

MICRO
OPERATING MANUAL

A. Background information to the development of the remote drive unit

When we look back over the evolution of turntables during the last few years, we see that manufacturers have focused on the major design checkpoints of rated speed maintenance and signal-to-noise ratio improvement. The development of the direct drive motor and its adoption in turntables can be virtually called a breakthrough since the technology resolves the themes posed over the years. As great improvements in rated speed maintenance and the signal-to-noise ratio, which form the basic requirements of rotating mechanisms, were forged, turntables moved into the mass production and mass consumption age, and along with the introduction of the quartz lock system and other electronic control circuits, turntables were thought to be virtually perfect from both a mechanical and electrical standpoint.

The basic function of a turntable is to play discs. What happens is that the disc is stationary and no signals at all are generated but by rotating the disc at the prescribed speed, a wave motion can be perceived from the speakers through the reproduction system.

We have seen that the sound which is reproduced by the speakers undergoes changes with the rotational energy of the platter, and it has recognized that there are limits to improving the sound quality simply by rotating the disc at the prescribed speed. What we mean here by rotational energy is not simply the value of the torque based on the motor itself but the effect of the moment of inertia which is produced by the diameter of the platter and its mass distribution. In other words, our experience is that clean reproduced sound should be provided with clean (natural) energy which is produced by the speed and the mass of the actual rotating body.

In its research we spotlighted the strength precision of the fulcrum, which is of fundamental importance for rotating mechanisms, and it has spent a great deal of time and effort in improving the shaft so that it sufficiently supports the rotation of the platter. In this way, we came to realize that the construction and strength precision of the shaft have a great effect on the reproduced sound, just like the platter's moment of inertia. However, there are limits to clarifying the fulcrum with today's DD motor turntables because of the construction involved, and this obliged us to develop its own shaft.

We can say quite clearly that, against the backdrop of string drive turntable design, it was only inevitable that we should take another look at these rotating mechanisms. Despite the fact that for the last ten years electronics technology has been introduced at a very rapid clip, there is still great support for string drive and other similar drive systems, and there are a number of audio-philes and groups which use effective techniques by experience to improve the sound quality to their own liking. Although the debate between the vacuum tube and the transistor appears to have been brought to a close, we cannot ignore the fact that in the world of rotating mechanisms the absolute requirements imposed by mechanical strength precision and mass cannot be replaced on equivalent terms simply by electronics. We can say that the capacity of the human ear to appraise sound quality goes beyond the limits detected by test and measuring instruments. Even with the range of the wave motion produced by the speakers, we must now stand behind the belief that there is no need to stick to "audio common sense" which dictated that it is possible to discriminate all the way between part of the mechanisms of the turntable, which is the entrance to the sound.

The new remote drive unit, designed and developed by us is based on an approach which does not conform to "audio common sense". The reproduced sound is of such a high quality that it gains an extra dimension over that recreated by conventional turntables. When you listen to its sound you will agree with other listeners who have said that "once you've heard the sound, you'll never forget it." We are convinced that this unit assembly, with its absolute bare minimum of distortion and its wide dynamic range, and with its string drive will break through the confines imposed by non-scientific preconception.

B. Construction of remote drive unit

- * Platter unit: RX-5000, 42.34 kg
- (1) Platter: made of gun-metal, 16 kg
- (2) Platter bearing assembly: 3.9 kg
Bearing nut: 0.24 kg.
- (3) Frame: made of zinc, 20 kg.
foot assembly, made of brass, 2.2 kg.
(4 units)
- * Motor unit: RY-5500, 12 kg
- * Arm mount: AX-1G-AX-8G, made of brass (option)
AX-1-AX-2, made of Aluminium (option)
- (1) AX-1 or AX-1G: Standard type
1 Effective arm length, 200 to 235 mm
- (2) AX-2 or AX-2G: SME3009 (S2) only
- (3) AX-3 or AX-3G: Long type
Effective arm length, 200 to 309 mm
- (4) AX-4G: SME3012 only
- (5) AX-5G: AT1503III, FR64S, EPA100
- (6) AX-6G: Large-diameter shaft
- (7) AX-7G: Long type only
- (8) AX-8G: Standard type only

C. Suitable tonearms

AX-1G

MICRO/MA-505X, 505S, 707X

ADC/LMF-1-LMF-2

EMT/929

ORTOFON/RS-212-RMG-212-SMG-212II

AUDIOTECHNICA/AT-1005II

AUDIO CRAFT/AC 300C.A.

DENON/DA303-305-307-309-401

FR/FR54-24MKII-14

SAEC/WE-308N-308SX-407/23

GRACE/G-545F-707-840FB-940-945S

TECHNICS/EPA-101 S-L-121S-L-99

PIONEER/PA-1000

INFINITY/FORMULA 4

AX-2G

SME/3999SII-SIII

AX-3G

MICRO/MA-505LX-505LS

EMT/997

ORTOFON/RF297-RMG309

AUDIO CRAFT/AC-300A-400A-C-400MKII

DENON/DA-302-304-308

GRACE/G-565F-860FB-960

SAEC/WE-308L

AX-4G

SME/3012

AX-5G

AUDIO TECHNICA/AT-1503II-1503III

FR/FR-64-64S

AX-6G

MICRO/MAX-282

LUSTER/GST801

AUDIO-CRAFT/AC-4000MC

AUDIO TECHNICA/AT-1501II-1501III

FR/FR-66S

SAEC/WE-506/30

VICTOR/UA-7082-7045

TECHNICS/EPA-100

GRACE/G860P

AX-7G

MICRO/MAX-282

AUDIOCRAFT/AC4000MC

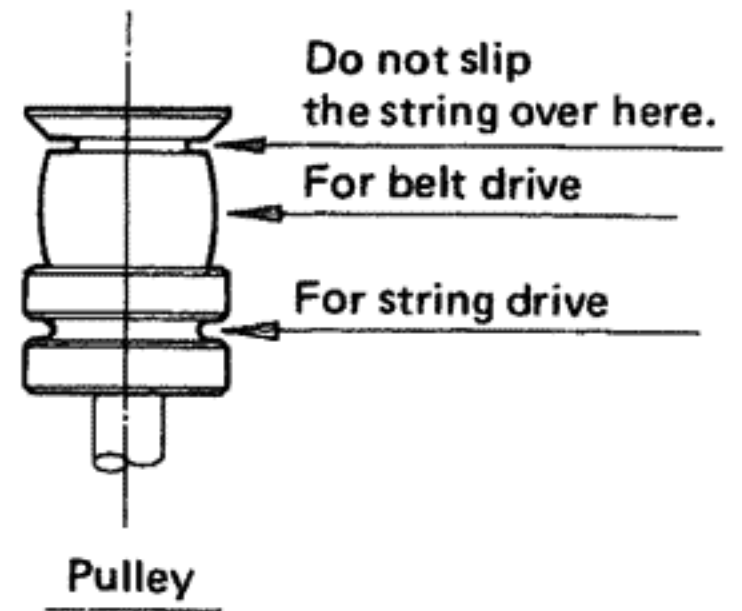
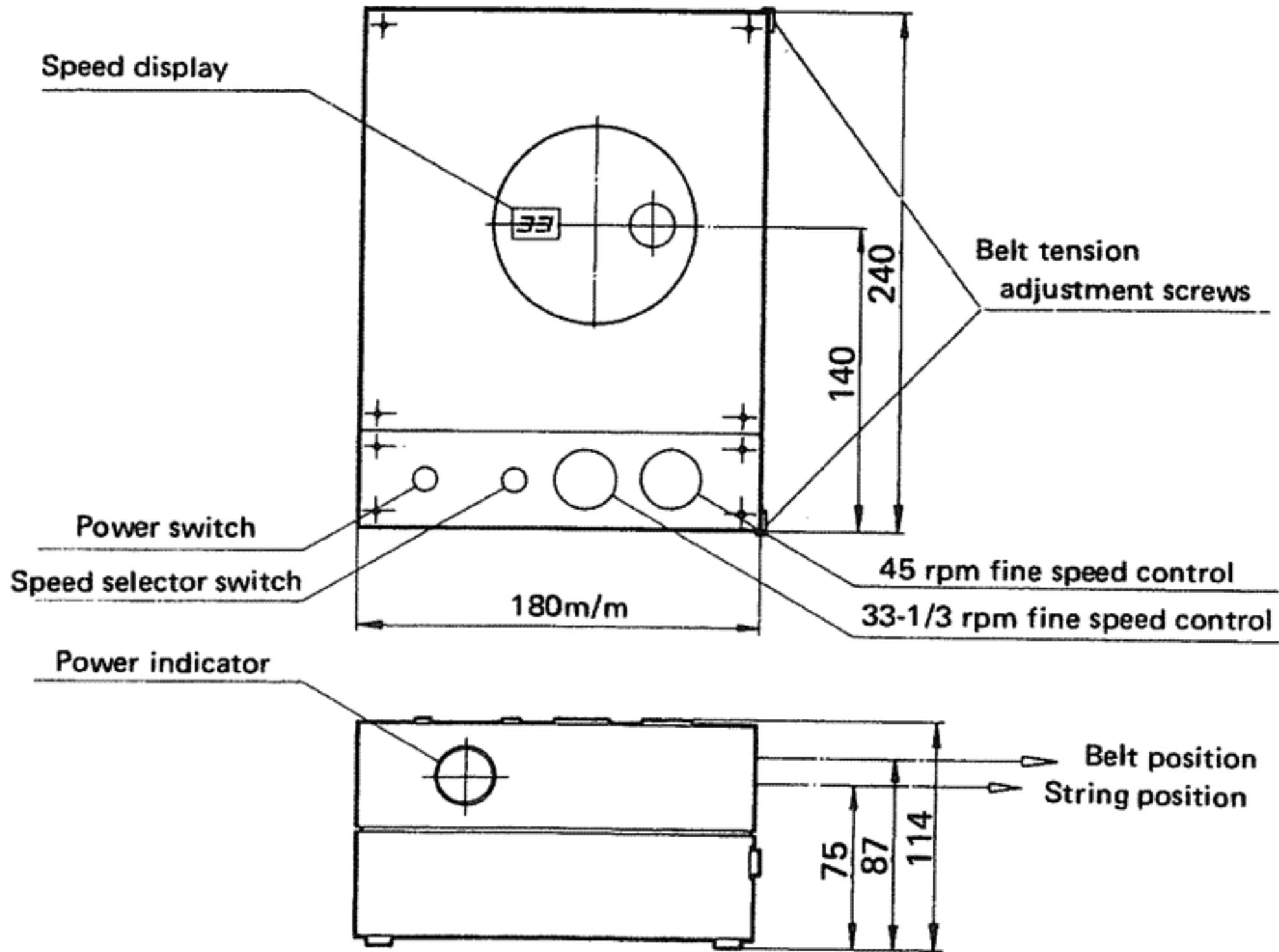
AX-8G

