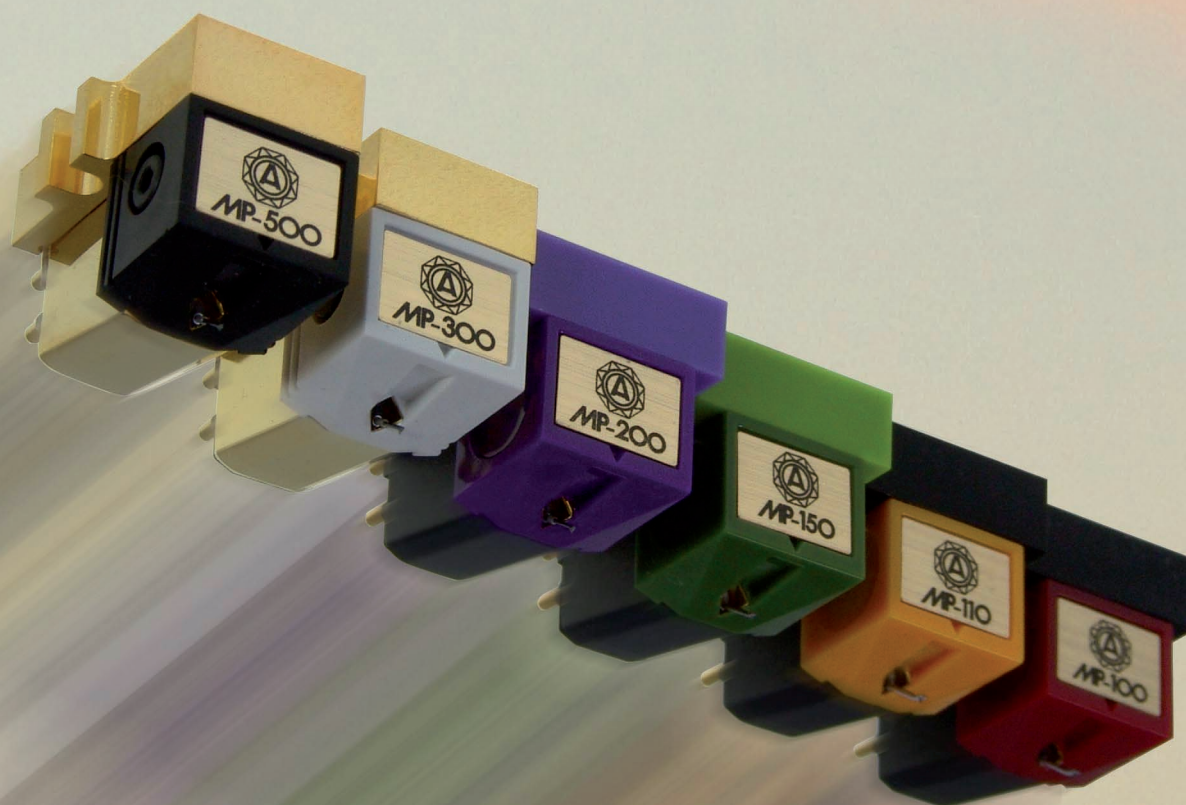




# NAGAOKA

BETTER SOUND FOR EVER



We can all find music listening pleasure with improved stereo imaging that enhances sense of motion and accentuates the delicate details on sound reproduction. We at Nagaoka have been challenged to develop an ideal cartridge that is capable of reproducing with perfection the sound of recorded music. Various magnet type cartridges, such as MM, MC and IM types, have all been studied and analyzed in order to realize these ideas. Nagaoka has a history of satisfying the needs of sound connoisseurs by developing a number of cartridges that have acquired the reputation of "masterpieces". Just recently, it has added to its high reputation by marketing a ribbon type cartridge of a design that produces no losses even in the super high frequency ranges. On the basis of the above-mentioned technology, we have developed 12 types of the high performance MP (moving permalloy) cartridges that shorten the magnetic circuit which brings us one step closer to the ideal cartridge.

**In pursuit of an ideal cartridge, the epitome of Nagaoka's technology has been concentrated in the high performance MP series. These cartridges reproduce transparent sound with high clarity and a substantially improved magnetic circuit.**

In these new high performance MP series cartridges, we have used the most up-to-date materials. This includes a permalloy oscillator having a high magnetic permeability and a samarium cobalt magnet having a high magnetic energy. These materials take advantage of Nagaoka's advanced cartridge technology.

