Technics EPA-500

System Tonearm

R&B series

System tonearm for precise matching to cartridge compliances, with interchangeable arm units including dynamically damped counterweights.

Does a tonearm really make a significant difference in the sound of an audio system? The answer to this question depends on the quality of the rest of the components in the system. Most home systems will benefit more from an upgrading of the cartridge, amplifier or speakers than they will from the use of a separate tonearm. But in really high-grade systems, a well-designed separate tonearm that is compatible with the installed cartridge can bring about a very noticeable improvement in sound. Listeners often report that the bass is tighter and better focused, that they hear more detail in the midrange, that the apparent "space" among the different instruments in the sound field is better defined, and that generally the sound is more lifelike. Why does this happen? Very simply, the tonearm is permitting the stylus to stay in better contact with the record grooves so that it can extract musical information more accurately from the grooves.

As mentioned above, it is important for the tonearm to be compatible, particularly in terms of tonearm mass vs. cartridge compliance. When installed in the arm, and placed upon the record's surface, the ideal arm/cartridge combination will tend to resonate at about 10 Hz. This means that, if there were a 10 Hz signal on the record, the arm would tend to be excited into oscillation, or either laterally or vertically. There is actually very little, if any, 10 Hz information on any record, so this type of excitation seldom occurs with an ideally matched arm and cartridge.

There is, however, a great deal of 5 Hz-and-below information on most records, in the form of minute warps and eccentricities.

A high-compliance cartridge in a high-mass arm will have a low resonant frequency, and these low-frequency imperfections in the record will tend to excite the arm. When this happens, the cartridge generates low-frequency, non-musical information to the amplifier (using up power), and the stylus also does not remain properly seated in the groove. In effect, the actual tracking force is changing continually as the arm resonates. Significant resonances will therefore degrade sound quality.

A low-compliance cartridge and low-mass arm is not a good combination either. In this case, the arm has too little mass to present sufficient lateral inertia to the stylus, and it mistracks on highly modulated records. Also, the low-bass range tends to be accentuated unrealistically. In either case, the mismatched combination detracts from sound quality in a manner that is significantly more noticeable with high-quality associated equipment.

If all cartridges were of exactly the same compliance, there would be an "ideal" tonearm mass, and your selection of a tonearm would be a very easy matter. But high-quality cartridges come in widely varying compliances, so the compatibility problem is a difficult one, particularly for the serious audiophile who owns numerous cartridges.

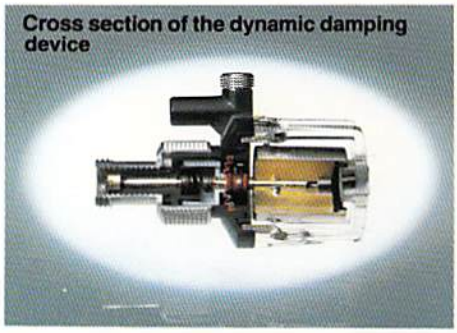
The EPA-500 tonearm system is probably the most thorough solution to the problem in existence today. The tonearm is actually five different ones with optimized damped counterweight assemblies for each. The basic arm assembly's effective mass is 8 grams, which is suitable for most cartridges now on the market. Should you wish to use a very high-compliance cartridge, you can purchase the optional "E" arm unit, whose lower effective mass will keep the system resonance around 10 Hz. Or should you want to use a cartridge with lower-than-average compliance, you can select the appropriate "M", "L" or "G" arm units. In each case, the right arm system will place the resonant frequency at or very near 10 Hz, while the bulit-in counterweight damping system will attenuate any resonances that occur at that point. Furthermore, the arm units are quickly and easily interchanged.

And every arm unit is made from titanium nitride, a material that combines lightness with very high strength. This material is also very non-resonant, so it is unlikely to transmit airborne or mechanical vibrations to the stylus, a fact which contributes to the extreme clarity and sonic neutrality that can be achieved with this arm.

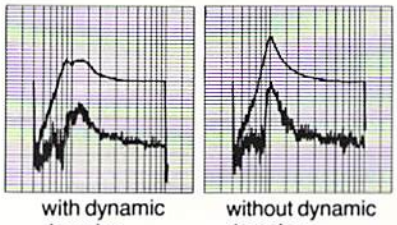
Dynamic Damping Attenuates Resonance Peak

The counterweights at the rear of the interchangeable arms are equipped with a built-in dynamic damping device which provides a very effective means of damping the low-frequency resonance peak produced by a cartridge-tonearm combination.
This means that you have two ways of dealing with the bass resonance problem. First you put the resonance frequency in the ideal 10 Hz area (above the predominant warp frequencies, yet below the audio range) by choosing the appropriate arm unit. Then you damp that resonance with the dynamic damping device. This dynamic damping system is eminently effective, attenuating the bass resonance peak by over 6 dB. Unlike some viscous damping systems, however, this causes no increase in low range mechanical impedance, retaining sharp subsonic attenuation even below the resonance frequency.

