Technical data

Power supply: alternating, 50 or 60 cycle changeable by changing motor pulley
Power supply voltage: 110/117 and 220/240 V, switchable
Drive: 4-pole asynchronous pole motor with radialelastic suspension
Power consumption: ≤ 10 watts
Current drain: 64 ma approx, at 220 V, 50 cycle
115 ma approx, at 117 V, 60 cycle
Turntable platter: weighing 3.2 lbs, or 4 lbs., dia 10 5/8 inch,
Turntable speeds: 33 1/3, 45 and 78 r.p.m.
Pitch control variation: adjustment range of approx. 1 semitone (6%) at all three turntable speeds
Speed accuracy deviation to DIN 45 500: < 0.12 % with platter 4 lbs,
< 0.15 % with platter 3.2 lbs.
Rumble: ≥ 35 dB below signal level in accordance to DIN 45 500
Weighted rumble: ≥ 55 dB below signal level in accordance to DIN 45 500
Tonearm: torsionally rigid, aluminium tubular tonearm with vertical needle bearings,
horizontal 2-layer precision ball bearings in hardened and polished races,
Maximum tracking error: 0.18º/cm
Tonearm bearing friction: (referred to stylus tip)
vertical: less than 0.01 gram  horizontal: less than 0.04 gram
Cartridge holder: removable, suitable for acceptance of cartridges having 1/2" mounting and
possessing a weight of 1 - 8 grams.
Weight: approx. 10.6 lbs. with platter 4 lbs.  approx. 9.7 lbs. with platter 3.2 lbs.
Dimensions and mounting cutouts: see installation instructions
Fig. 1 Tonearm hookup schematic

- **right channel channel 1**
  - red

- **left channel channel 2**
  - white

- **Tonearm audio lead**
- **tonearm junction board with muting switch**
- **channel 1 red**
- **channel 2 white**

- **a) with miniature 5-pin plug**
  - channel 1 red lead
  - channel 2 white lead

- **b) with phono plug**
  - red
  - yellow

- **c) with banana plugs**
  - channel 1 = red
  - channel 2 = yellow
  - common = black
  - ground = green

- **contact plate at plug-in head**
- **plug-in head**
- **spring contacts between plug-in cartridge head and tonearm**

- **plug-in head with cartridge**
  - red
  - green
  - white
  - blue

- **mu-metal housing of cartridge**

- **phonograph record**
  - inner side of groove
  - left channel
  - Q2
  - Q1
  - outer side of groove
  - right channel

- **Q1**
- **Q2**
Motor and drive

The turntable platter and change mechanism are driven by a vibration-free four-pole motor (168) with an extremely low stray magnetic field.

Motor speed is constant for line-voltage variations of $\pm 10\%$. It is dependent on (and proportional to) line frequency. Two interchangeable motor pulleys (120) are available for adapting the changer to 50 or 60 Hz operation.

Motor pulley for 50 Hz operation: part no. 220 970
Motor pulley for 60 Hz operation: part no. 220 971

The motor pulley is secured to the motor shaft by a setscrew. When a pulley is replaced or exchanged, it must be set at the correct height (see Fig. 5).

The turntable platter is driven by the idler wheel (108) which is automatically disengaged from the motor pulley when the unit is shut off, in order to protect its driving surface.

Turntable speeds of 33 1/3, 45 and 78 rpm are selected by raising or lowering the idler wheel (108) to the appropriate step on the motor pulley.

When the selector lever (8) is moved, the selector segment (112) rotates. This causes the lever (105) fitted in the slot of the selector segment to move in a vertical direction. The idler wheel (108) mounted on the swinging arm (130) is lifted off the motor pulley and set down again on the motor pulley step for the adjacent speed.
Pitch Control

For turntable speeds 33 1/3, 45 and 78 rpm, the unit incorporates a voltage-independent pitch control, which permits a turntable speed variation of up to 6% (approximately one semitone).

When the pitch control knob (9) is turned, the switch segment (112) and the switch lever (105) attached to it are moved up or down. This vertical displacement changes the position of the idler wheel on whatever step of the motor pulley it has been placed on (by the speed selector), and, due to the tapered shape of the pulley, affects approximately ± 3% variation in speed.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turntable does not run when unit is plugged in and start switch operated</td>
<td>a) Current path to motor interrupted &lt;br&gt;b) Idler wheel (108) not in contact with platter &lt;br&gt;c) Motor pulley loose</td>
<td>a) Check connection at switch plate and voltage selector &lt;br&gt;b) Check switch lever assembly (105) &lt;br&gt;c) Tighten motor pulley</td>
</tr>
<tr>
<td>Turntable does not come up to speed</td>
<td>a) Motor pulley is not correct for local line frequency &lt;br&gt;b) Slippage between idler wheel (108) and motor pulley (120) or platter &lt;br&gt;c) Excessive friction in motor, drive wheel or platter bearings</td>
<td>a) Change motor pulley &lt;br&gt;b) Clean friction surfaces of idler wheel, motor pulley and turntable platter. If necessary, replace drive wheel. Once the drive surface of the platter has been cleaned, do not touch it with your fingers &lt;br&gt;c) Clean and oil bearings</td>
</tr>
<tr>
<td>Rumble in reproduction</td>
<td>Worn idler wheel</td>
<td>Replace idler wheel (108) and clean platter drive surface and motor pulley with greaseless solvent. Once surface are cleaned do not touch them with your fingers</td>
</tr>
<tr>
<td>Correct nominal speed obtained only at extreme settings of pitch control</td>
<td>Idler wheel does not contact motor pulley correctly</td>
<td>Loosen setscrew (122) and by means of setscrew (119) adjust the motor pulley on the motor shaft so that when the fine speed adjustment knob is in the center of its range, the idler wheel is positioned in the center of the appropriate motor pulley step. (Fig. 6). When adjustment is completed, tighten setscrew (122).</td>
</tr>
</tbody>
</table>

Symptom

Tonearm head is not parallel to turntable platter

Cause

Orientation of tonearm head on tonearm tube has altered because of jolting in transport (shipping)

Remedy

Remove turntable platter with the help of a screwdriver inserted through the hole in the chassis placed there for the purpose. Loosen screw on tonearm head. After correcting the tonearm head, tighten screw. (Fig. 6)
Tonearm and tonearm bearing

The tonearm of the Dual 1216 is counterbalanced and pivots vertically and horizontally on precision ball bearings. This approach gives highly favorable tracking characteristics. The tonearm head is removable. To aid in replacing or adjusting the tonearm head, a hole is provided in the turntable base to facilitate mounting the tonearm head without first removing the tonearm. Before setting the correct stylus force for the cartridge that has been installed, the tonearm should be balanced with the stylus-force setting at zero.

