

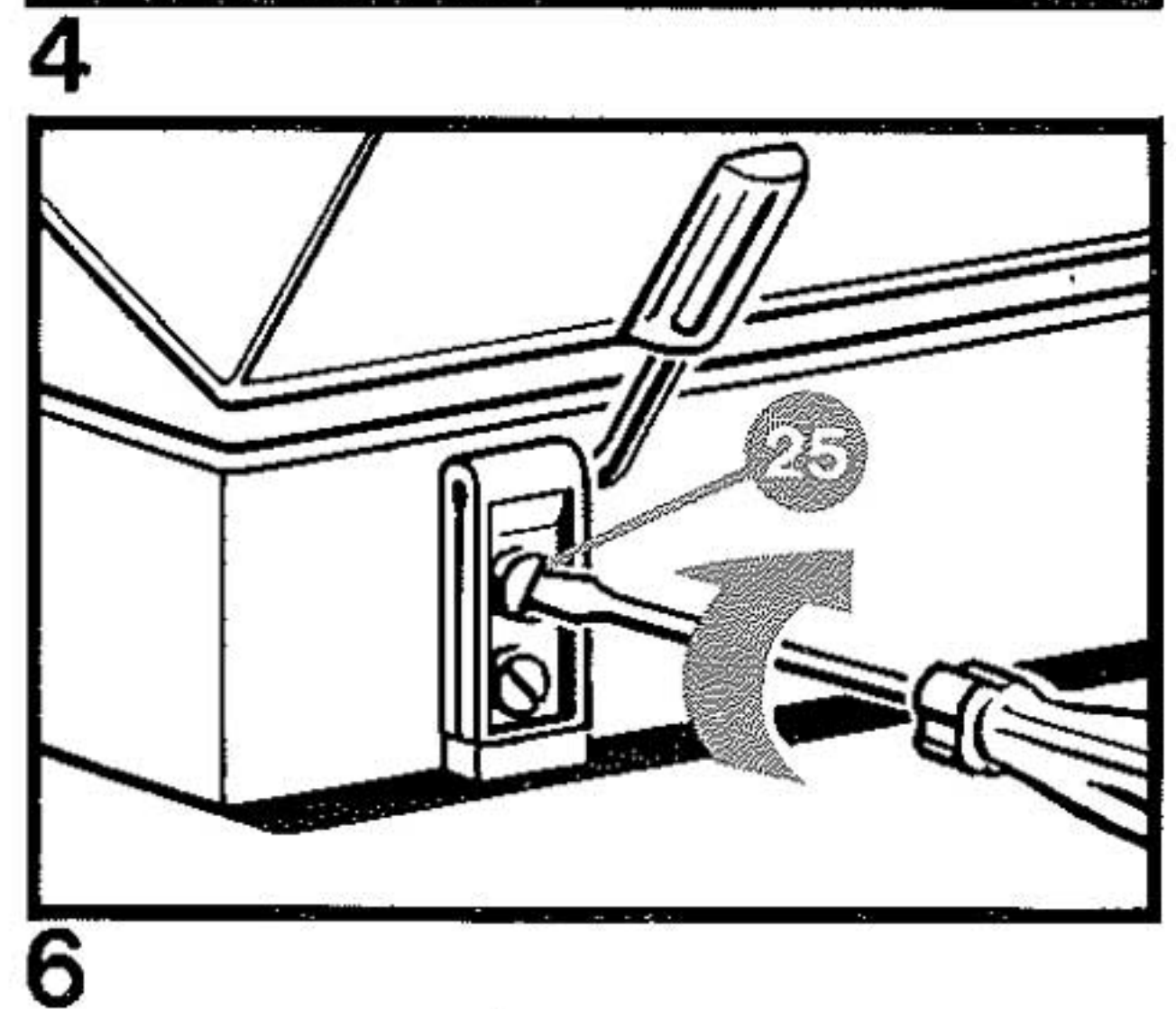
