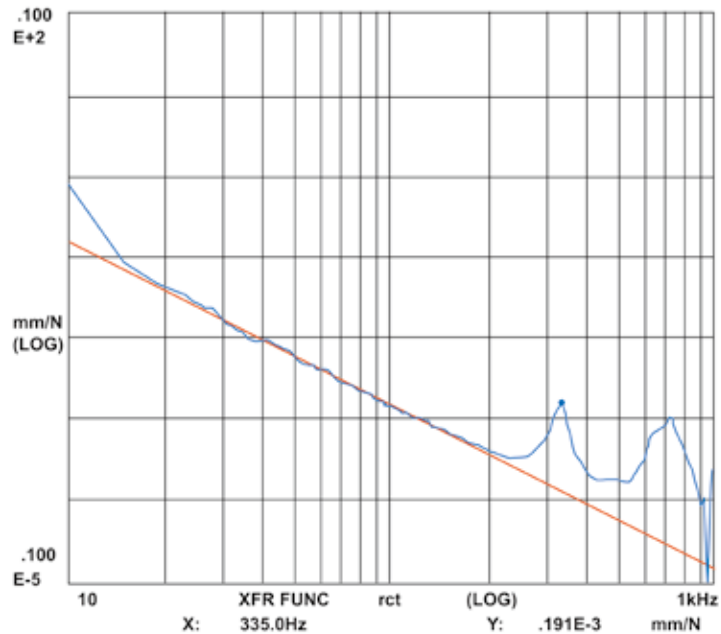


CHAPTER 7 VIBRATION CONTROL

| | |
|----------------------------------|------|
| Optical Tables | 7.2 |
| Active Pneumatic Suspension | 7.10 |
| Desktop Air Suspension | 7.12 |
| High Loading Vibration Isolators | 7.14 |
| Optical Breadboards | 7.15 |
| Vibration Measurement | 7.16 |

HONEYCOMB SURFACE TABLE

Improvement of the damping materials and the steel honeycomb cores steel honeycomb offers extreme stiffness and damping a bonding agent having no organic solvents is used between the honeycomb cores and the top and bottom steel plates. Machine polishing of a honeycomb table surface, which has been regarded as difficult to perform, has become possible thanks to our unique technology. As an optional feature, tables with maximum flatness can be manufactured to order the tabletop length, width and thickness can be modified upon request work surface options and configurations, such as through holes, cut-outs, and notches. Custom tapped holes are also available. Two or more tables can also be joined together to create longer or wider tables, or T-shaped tables, L-shaped tables.

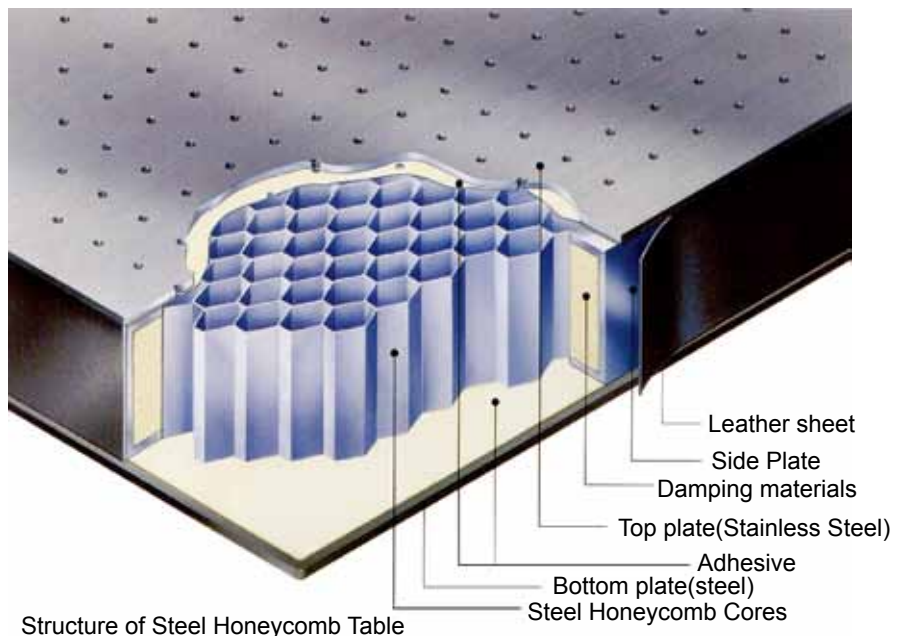


Type K4

The top plate is made of SUS430 stainless steel, enabling the use of a magnetic stand.