The cartridges of the new series reproduce a flat sound for all frequency ranges, from crystal clear high notes to super deep low tones, that clearly accentuate the details of musical instruments. The sensitive sound, that is a characteristic of Nagaoka's continuous pursuit of perfect reproduction, should not fail to provide you with musical and audio satisfaction.



**"Better Sound Forever" - A theme of Nagaoka's unconciliating technical efforts in insatiable pursuit of ultimate means of reproducing original sound**

Music is an art created by intricate combination of sound signals that undergo changes every second. It therefore would not be exaggeration to say that the cartridge, being the contact point of the musical signals engraved in the record and the audio mechanism, assumes the vital role, for it is up to the volume and accuracy of the information picked up by the cartridge that the quality of the reproduced music is determined.

During the history of 40 years that it shares with the development of records, Nagaoka has continued research and development of cartridges. A number of cartridges produced by the company in the meantime have given Nagaoka a worldwide reputation. For cartridges that contain in each of their small bodies a complicate mechanism for conversion of mechanical oscillations into electrical signals, "Better Sound Forever" would be an eternal theme.

Of all audio instruments, cartridges require the most sophisticated precision fabrication technology. A speciality manufacturer of cartridges, Nagaoka does every work involved at its own factory, from the super precision grinding of stylus tips to design and fabrication of a screw, as it is indispensable for the company to maintain accuracy and to consistently maintain its tone policy.

Nagaoka's corporate policy to utilize the latest technical know-how wherever possible can be seen, for example, in production of the line contact type stylus tip, which requires highly sophisticated skill, enabling elliptical diamond tip to track the sound groove to the super high note range without any sound distortion.

With its most up-to-date processing machines and latest measuring instruments, combined with the perfect quality control system that cannot be more severer, Nagaoka produces cartridges in unconciliating pursuit of perfection in their characteristics and the sound they reproduce.

And yet, Nagaoka cartridges are not complete until they pass a sound quality test by scrutinizing ear of musicians. What lies behind all this is the manufacturer's determination to make a cartridge that is capable of picking up the rich musical information together with the feeling of surrounding air in which the music has originally been played. This, indeed, is a secret of Nagaoka's cartridges that reproduce ripe and mellow sound appealing to musical sensitivity with the superb technology.



**New Product Development & Design Room**

For planning and designing new products



**All-round Computer Room**

Computer room for technological calculation and general administration



**Scanning-type Electronic Microscope**

Scanning-type electronic microscope for precise measurement of needle-point shape



**Measurement Room for Development**

Measurement department for precise measurement of products being newly developed



**Machining & Finishing Room**

Machining & finishing room for integrated production from parts to finished products.



**Assembling Line**

Fully-equipped assembling line for consistent quality control



**Environmental Test Room**

Environmental test room for developing products which can be adapted in every environmental condition.



**The MP Series, Developed by  
the Philosophy "All But Oscillation  
System Should Be Rigid"**

**A New Oscillation System Aimed at  
Perfect Tracking Capability**

The pursuit of flexibility enabling perfect trackability of any sound and the realization of low mass are eternal quests of cartridge manufacturers. The new MP Series has been conceived and developed according to this philosophy.

The starting point for the high performance MP Series was creation of an oscillation system that enables the signals engraved in the groove of a record to be perfectly picked up. At the same time, each of these signals to be reproduced with sharp clarity and enriched sound. The characteristics of the MP series thus developed are as follows:

**Development of low mass oscillating block**

Adoption of a conical stylus tip that utilizes a reduced mass, and a newly developed cantilever that is outstanding in modular ratio, and possessing alpha-pipe that has hollow construction, has substantially reduced the mass of the oscillating block in general. This has increased the tracking capability and provided flat frequency characteristics and reduced distortion factors.