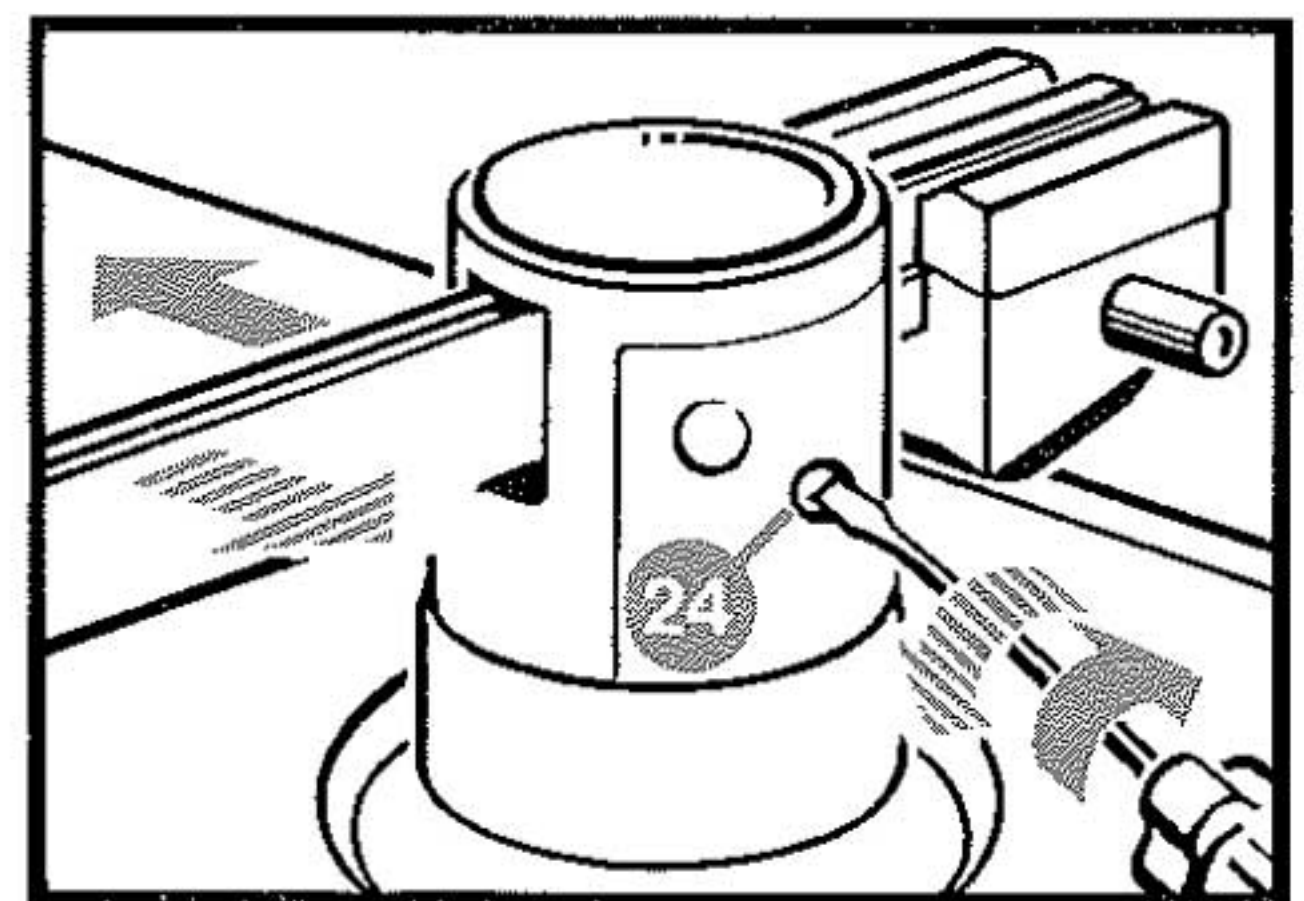