It is recommended that the balancing should be done right next to the tonearm rest.

The counterweight is so designed that it can balance cartridges with weights from 1 to 8 grams.

For shock absorption (the absorption of short, rapid jolts) the counterweight is elastically mounted on the tonearm and bracketed to prevent unintended rotation. The tonearm head is designed to accept all cartridges with internationally standard 1/2 inch mounting centers and with a weight not exceeding 1-8 grams. Stylus force is set by turning a calibrated spring housing (40), thus tensioning or slackening the spiral spring it contains. The scale is calibrated over a range of 0 to 5.5 grams, allowing an exact setting of stylus within that range in 0.5 gram steps.

To replace the tonearm with its bearing assembly, the following procedure is recommended:

1. Secure the unit in the repair jig, set the stylus force to zero and lock the tonearm in place.
2. Turn the unit upside down and unsolder the tonearm leads.
3. Remove main lever (204) and linking lever (192).
4. Connect the springs and screw on the shield.
5. Unfasten the c-washer and remove skating lever.
6. After loosening the c-washer (254) and friction washer (253) separate shutoff slide (234) four segment
7. Loosen cylinder screw (245/247) and remove segment.
8. Hold the main lever bracket and unscrew the hex nut (4 a)
9. Pull out the ball bearing with balls (5 places)
10. Set the unit on an upright position and take out the tonearm together with the main lever bracket.

Screw on the hex nut until you feel a slight resistance. After screwing it on place, there must be a noticeable play. After screwing on the cylinder screw, test the tonearm by setting it over the tonearm rest. The tonearm is correctly set when the tonearm can be lowered onto the rest without binding.

When reinstalling the protective cover (237), be sure that the segment (246) can move without hindrance though the tonearm leads.

To remove the tonearm from its bearing frame, unsolder the tonearm leads, then set the stylus-force adjustment to zero. Unscrew locknut (28) with setscrew (27) and bearing screw (45) (lefthand thread). Carefully lift the tonearm free from the bearing frame.
Anti-skating adjustment

The tendency of a tonearm with an offset (angled) head to "skate" inward across the record is eliminated in the Dual 1216 by a precision anti-skating mechanism.

Skating force depends on tonearm geometry, stylus force and the tip radius of the stylus. The inward pull on the tonearm caused by the skating effect gives rise not only to an undesirable jumping of the tonearm when it is set down on the record, but also to unequal forces on the two opposite groove walls, with corresponding ill effects. This can be corrected with proper anti-skating adjustment.

By turning the anti-skating adjustment knob (50) on the chassis, an asymmetrical curved washer (249) is turned. This washer has two different curved surfaces corresponding, respectively, to the red and black scales on the anti-skating dial. The red scale is for conical (spherical-tip) stylus; the black for elliptical (bi-radial) stylus. When the knob is turned, the curved surfaces push the anti-skating lever (231) away from its rest position so that it applies a suitable counterforce via a spring (233).

Skating compensation is set at the factory for conical stylus with a tip radius of 0.6 to 0.7 mil (.0006-.0007 inch), and for elliptical stylus with measurements of 0.20 to 0.23 mil by 0.79 to 0.87 mil. The hex adjusting nut is tightened and sealed. Readjustments should be attempted only with the help of the Dual Skate-O-meter and test record L 096. This work is best done by an authorized Dual service agency.

---

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stylus skips</td>
<td>a) Tonearm not balanced</td>
<td>a) Balance tonearm according to operating instructions</td>
</tr>
<tr>
<td></td>
<td>b) Stylus force too low</td>
<td>b) Set stylus force to cartridge manufacturer's recommended value</td>
</tr>
<tr>
<td></td>
<td>c) Stylus worn or chipped</td>
<td>c) Replace stylus</td>
</tr>
<tr>
<td></td>
<td>d) Excessive friction in tonearm bearing</td>
<td>d) Check tonearm horizontal pivot. Should have barely noticeable play. Adjust vertical bearing only with the left bearing screw (27) and the horizontal bearing with nut. Horizontal bearing is correctly adjusted when the tonearm, with anti-skating 0.5 p., swings freely from center to rest</td>
</tr>
<tr>
<td></td>
<td>e) Ball (235) missing from shut-off rail</td>
<td>e) Replace ball (235)</td>
</tr>
<tr>
<td></td>
<td>f) Anti-skating wrongly adjusted</td>
<td>f) Correct anti-skating setting</td>
</tr>
<tr>
<td>Tonearm sets down beside tonearm rest</td>
<td>Arm segment (246) incorrectly adjusted</td>
<td>Correct segment positioning: after loosening screws (245/247) rotate segment (246). Adjustment is correct when the tonearm descends to the tonearm rest without binding.</td>
</tr>
<tr>
<td>Horizontal pivot friction too high</td>
<td>Tonearm is set too high on tonearm lift. Main lever jams against guide pin of lift screw assembly</td>
<td>Stylus should be no farther from record surface than 1/4&quot;. Adjust by turning screw (211).</td>
</tr>
</tbody>
</table>
Tonearm movements

A guide groove located on the underside of the main cam (197) controls the automatic lift and set-down of the tonearm as the cam rotates through 360°. Tonearm lift and lowering are controlled by the main lever (204) and the lift screw (229). Horizontal movements are controlled by the main lever (204) and the segment (246). Setting the changer for playback of 7”, 10” or 12” discs is done with the indexing lever (33). Setdown points are determined by the eccentric portion of the arm positioning slide (243) and the indexing lever (242).