**Complete separation of oscillating block and magnet**

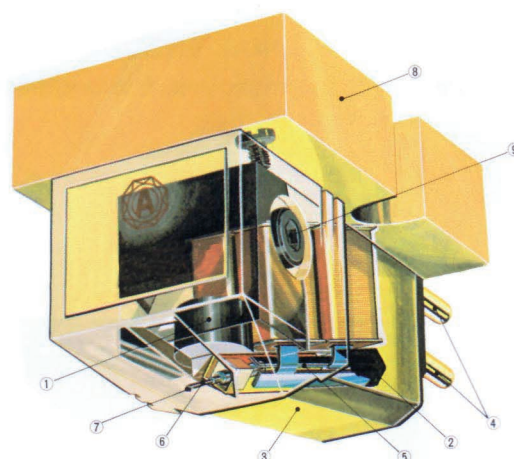
For the purpose of reducing the weight and dimensions of the oscillating block, it has been completely separated from the magnet. As a result, it has become possible to increase the output simply by the control of the magnet.

**Adoption of samarium cobalt magnet**

The cartridge weight in general has been reduced by adoption of a magnet circuit that is small but powerful. For the induced magnet, Samarium cobalt magnet (REC 30) that imparts the greatest magnetic energy per unit weight has been adopted, minimizing the distance of the magnet circuit and reducing the magnet energy loss.

**Rigid body that expends unnecessary resonance**

While the oscillating block of the MP series has been made to have reduced weight and mass, other parts have been made more rigid than ever with critically selected materials, that eliminate unnecessary resonance. The cylinder, for example, has been made three times physically stronger than the conventional ones with carbon fiber reinforced plastics. The frame has been manufactured with A1 impact material, to obtain clearer sound through a generally improved system. Use of epoxy binder and employment of screws on essential parts also are examples of careful considerations that have been given to its design.



- (1) Magnet
- (2) Cylinder
- (3) Shield case
- (4) Terminal pin
- (5) Pole piece
- (6) Cantilever
- (7) Stylus tip
- (8) Housing
- (9) Screw-fitting part of stylus

**Gold tip terminals**

The terminals have been gold tipped to maintain their electrical and mechanical characteristics for many years. This protects the surface of terminals from oxidation and, at the same time, minimizes losses and sound deterioration caused by contact resistance.

**Frame**

The frame has been fabricated by means of the impact molding of high purity aluminium that is light in weight and has high physical strength. Because of its even density, sound distortion caused by vibration of the frame body is minimal.

**Special screw**

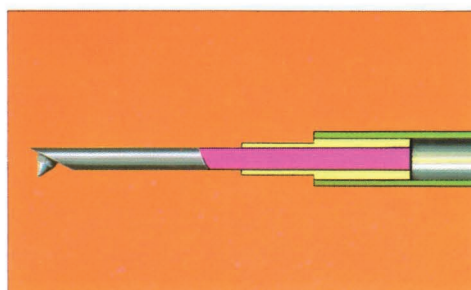
The stylus knob and the body have been completely tightened with a special screw. This has eliminated occurrence of resonance at the replaceable stylus section and improved the sound quality.

**Details of MP-500  
Stylus tip**

Conical diamond tip, the mass of which is one third of the conventional tips. It is a semi contact stylus manufactured by super fine particle grinding based on extended stylus technology. This substantially improves the highs and features a broad dynamic range and low distortion factor.

**Cantilever**

Since high rigidity is essential for a cantilever, Boron has been selected because it is light in weight, strong and most outstanding in transmission characteristics. Precision fabricated to the order of microns, this rigid cantilever has good starting characteristics, is outstanding in high note range performance and ensures even and distortion-free sound reproduction.



**Oscillator**

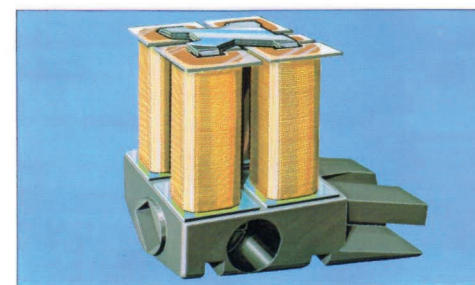
For the oscillator that is expected to accurately perceive the delicate oscillation of the stylus tip, permalloy, a nickel-iron alloy, has been adopted. Adoption of permalloy, that has high magnetic permeability even in a weak magnetic field, has realised a high sensitivity, a high output and a broad dynamic range.