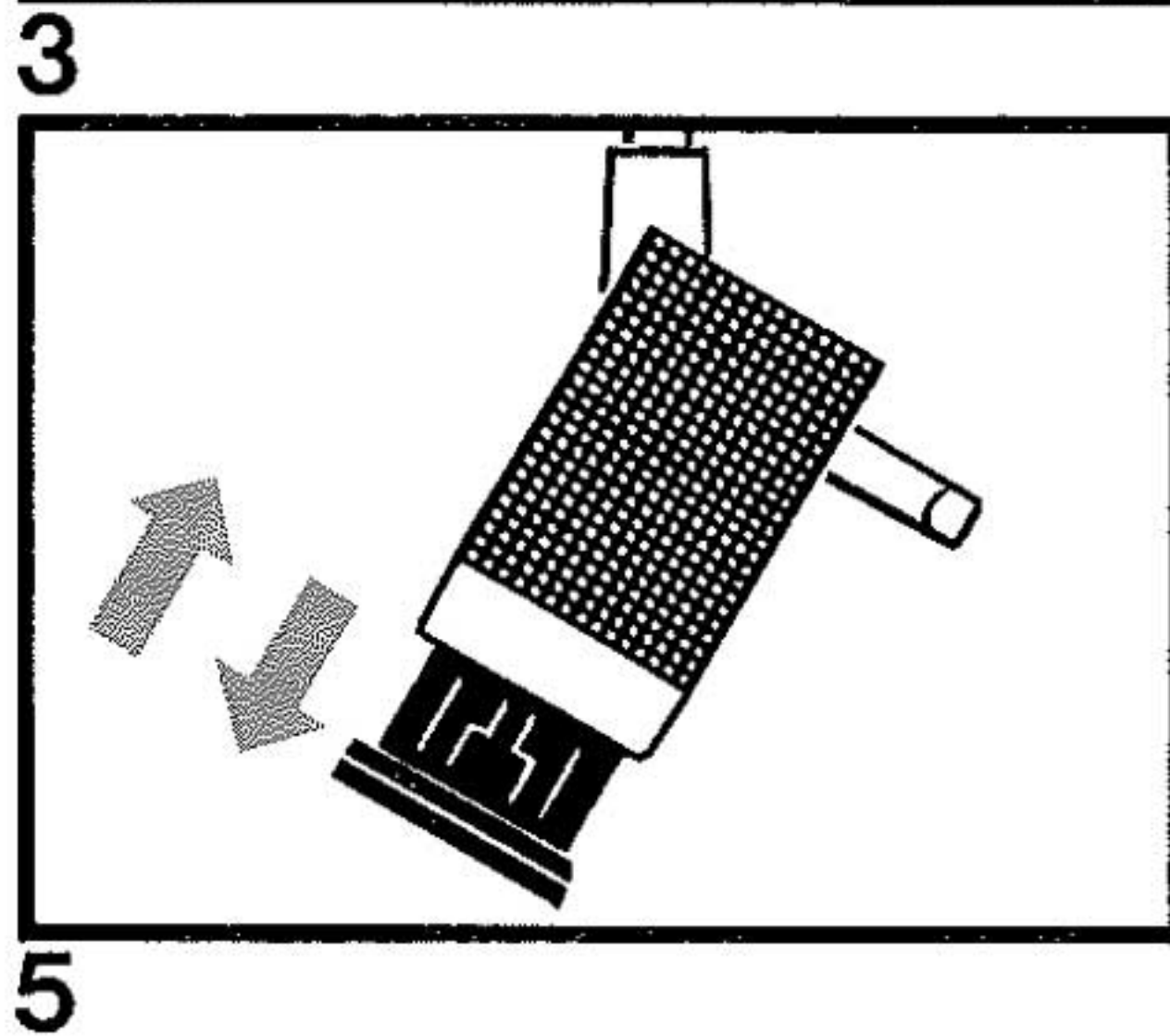
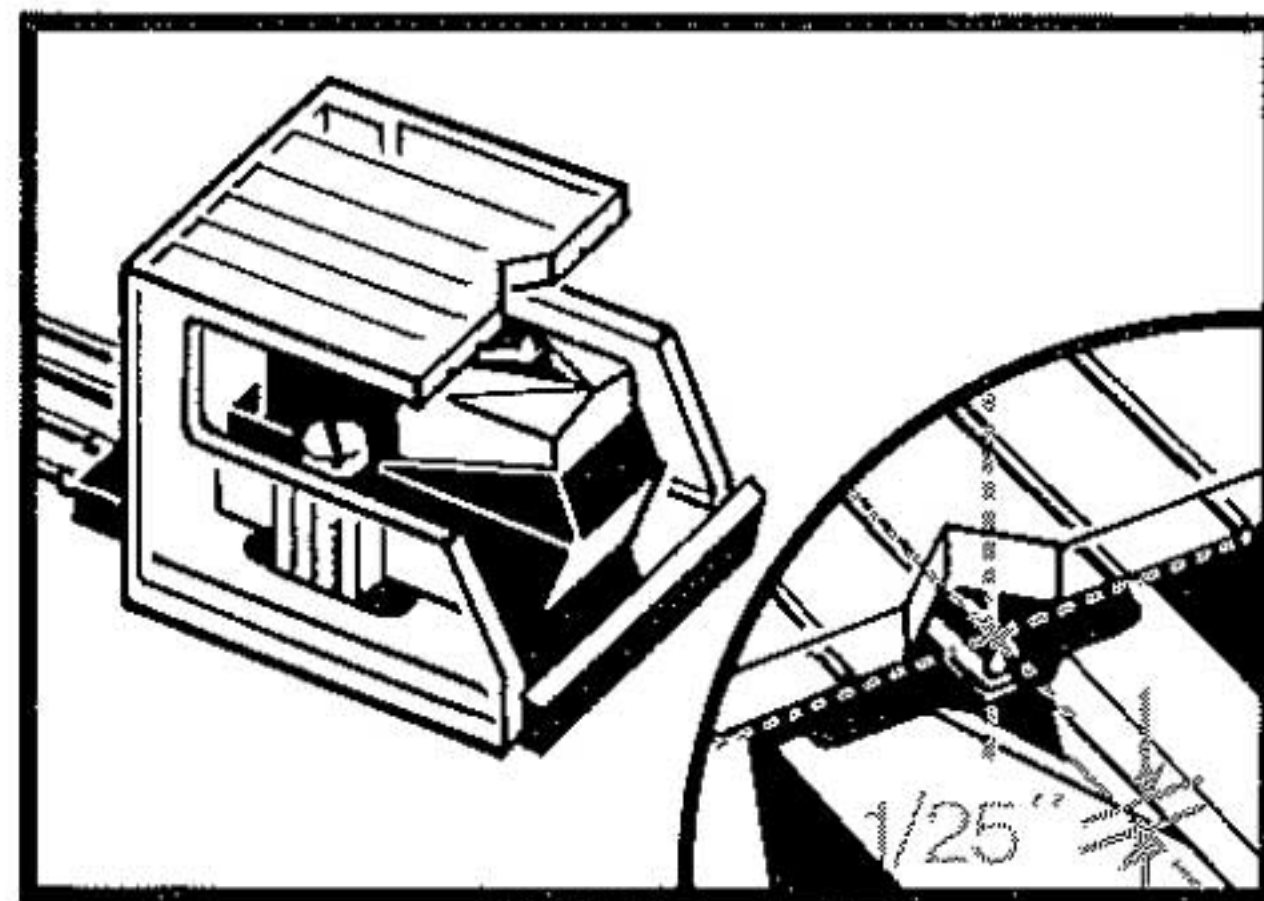