Type K5

Each M6 tapped hole, either on 50mm grid or 25mm grid is sealed with a cap attached on the back side, to prevent inflow of water or chemicals, and the circulation of air by convection into the honeycomb table. The air spring vibration isolator of Type K5 (AYA and AY series) comes standard with an automatic leveler with exhaust air drain line, for use in clean rooms. Type K5 is an ideal vibration free system for use in Class 100 clean rooms.



CHAPTER 7 VIBRATION CONTROL

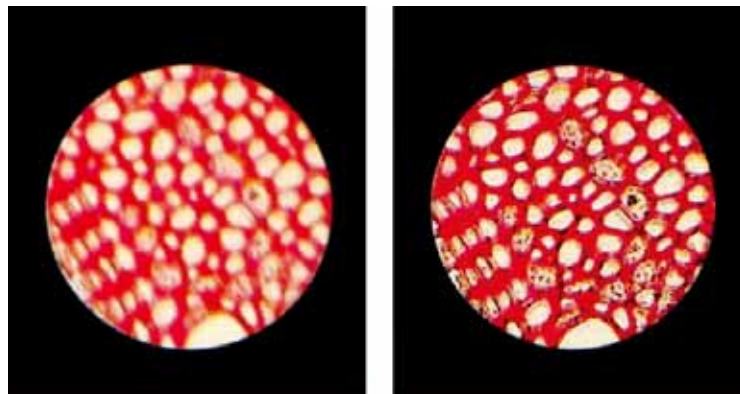
VIBRATION ISOLATION

To interrupt the vibrations immediately prior to the precision instrument itself. VISOLATOR is a vibration isolator that is the embodiment of this principle of vibration.

Shape and material of the air springs, the volume of the air spring chamber and the surge tank, the diameter and length of the orifice and the type of automatic leveler are all mutually inter-related.

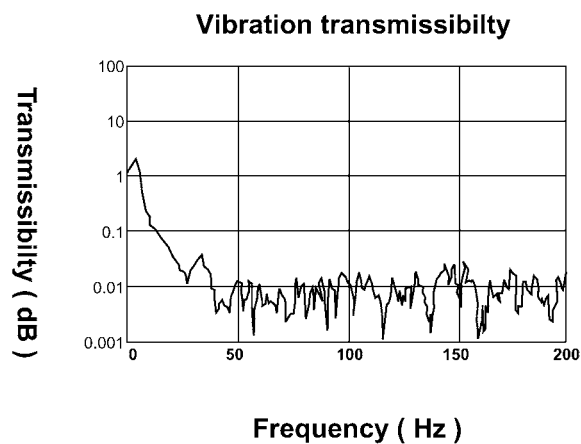
All of the VISOLATOR™ models house the finest in air spring systems that can only be made possible through the expertise of Meiritsu. Allow it to respond with a high degree of sensitivity to even extremely light objects, minimizing vibration spiraling as much as possible.

This series of vibration isolators are equipped with our patented automatic leveling mechanism which constantly keeps the surface table level even when removing and placing instruments as well as when changing their position.



■ On floor

■ On VISOLATOR™



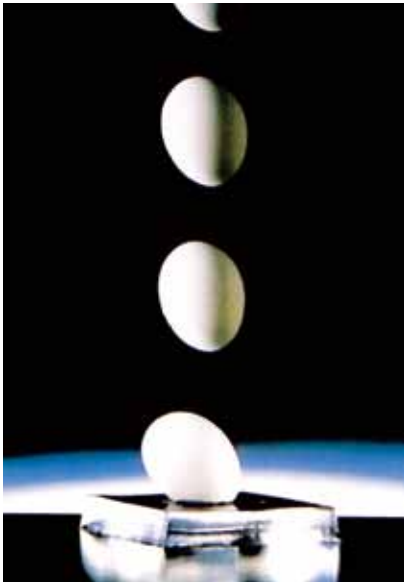
Automatic leveler

Air spring
variable orifice



AYA SERIES OPTICAL TABLES

The AYA series is the highest performance table top of the line series which feature improved isolation performance and various useful functions. Through improvement of horizontal direction vibration isolation performance, the AYA series is able to respond to the optical experimentation needs including interferometers and holography equipment which are sensitive to minute vibrations in all directions.