**Magnetic circuit**

Samarium cobalt magnet, having greater magnetic energy than any other magnets available at the present time, has been adopted. With adoption of this powerful magnet, the magnet circuit has been made smaller and yet more powerful. Furthermore, since it enables the magnetic circuit to be made shorter in distance, it has become possible to minimize the magnetic energy loss, one of the causes of deterioration in sound quality.

**Pole piece**

A full scale laminate yoke (thickness 0,1 mm + 0.1 mm + 0. 1 mm) has been adopted. Use of super permalloy having good magnet sensitivity at its core has reduced the over-current loss of the pole piece and has realized flat sound characteristics, with an absense of loss in the high range and peaks in the medium range.



**Cylinder**

The cylinder is made of carbon fiber reinforced plastics that is three times physically stronger than the conventionally used resin (ABS). This has eliminated unnecessary resonance, causing a Clearer sound.

**Magnetic shield casing**

For realisation of a high SN ratio, super permalloy, that is outstanding in magnetic shield characteristics, has been adopted.



### **Moving Permalloy Cartridges MP-500 and MP-500H (with head shell)**

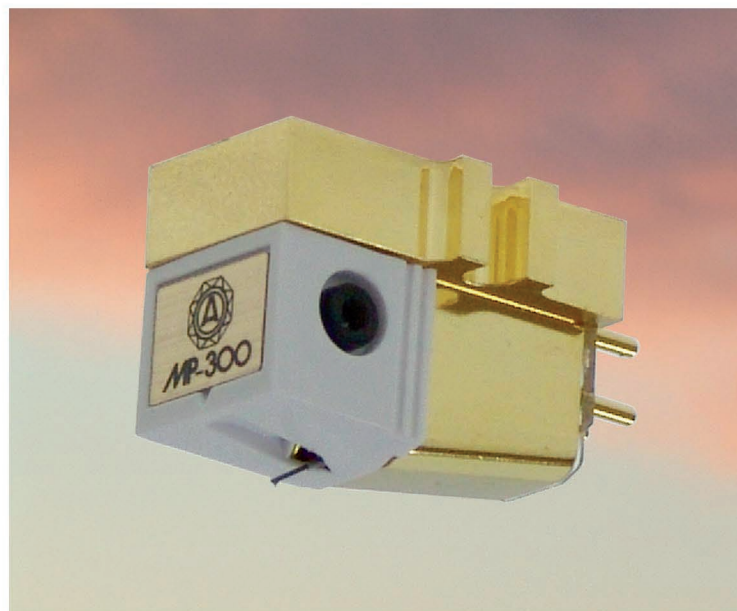
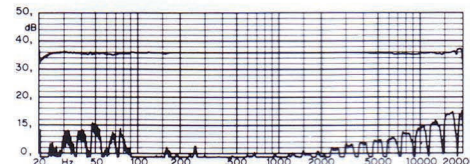
The ultimate of all Nagaoka MP series cartridges, MP-500 and MP-500H feature the most up-to-date original technology. These cartridges reproduce the most beautiful sounds presently available. The cantilever, which is a vital part of the oscillation system, has been made Boron. This material is exceptionally light in weight and very rigid. Originally developed for the space program Boron makes an ideal material for cartridge cantilevers being more durable than granite, beryllium or carbon fiber. The stylus tip/groove contact area has been increased to make its characteristics in the high range outstanding and to reduce tracking distortion. With this new cantilever and high-performance tip, outstanding tracking

capability has been realized, substantially improving the quality of sound reproduction in the medium to high making the sound flat and free from distortion.

A Samarium cobalt magnet, having greater magnetic energy per unit weight than any other known magnet, has been adopted to make the induced magnet smaller and yet more efficient, thus producing high output. Each of the cartridges comprises critically selected parts such as pole piece of laminated super permalloy. The frame is impact stronger than the conventionally used resinous material (ABS), minimizing harmful vibration and distortion, increasing low level resolution and making the shield effect outstanding.

The high-accuracy screw stopping construction of the replaceable stylus section is only

one example of the high level technology and careful consideration with which the cartridges have been constructed, ensuring the most transparent and beautiful sounds now available.