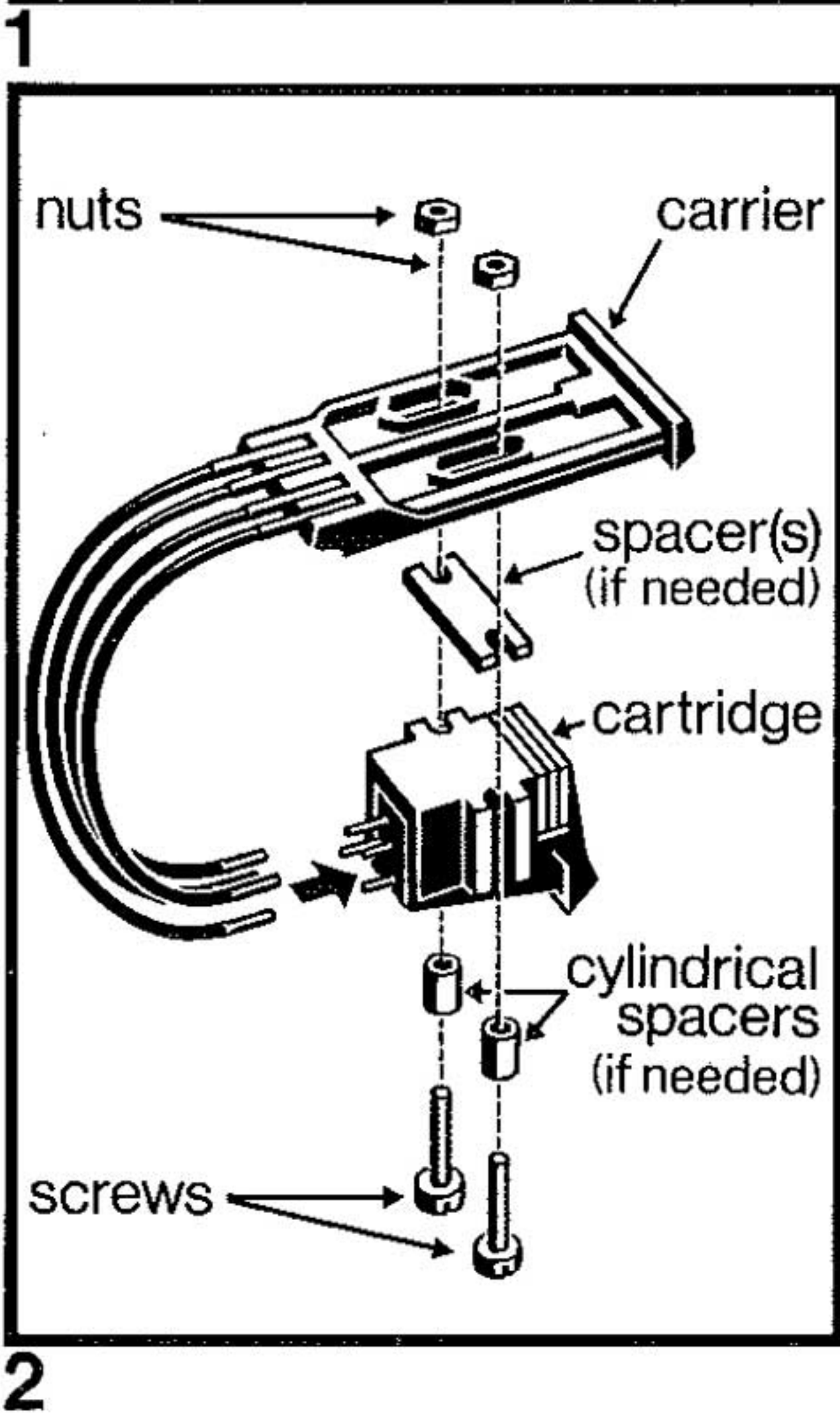