Horizontal movement of the tonearm is limited by the arm segment striking the arm positioning slide (243). During the change cycle, the main lever (204) raises the arm positioning slide, bringing it within reach of the spring stud. On completion of the change cycle (set-down of the tonearm on the record), the arm positioning slide (243) is again released and returns to its normal position. It thus moves out of reach of the spring stud, permitting the tonearm to move horizontally without hindrance, while playing the record.

Tonearm lift (Cue control)

The tonearm lift permits the tonearm to be set down on the record safely at any desired point except the shut-off area (near the record label).

Pulling the tonearm lift towards the front turns the drive washer (207). This moves the connecting lever (192), main lever (204) and lift screw (229) to raise the tonearm.

After the tonearm is moved (by hand) to the desired spot on the record, the tonearm lift handle is lightly tapped towards the rear to release the mechanism. The connecting lever (192) and the leaf spring (186) of the main lever are freed, allowing the tonearm to fall. The rate of fall is controlled by silicone grease on the drive washer (207).

The height of the stylus above the record can be varied from zero to about 1/4” by adjusting setscrew (211).

Turning it to the right increases the height, turning it to the left decreases the height.
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Tonearm misses edge of record | a) Set-down incorrectly adjusted  
   b) Record not standard size  
   c) Friction surfaces of tonearm clutch dirty | a) Adjust set-down with a 12" record so that stylus touches record approximately 1/16" inside edge of record. Adjustment will be correct for other sizes  
   b) Use standard records  
   c) Clean clutch surfaces |
| Tonearm strikes record during change cycle | Tonearm height incorrectly set | Adjust arm height with screw (30). Height is correct when stylus tip is 1/16" to 1/8" above start switch (32) when arm is removed from rest lowered |
| Tonearm does not move onto record when drop cycle is started | Damping too great, drive washer dirty | Loosen nut (205) and washer (206) and coat both sides evenly with silicone grease. Reassemble and wipe off excess grease |
| Tonearm lowers too quickly when drop cycle is started | Too little damping | Loosen nut (205) and washer (206) and drive washer (207). Clean thoroughly. Coat both sides evenly with silicone grease. Re-assemble and wipe off excess |
| Tonearm returns to rest immediately after being placed on record manually | Shut-off mechanism has shifted out of position during shipping | Before using changer after moving, run it through start cycle with tonearm locked on rest |

**Start cycle**

Moving the start switch (32) moves the switch lever (181) towards the main cam (197), initiating the following sequence:

a) The set screw of the switch lever assembly (181) turns the switch arm (143) mounted on the grooved shaft (185). Via a tension spring, this actuates the rocker assembly (105) and engages the idle (108) between the platter (7) and the motor pulley (120). At the same time, the power switch (141) is actuated by the switch slide (138) through the switch arm, and the turntable begins to rotate.

b) The switch lever (181) is brought within reach of the cam follower lever (236), so that it is pushed into the change position after the rotation of the main cam.

Fig. 12 Start position
Moving the operating switch also releases the start lever (183), pulling it towards the main cam by means of the tension spring (182). This causes coil spring to bring the shut-off lever (222) within range of the main cam dog. Thus the shut-off lever drives the main cam.

To prevent malfunctioning, the operating switch is locked during the start cycle (that is, while the main cam is turning). Just before the main cam reaches its neutral position (at the end of the change cycle), the start lever is pushed clear of the main cam by the start pin of the main cam. This restores the switch lever and operating switch to their original positions.

After installation and also after moving the changer, the unit should be started with the tonearm locked on the rest. This will automatically re-adjust the shut-off lever, which may have shifted out of position.

---

**Manual start**

When the tonearm (16) is swung inward by hand, the pawl on the switch arm drops into a support on the base plate, holding the switch arm in this position and the idler wheel (108) in contact with the platter. The slide (138) linked with the switch arm actuates the power switch and sets the turntable platter rotating.

On reaching the run-out groove, the tonearm automatically returns to its rest position and the unit shuts itself off, (See shut-off mechanism, next side). However, if the tonearm is lifted off the record manually and returned to the rest, the tab of the arm segment (246) release the pawl. The torsion spring (176) then returns the switch arm to its initial position, opening the power switch and disengaging the idler wheel.

---

**Stop switching**

When the operating lever is moved to "stop", the starting lever (183) is pushed forward. As a result the shut-off linkage comes into contact with the main cam. The swinging lever (236) remains in its stop position.

When the tonearm is on its rest and the operating lever is pushed to "stop", the operating lever must not jam,
Muting Switch

To prevent the noises of the change cycle from being sent through the audio system, the apparatus is fitted with a short-circuiting (muting) switch (239). The switch springs for both channels are actuated by the main cam (197). In the tonearm rest position, the muting switch is opened.

Record drop

Insert the appropriate spindle - AW 3 for standard records (7 mm center hole) or AS 12 for 45 rpm records (38 mm center hole).

Record-drops is initiated by the rotation of cam, whose cam surface guides the cam rocker, pushing the change actuator stud and releasing a record by means of the automatic spindle. The main cam is designed so that a record can drop only when the tonearm is above the tonearm rest and thus out of the reach of the largest possible records (12" diameter).

Shut-off and change cycle

The dog (M) on the turntable platter gear (PR) and the shut-off lever (222) actuate both the change cycle at the end of the record as well as the shut-off after the last record in a stack is played.

At the end of a record, the tonearm moves towards the center at an accelerated rate due to the increased pitch of the grooves. This motion carries the shut-off lever (222) towards the dog by means of the shut-off slide (234). The eccentric dog pushed the shut-off lever (232) back at each revolution as long as the tonearm advance is only one normal record groove.