Cross section of the dynamic damping device



Low frequency range response

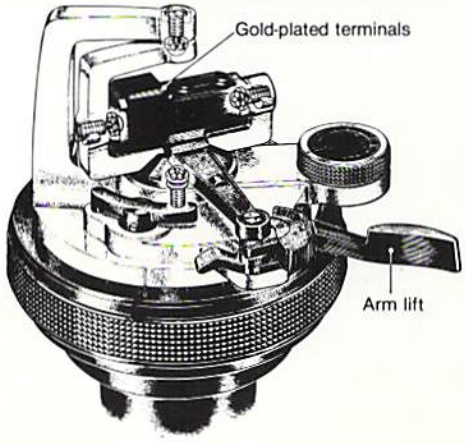


with dynamic damping | without dynamic damping

Arm Base with Precision Gimbal Suspension

The interchangeability of arm units notwithstanding, the EPA-500 System Tonearm is equipped with a true gimbal suspension system of extremely low friction in both planes. It thereby follows the same thinking that went into the Technics tonearms equipped on our high grade turntables.
Four high-precision ball bearings, two each for the horizontal and vertical axes of rotation, pivot the arm in such a way that it is effectively supported at one single point. Arm sensitivity is extremely high, thanks to a bearing friction of only 7 milligrams or less in both axes.
Technics produces the bearing assemblies in our own plant, under very strict quality control, assuring that highest standards of precision are adhered to. The interchangeable arm unit is fastened to the base by means of a very slide-in connector. Electrical connection is made through gold-plated terminals which are automatically cleaned whenever an arm unit is exchanged.

Internal construction of gimbal suspension



Tapered, Tubular Arm of Titanium Nitride

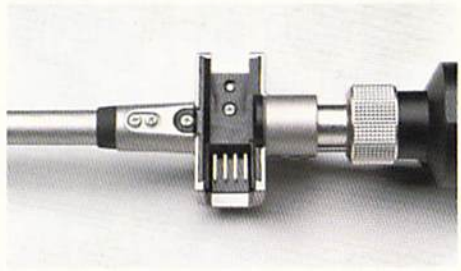
EPA-500 is the designation of the basic model in this system, supplied with EPA-A501H arm unit which has the appropriate effective mass for matching with the mass and compliance of today's widely used high-compliance phono cartridges. Additional arm units are available, with various effective masses and of different materials to match cartridges of widely different design concepts.
The tapered tubular arm units, (models EPA-A501H, A501M, A501L, A501E and A501G) are made of nitrogen-hardened titanium, or titanium nitride, which gives them outstanding rigidity and strength despite their minimum weight. This arm construction, an original Technics development, helps to avoid resonances in the arm tube, and also permits ideal distribution of mechanical strength in the arm while keeping the effective mass low.

Low Capacitance, Low Resistance Phono Cable

To assure you of the maximum potential of which this system is capable, we supply you with a truly superior phono cable. This cable has a unique combination of extremely low resistance *and* low capacitance. Ohmic resistance is a mere 39.5 milli-ohms per meter, and capacitance is only 41.5 picofarads per meter to ensure excellent signal quality right up to your preamp input jacks.

Supplied with Electronic "Stylus Pressure Gauge"

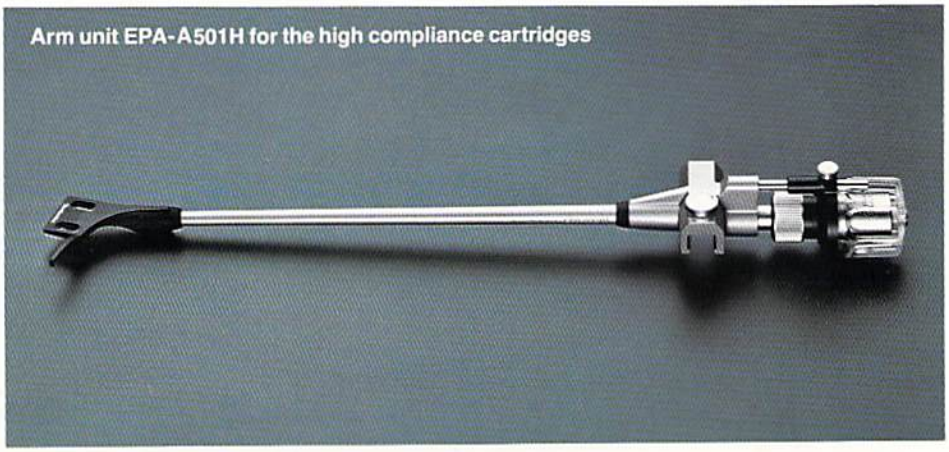
Supplied with this tonearm system is a unique and valuable accessory, the Technics Stylus Pressure Gauge. Operating on the semi-conductor strain gauge principle, this purely electronic device employs two semiconductor strain gauge elements and two transistors to give highly accurate readings on a large meter.
The gauge is sensitive to very slight variations in tracking force so that you can obtain the optimum adjustment for each of your cartridges.



Other Features

- Precise tonearm height adjustment up to 20 mm is possible with 12-spiral helicoid.
- Large, rugged base of diecast zinc.
- Advanced, damped cueing system for smooth raising and lowering of the tonearm.
- Precise anti-skating device acts in lateral axis of tonearm movement.
- Sturdy, integrated headshell designed for minimum resonance and low weight.