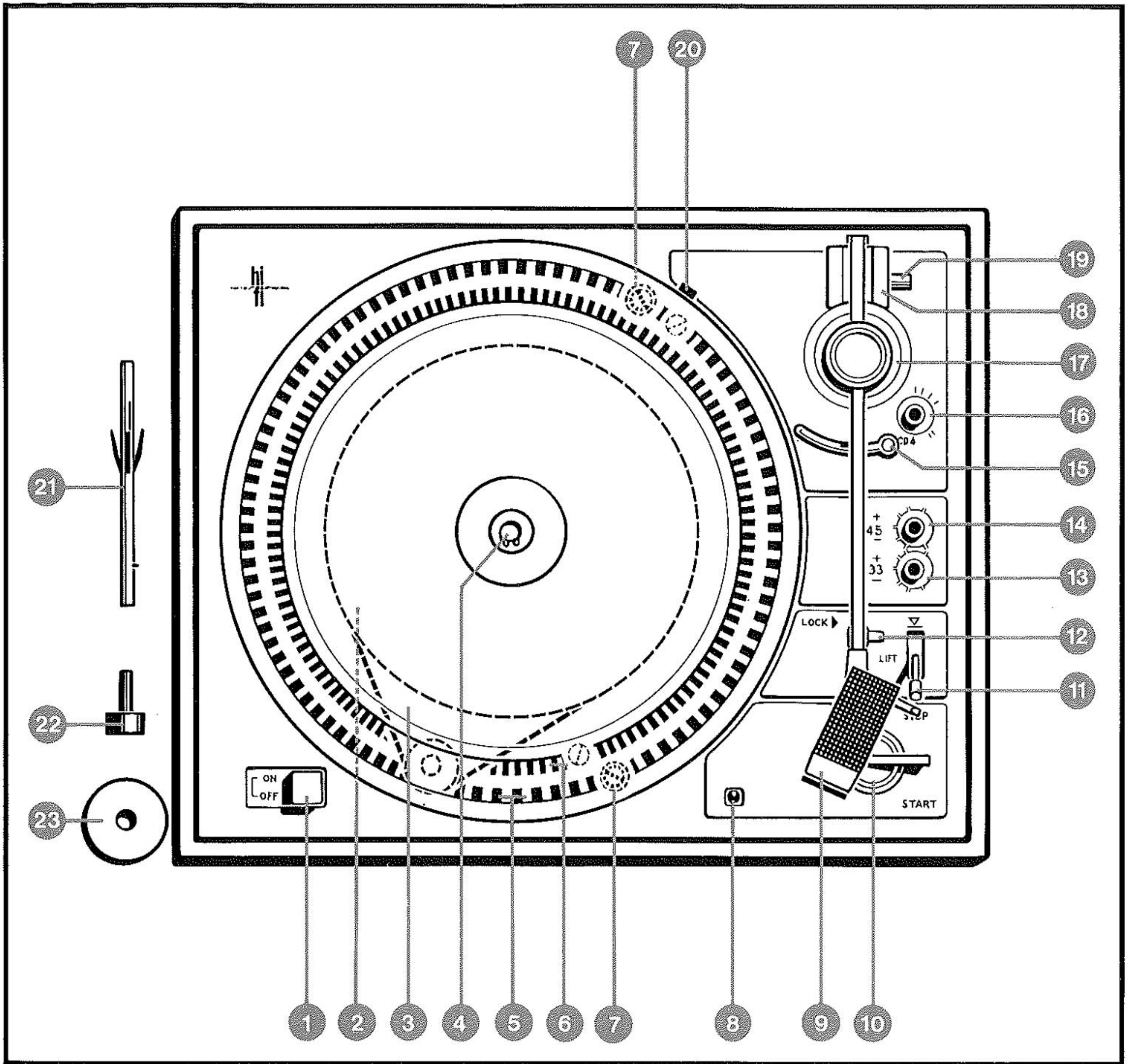