The run-out groove with its steeper pitch moves the shut-off lever against the dog with greater force, engaging the shut-off lever (222) and causing the main cam (197) to be driven out of its neutral position by the turntable platter gear.
Shut-off mechanism

Shut-off and change functions are determined by the position of the cam follower lever (236). After every start or record-drop, the cam follower lever is brought to its stop position by the main lever (204) (longer end towards the center of the main cam). As the record is dropped the cam follower lever (236) is turned to its start position by the cam rocker (171), so that the tonearm can swing in toward the record and be lowered on to it. If there are no more records on the spindle and the cam rocker cannot turn the cam follower lever, the lever remains in its stop position and allows the tonearm to swing to its rest position.

When the main cam (197) returns to its neutral position, the switch arm (143) drops into a cut-out in the main cam, opening the power switch (141) and disengaging the drive idle (108).

Symptom
Turntable stops after automatic setdown of the tonearm

Cause
a) Switch arm (143) is not latched by pawl (194)

b) Power switch opens

Remedy
a) Loosen screw and turn the short arm piece on the long switcharm piece. Move the tonearm in and turn the main cam to its neutral position and adjust for about 1/64" play between cam and rectangular bolts riveted into the chassis;

b) As the tonearm moves in, switch slide (138) must overtravel by about 1/64", its tab must engage the switch (138),

Symptom
Last record keeps repeating

Cause
Defective spindle

Remedy
Replace spindle
Symptom
Record does not drop when unit is switched to "start"

Cause
Inadequate engagement between change lever and cam rocker (171)

Remedy
Adjust clearance between change lever and cam rocker to 1/64" minimum with apparatus in "start" position.

Symptom
Record drops when unit is switched to "stop"

Cause
Cam rocker (171) not caught by start lever

Remedy
Adjust cam rocker so that at the conclusion of the "stop" function the start lever runs about 1/16" under the follower.

Symptom
Records do not drop

Cause
Cam rocker (171) has too little force (travel)

Remedy
Re-adjust eccentric so that when the three supports in the automatic spindle are held in and the main cam is at its neutral, pressing the change screw moves the support about 1/64".
Symptom
Switch latches into "stop" position when tonearm is at rest.

Cause
Too much clearance between tab on switch arm (143) and start lever (183).