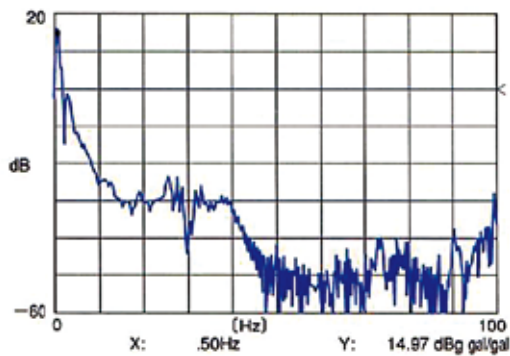
Impact absorption with αGEL

Parallel Swing Mechanism

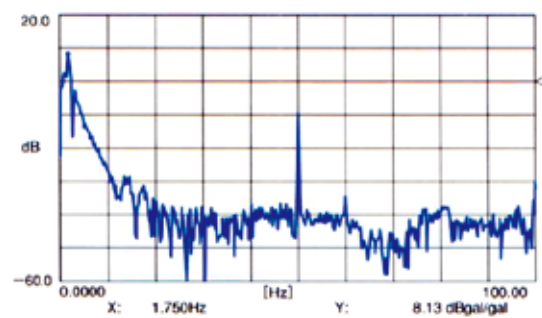
The AYA Series is equipped with Mei-ritsu's original parallel swing mechanism which can be likened to a swing which can swing forward and backward as well to the right and left, and moreover, can do so simultaneously. The result is the horizontal direction being reduced to 0.5Hz.

New Mechanisms for Emphasis on Ease of Use

The AYA Series is equipped with a newtype of damper which utilizes the new material α GEL damping performance, which is able to promptly absorb any vibrations which cause the surface table to fluctuate, has been improved even more without any loss of vibration isolation performance there by leading to increased ease of use α GEL is the registered trademark of GELTEC CO.,LTD



Transmissibility (AYA-2415K4. Vertical, Loading:300Kg)



Transmissibility (AYA-2415K4. Horizontal, Loading: 300Kg)

AYA - K5, k4 Type

AYA-Type K5

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Suitable for class 100 clean room uses (each tapped hole is airtight and an automatic leveler is equipped with exhaust air drain line).

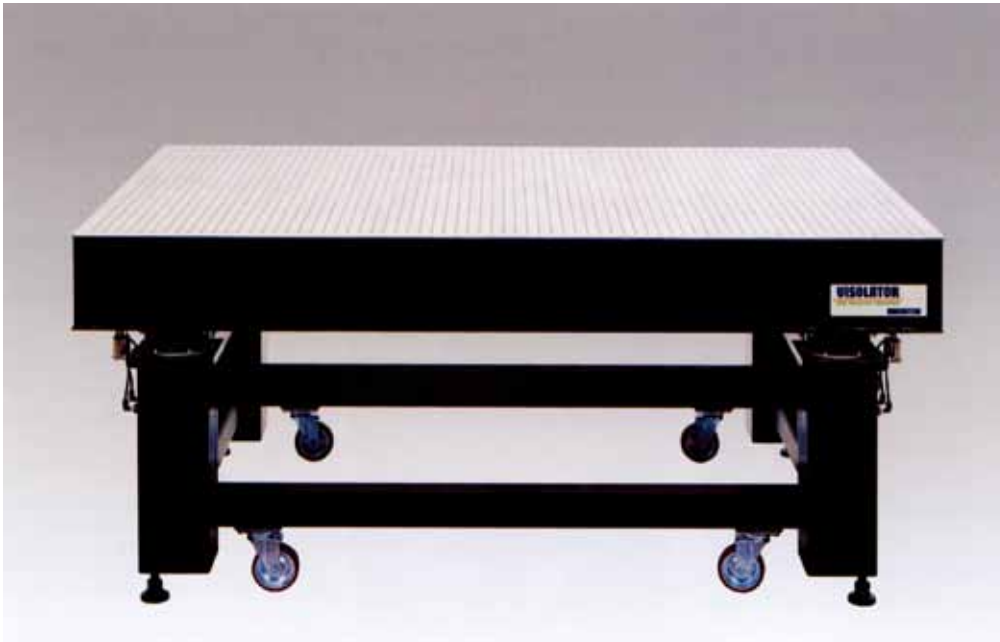
AYA-Type K4

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Through hole and specified tapped hole working available. Can join Honeycomb tables. (optional)