**PHILIPS**

**GA 406 AUTOMATIC  
DC SERVO - BELT-DRIVE**

**hi**  
HIGH FIDELITY INTERNATIONAL  
**fi**





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## WARNING

**To prevent damage which may result in fire or shock hazard, do not expose this appliance to rain or excessive moisture.**

### Introduction

This HiFi record player can be used either as a fully automatic or manual player for a single record or as a record changer for a number of records. In both cases, it meets the DIN 45 500 requirements, partly because it is equipped with two motors.

One of these motors is used to drive the turntable via a belt, its speed being controlled by means of a tachogenerator. The other motor provides the motive power for all the automatic functions. This arrangement guarantees not only optimum sound quality but also a long life for the record player.

Apart from its special construction, this record player incorporates the following features:

- automatic diameter selection for 7" and 12" records
- automatic speed selection (33 or 45 r.p.m.)
- automatic switch-off of drive mechanism and return of pickup arm to rest at end of record
- stylus force adjustable between 0 and 4 grams
- adjustable anti-skate
- hydraulically damped pickup arm lift
- universal head shell to take all cartridges with standard 1/2" mounting distances
- possibility of closing cover while playing 12" records

### Controls, etc.

#### Figure 1

- ① power switch
- ② drive plate
- ③ turntable
- ④ hole in turntable
- ⑤ 45-r.p.m. stroboscope
- ⑥ 33-r.p.m. stroboscope
- ⑦ transport screws
- ⑧ pilot light
- ⑨ pickup head shell
- ⑩ start/stop switch
- ⑪ pickup arm lift lever
- ⑫ pickup arm lock
- ⑬ fine speed adjustment for 33 r.p.m.
- ⑭ fine speed adjustment for 45 r.p.m.
- ⑮ pickup arm lift
- ⑯ anti-skate adjuster
- ⑰ stylus-force adjustment ring

- ⑱ counterweight
- ⑲ adjustment knob for counterweight
- ⑳ record diameter probe
- ㉑ record changer spindle
- ㉒ record player spindle
- ㉓ adapter for 45-r.p.m. records

#### Figure 5

- ㉔ pickup arm adjustment screw

#### Figure 6

- ㉕ cover hinge adjustment screw

### Installation

#### Unpacking

The various parts of the record player are packed separately to prevent them from damage during transit. Remove all parts from the packing, these are: turntable ③, counterweight ⑱, record-changer spindle ㉑, record-player spindle ㉒, 45-r.p.m. adapter ㉓ and an alignment jig with hardware and plastic carrier for mounting your cartridge.

Remove plastic bag and string from head shell ⑨.

#### Transport locking

This record player is provided with a special locking device to protect it against shocks during transport. This locking device must be removed after the record player has been put in place, before fitting the turntable.

To unlock the chassis turn the two red-ringed screws ⑦ next to the drive plate ② anti-clockwise as far as they will go.

*N.B.:* Don't forget to lock the transport screws ⑦ again if the record player has to be transported.

#### Assembly

a. Place turntable ③ on drive plate ②.

b. Slide counterweight ⑱ with the groove on top and knob ⑲ on the right over the end of the pickup arm until it comes up against the teeth on this arm; now turn knob ⑲ a couple of turns clockwise.

c. All cartridges with standard mounting distances (1/2") can be mounted on the sliding carrier. A mounting kit is supplied with the record player. This kit consists of mounting hardware and an alignment jig; the function of the jig is to determine accurately the position of the cartridge on the carrier.