Remedy
Adjust tab on switch arm so that it clears start lever by 1/64" when main cam is in neutral position.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonearm moves with stylus force and anti-skating force at zero:</td>
<td>a) Anti-skating out of adjustment</td>
<td>a) Adjust skating lever so that horizontal movement of tonearm causes no movement of anti-skating spring,</td>
</tr>
<tr>
<td>a) outward;</td>
<td>b) Too-taut tonearm leads produce a twisting force</td>
<td>b) Allow some slack in tonearm leads</td>
</tr>
<tr>
<td>b) inward</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During change, stop and start operations, noises from the mechanism can be heard in system speaker</td>
<td>Muting switch misadjusted. Distance between contact springs and shorting contact is too great</td>
<td>Bend contacts so that, in the neutral position of the main cam the spacing between contacts is about 0.02 inch. Clean contacts</td>
</tr>
<tr>
<td>No sound</td>
<td>Spacing too small</td>
<td>See above</td>
</tr>
<tr>
<td>Motor will not shut off when tonearm is on arm rest</td>
<td>Capacitor across power switch is shorted</td>
<td>Replace capacitor (0.1 μF, 700 V)</td>
</tr>
<tr>
<td>Acoustic feedback</td>
<td>a) Chassis parts (for example leads) are touching base cut-out</td>
<td>a) Correct cut-out according to instructions supplied with unit. Move cables</td>
</tr>
<tr>
<td></td>
<td>b) Connecting cables are too taut</td>
<td>b) Allow more slack in cables</td>
</tr>
<tr>
<td>Pos. No.</td>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>1</td>
<td>215 470</td>
<td>Automatic spindle AS 12</td>
</tr>
<tr>
<td>2</td>
<td>213 095</td>
<td>Changing spindle AU 3</td>
</tr>
<tr>
<td>3</td>
<td>210 079</td>
<td>Facing ring 170 Ø</td>
</tr>
<tr>
<td>4</td>
<td>214 054</td>
<td>Washer</td>
</tr>
<tr>
<td>5</td>
<td>200 543</td>
<td>Retaining ring</td>
</tr>
<tr>
<td>6</td>
<td>218 667</td>
<td>Turntable mat complete, with facing ring 170 mm Ø</td>
</tr>
<tr>
<td>7</td>
<td>218 662</td>
<td>Turntable complete, with turntable mat and facing ring 170 mm Ø</td>
</tr>
<tr>
<td>8</td>
<td>221 725</td>
<td>Speed change lever, left</td>
</tr>
<tr>
<td>9</td>
<td>219 965</td>
<td>Speed regulator knob, complete</td>
</tr>
<tr>
<td>10</td>
<td>225 101</td>
<td>Blind (cm)</td>
</tr>
<tr>
<td>11</td>
<td>225 102</td>
<td>Blind (inch)</td>
</tr>
<tr>
<td>12</td>
<td>225 075</td>
<td>Chassis complete</td>
</tr>
<tr>
<td>13</td>
<td>214 210</td>
<td>Shipping screw assembly</td>
</tr>
<tr>
<td>14</td>
<td>216 851</td>
<td>Machine screw M 4 x 4</td>
</tr>
<tr>
<td>15</td>
<td>220 213</td>
<td>Canting disk</td>
</tr>
<tr>
<td>16</td>
<td>200 709</td>
<td>Single play spindle</td>
</tr>
<tr>
<td>17</td>
<td>223 017</td>
<td>Tonearm complete</td>
</tr>
<tr>
<td>18</td>
<td>223 001</td>
<td>Tonearm head, complete</td>
</tr>
<tr>
<td>19</td>
<td>223 005</td>
<td>Contact plate complete</td>
</tr>
<tr>
<td>20</td>
<td>201 132</td>
<td>Lift</td>
</tr>
<tr>
<td>21</td>
<td>210 182</td>
<td>Lockwasher</td>
</tr>
<tr>
<td>22</td>
<td>210 197</td>
<td>&quot;C&quot; clip G 4 x 0.8</td>
</tr>
<tr>
<td>23</td>
<td>223 011</td>
<td>Tonearm base assembly</td>
</tr>
<tr>
<td>24</td>
<td>210 362</td>
<td>Hex nut BM 3</td>
</tr>
<tr>
<td>25</td>
<td>210 366</td>
<td>Hex nut BM 4</td>
</tr>
<tr>
<td>26</td>
<td>210 362</td>
<td>Hex nut BM 3</td>
</tr>
<tr>
<td>27</td>
<td>217 438</td>
<td>Threaded pin</td>
</tr>
<tr>
<td>28</td>
<td>200 829</td>
<td>Stop nut</td>
</tr>
<tr>
<td>29</td>
<td>215 430</td>
<td>Cartridge mount TK 14, complete</td>
</tr>
<tr>
<td>30</td>
<td>218 636</td>
<td>Set screw</td>
</tr>
<tr>
<td>31</td>
<td>207 839</td>
<td>Damping ring</td>
</tr>
<tr>
<td>32</td>
<td>221 726</td>
<td>Switch lever right</td>
</tr>
<tr>
<td>33</td>
<td>221 726</td>
<td>Switch lever right</td>
</tr>
<tr>
<td>34</td>
<td>210 146</td>
<td>&quot;C&quot; ring 3.2</td>
</tr>
<tr>
<td>35</td>
<td>216 851</td>
<td>Arm lift lever, complete</td>
</tr>
<tr>
<td>36</td>
<td>210 353</td>
<td>Hex nut BM 2</td>
</tr>
<tr>
<td>37</td>
<td>225 104</td>
<td>Weight, complete</td>
</tr>
<tr>
<td>38</td>
<td>221 951</td>
<td>Threaded pin</td>
</tr>
<tr>
<td>39</td>
<td>223 003</td>
<td>Tonearm bearing, complete</td>
</tr>
<tr>
<td>40</td>
<td>217 273</td>
<td>Spring barrel, complete</td>
</tr>
<tr>
<td>41</td>
<td>221 510</td>
<td>Stop plate</td>
</tr>
<tr>
<td>42</td>
<td>210 487</td>
<td>Machine screw M 3 x 10</td>
</tr>
<tr>
<td>43</td>
<td>225 105</td>
<td>Bearing support</td>
</tr>
<tr>
<td>44</td>
<td>216 504</td>
<td>Indicator</td>
</tr>
<tr>
<td>45</td>
<td>217 436</td>
<td>Bearing screw, complete</td>
</tr>
<tr>
<td>46</td>
<td>200 567</td>
<td>Bearing race, complete</td>
</tr>
<tr>
<td>47</td>
<td>216 310</td>
<td>Bearing housing</td>
</tr>
<tr>
<td>48</td>
<td>200 567</td>
<td>Bearing race, complete</td>
</tr>
<tr>
<td>49</td>
<td>201 149</td>
<td>Set nut</td>
</tr>
<tr>
<td>50</td>
<td>221 926</td>