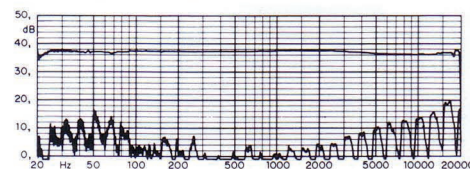
### **Moving Permalloy Cartridges MP-300 and MP 300H (with head shell)**

As in the case of MP-500, these cartridges have an oscillation system that is now in design, light in weight and has a high rigidity. This, together with adoption of a powerful magnet, enables the sound to be reproduced in clear and brilliant tones. The sound in the high ranges reproduced by these cartridges is especially beautiful. The specially ground semi-line conical stylus tip maintains good contact with the record groove. It is capable of tracking the super high notes. The tip-groove contact resistance has been made minimal. To take advantage of the unique performance of this stylus tip, the cantilever has been made of Boron that is light in weight and highly rigid to further improve the tracking capability in the high note range and to eliminate distortion in the medium note range.

Samarium cobalt magnet, featuring the most powerful magnet energy of all known materials, has been adopted to realize small and yet highly efficient induced magnet. This has enabled the magnet circuit to be shortened, reducing the magnet loss, one of the causes of the sound quality deterioration. The pole piece consists of the laminated super permalloy as in the case of MP-500, to reduce the overcurrent loss and to make the magnet circuit of flat frequency characteristics.

The frame has been made rigid with impact molded aluminium to eliminate unnecessary vibration or resonance. Super permalloy that is outstanding in magnetic shield characteristics has been adopted as materials for the shield casing to increase the SN ratio. The cylinder has been manufactured with carbon fiber reinforced plastics also for the purposes of eliminating unnecessary resonance.

Thus, except for the oscillation system, MP 300 and MP-300H have all been made with rigid parts. The advantages of these new materials are fully utilized, and these high quality cartridges have been made to produce high quality sound and to have outstanding tracking capability.





### Moving Permalloy Cartridges

#### MP-200 and MP-200H (with head shell)

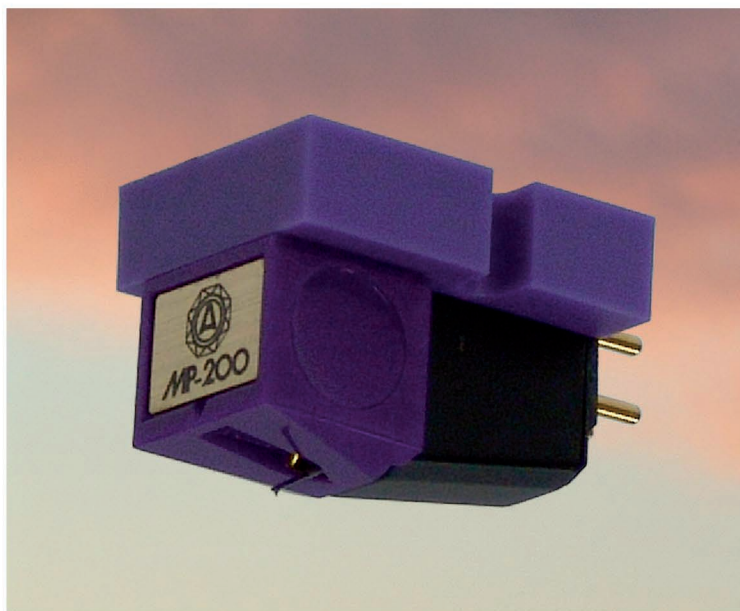
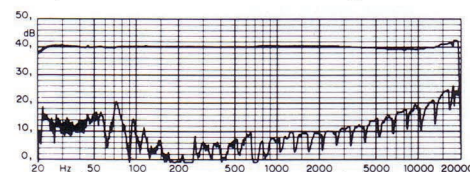
Of all the MP series cartridges, the MP-200 and MP-200H feature the highest cost to performance ratio. Having been constructed by using the same material as those for the higher class MP cartridges with careful precision fabrication technology, MP-200 and MP-200H ensure a sound quality that is high in density, brilliant and carefree.

Boron has been used for cantilever, because it has a durability close to that of a diamond and it is seldom distorted notwithstanding its light weight. A conical tip of small mass, that is capable of completely tracking the most delicate sounds has been selected for the stylus.