MICRO/MA505XII-SII-808X

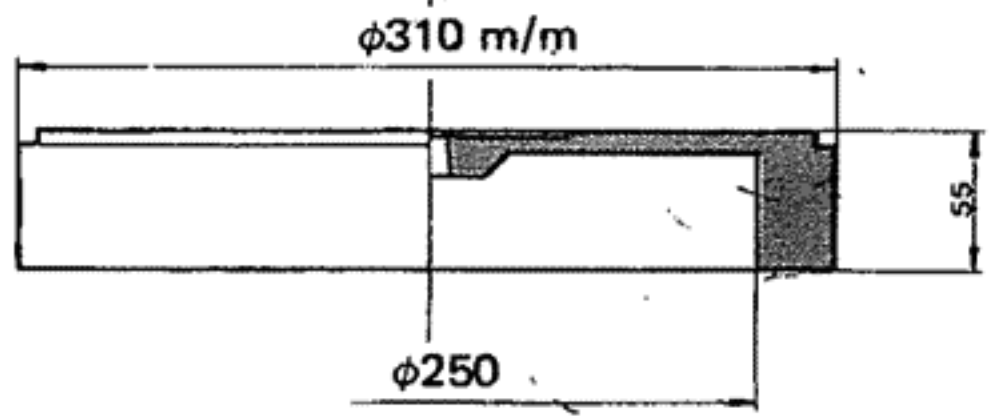
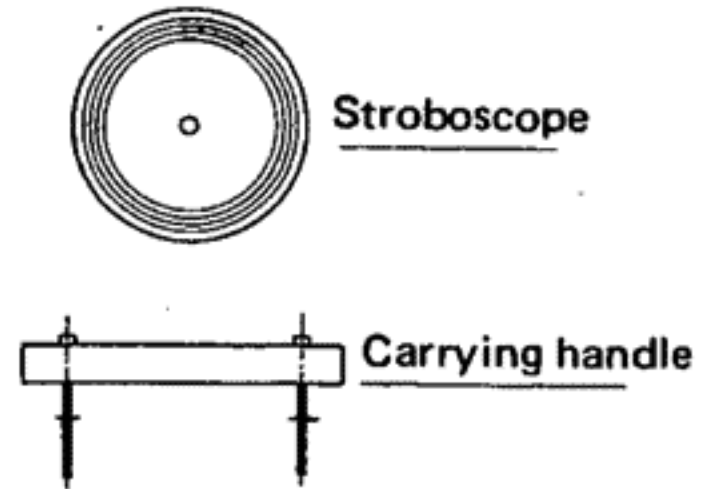
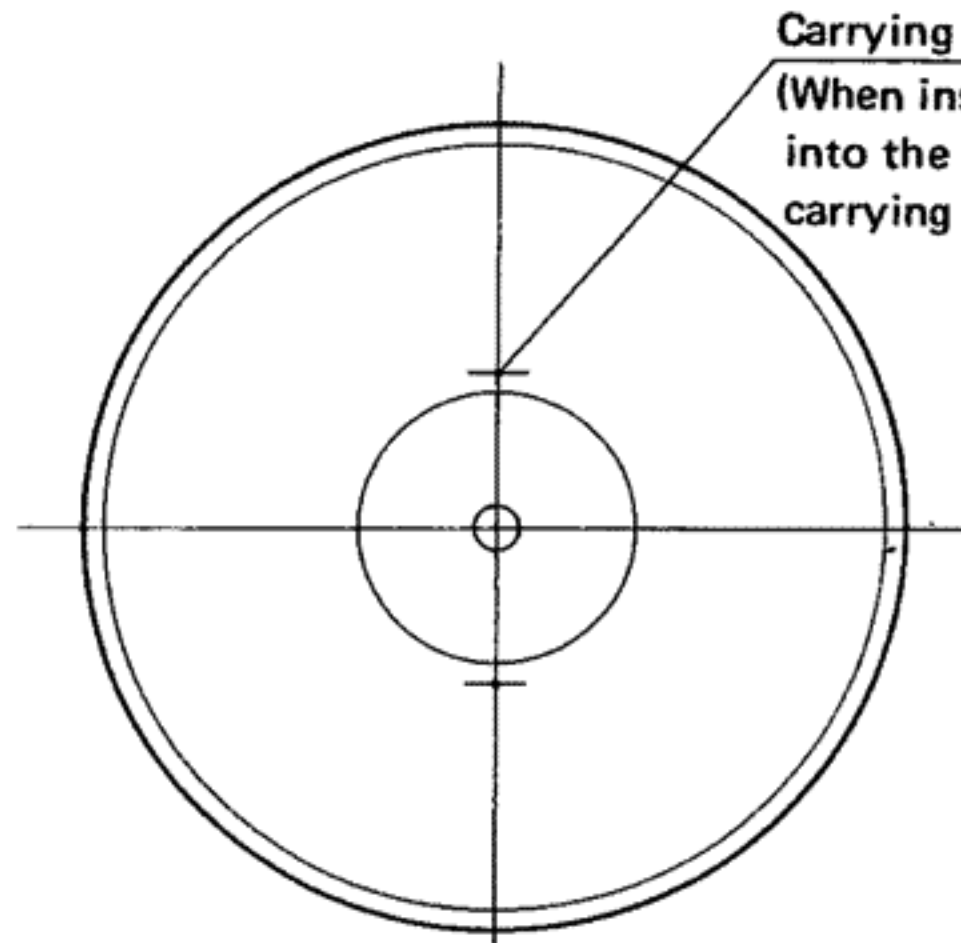
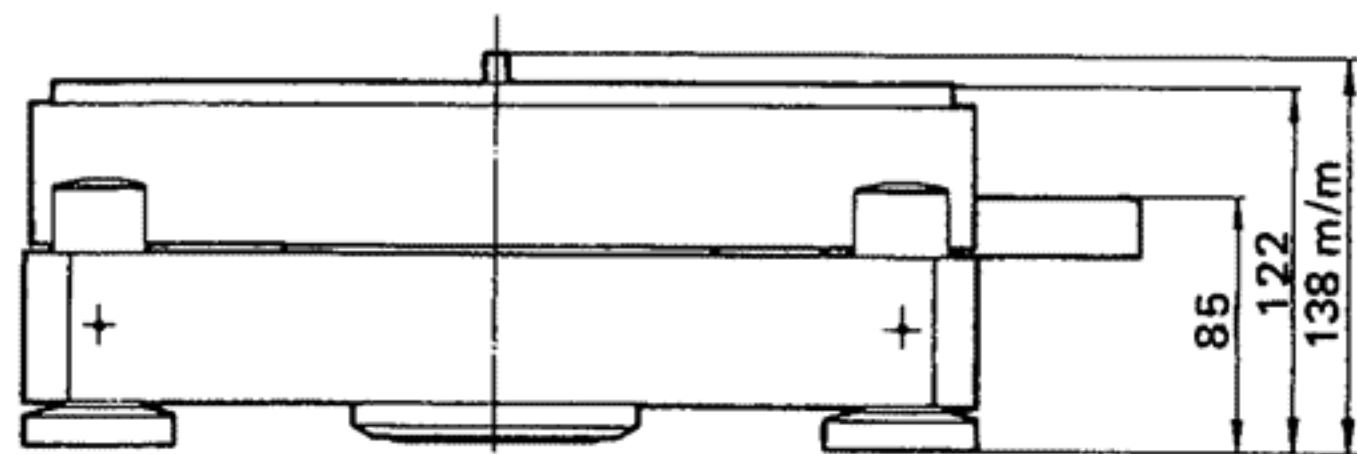
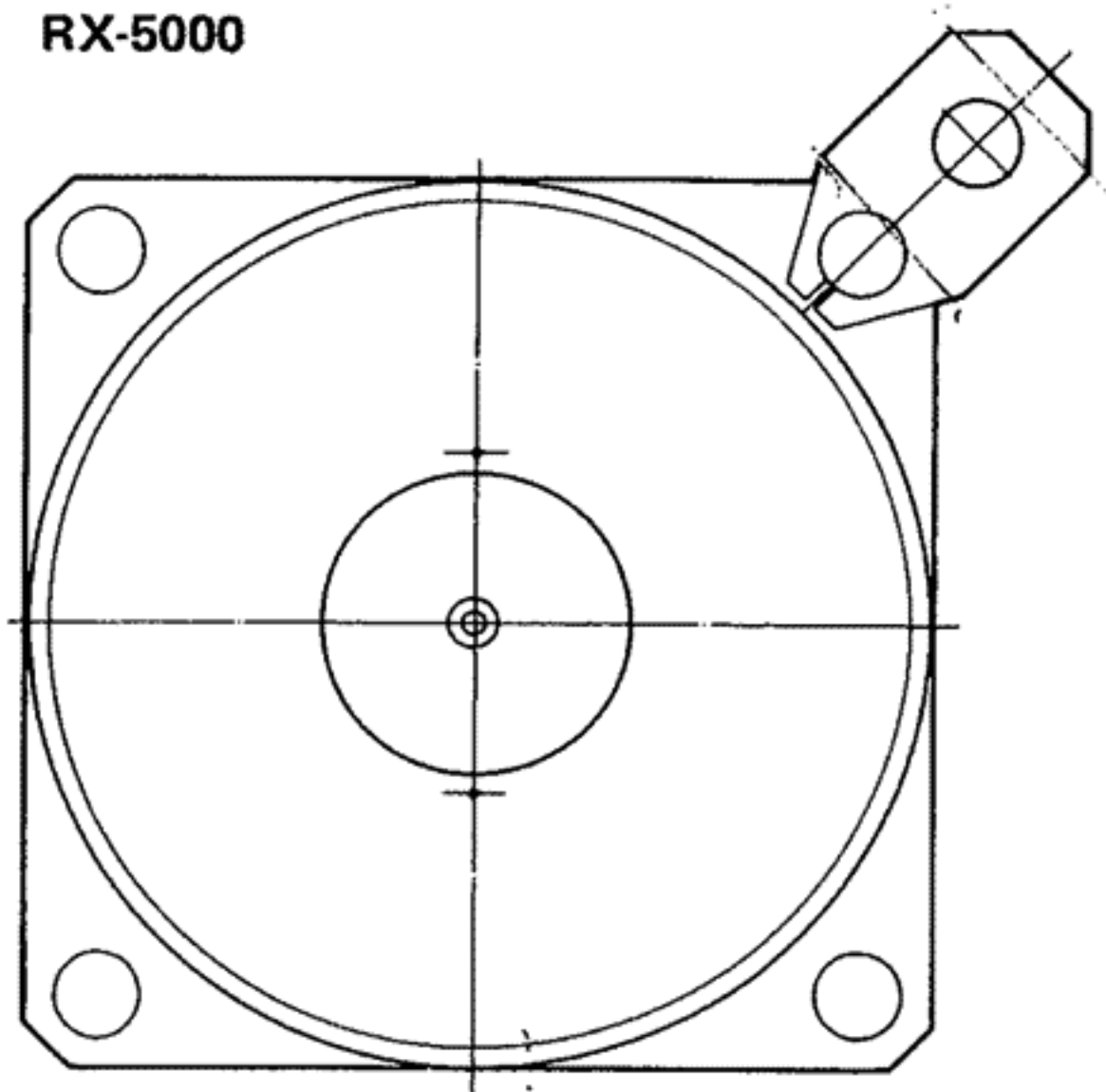
SAEC/WE-308N-308SX-407/23