<td>Turn-knob</td>
</tr>
<tr>
<td>51</td>
<td>225 103</td>
<td>Dress-up plate, complete</td>
</tr>
<tr>
<td>52</td>
<td>213 260</td>
<td>Pin 2 x 6</td>
</tr>
<tr>
<td>53</td>
<td>217 905</td>
<td>Damping piece</td>
</tr>
<tr>
<td>54</td>
<td>214 047</td>
<td>Special screw (pierced)</td>
</tr>
<tr>
<td>55</td>
<td>214 211</td>
<td>Special screw (threaded)</td>
</tr>
<tr>
<td>56</td>
<td>200 579</td>
<td>Spring mounted footing (1 set = 3 pieces)</td>
</tr>
<tr>
<td>57</td>
<td>200 721</td>
<td>Threaded piece</td>
</tr>
<tr>
<td>58</td>
<td>200 723</td>
<td>Rubber insert isolation mount</td>
</tr>
<tr>
<td>59</td>
<td>200 722</td>
<td>Steel cup</td>
</tr>
<tr>
<td>60</td>
<td>210 816</td>
<td>Machine screw M 4 x 4</td>
</tr>
<tr>
<td>61</td>
<td>210 024</td>
<td>Washer 4.2/7.0/0.3 St</td>
</tr>
<tr>
<td>62</td>
<td>201 632</td>
<td>Rubber washer</td>
</tr>
<tr>
<td>63</td>
<td>200 713</td>
<td>Washer</td>
</tr>
<tr>
<td>64</td>
<td>200 712</td>
<td>Spring cup</td>
</tr>
<tr>
<td>65</td>
<td>210 366</td>
<td>Hex nut BM 4</td>
</tr>
<tr>
<td>66</td>
<td>210 624</td>
<td>Washer 4.2/7.0/0.3 St</td>
</tr>
<tr>
<td>67</td>
<td>200 718</td>
<td>Compression spring</td>
</tr>
<tr>
<td></td>
<td>200 711</td>
<td>Lockwasher</td>
</tr>
<tr>
<td>Pos.No.</td>
<td>Part.No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>101</td>
<td>217 376</td>
<td>Compression spring</td>
</tr>
<tr>
<td>102</td>
<td>217 026</td>
<td>Cam wheel</td>
</tr>
<tr>
<td>103</td>
<td>210 146</td>
<td>&quot;C&quot; clip 3.2</td>
</tr>
<tr>
<td>104</td>
<td>225 075</td>
<td>Chassis complete</td>
</tr>
<tr>
<td>105</td>
<td>217 234</td>
<td>Switch lever complete</td>
</tr>
<tr>
<td>106</td>
<td>210 146</td>
<td>&quot;C&quot; clip 3.2</td>
</tr>
<tr>
<td>107</td>
<td>200 110</td>
<td>Washer</td>
</tr>
<tr>
<td>108</td>
<td>217 888</td>
<td>Idler wheel complete</td>
</tr>
<tr>
<td>109</td>
<td>200 633</td>
<td>Lockwasher</td>
</tr>
<tr>
<td>110</td>
<td>217 027</td>
<td>Speed regulator wheel</td>
</tr>
<tr>
<td>111</td>
<td>217 233</td>
<td>Speed regulator detent</td>
</tr>
<tr>
<td>112</td>
<td>217 028</td>
<td>Switching segment</td>
</tr>
<tr>
<td>113</td>
<td>216 736</td>
<td>Compression spring</td>
</tr>
<tr>
<td>114</td>
<td>216 558</td>
<td>Support complete</td>
</tr>
<tr>
<td>115</td>
<td>217 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>116</td>
<td>217 239</td>
<td>Groove detent complete</td>
</tr>
<tr>
<td>117</td>
<td>210 642</td>
<td>Washer 4.2/7.0/0.3</td>
</tr>
<tr>
<td>118</td>
<td>210 361</td>
<td>Hex nut M 3</td>
</tr>
<tr>
<td>119</td>
<td>217 751</td>
<td>Threaded pin M 2.6 x 8</td>
</tr>
<tr>
<td>120</td>
<td>220 970</td>
<td>Motor pulley 50 cycles</td>
</tr>
<tr>
<td>121</td>
<td>220 971</td>
<td>Motor pulley 60 cycles</td>
</tr>
<tr>
<td>122</td>
<td>210 509</td>
<td>Machine screw AM 3.5 x 8</td>
</tr>
<tr>
<td>123</td>
<td>210 220</td>
<td>Threaded pin M 2.6 x 3.5</td>
</tr>
<tr>
<td>124</td>
<td>200 669</td>
<td>Dress-up plate</td>
</tr>
<tr>
<td>125</td>
<td>221 386</td>
<td>Isolation mount plate</td>
</tr>
<tr>
<td>126</td>
<td>221 385</td>
<td>Isolation washer lower</td>
</tr>
<tr>
<td>127</td>
<td>209 939</td>
<td>Slewing</td>
</tr>
<tr>
<td>128</td>
<td>217 727</td>
<td>Isolation sleeve</td>
</tr>
<tr>
<td>129</td>
<td>220 007</td>
<td>Washer 4.9/2/1.2 F</td>
</tr>
<tr>
<td>130</td>
<td>217 244</td>
<td>Idler arm complete</td>
</tr>
<tr>
<td>131</td>
<td>217 377</td>
<td>Compression spring</td>
</tr>
<tr>
<td>132</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>133</td>
<td>218 629</td>
<td>Compression spring</td>
</tr>
<tr>
<td>134</td>
<td>209 358</td>
<td>Steel ball 4 mm Ø</td>
</tr>
<tr>
<td>135</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>136</td>
<td>218 986</td>
<td>Roller for switch slide</td>
</tr>
<tr>
<td>137</td>
<td>214 181</td>
<td>Screw bolt</td>
</tr>
<tr>
<td>138</td>
<td>213 970</td>
<td>Switch slide complete</td>
</tr>
<tr>
<td>139</td>
<td>217 062</td>
<td>Cover for power switch with voltage selector</td>
</tr>
<tr>
<td>140</td>
<td>210 492</td>
<td>Machine screw AM 3 x 15</td>
</tr>
<tr>
<td>141</td>
<td>210 059</td>
<td>Power switch complete with voltage selector</td>
</tr>
<tr>
<td>142</td>
<td>200 447</td>
<td>Cable clamp</td>
</tr>
<tr>
<td>143</td>
<td>217 889</td>
<td>Switch arm complete</td>
</tr>
<tr>
<td>144</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>145</td>
<td>218 583</td>
<td>Machine screw AM 3 x 4</td>
</tr>
<tr>
<td>146</td>
<td>213 778</td>
<td>Tension spring</td>
</tr>
<tr>
<td>147</td>
<td>216 777</td>
<td>Switch-on lever</td>
</tr>
<tr>
<td>148</td>
<td>204 665</td>
<td>Shield</td>
</tr>
<tr>
<td>149</td>
<td>200 167</td>
<td>Bearing spacer</td>
</tr>
<tr>
<td>150</td>
<td>204 686</td>
<td>Motor bearing top complete</td>
</tr>
<tr>
<td>151</td>
<td>217 591</td>
<td>Stator 110/220 V complete</td>
</tr>
<tr>
<td>152</td>
<td>200 196</td>
<td>Stator 150 V complete</td>
</tr>
<tr>
<td>153</td>