A Samarium cobalt magnet, a pole piece comprising a full scale laminated super per-

malloy, the frame made of PPS material that is three times stronger than the conventional molding material, the shield case made of super permalloy having outstanding magnet shielding efficiency, the cylinder fabricated with carbon fiber reinforced plastics – every part of MP-200 and MP-200H, except for the oscillating system, have been made rigid. With the reduced weight/mass of the oscillation system and with the bodystructure that eliminates unnecessary oscillation wherever possible, MP-200 and MP-200H possess a quality that has long been the object of the technical efforts in pursuit of better sound quality. The terminals have all been gold tipped to protect their surfaces from oxidation for many years and to minimize the contact resistance loss. With all these and other careful consideration,

MP-200 and MP-200H cartridges embody the perfection of the MP cartridges



### Moving Permalloy Cartridges

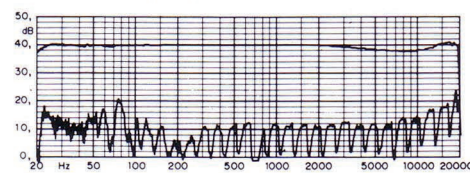
#### MP-150 and MP-150H

Products of Nagaoka's traditional precision fabrication technology and repeated listening tests, MP-150 and MP-150H moving permalloy cartridges feature outstanding tracking capability and rich musical expression. With a view to improving the tracking capability through reduced mass of the oscillation system, UT-58 aluminium alloy has been selected to make the cantilever. Strongest of all aluminium alloys, UT-58 is first fabricated and then subjected to a special annealing process to double its physical strength. Thus, the material comes to possess outstanding properties, namely, light in weight and high rigidity.

Attached to the cantilever is a 0.15 pure stylus tip, which has substantially improved the flat frequency characteristics free of tracking error.

Adoption of a small but high energy Samarium cobalt magnet has enabled the magnetic circuit to be shortened, and the laminated permalloy pole piece has improved the AC magnetic permeability, enabling a large output to be obtained with a shorter coil winding. These are some of the examples of Nagaoka's technological characteristics embodied in MP-150 and MP-150H. Except for the oscillating system, MP-150 and MP-150H have all been made rigid by the use of PPS material having high physical strength for the frame, super

permalloy for the shield casing to increase the S/N ratio and carbon fiber reinforced plastics for the cylinder. Beside the light mass oscillation system, this rigid construction is an outstanding feature of the cartridge. MP-150 and MP-150H, thus provided with the tracking capability to the highest degree come close to the higher priced cartridges with the high quality of sound they reproduce.





### Moving Permalloy Cartridges

#### MP-110 and MP-110H (with head shell)

MP-110 and MP-110H enable sound connoisseurs to enjoy economically the pure sound reproduced by the moving permalloy cartridges through the minimised magnetic energy losses.

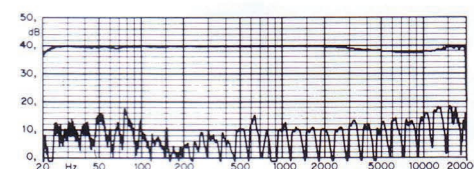
Adoption for its magnetic circuit of Samarium cobalt magnet that is believed to have the most powerful magnetic energy of all materials available at present, is the most important feature of MP-110 and MP-110H, both of which have been developed on the same design concept as that of MP-500, the epitome of the MP series cartridges.

Samarium cobalt magnet, which is smaller and yet more powerful than any conventional magnet, has enabled the magnetic circuit to be shortened, thereby minimizing

the magnetic energy loss that has harmful effects on the sound quality, especially improving the characteristics in the high note range.

Super permalloy that is 15% thinner than the ones used in the conventional Nagaoka products has been used for the pole piece to minimize the overcurrent loss and to make the sound of all note ranges flat. Also, for the purpose of reducing the weight in general of the oscillation system, 17S super hard aluminium alloy has been selected for cantilever, enabling complicated musical signals to be accurately transmitted without a loss, especially in the high note range. The stylus has super fine particle ground elliptical tip that is outstanding in smoothness and produces clear sound having the least degree of tracking error.

Furthermore, the shield casing of super permalloy, the cylinder of carbon fiber reinforced plastics, gold tipped terminals that minimize the contact resistance and are resistant to deterioration by aging, and other available technology for improvement of sound quality has all been unsparingly utilized in production of these cartridges. MP-110 and MP-110H, combining the substantially improved sound quality and basic performance, can be placed on your treasured records with a sense of relief.