AUDIO CRAFT/AC300MKII-3000MC

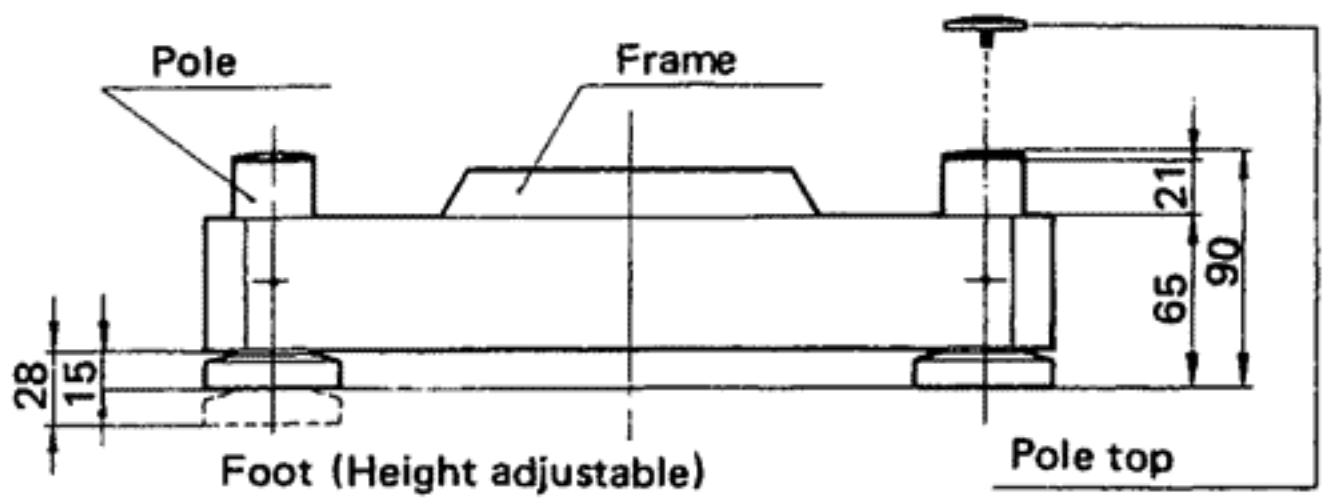
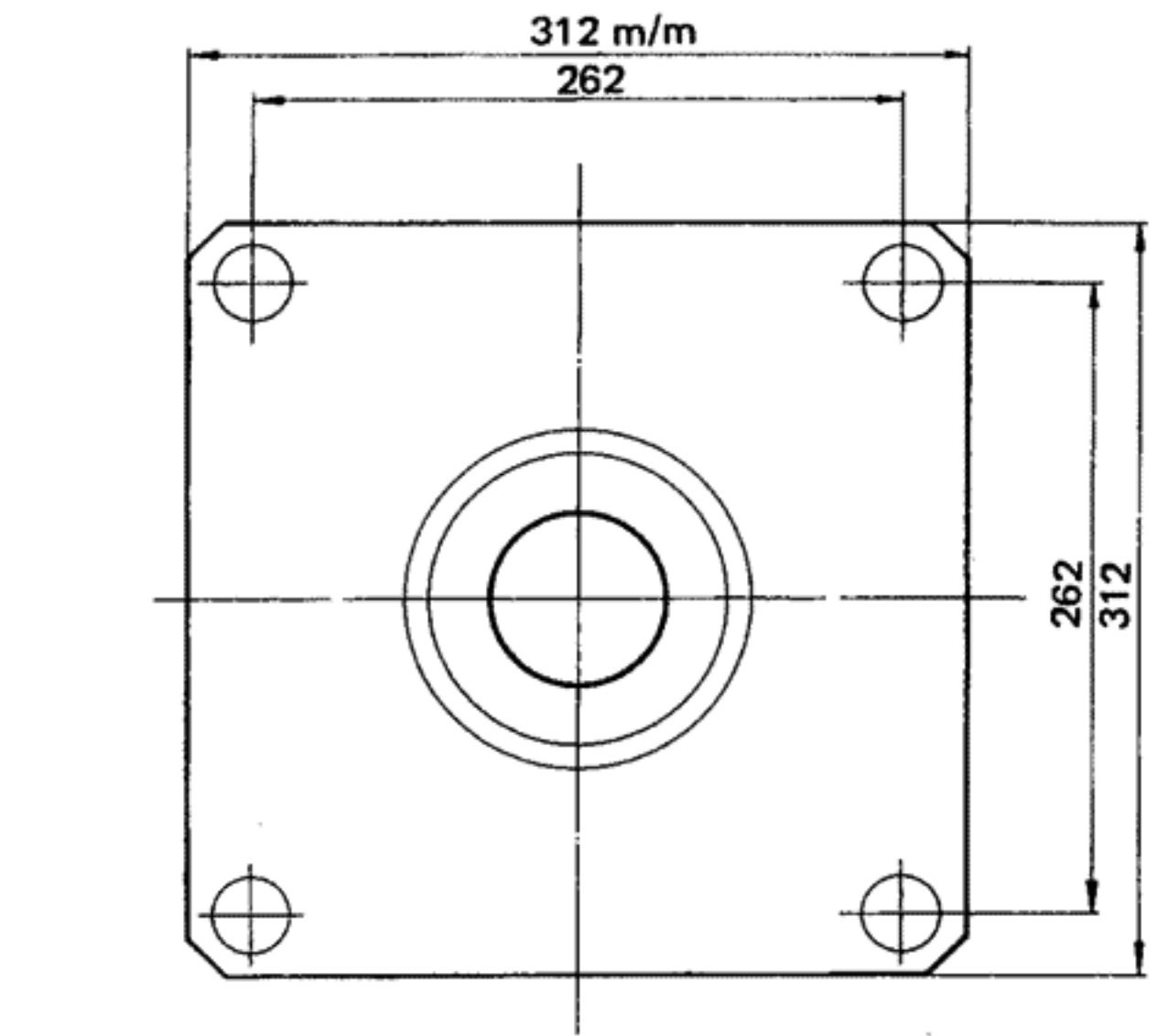
RY-5500