<td>204 685</td>
<td>Motor complete with voltage selector</td>
</tr>
<tr>
<td>154</td>
<td>223 781</td>
<td>Screw bolt</td>
</tr>
<tr>
<td>155</td>
<td>217 060</td>
<td>Switch plate complete with voltage selector</td>
</tr>
<tr>
<td>156</td>
<td>213 966</td>
<td>Snap spring</td>
</tr>
<tr>
<td>157</td>
<td>214 176</td>
<td>Screen spring</td>
</tr>
<tr>
<td>158</td>
<td>210 196</td>
<td>&quot;C&quot; clip G 3 x 0.6</td>
</tr>
<tr>
<td>159</td>
<td>213 968</td>
<td>Tension spring</td>
</tr>
<tr>
<td>160</td>
<td>214 174</td>
<td>Contact support</td>
</tr>
<tr>
<td>161</td>
<td>214 173</td>
<td>Speed spindle</td>
</tr>
<tr>
<td>162</td>
<td>203 725</td>
<td>Capacitor</td>
</tr>
<tr>
<td>163</td>
<td>211 185</td>
<td>SEMKO-capacitor</td>
</tr>
<tr>
<td>164</td>
<td>217 920</td>
<td>Locking device small</td>
</tr>
<tr>
<td>165</td>
<td>213 979</td>
<td>Locking device large</td>
</tr>
<tr>
<td>Pos.No.</td>
<td>Part.No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>164</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>165</td>
<td>210 099</td>
<td>Plastic clamp for motor line</td>
</tr>
<tr>
<td></td>
<td>220 152</td>
<td>Plastic clamp for power line</td>
</tr>
<tr>
<td>166</td>
<td>210 586</td>
<td>Washer 3.2/7.0/0.5 St</td>
</tr>
<tr>
<td>167</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>168</td>
<td>220 973</td>
<td>Motor 110/220 V complete</td>
</tr>
<tr>
<td></td>
<td>220 973</td>
<td>Motor 150 V complete</td>
</tr>
<tr>
<td>169</td>
<td>214 175</td>
<td>Contact spring</td>
</tr>
<tr>
<td>170</td>
<td>200 685</td>
<td>Hex nut</td>
</tr>
<tr>
<td></td>
<td>213 922</td>
<td>Cam rocker complete</td>
</tr>
<tr>
<td></td>
<td>217 813</td>
<td>Shaft</td>
</tr>
<tr>
<td>173</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>174</td>
<td>213 918</td>
<td>Change actuator complete</td>
</tr>
<tr>
<td>175</td>
<td>210 586</td>
<td>Washer 3.2/7.0/0.5 St</td>
</tr>
<tr>
<td>176</td>
<td>213 940</td>
<td>Torsion spring</td>
</tr>
<tr>
<td>177</td>
<td>213 920</td>
<td>Compression spring</td>
</tr>
<tr>
<td>178</td>
<td>213 921</td>
<td>Bushing</td>
</tr>
<tr>
<td>179</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>180</td>
<td>210 147</td>
<td>&quot;C&quot; washer 4</td>
</tr>
<tr>
<td>181</td>
<td>210 538</td>
<td>Switch lever complete</td>
</tr>
<tr>
<td>182</td>
<td>200 103</td>
<td>Tension spring</td>
</tr>
<tr>
<td>183</td>
<td>217 258</td>
<td>Start lever</td>
</tr>
<tr>
<td>184</td>
<td>210 147</td>
<td>&quot;C&quot; washer 4</td>
</tr>
<tr>
<td>185</td>
<td>217 334</td>
<td>Grooved shaft</td>
</tr>
<tr>
<td>186</td>
<td>201 186</td>
<td>Leaf spring</td>
</tr>
<tr>
<td>187</td>
<td>200 458</td>
<td>Spacer</td>
</tr>
<tr>
<td>188</td>
<td>210 480</td>
<td>Machine screw AM 3 x 6</td>
</tr>
<tr>
<td>189</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>190</td>
<td>210 554</td>
<td>Ball bearing</td>
</tr>
<tr>
<td>191</td>
<td>214 201</td>
<td>Bearing support complete</td>
</tr>
<tr>
<td>192</td>
<td>213 300</td>
<td>Connecting lever</td>
</tr>
<tr>
<td>193</td>
<td>213 925</td>
<td>Torsion spring</td>
</tr>
<tr>
<td>194</td>
<td>213 942</td>
<td>Latch complete</td>
</tr>
<tr>
<td>195</td>
<td>202 043</td>
<td>Washer 6.8/12.0/0.5 St</td>
</tr>
<tr>
<td>196</td>
<td>210 145</td>
<td>&quot;C&quot; washer 3.2</td>
</tr>
<tr>
<td>197</td>
<td>220 332</td>
<td>Cam wheel complete</td>
</tr>
<tr>
<td>198</td>
<td>200 519</td>
<td>Bearing post</td>
</tr>
<tr>
<td>199</td>
<td>210 366</td>
<td>Hex nut BM 4</td>
</tr>
<tr>
<td>200</td>
<td>200 528</td>
<td>Shaft</td>
</tr>
<tr>
<td>201</td>
<td>201 185</td>
<td>Bearing support</td>
</tr>
<tr>
<td>202</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>203</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>204</td>
<td>201 094</td>
<td>Main lever complete</td>
</tr>
<tr>
<td>205</td>
<td>210 366</td>
<td>Hex nut BM 4</td>
</tr>
<tr>
<td>206</td>
<td>201 195</td>
<td>Cover washer</td>
</tr>
<tr>
<td>207</td>
<td>217 290</td>
<td>Drive washer complete</td>
</tr>
<tr>
<td>208</td>
<td>217 286</td>
<td>Support bracket assembly</td>
</tr>
<tr>
<td>209</td>
<td>217 296</td>
<td>Torsion spring</td>
</tr>
<tr>
<td>210</td>
<td>221 527</td>
<td>Drive cam</td>
</tr>
<tr>
<td>211</td>
<td>220 167</td>
<td>Set screw</td>
</tr>
<tr>
<td>212</td>
<td>210 187</td>
<td>Bowed lockwasher</td>
</tr>
<tr>
<td>213</td>
<td>210 147</td>
<td>&quot;C&quot; washer 4</td>
</tr>
<tr>
<td>214</td>
<td>210 469</td>
<td>Machine screw AM 3 x 3</td>
</tr>
<tr>
<td>215</td>
<td>217 297</td>
<td>Bearing support complete</td>
</tr>
<tr>
<td>216</td>
<td>210 511</td>
<td>Machine screw AM 4 x 4</td>
</tr>
<tr>
<td>217</td>
<td>210 143</td>
<td>&quot;C&quot; washer 1.5</td>
</tr>
<tr>
<td>218</td>
<td>201 174</td>
<td>Compression spring</td>
</tr>
<tr>
<td></td>
<td>201 179</td>
<td>Conical spring</td>
</tr>
<tr>
<td>220</td>
<td>200 686</td>
<td>Spring pin</td>
</tr>
<tr>
<td>221</td>
<td>220 235</td>
<td>Stop nut</td>