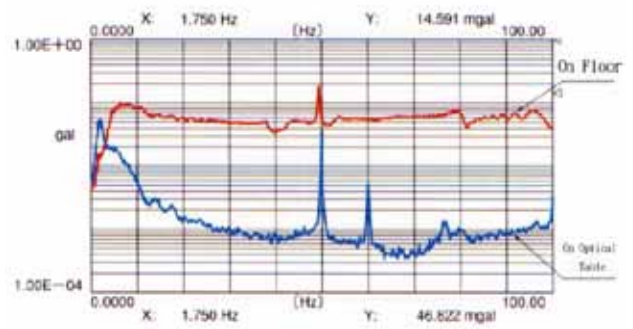
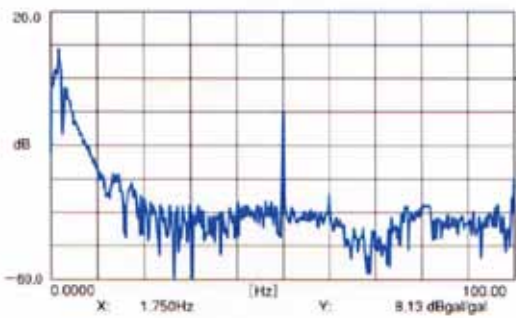
| Model | AYA-1007K5 | AYA-1209K5 | AYA-1510K5 | AYA-1809K5 | AYA-1812K5 | AYA-2010K5 | AYA-2012K5 | AYA-2015K5 | AYA-2015K5 | AYA-2210K5 |
|----------------------------|---|------------|------------|------------|------------|---|------------|------------|------------|------------|
| Item | AYA-1007K4 | AYA-1209K4 | AYA-1510K4 | AYA-1809K4 | AYA-1812K4 | AYA-2010K4 | AYA-2012K4 | AYA-2015K4 | AYA-2015K4 | AYA-2210K4 |
| Natural frequency | Vertical: 1.1Hz | | | | | Horizontal: 0.5Hz | | | | |
| Vibration isolation method | Vertical: Diaphragm air spring | | | | | Horizontal: Parallel swing mechanism | | | | |
| Damping method | Vertical: Air damping using variable orifices | | | | | Horizontal: Special damping using the α-GEL | | | | |
| Leveling method | Automatic levelers keep the surface table level automatically | | | | | | | | | |
| Low weight(Kg) | 300 | | | | | | | | | |
| Table dimensions(mm) | 1030x730 | 1200x900 | 1500x1000 | 1500x1200 | 1800x900 | 1800x1200 | 2000x1000 | 2000x1200 | 2000x1500 | 2200x1000 |
| Table thickness(mm) | 100 | | | | 200 | 100 | | | | 200 |
| Table materials | Steel Honeycomb : Top plate SUS430 5t(6t) . Bottom plate SS400 4.5t | | | | | | | | | |
| Machine height(mm) | 800 | | | | | | | | | |
| Machine weight(Kg) | 185 | 280 | 365 | 410 | 390 | 465 | 440 | 505 | 615 | 470 |
| | 175 | 250 | 325 | 365 | 350 | 410 | 385 | 440 | 535 | 410 |
| Air supply | 0.35~0.70Mpa | | | | | | | | | |