RX-5000

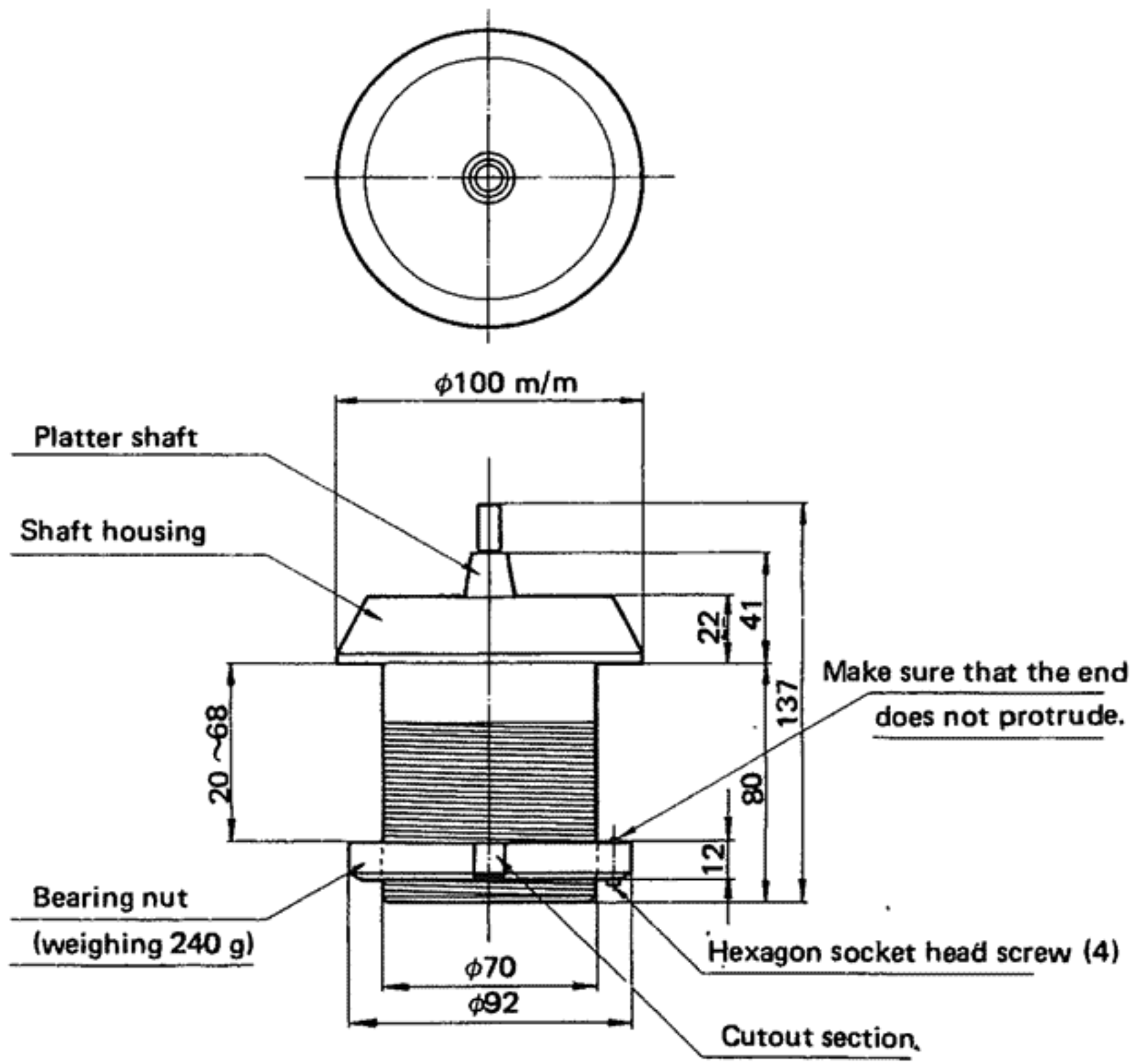


Note: The scale-like pattern on the platter surface is the gun-metal crystal pattern formed when the platter is cast. It does not indicate smudging, dirt or any other defect.



* Frame: 20 kg
 * Foot (x 4): 2.2 kg
 Total: 22.2 kg

(Fix the holder for the separate arm rest)



Bearing ass'y
 Weight: 3.9 kg

D. Motor unit

In order to achieve a mass which corresponds sufficiently to the rotational energy of the platter (weighing 16 kg), the motor unit employs a zinc chassis. The drive motor and pulley are constructed so that they are secured to the unit that weighs a total of 12 kg. When slipping the string over the pulley, a handy method is to detach the unit's top panel with the accessory hexagonal wrench. Check that the string is safely in the groove of the pulley.

* Installing the motor unit

(1) String drive

With string drive, make sure that the motor unit is first between 10 and 20 cms away from the platter unit. Determine the distance between the two units which have been connected together in accordance with the string loops, and move the units to adjust the tension between the platter and pulley to the correct value. (For details, refer to the operating instructions of string K5.) We will recommend the thread drive rather than the belt drive, because of the reproduction sound quality.

(2) Belt drive

With belt drive, install the motor unit right up against the platter unit. The motor unit side is provided with an interlocking projection and so use this to bring the unit into close contact with the frame.

Accessories:	Ground wire	1
	Hexagonal wrench	1
	Spare fuse	1

Specifications:

Dimensions	180(W) x 240(D) x 114(H) mm
Weight	12 kg

Power requirements	AC 120V (60Hz) or 220V (50Hz)
Power consumption	12W
Motor	FG servo DC motor
Motor speed	666 rpm with 33-1/3 rpm disc speed 900 rpm with 45 rpm disc speed
Speed adjustment range	± 6%

Downloaded from www.vinylengine.com

E. Platter

In order to yield a stable rotational performance and a high-quality reproduction sound emanating from such a performance, the platter features a high specific gravity, and gun-metal (85% copper and 15% tin, etc. alloy.) which has a high internal loss. Other major statistics are a weight of 16 kg and a moment of inertia of 2,700 kg.cm² which underscore the ultra-high inertia of this platter.

This platter, which is designed to a high degree of mechanical precision is designed to accommodate discs directly. Since there is no conventional rubber mat, the reproduced sound features a markedly improved ambience, resolution and distortion reduction. Since the point of contact between the stylus tip and the sound grooves plays a role of a utmost importance for the vibration system, it is essential that this be clarified continually even in a dynamic situation. By removing the rubber mat, the disc and platter act almost as a single integrated unit, and it also helps increase the stiffness of the disc. This means that the response of the stylus tip, with respect to the sound grooves, is improved. The disc stabilizer (optional ST-10) can be used for disc play to enhance the reproduced sound.

*** Mounting and detaching the platter**

Always use the accessory carrying handle to mount and detach the platter. When mounting the platter, wipe the shaft perimeter and the central holes inside the platter beforehand and take care that no dust or dirt is allowed to adhere. Slip the platter over the shaft so that the bearing section is not subjected to excessive shock. The platter is heavy and you may damage the bearing section with excessive shock.

*** Using the carrying handle**

Anchor the screws at either end of the carrying handle into the two holes on the top of the platter until they will go no further. Now take hold of the handle pipe section and you will be able to mount and detach the platter quite safely.

*** Using the stroboscope**

It is necessary to conduct an adjustment check in order to achieve the correct rotational speed (33-1/3 and 45 rpm) of the platter. Place the accessory stroboscope in the center of the platter, and adjust the speed at the drive end so that the stripes appear to stand still.

*** Maintaining the platter**

The surface of the platter is treated with a special corrosion-proof material and so it should not be wiped with thinner or other volatile chemicals. It is recommended that you use a soft, clean cloth to remove fingerprints and dirt, etc.