Arm unit EPA-A501H for the high compliance cartridges



Technical Specifications

EPA-A501H (Arm Unit)

Type	Interchangeable arm unit with dynamic damping device
Arm tube	Titanium-Nitride tapered pipe
Effective length	250 mm (9-27/32")
Rear stub length	68~85.5 mm (from point of suspension)
Overhang	15 mm (19/32")
Lateral tracking error angle	+1°6′ at the inner groove +2°6′ at the outer groove
Effective arm mass	8 g (without cartridge)
Suitable cartridge compliance	10~14×10⁻⁶cm/dyne (100 Hz, dynamic) 20~28×10⁻⁶cm/dyne (static)
Suitable cartridge weight	5~7 g
Pitch of mounting screws	Standard 12.7 mm (1/2")
Headshell pins	1.2 mm diameter, 4 pins

EPA-B500 (Arm Base)

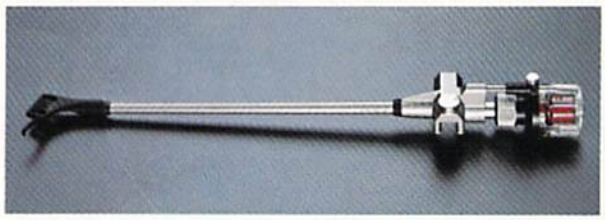
Type	Tonearm base fit for interchangeable arm units
Suspension	Gimbal suspension
Range of height adjustment	42~62 mm (from mounting surface to arm tube center) (20 mm at helicoid part)
Friction	7 mg or less (lateral, vertical)
Length of phono cable	125 cm
DC resistance of phono cable	39.5 mΩ/m
Capacitance of phono cable	41.5 pF/m
Diameter of arm mounting hole	62 mm∅

SH-50P1 (Stylus Pressure Gauge)

Type	Stylus pressure gauge
Principle	Electronically controlled semiconductor strain gauge with zero and gain calibration
Power supply	DC 3 V (2 silver oxide dry cells)
Measuring range	0.5~3 grams tracking force
Semiconductor elements	2 semiconductor strain gauge elements, 2 transistors, 1 LED
Dimensions (H×W×D)	24×147×52 mm (15/16"×5-25/32"×2-3/64")
Weight	125 g (0.275 lb)

Titanium-Nitride tapered pipe tonearm unit with dynamic damping EPA-A501M (optional) for the medium compliance cartridges.

Titanium-Nitride tapered pipe tonearm unit with dynamic damping EPA-A501L (optional) for the low compliance cartridges.



Titanium-Nitride tapered pipe tonearm unit with dynamic damping EPA-A501E (optional) for the extra high compliance cartridges.

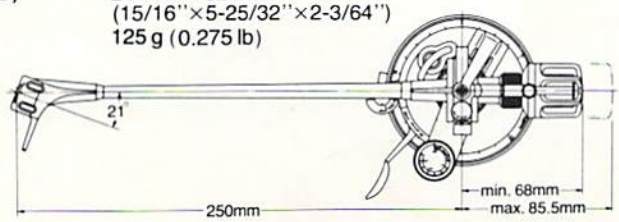
Titanium-Nitride tapered pipe tonearm unit with dynamic damping EPA-A501G (optional) for the heavy weight, low compliance cartridges.

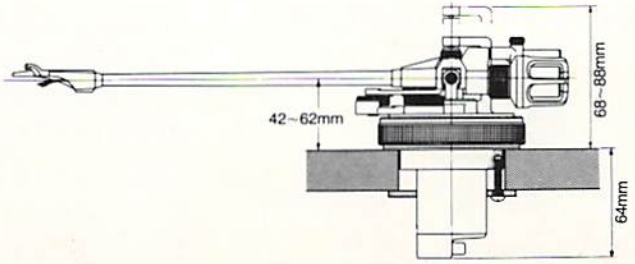
Matching Table of Arm Units, Cartridge Compliances, Cartridge Weights.

Arm units \ Cartridge	Type		(H) High compliance	(M) Medium compliance	(L) Low compliance	(E) Extra high compliance	(G) Heavy weight, low compliance
	Weight (g)		5 ~ 7	5 ~ 7	5 ~ 7	5 ~ 6.5	7 ~ 11
	Compliance (×10⁻⁶cm/dyne)	Dynamic (100Hz)	10 ~ 14	7 ~ 10	5 ~ 7	14 ~ 25	6 ~ 10
		Static	20 ~ 28	14 ~ 20	10 ~ 14	28 ~ 50	12 ~ 20
EPA-A501 H			◎	○	○		
EPA-A501 M			○	◎	○		
EPA-A501 L					◎		
EPA-A501 E						◎	
EPA-A501 G							◎

◎: Optimum Match ○: Suitable Match

Additional arm units are now available, with various effective masses to match cartridges of widely different design concepts. The basic EPA-500 consists of one arm base (EPA-B500), one arm unit (EPA-A501H) with counterweight, and one electronic Stylus Pressure Gauge (SH-50P1). Other arm units can be purchased independently.





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