Mount the cartridge (see Figure 2) with screws and nuts on the smooth side of the carrier, but do not tighten the screws completely. The length of the screws should be chosen so that they do not



project above the edge of the carrier when they are tightened. If necessary, put cylindrical spacers on the screws.

Slide the carrier with the cartridge into the grooves in the jig (see Figure 3). First of all, check whether the stylus is about  $\frac{1}{25}$ " underneath the top plate of the jig. If the clearance is greater than this place one or more spacers under the cartridge. Now adjust the cartridge carefully until:

- the stylus is exactly in the middle of the notch in the jig;
- the main axis and the long sides of the cartridge are parallel with the lines on top of the jig.

Now fix the cartridge firmly in place by tightening the screws uniformly.

Connect the colored wires on the carrier to the pins on the cartridge as follows:

- L (white) to L (left channel)
- R (red) to R (right channel)
- LG (blue) to LG (left channel ground)
- RG (green) to RG (right channel ground)

If necessary, the black wire supplied with the mounting kit can be used to make a ground connection to the middle tag on the carrier.

Finally, slide the carrier with the cartridge into the head shell (see Figure 4).

#### *Connection to AC and amplifier*

Insert the plug from the AC line cord into a standard AC receptacle supplying 110/120 volts, 60 hertz power.

Connect the pickup leads to the input socket of your amplifier or tuner/amplifier - lead marked 'L' to the left channel input and the lead marked 'R' to the right channel input.

Connect the ground lead from the record player to the ground terminal on the amplifier or tuner/amplifier.

#### *Stylus-force adjustment*

The stylus force is the vertical force the stylus exerts on the record. Each type of cartridge has an optimum stylus force, which is given in the technical data for the cartridge. It is of the utmost importance that the stylus force should be accurately adjusted to the recommended value, as too high or too low a stylus force can lead to poor sound quality and damage to your records.

Adjust the stylus force as follows:

- Turn the '0' on stylus-force adjustment ring (17) until it is opposite the silver mark at the foot of the pickup arm.
- Set anti-skate adjuster (16) to '0'.
- Set pickup arm lift lever (11) to '▼'.
- Remove the protective cover from the cartridge, if provided.

- Free the pickup arm by turning knob (12) anti-clockwise.

● Support the pickup arm near the arm rest with one hand. Turn knob (19) carefully clockwise with the other hand, until counterweight (18) keeps the arm in equilibrium at the height of the arm rest when you let the arm go: the pickup arm should then float freely and not rise or fall.

- Finally, turn adjustment ring (17) until the appropriate figure is opposite the silver mark at the foot of the pickup arm.

#### *Anti-skate*

Skate is the force generated by the friction of the stylus against the groove wall, which tends to press the stylus more strongly against the inner groove surface. This leads to imperfect tracking and thus distortion. Skate depends not only on the stylus force but also on the shape of the stylus (spherical, bi-radial or CD4 stylus).

In order to compensate for the skate, this record player is designed so that a well defined force equal and opposite to the skate can be exerted on the pickup arm.

The anti-skate is adjusted by setting knob (16) to the same figure as the stylus-force adjustment. For cartridges with a spherical stylus, use the silver scale; for cartridges with a bi-radial stylus or a CD4 stylus, use the red scale.

#### **Switching on and off**

*Switching on:* depress power switch (1): pilot light (8) will now light up.

*Switching off:* depress power switch (1) again; pilot light (8) will now go out.

#### **Operation as a record player**

*Note:* 10" records can only be played manually.

- Place record-player spindle (22) in hole (4). For 45-r.p.m. records with a large center hole, use adapter (23).
- Remove the protective cover from the cartridge or push up the stylus guard as far as it will go.
- Free the pickup arm by turning knob (12) anti-clockwise.

#### *Operation as automatic record player*

(for 12", 33-r.p.m. or 7", 45-r.p.m. records)

- Place the record on the turntable.
- Make sure that lever (11) is set to '▼'.
- Turn start/stop switch (10) to 'START' and release it.



### *Operation as manual record player*

(for 33-r.p.m. records)

- Place the record on the turntable.
- Set lever (11) to '▽'. (N.B.: The automatic pickup arm lift only works when the lever is pushed as far as it will go.)
- Take the pickup arm from its rest, place it over the desired part of the record and set the lever back to '▽'.

At the end of the record, the pickup arm returns to its rest and the drive mechanism is switched off.

### *Selection or repetition of a part of a record*

Set lever (11) to '▽'. Place the pickup arm above the desired part of the record, and move the lever back to '▽'.