Accessories:	Carrying handle	1
	Stroboscope	1
	45 rpm adapter	1
	Polishing cloth	1

F. Frame

In order to support the platter made of gun-metal and weighing 16 kg (with a moment of inertia of 2,700 kg.cm², the frame must have a high mass. Because of its constructional strength, zinc is used as the material of the frame, and the total weight including the brass feet comes to 22.2 kg. So that the frame can be installed on the horizontal, the height of the feet are adjusted when the frame leaves the manufacturing plant. However, the feet are designed to allow a height adjustment of up to 13 mm if the installation conditions require a re-adjustment.

*** Installing the platter unit**

When the platter has been set in position, the total weight of the unit is over 42 kg. This means that the unit has sufficient stability just when it is mounted on a stand.

Accessories:	Hexagonal wrench	2
	Ground wire	1.5 m

G. Platter shaft

The platter shaft is designed with strength precision in mind, enabling it to serve as the fulcrum in order to support sufficiently the platter which stores a massive amount of energy emanating from its weight of 16 kg and moment of inertia of 2,700 kg.cm². The stainless steel shaft with a diameter of 16 mm is first refined, heat hardened and then polished before it is lapped by combining it with the bearing and then mirror-finished. A bearing made of special alloy is employed at the bearing side which comes into contact with the shaft surface, and the whole construction is designed so that as the shaft rotates, the lead molecules are extracted evenly onto the oil film and so that an extremely smooth rotation is maintained. Therefore, the signal-to-noise ratio is markedly improved. A ceramic ball which is harder than metal is introduced into the shaft end thrust section, and this provides the mechanical strength precision of the shaft as the fulcrum and also makes for a high degree of durability. Each of the bearing sections are configured as an oil bath system filled with oil and so there is no danger of the oil going dry. Furthermore, there is an impressive damping effect to combat the resonance which is generated as the platter rotates, and the total signal-to-noise ratio is also improved. The shaft mechanism is accommodated in a 4 kg brass, large-sized housing, and the construction is sufficiently able to come to grips with the platter mass. Massive nuts (M70) are used for the housing mounting and these are tightened up to integrate the shaft perfectly with the base.

Since the oil bath system is featured in the shaft construction, make absolutely sure that the housing bottom tail cap and the side screw section do not come free. Oil leakage can disrupt the rotation.

H. Drive string K5

"Aramid" is employed as the string in order to transmit the rotations to the platter. This is ideal in this capacity since, as indicated in the table below, it has such properties as an excellent tensile strength and a low level of elongation when broken. This means that its initial characteristics can be maintained over a prolonged period of time, and that the loss in the transmission of the rotation is extremely low. The string is made up of 134 strands of fiber each 12.1 μ wide and twisted together and so the tensile strength is a high 24.5 kg.

Comparison of properties with those of other materials.

	Aramid	Nylon	Glass	Stainless Steel
Tensile strength (kg/mm ²)	282	100	244	176
Elongation when broken (%)	4.0	18.3	3.5	2.0
Density (g/cm ³)	1.44	1.14	2.55	7.83

* Positioning the string

First, the installation location of the platter unit is determined and the unit is secured. The motor unit is then provisionally placed between 10 and 15 cm away. The string is then cut to a length enabling it to pass outside the pulley and the platter perimeter, and bound firmly. The end of the string projecting from the join is then cut off with scissors.

After checking that the string has been positioned around the platter and pulley, the motor unit is gradually moved out and the

string pulled taut. Make sure that you do not make the string too tight. Once the platter rotates, the inertia will have an effect and so there is no need for the string to be pulled too tight because the power is transmitted. However, if the platter is helped to rotate by hand when it first starts up, it will reach the rated speed smoothly.

*** Positioning the belt**

With belt drive, place the frame and the motor unit close together. The belt is one which is commonly used and its length is set. This means that when the two units are positioned closely together, the rotations will be transmitted smoothly. It is recommended that the belt be replaced once every two years so that its initial specifications can be maintained.

*** Drive belt: B91**

Material: polyurethane with carbon
 Width: 8 mm
 Thickness: 0.455 mm

• Tonearm mounting

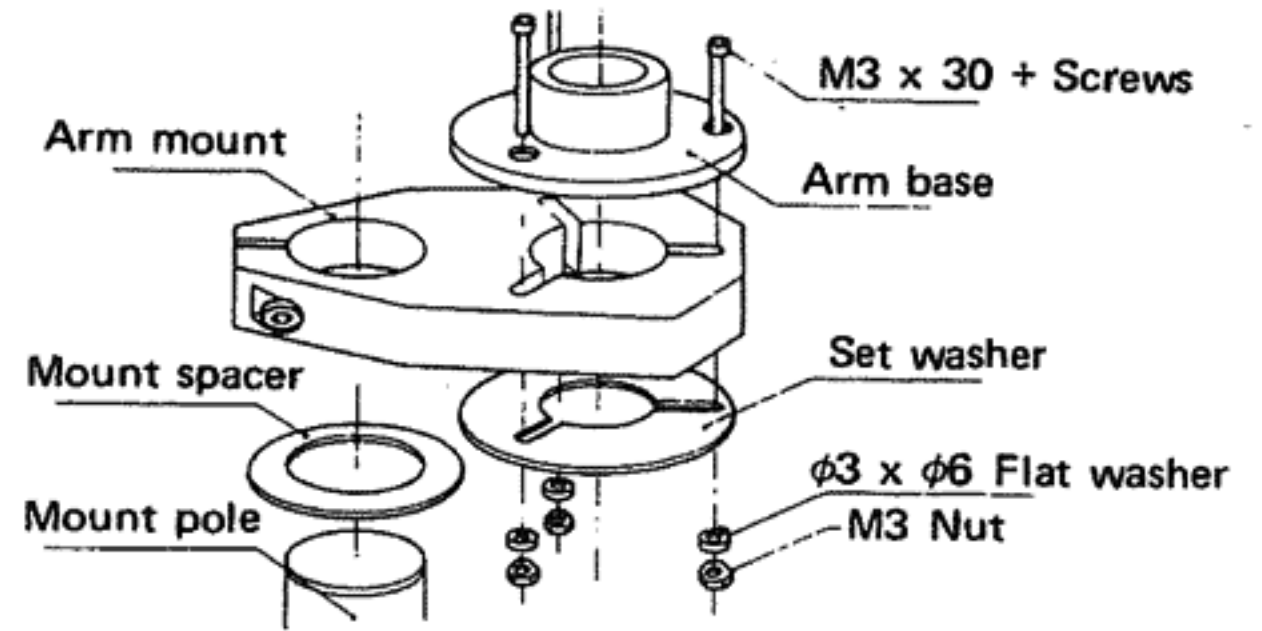
Arm mount accessories

	AX-1G	AX-2G	AX-3G	AX-4G	AX-5G	AX-6G	AX-8G
1. Arm mount	1	1	1	1	1	1	1
2. Mount spacer	1	1	1	1	1	1	1
3. Set washer	1		1				
4. M3 x 30 Screw	3		3				
5. $\phi 3 \times \phi 6$ Flat washer	3		3				
6. M3 Nut	3		3				
7. M2.6 x 8 Screw		4		4			
8. M2.6 x 18 Screw		4		4			
9. M4 x 35 Screw					3	3	
10. $\phi 4 \times \phi 8$ Flat washer					3	3	
11. M4 Nut					3	3	

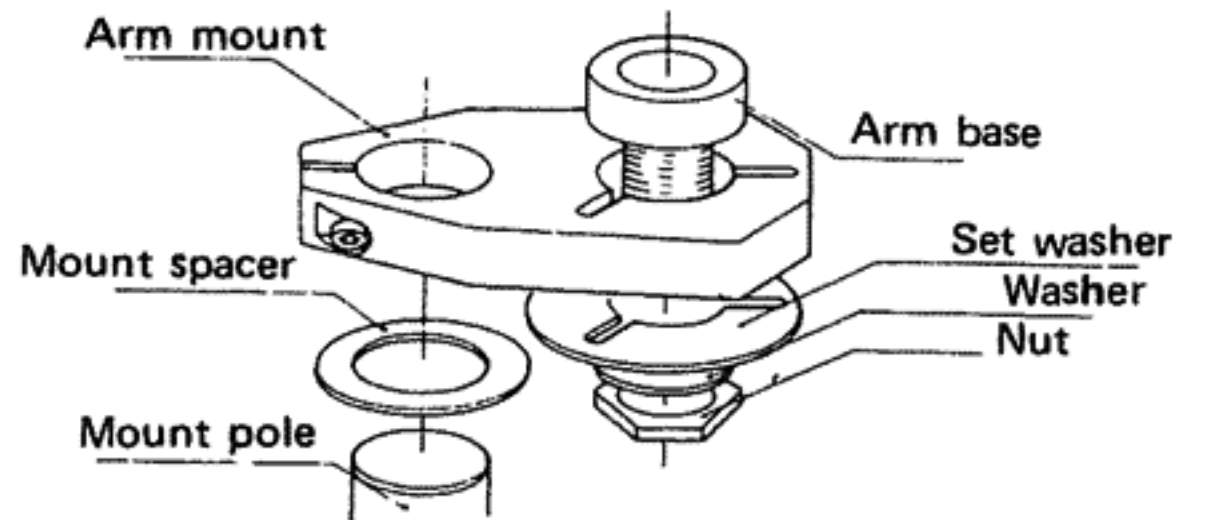
• AX-1 or AX-1G

Usable distance: 200–240 mm (from the platter center to the tonearm pivot center)