| Model | AYA-2212k5 | AYA-2215K5 | AYA-2412K5 | AYA-2415K5 | AYA-3012K5 | AYA-3015K5 | AYA-3612K5 | AYA-3615K5 | AYA-4012K5 | AYA-4015K5 |
|----------------------------|---|------------|-------------------|------------|-----------------|---|-------------------|------------|------------|------------|
| Item | AYA-2212k4 | AYA-2215K4 | AYA-2412K4 | AYA-2415K4 | AYA-3012K4 | AYA-3015K4 | AYA-3612K5 | AYA-3615K4 | AYA-4012K4 | AYA-4015K4 |
| Natural frequency | Vertical: 1.1Hz | | Horizontal: 0.5Hz | | Vertical: 1.2Hz | | Horizontal: 0.8Hz | | | |
| Vibration isolation method | Vertical: Diaphragm air spring | | | | | Horizontal: Parallel swing mechanism | | | | |
| Damping method | Vertical: Air damping using variable orifices | | | | | Horizontal: Special damping using the α-GEL | | | | |
| Leveling method | Automatic levelers keep the surface table level automatically | | | | | | | | | |
| Low weight(Kg) | 300 | | | | | | | | | |
| Table dimensions(mm) | 2200x1200 | 2200x1500 | 2400x1200 | 2400x1500 | 3000x1200 | 3000x1500 | 3600x1200 | 3600x1500 | 4000x1200 | 4000x1500 |
| Table thickness(mm) | 200 | | | 300 | | | | | | |
| Table materials | Steel Honeycomb: Top plate SUS430 5t(6t). Bottom plate SS400 4.5t | | | | | | | | | |
| Machine height(mm) | 800 | | | | | | | | | |
| Machine weight(Kg) | 535 | 655 | 580 | 710 | 800 | 995 | 945 | 1170 | 1060 | 1275 |
| | 465 | 570 | 505 | 610 | 655 | 810 | 765 | 945 | 830 | 1025 |
| Air supply | 0.35~0.70Mpa | | | | | | | | | |

AY/AYN SERIES OPTICAL TABLES



Transmissibility (AY-1510K4. Vertical ,Loading:300Kg)



AY/Ayn -Series



AY



AYN

AY Series

The AY Series are equipped with automatic levelers, keeping the surface table level automatically, whereas AYN series are manual leveling types.

CHAPTER 7 VIBRATION CONTROL

AY/AYN SERIES OPTICAL TABLES

AY/AYN-Type K5

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Suitable for class 100 clean room uses. (each tapped hole is airtight and an automatic leveler is equipped with exhaust air drain line).

AY/AYN-Type K4

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Through hole and specified tapped hole working available. Can join Honeycomb tables.(optional)

| Model | AY/AYN-1007K5 | AY/AYN-1209K5 | AY/AYN-1510K5 | AY/AYN-1512K5 | AY/AYN-1809K5 | AY/AYN-1812K5 | AY/AYN-2010K5 | AY/AYN-2012K5 | AY/AYN-2015K5 | AY/AYN-2210K5 |
|----------------------------|---|---------------|---------------|---------------|----------------|---|---------------|---------------|---------------|---------------|
| Item | AY/AYN-1007K4 | AY/AYN-1209K4 | AY/AYN-1510K4 | AY/AYN-1512K4 | AY/AYN-1809K4 | AY/AYN-1812K4 | AY/AYN-2010K4 | AY/AYN-2012K4 | AY/AYN-2015K4 | AY/AYN-2210K4 |
| Natural frequency | | | | | Vertical:1.5Hz | Horizontal:1.8Hz | | | | |
| Vibration isolation method | Diaphragm air spring | | | | | | | | | |
| Damping method | Air damping using variable orifices | | | | | | | | | |
| Leveling method | AY: Automatic levelers keep the surface table level automatically | | | | | AYN: Manual operated with an attached hand pump | | | | |
| Low weight(Kg) | 300 | | | | | | | | | |
| Table dimensions(mm) | 1030x730 | 1200x900 | 1500x1000 | 1500x1200 | 1800x900 | 1800x1200 | 2000x1000 | 2000x1200 | 2000x1500 | 2200x1000 |
| Table thickness(mm) | 100 | | | | | 200 | | | | |
| Table materials | Steel Honeycomb : Top plate SUS430 5t(6t) . Bottom plate SS400 4.5t | | | | | | | | | |
| Machine height(mm) | 800 | | | | | | | | | |
| Machine weight(Kg) | 175 | 265 | 350 | 395 | 375 | 450 | 425 | 485 | 600 | 455 |
| | 165 | 235 | 310 | 350 | 335 | 395 | 370 | 420 | 520 | 395 |
| Air supply | 0.35~0.70Mpa | | | | | | | | | |