### Moving Permalloy Cartridges

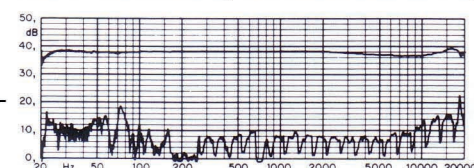
#### MP-100 and MP-100H (with head shell)

With MP-100, you can fully enjoy beautiful high notes and well balanced carefree sound. Consistent with the tone characters of the MP series cartridges, MP-100 has been fabricated in pursuit of the best cost performance. Its basic design is identical to that of MP-110. As in the case of the higher class cartridges of the MP series, Samarium cobalt magnet that has high magnetic energy has been adopted to MP-100, to improve the efficiency of the magnetic circuit and to minimize the magnetic energy loss. On the basis of the design philosophy that priority should always be given to the sound quality, same pole piece, shield casing and

cylinder as those used in MP-110 have been adopted to MP-100.

Having physically, electrically and mechanically balanced design incorporating an aluminium cantilever and a stylus tip that is outstanding in the tracking capability to realize the reduced mass of the oscillation system, MP-100 embodies all of the outstanding features of the moving permalloy cartridges. MP-100 would be ideal for any beginner to convince himself of the outstanding features of the moving permalloy cartridges that evenly reproduce the recorded sound from low to high note ranges and awaken his sensitivity into dazzlingly brilliant charm of music.

You should not fail to discern the difference between the sound reproduced by the smooth tracing capability of MP-100 cartridge and that obtained by a conventional cartridge.





Specifications	MP-500H MP-500	MP-300H MP-300	MP-200H MP-200
Output voltage	3 mV (5cm/sec)	3 mV (5cm/sec)	4 mV (5cm/sec)
Frequency characteristic	20–25,000 Hz	20–25,000 Hz	20–23,000 Hz
Channel separation	27 dB (1 KHz)	25 dB (1 KHz)	25 dB (1 KHz)
Channel balance	1.0 dB or less	1.0 dB or less	1.5 dB or less
Load resistance	47 K $\Omega$	47 K $\Omega$	47 K $\Omega$
Canti-lever	Boron	Boron	Boron
Stylus tip	Line contact, diamond	0.4 x 0.7mil elliptical, diamond	0.4 x 0.7mil elliptical, diamond
Stylus pressure	1.3–1.8 g	1.3–1.8 g	1.5–2.0 g
Cartridge's weight	8 g	8 g	6.5 g
Head shell's weight	13.5 g	13.5 g	9.5 g
Replacement stylus	JN-P500	JN-P300	JN-P200

	MP-150H MP-150	MP-110H MP-110	MP-100H MP-100
Output voltage	4.5 mV (5cm/sec)	5 mV (5cm/sec)	5 mV (5cm/sec)
Frequency characteristic	20–20,000 Hz	20–20,000 Hz	20–20,000 Hz
Channel separation	24 dB (1KHz)	23 dB (1 KHz)	22 dB (1 KHz)
Channel balance	1.5 dB or less	1.5 dB or less	2 dB or less
Load resistance	47 K $\Omega$	47 K $\Omega$	47 K $\Omega$
Canti-lever	Hardening taper aluminum alloy	Aluminum alloy	Aluminum alloy
Stylus tip	0.4 x 0.7mil elliptical, diamond	0.4 x 0.7mil elliptical, bonded diamond	0.6mil conical, bonded diamond
Stylus pressure	1.5–2.0 g	1.5–2.0 g	1.8–2.3 g
Cartridge's weight	6.5 g	6.5 g	6.5 g
Head shell's weight	9.5 g	9.5 g	9.5 g
Replacement stylus	JN-P150	JN-P110	JN-P100

Also, the MP series cartridges are available in six different types, each equipped with head shell. The head shell has been developed to optimize the performance of the MP series cartridges. It is principally made of magnesium, which is lightest in weight and has outstanding mass/strength ratio of all commercially available metals. The lead wire is litz wire of tough pitch copper that minimize the transmission loss for all tone ranges and the terminals have been gilded to maintain high quality, sustaining Nagaoka's high precision technology. Nagaoka's philosophy „all but the oscillation system should be rigid“ is again applied here.



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