(1) How to install with screws

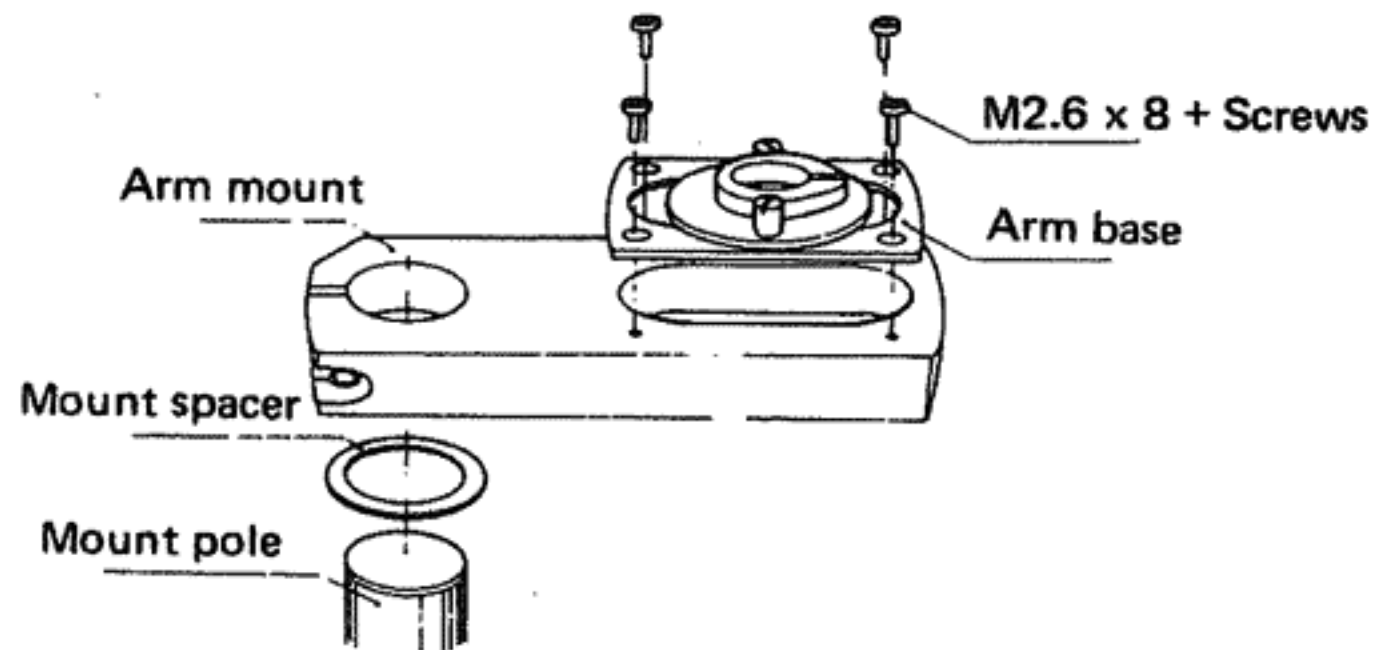


(2) How to install with the nut.



- **AX-2 or AX-2G, AX-4G**

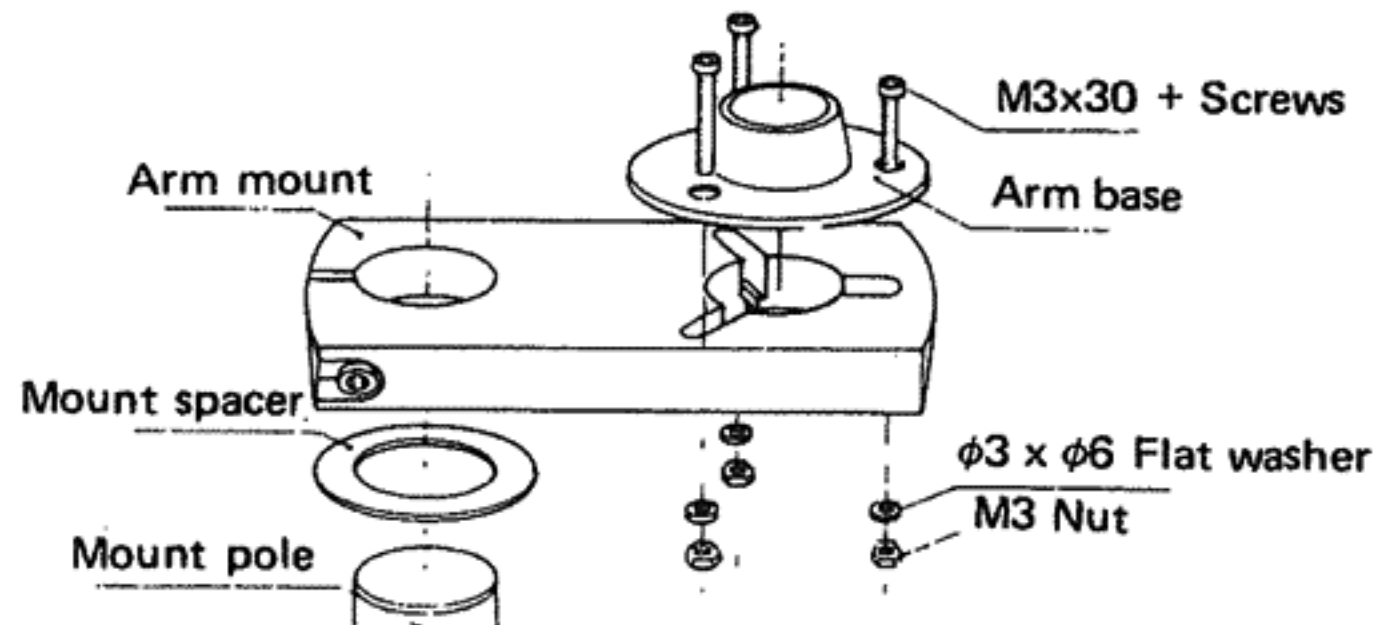
For SME-3009 (AX-2 or (G)), SME-3012 (AX-4 or (G)).



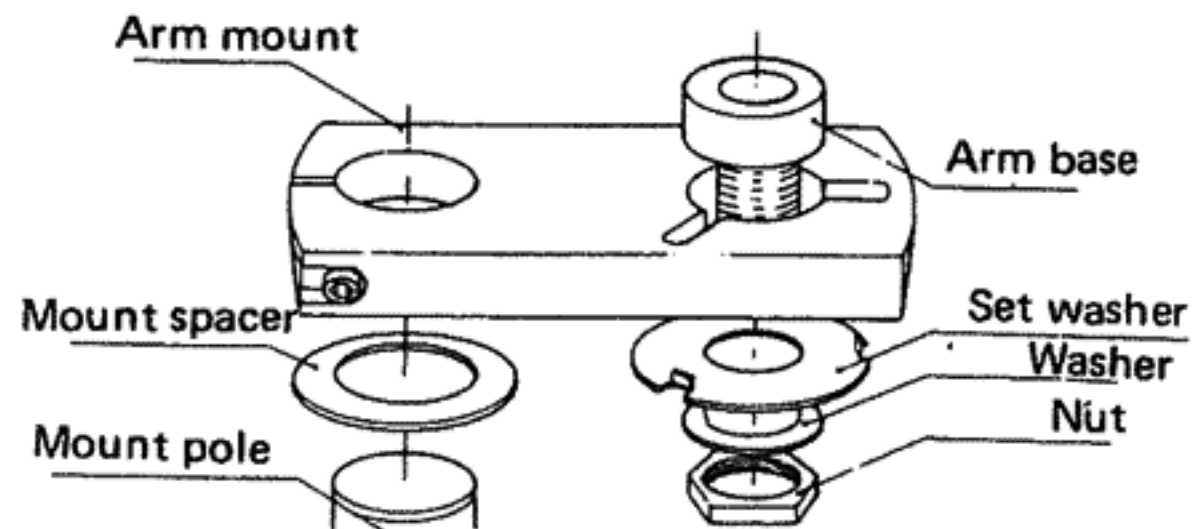
- **AX-3 or AX-3G**

Usable distance: 200–309 mm (from the platter center to the tonearm pivot center)

(1) How to install with screws.