</tr>
<tr>
<td>222</td>
<td>220 232</td>
<td>Shut-off lever complete</td>
</tr>
<tr>
<td>223</td>
<td>222 690</td>
<td>Friction plate complete</td>
</tr>
<tr>
<td>224</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>225</td>
<td>200 650</td>
<td>Sleeve</td>
</tr>
<tr>
<td>226</td>
<td>200 522</td>
<td>Snap spring</td>
</tr>
<tr>
<td>227</td>
<td>211 614</td>
<td>Solder lug</td>
</tr>
<tr>
<td>228</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>229</td>
<td>223 952</td>
<td>Lift rod complete</td>
</tr>
<tr>
<td>230</td>
<td>210 146</td>
<td>&quot;C&quot; washer 3.2</td>
</tr>
<tr>
<td>231</td>
<td>222 691</td>
<td>Skating lever complete</td>
</tr>
<tr>
<td>232</td>
<td>217 948</td>
<td>Torsion spring</td>
</tr>
<tr>
<td>233</td>
<td>218 591</td>
<td>Tension spring</td>
</tr>
<tr>
<td>234</td>
<td>200 668</td>
<td>Shut-off slide</td>
</tr>
<tr>
<td>235</td>
<td>209 358</td>
<td>Steel ball 4 mm ø</td>
</tr>
<tr>
<td>236</td>
<td>214 203</td>
<td>Cam follower lever complete with sleeve</td>
</tr>
<tr>
<td>237</td>
<td>217 285</td>
<td>Cover plate</td>
</tr>
<tr>
<td>238</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>Pos. No.</td>
<td>Part. No.</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>239</td>
<td>207 447</td>
<td>Muting switch complete</td>
</tr>
<tr>
<td>240</td>
<td>201 240</td>
<td>Motor shield</td>
</tr>
<tr>
<td>241</td>
<td>218 583</td>
<td>Machine screw M 3 x 4</td>
</tr>
<tr>
<td>242</td>
<td>217 264</td>
<td>Record size selector left complete</td>
</tr>
<tr>
<td>243</td>
<td>217 276</td>
<td>Arm positioning slide complete</td>
</tr>
<tr>
<td>244</td>
<td>200 453</td>
<td>Tension spring</td>
</tr>
<tr>
<td>245</td>
<td>210 482</td>
<td>Machine screw AM 3 x 6</td>
</tr>
<tr>
<td>246</td>
<td>225 228</td>
<td>Segment complete</td>
</tr>
<tr>
<td>247</td>
<td>210 480</td>
<td>Machine screw AM 3 x 6</td>
</tr>
<tr>
<td>248</td>
<td>216 867</td>
<td>Bowed lockwasher</td>
</tr>
<tr>
<td>249</td>
<td>220 899</td>
<td>Cam washer</td>
</tr>
<tr>
<td>250</td>
<td>210 361</td>
<td>Hex nut M 3</td>
</tr>
<tr>
<td>251</td>
<td>221 260</td>
<td>Set screw</td>
</tr>
<tr>
<td>252</td>
<td>201 184</td>
<td>Set washer</td>
</tr>
<tr>
<td>253</td>
<td>201 187</td>
<td>Friction disc</td>
</tr>
<tr>
<td>254</td>
<td>210 145</td>
<td>&quot;C&quot; washer 2.3</td>
</tr>
<tr>
<td>255</td>
<td>217 617</td>
<td>Stand</td>
</tr>
<tr>
<td>256</td>
<td>217 759</td>
<td>Stand complete with phono jacks</td>
</tr>
<tr>
<td>257</td>
<td>210 475</td>
<td>Machine screw AM 3 x 5</td>
</tr>
<tr>
<td>258</td>
<td>209 457</td>
<td>Inner casing for AMP-plug</td>
</tr>
<tr>
<td>259</td>
<td>209 436</td>
<td>Flat prong socket</td>
</tr>
<tr>
<td>260</td>
<td>213 980</td>
<td>Input jack housing</td>
</tr>
<tr>
<td>261</td>
<td>213 984</td>
<td>Power cable, with U.S. type plug and 5-pole Dual plug</td>
</tr>
<tr>
<td></td>
<td>207 311</td>
<td>Power cable, with U.S. type plug and 4-pole Dual plug</td>
</tr>
<tr>
<td>262</td>
<td>209 424</td>
<td>Miniatur plug for audio cable</td>
</tr>
<tr>
<td>263</td>
<td>207 303</td>
<td>Audio cable complete with miniatur plug</td>
</tr>
<tr>
<td>264</td>
<td>220 142</td>
<td>Power cable complete with 5-pole Dual plug</td>
</tr>
<tr>
<td>265</td>
<td>207 312</td>
<td>Power cable complete with 4-pole AMP-plug</td>
</tr>
<tr>
<td>266</td>
<td>209 426</td>
<td>Phono plug, red</td>
</tr>
<tr>
<td></td>
<td>209 425</td>
<td>Phono plug, yellow</td>
</tr>
<tr>
<td>**</td>
<td>207 299</td>
<td>Audio cable complete with phono plugs</td>
</tr>
<tr>
<td>**</td>
<td>201 229</td>
<td>Cover pin</td>
</tr>
<tr>
<td>**</td>
<td>214 120</td>
<td>Mounting hardware</td>
</tr>
<tr>
<td>**</td>
<td>211 473</td>
<td>Stroboscope disc 50/60 Hz</td>
</tr>
<tr>
<td>**</td>
<td>214 219</td>
<td>Packing carton complete</td>
</tr>
<tr>
<td>**</td>
<td>223 669</td>
<td>Operating instructions, 4 languages</td>
</tr>
<tr>
<td>**</td>
<td>225 034</td>
<td>Operating instructions, UAP</td>
</tr>
<tr>
<td>**</td>
<td>225 035</td>
<td>Operating instructions, english</td>
</tr>
<tr>
<td>**</td>
<td>223 668</td>
<td>Mounting instructions</td>
</tr>
<tr>
<td>**</td>
<td>214 048</td>
<td>Mounting gauge for pick-up system</td>
</tr>
</tbody>
</table>

Alteration reserved
** Not illustrated
**Lubrication**

All bearings and sliding points have been properly lubricated during assembly. Re-lubrication is normally not necessary for about two years since all important bearings are provided with oil retainers and sintered bearings.

Lubrication should be applied sparingly. It is of primary importance that no oil or grease should get onto the friction surfaces of the drive wheel, motor pulley or turntable, to avoid slippage. For the same reason, avoid touching these parts.

---

**Use the following lubricants:**

- **Adhesive oil, Renotac No. 342**
- **BP oil, Super Viscostatic 10 W/30**
- **Shell Alvania No. 2**
- **Isoflex PDP 40**
- **Wacker silicone oil AK 500 000**