
126	00 366 0	Tension Spring for Turn-off Lever	1
127	14 1538 1	Turn-off Lever subassembly	3
128	05 438 0	Vibration Absorbing Cushion	1
129	00 363 0	Tension Spring for Turn-off Pawl	1
130	795 934	Cable Holder	1
131	790 365	Set Screw M 3,5 x 5	1*
132	16 1504 0	Motor pulley 50 Hz	4
	16 1505 0	Motor pulley 60 Hz	4
133	15 3175 0	Motor Suspension Bracket	2
134	14 0702 1	Shaded Pole Motor SPM 4/15 with Motor Suspension Assembly (2015)	17
	14 0720 0	Shaded Pole Motor SPM 2/15-2 with Motor Suspension Assembly (2012)	16
135	14 3070 0	Bearing Pin for Control Cam	3
136	16 0628 1	Control Cam Assembly	10
137	14 1529 0	Stop Switch	2
138	794 167	Hexagon Nut M 3,5	1*
139	14 3190 1	Supporting Foot	2
140	14 3139 0	Supporting Bracket	3
141	791 306	Flat Head Screw AM 3 x 6	1*
142	794 708	Retaining Ring 2,3	1*
143	15 3070 0	Bearing Bracket for Drive Lever	2
144	14 3085 0	Hinge Pin for Drive Lever	1
145	794 431	Spring Washer A 5	1*
146	00 367 0	Torsion Spring for Drive Lever	1
147	14 3068 0	Compression Sleeve for Drive Lever	1
148	792 272	Lock Nut M 4	1*
149	14 3159 0	Guide Pin for Drive Lever	2
150	794 165	Hexagon Nut M 3	1*
151	14 0622 0	Short Circuit Switch	4
152	794 313	Washer 6,8	1*
153	791 628	Fillister Head Screw M 3 x 8	1*
154	15 1518 0	Drive Lever	5
155	14 1519 0	Lower Locating Lever	4
156	794 708	Retaining Ring 2,3	1*
157	14 1521 0	Sensing Pin subassembly	1
158	14 1561 0	Sensing Lever subassembly	3
159	00 357 0	Tension Spring for Sensing Lever	1
160	16 1528 0	Tonearm Clutch subassembly	4
161	791 304	Flat Head Screw AM 3 x 5	1*
162	03 499 0	Protective Sleeve	1*
163	15 3074 0	Trip Link	2
164	01 484 0	Paper Washer	1*
165	794 704	Retaining Ring 1,5	1*
166	15 3085 0	Friction Pin for Lifting Shaft	1
167	16 3120 0	Adjusting Nut	1
168	00 390 0	Compression Spring for Lifting Shaft	1*
169	16 0639 0	Lifting Shaft Assembly	4
170	15 3217 0	Friction Bushing	1*
171	00 388 0	Compression Spring for Guide Bushing	1
172	00 369 0	Tension Spring for Ratchet Lever	1
173	16 1529 0	Guide Bushing subassembly compl.	4
174	794 558	Grip Ring	1
175	15 3085 0	Friction Pin	1
176	791 624	Fillister Head Screw AM 3 x 5	1
177	00 360 0	Tension Spring	1
178	791 306	Flat Head Screw 3 x 6 with Cup Point	1*
179	14 1524 0	Lower Control Lever	4
180	14 3098 0	Switching Roller	1
181	794 702	Retaining Ring 1,2	1*
182	791 624	Fillister Head Screw AM 3 x 5	1
183	797 001 3	ON/OFF Switch subassembly	5
184	14 3277 0	Suspension Spring — Front Right	1
185	00 387 0	Torsion Spring for Lift	1
186	14 3085 0	Hinge Pin for Lift Lever	1
187	15 1552 0	Knob for Lift Lever subassembly	2
188	794 708	Retaining Ring 2,3	1*
189	15 3029 0	Lift Lever	1
190	794 557	Grip Ring 2,5	1*
191	15 1556 0	Actuating Lever for Lift subassembly	3
192	794 708	Retaining Ring 2,3	1*
193	15 3216 0	Lift Crank	1
194	794 557	Grip Ring 2,5	1*
195	00 361 1	Torsion Spring for Ratchet Lever	1
196	794 710	Retaining Ring 3,2	1*
197	15 1551 0	Ratchet Lever subassembly	4
198	15 3219 0	Safety Sleeve	1*
199	15 3218 0	Safety Spring	1
200	794 710	Retaining Ring 3,2	1*
201	00 362 0	Torsion Spring for Starting Lever	1
202	14 1532 2	Starting Lever subassembly	4
203	10 505 0	Locking Segement	1*
204	794 710	Retaining Ring 3,2	1*
205	794 469	Washer 9 x 4,3 x 1	1*
206	15 1550 0	Locking Pawl subassembly	3
207	00 364 0	Tension Spring for Locking Pawl	1
208	15 1549 0	Shifting Lever subassembly	3
209	794 313	Washer 9 x 4,2 x 1	1*
210	794 710	Retaining Ring 3,2	1*
	16 3130 0	Pick-up Cartridge Mounting Gauge (1 Piece)	2

* Package of 10 Pieces

Perpetuum-Ebner KG

Perpetuum-Ebner KG 7742 St. Georgen/Schwarzwald · Postfach 36

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