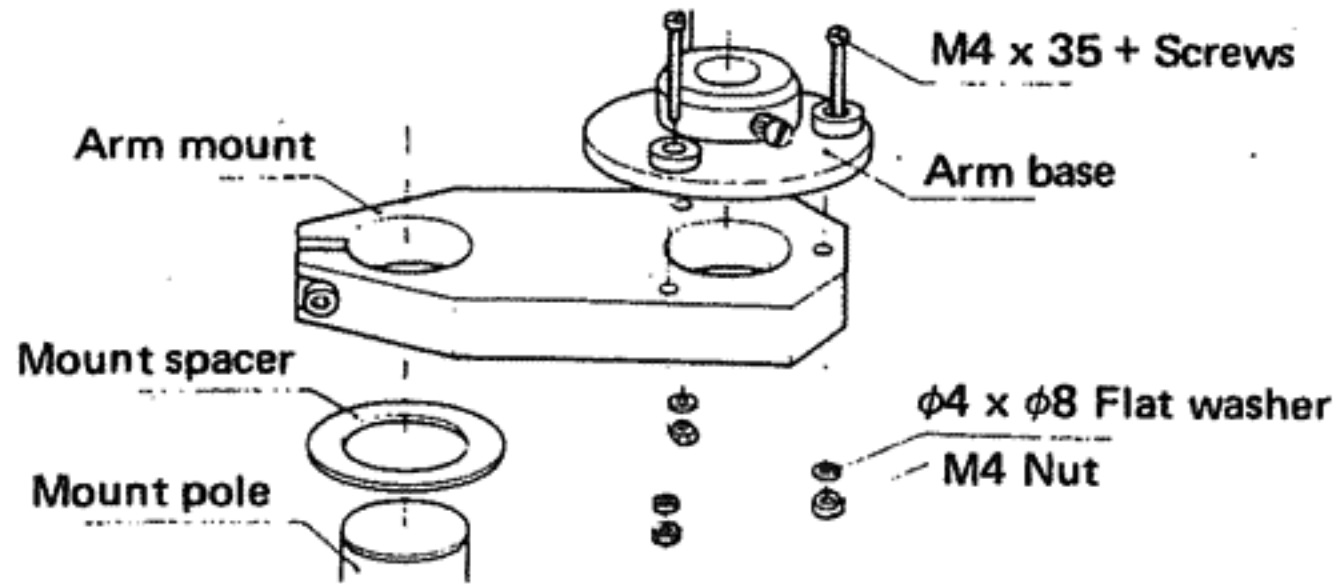


(2) How to install with the nut.