| Model | AY/AYN-2212K5 | AY/AYN-2215K5 | AY/AYN-2412K5 | AY/AYN-2415K6 | AY/AYN-3012K5 | AY/AYN-3612K5 | AY/AYN-3615K5 | AY/AYN-4012K5 | AY/AYN-4012K5 | AY/AYN-4015K5 |
|----------------------------|---|---------------|---------------|---------------|----------------|---|---------------|---------------|---------------|---------------|
| Item | AY/AYN-2212K4 | AY/AYN-2215K4 | AY/AYN-2412K4 | AY/AYN-2415K4 | AY/AYN-3012K4 | AY/AYN-3612K4 | AY/AYN-3615K4 | AY/AYN-4012K4 | AY/AYN-4012K4 | AY/AYN-4015K4 |
| Natural frequency | | | | | Vertical:1.5Hz | Horizontal:1.8Hz | | | | |
| Vibration isolation method | Diaphragm air spring | | | | | | | | | |
| Damping method | Air damping using variable orifices | | | | | | | | | |
| Leveling method | AY: Automatic levelers keep the surface table level automatically | | | | | AYN: Manual operated with an attached hand pump | | | | |
| Low weight(Kg) | 300 | | | | | | | | | |
| Table dimensions(mm) | 2200x1200 | 2200x1500 | 2400x1200 | 2400x1500 | 3000x1200 | 3600x1200 | 3600x1500 | 4000x1200 | 4000x1200 | 4000x1500 |
| Table thickness(mm) | 200 | | | | | 300 | | | | |
| Table materials | Steel Honeycomb : Top plate SUS430 5t(6t) . Bottom plate SS400 4.5t | | | | | | | | | |
| Machine height(mm) | 800 | | | | | | | | | |
| Machine weight(Kg) | 520 | 639 | 565 | 695 | 785 | 975 | 930 | 1155 | 1045 | 1260 |
| | 450 | 554 | 490 | 595 | 640 | 790 | 750 | 930 | 815 | 1010 |
| Air supply | 0.35~0.70Mpa | | | | | | | | | |

Note: Load weight up to 500kg can be customized

RHS/HS SERIES OPTICAL TABLES



RHS Series

These surface tables specially designed for optical experimentation applications have inherited all of the characteristics of the surface tables used in our steel honeycomb surface table air spring vibration isolators.

RHS Series-Optical Surface Tables with Stand

The RHS Series uses a rubber cushion to suppress vibrations. It features all optimal design that brings out the features of optical surface tables. Since the stand is equipped with foot-adjusted and casters the installation site can be changed easily.

Rigid tables without rubber cushions, called the LHS Series, are also available.

HS Series-Optical Surface Tables without Stand

This is a simple type of surface table which can be installed by simply placing on existing lab desks or racks for meeting the specifications of optical experiments.



HS Series



RHS Series

RHS/Hs - K5, k4 Type

RHS/HS-Type K5

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Suitable for class 100 clean room uses. (each tapped hole is airtight)

RHS/HS-Type K4

- M6 tapped holes, either on 50mm grid or 25mm grid (to be specified by the user).
- Through hole and specified tapped hole working available. Can join Honeycomb tables.(optional)

| Item | Model | RHS/HS-0806k5 | RHS/HS-1007K5 | RHS/HS-1209K5 | RHS/HS-1510K5 | RHS/HS-1512K5 |
|----------------------|-------|--|---------------|---------------|---------------|---------------|
| | | RHS/HS-0806k4 | RHS/HS-1007K4 | RHS/HS-1209K4 | RHS/HS-1510K4 | RHS/HS-1512K4 |
| Table dimensions(mm) | | 830x630 | 1030x730 | 1200x900 | 1500x1000 | 1500x1200 |
| Table thickness(mm) | | 100 | | | 200 | |
| Table weight (Kg) | | 60 / 55 | 85 / 75 | 165 / 135 | 225 / 185 | 265 / 220 |
| Table materials | | Steel Honeycomb : Top plate SUS430 5t(6t). Bottom plate SS400 4.5t | | | | |
| Load weight (Kg) | | 300 | | | | |
| Machine height (Kg) | | 800 | | | | |
| Machine weight (Kg) | | 95 | 140 | 225 | 285 | 330 |
| | | 90 | 130 | 195 | 245 | 285 |