### *Interruption of play*

Set lever (11) '▽'. The pickup arm is now raised from the record, while the turntable continues to revolve. Set the lever to '▽' again when you want to continue playing the record.

### *Stopping during play*

Turn start/stop switch (10) to 'STOP' and release it. The pickup arm will now return automatically to its rest, and the drive mechanism will be switched off.

### **Operation as a record changer**

(for 12", 33-r.p.m. and 7", 45-r.p.m. records)

- Put recorder-changer spindle (21) in hole (4), turning it clockwise during insertion until it can turn no further. For 45-r.p.m. records with a large center hole, use record-changer unit EG 7048 (optional extra, not available in every country).
- Remove the protective cover from the cartridge or push up the stylus guard as far as it will go.
- Free the pickup arm by turning knob (12) anti-clockwise.
- Load up to five records of the same diameter and speed on the record-changer spindle.
- Make sure that lever (11) is set to '▽';
- Turn start/stop switch (10) to 'START' and release it.

After the last record has been played, the pickup arm will return to its rest and the drive mechanism will be switched off.

### *Changing to the next record*

If you want to hear the next record while a disc is still being played, turn start/stop switch (10) to 'START' again.

### *Stopping during play*

Turn start/stop switch (10) to 'STOP' and release it. The next record will not be played; the pickup arm will return to its rest, and the drive mechanism will be switched off.

*Note:* Do not leave any records on the record-changer spindle after the record player has been switched off as they may tend to warp. Keep the records horizontal as you remove them from the spindle. Now turn the spindle anti-clockwise and pull it out of the center hole.

### **Adjustments**

#### *Adjustment of the turntable speed*

If necessary, the speed of the turntable can be accurately adjusted with the aid of knobs (13) (for 33 r.p.m.) and (14) (for 45 r.p.m.). The stroboscopes (6) (for 33 r.p.m.) and (5) (for 45 r.p.m.) can be used to check the speed. The ring in question should appear to be stationary, when viewed under a fluorescent lamp operating from 60Hz power. If the ring appears to be turning anti-clockwise, the corresponding knob should be turned clockwise, and vice versa.

In order to check and adjust the speed of 33 r.p.m., start the turntable by setting lever (11) to '▽', taking the pickup arm from its rest and moving it a little towards the turntable.

In order to check and adjust the speed of 45 r.p.m., place a 7" record on the turntable and start the latter by setting lever (11) to '▽' and turning start/stop switch (10) to 'START'.

The possibility of adjusting the speed of the record player is also useful if you want to play a musical instrument together with a record. You may then need to adjust the pitch of the music on the record to that of your own instrument; this can be done by raising or lowering the speed of the record player with the appropriate knob; the pitch can be raised or lowered by up to a semitone in this way.

#### *Adjusting the pickup arm*

In automatic operation, the stylus should set down in the lead-in groove of the record.

If this is not the case, the pickup arm can be adjusted by turning screw (24) anti-clockwise to move the arm away from the center, or clockwise to move the arm towards the center (see Figure 5). When adjusting the pickup arm it should lie on the arm rest.

#### *Adjusting the cover hinges*

Thanks to the use of friction hinges, the cover can be held open in practically any position.



If the cover does not remain in the desired position, you can adjust the hinges by tightening screws ②⑤ (see Figure 6).

*N.B.:* The hinges must not be lubricated.

### Maintenance

In order to check the stylus or to replace the cartridge, the sliding carrier with the cartridge can be pulled out of the head shell by its raised edge (see Figure 4).

Although a diamond stylus is only subject to very slight wear, it is advisable to have it checked at regular intervals by your dealer, e.g. once a year. The stylus can be cleaned with a soft-haired brush. Never put a record on the turntable or remove one from the turntable while the latter is still rotating. The mechanism of this record player does not require any special maintenance, as it is fitted with self-lubricating bearings.

### Technical data

*(subject to modification without notice)*

Turntable speeds	33 $\frac{1}{3}$ and 45 r.p.m. (can be varied up to $\pm 3\%$ , i.e. one semitone)
Wow and flutter (DIN)	0.1%
Rumble (DIN B)	60dB
Tracking error	0°9' /cm
Stylus force	adjustable from 0 to 4 grams
Arm friction (hor./vert.)	50 mg
Line voltage	117V
Line frequency	60Hz
Power consumption	7W
Dimensions	16 $\frac{1}{2}$ " x 13 $\frac{5}{8}$ " x 5 $\frac{3}{4}$ "
Weight	abt. 14 lbs.