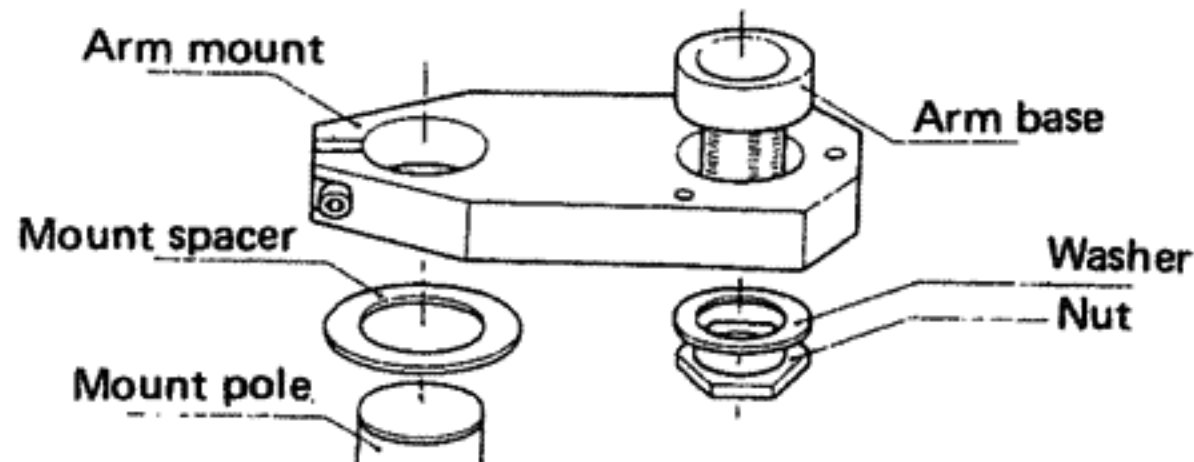


• AX-5G

(1) For AT-1503II

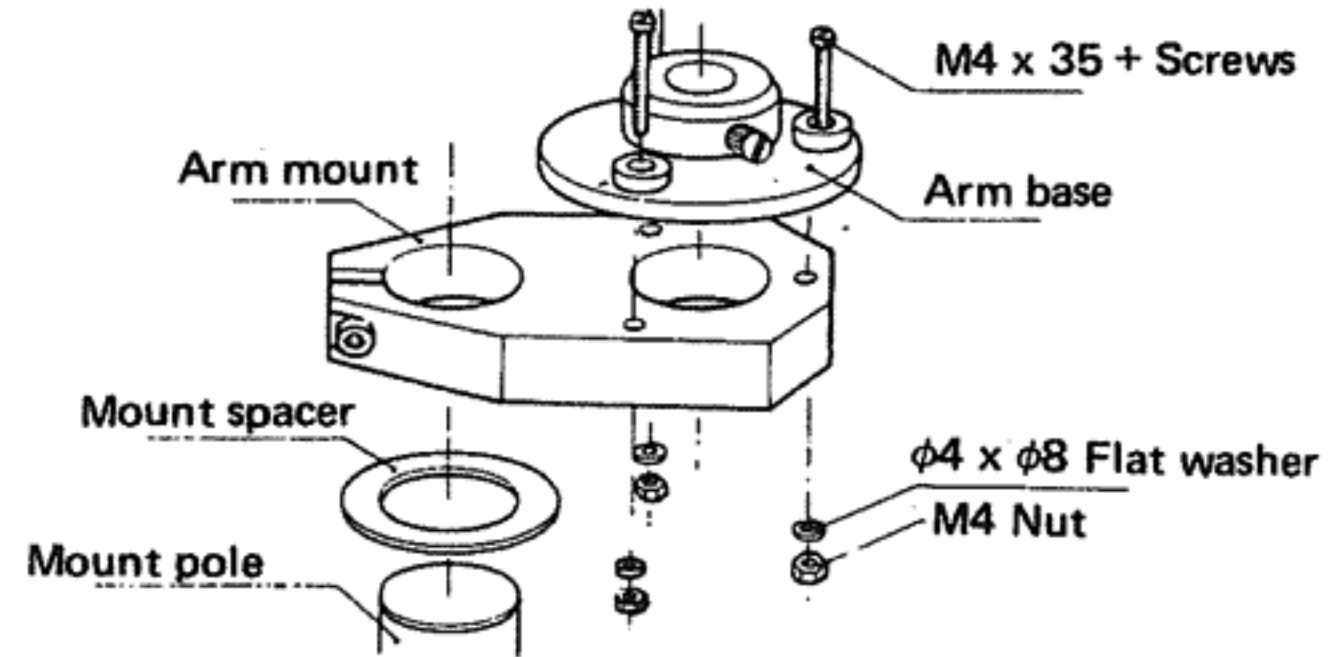


(2) For FR-64

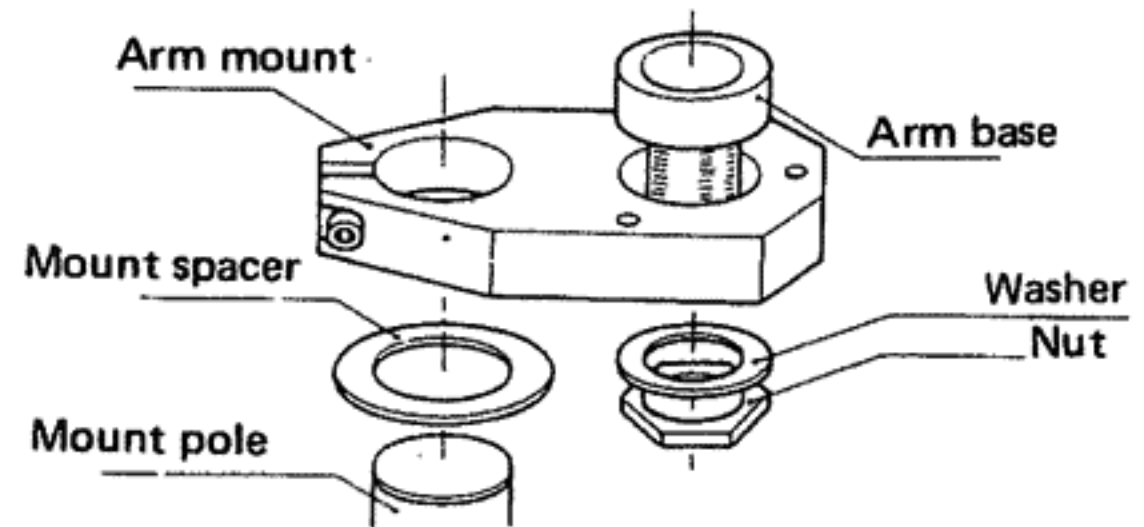


• AX-6G

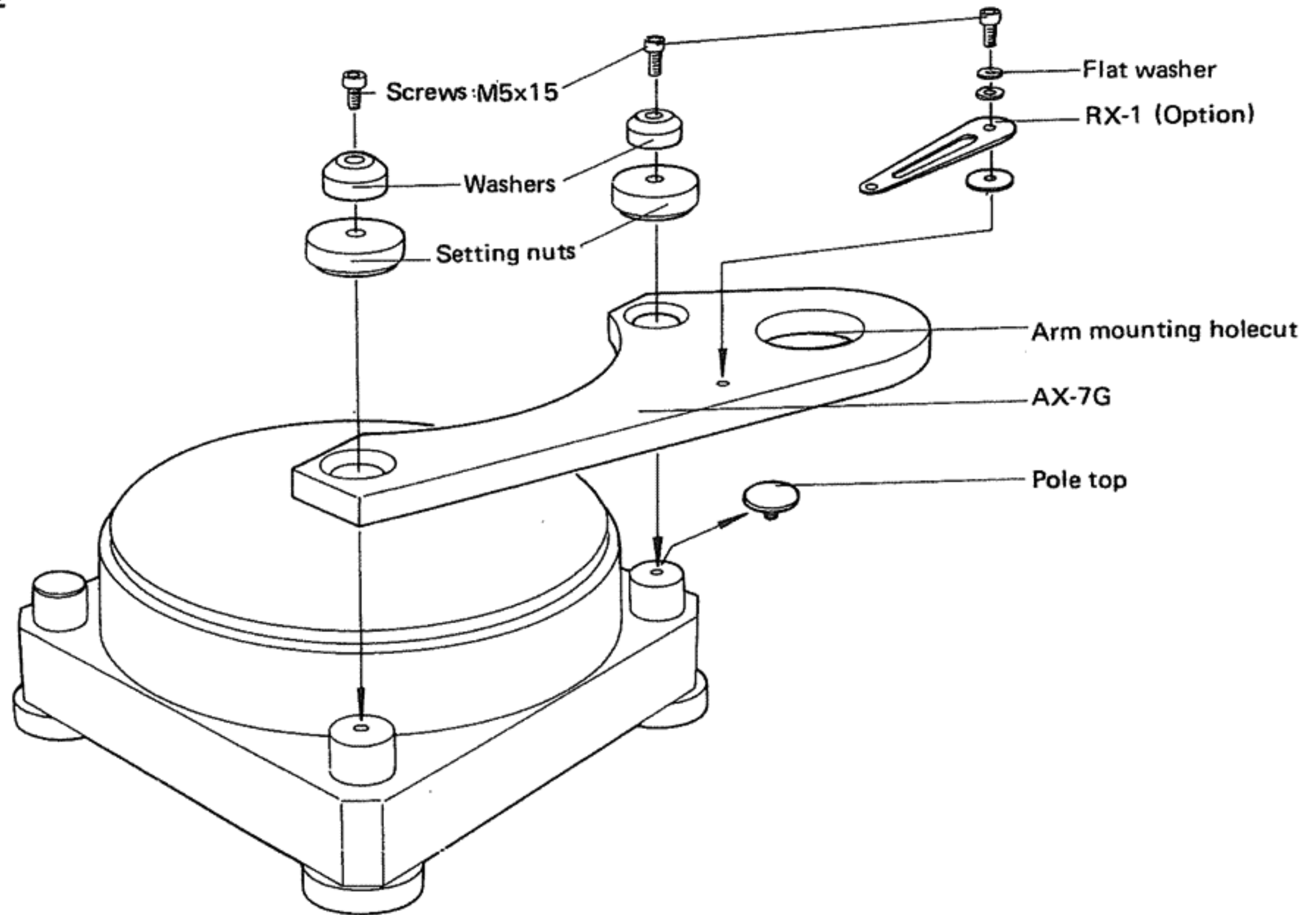
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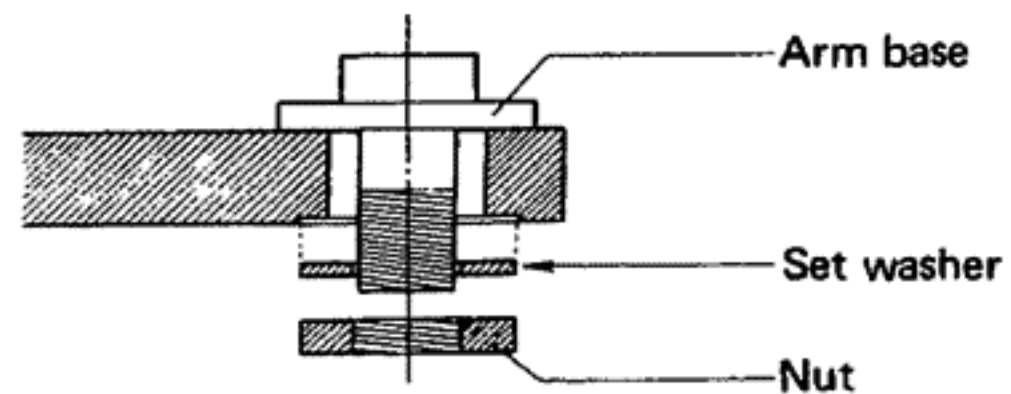
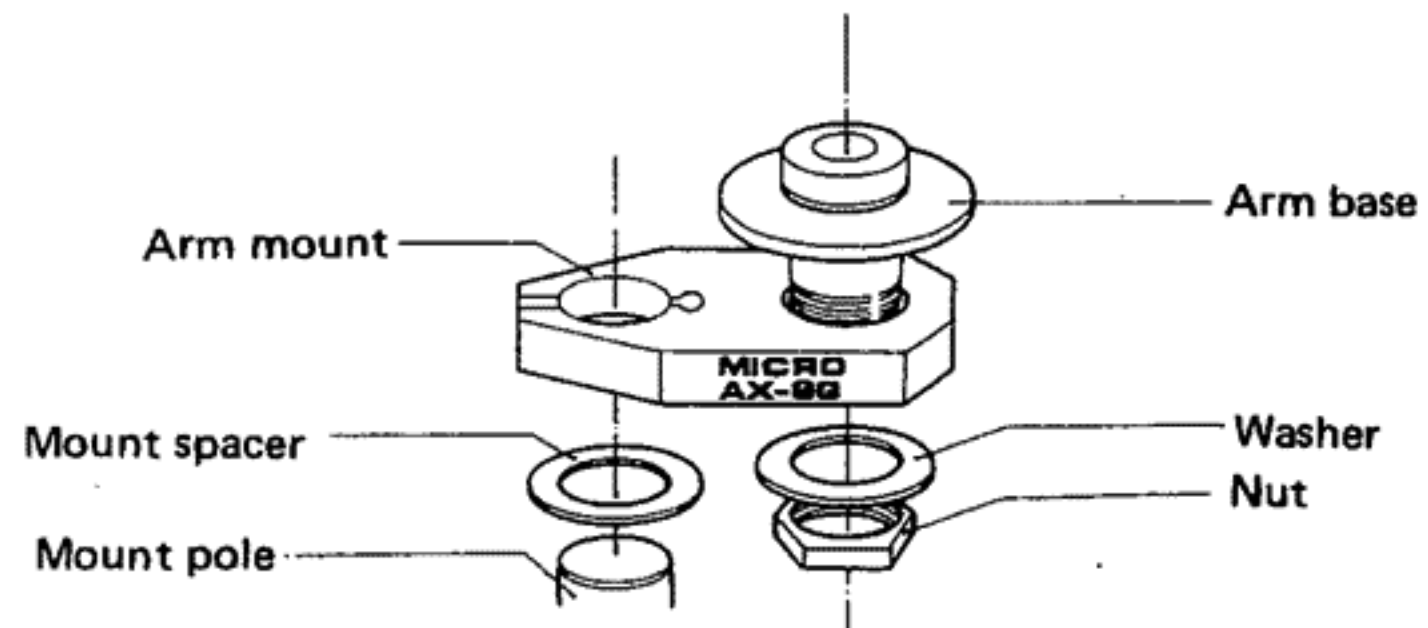
(2) For FR-66S, EPA-100, AC-4000MC
UA-7082, WE-506/30



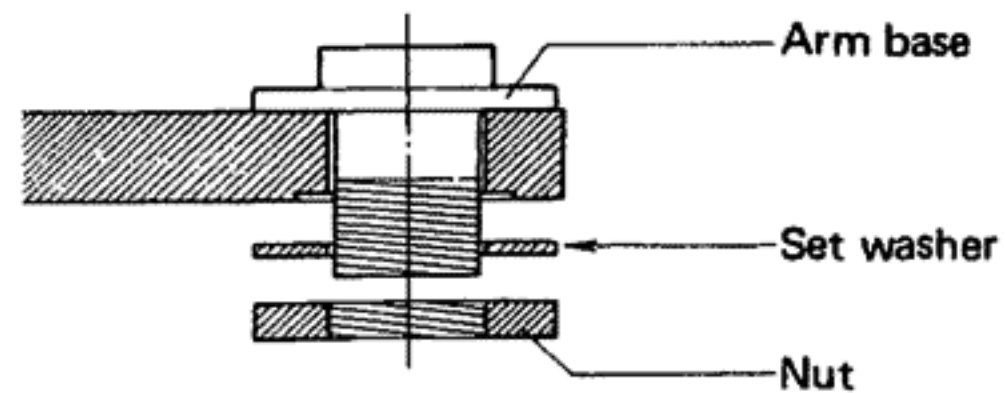
● AX-7G MICRO MAX-282



• AX-8G



MICRO MA-505X.S
SAEC WE-308N



MICRO MA-808X
MA-505XII
MA-505SII

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