| Item | Model | RHS/HS-1809K5 | RHS/HS-1812K5 | RHS/HS-2010K5 | RHS/HS-2012K5 | RHS/HS-2015K5 | RHS/HS-2210K5 |
|----------------------|-------|--|---------------|---------------|---------------|---------------|---------------|
| | | RHS/HS-1809K4 | RHS/HS-1812K4 | RHS/HS-2010K4 | RHS/HS-2012K4 | RHS/HS-2015K4 | RHS/HS-2210K4 |
| Table dimensions(mm) | | 1800*900 | 1800x1200 | 2000x1000 | 2000*1200 | 2000x1500 | 2200x1000 |
| Table thickness(mm) | | 200 | | | | | |
| Table weight (Kg) | | 240 / 200 | 315 / 260 | 295 / 240 | 350 / 285 | 460 / 380 | 325 / 265 |
| Table materials | | Steel Honeycomb : Top plate SUS430 5t(6t). Bottom plate SS400 4.5t | | | | | |
| Load weight (Kg) | | 300 | | | | | |
| Machine weight (mm) | | 800 | | | | | |
| Machine weight (Kg) | | 305 | 385 | 360 | 420 | 530 | 390 |
| | | 265 | 330 | 305 | 355 | 450 | 330 |

| Item | Model | RHS/HS-2212k5 | RHS/HS-2215K5 | RHS/HS-2412K5 | RHS/HS-2415K5 | RHS/HS-3012K5 | RHS/HS-3015K5 | RHS/HS-3612K5 | RHS/HS-3615K5 | RHS/HS-4012K5 | RHS/HS-4015K5 | |
|----------------------|-------|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|
| | | RHS/HS-2212k4 | RHS/HS-2215K4 | RHS/HS-2412K4 | RHS/HS-2415K4 | RHS/HS-3012K4 | RHS/HS-3015K4 | RHS/HS-3612K4 | RHS/HS-3615K4 | RHS/HS-4012K4 | RHS/HS-4015K4 | |
| Table dimensions(mm) | | 2200x1200 | 2200x1500 | 2400x1200 | 2400x1500 | 3000x1200 | 3000x1500 | 3600x1200 | 3600x1500 | 4000x1200 | 4000x1500 | |
| Table thickness(mm) | | 200 | | | | | | | | | | |
| Table weight (Kg) | | 385 / 315 | 500 / 415 | 420 / 345 | 550 / 450 | 520 / 425 | 680 / 560 | 625 / 510 | 815 / 670 | 695 / 565 | 905 / 740 | |
| Table materials | | Steel Honeycomb : Top plate SUS430 5t(6t). Bottom plate SS400 4.5t | | | | | | | | | | |
| Load weight (Kg) | | 300 | | | | | | | | | | |
| Machine height (mm) | | 800 | | | | | | | | | | |
| Machine weight (Kg) | | 455 | 575 | 490 | 625 | 610 | 775 | 730 | 930 | 810 | 1030 | |
| | | 385 | 490 | 415 | 525 | 515 | 655 | 615 | 785 | 680 | 865 | |

ACTIVE PNEUMATIC SUSPENSION



Though MAPS has compact size, it can isolate the vibration of six degrees of freedom

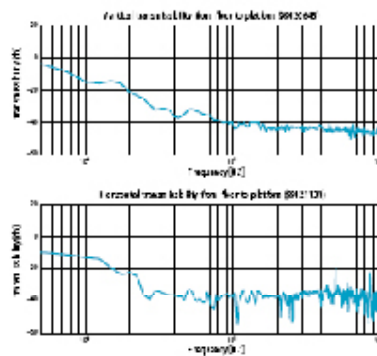
Each unit of MAPS series provided by Meiritsu has two air pressure actuators: one for the vertical, another for the horizontal. Using MAPS, you can experience excellent performance of vibration-isolation, vibration suppression and precise positioning.

MAPS makes it possible to eliminate the vibration of frequency band width which passive system cannot.

It often occurs that resonance due to the natural frequency causes a trouble in passive isolation system. The resonance increases magnitude of vibrations three times or more. But the resonance can be removed by using MAPS. And it is possible to get excellent isolation performance in this frequency area. For example, vibration of 2Hz near the resonance of typical passive isolation system can be eliminated to less than 1/30-1/100 in comparison with most of passive isolation systems.

A device of ten tons or more can be isolated from vibrations by a standard type of MAPS

The recent precise machine shows a tendency of becoming large caused by the functional fulfillment. Some devices already have 10 tons or more in the total weight. It has become difficult to keep the structural natural frequency of the device high because of the enlargement of the device. This is one of the reasons why active vibration isolation system which has excellent performance in the low frequency is necessary.



It is steady even if a device on which stage works is carried.

If a device has some movements made by XYstages for example, the device swings in the big amplitude, and the vibration is enlarged on passive isolation system such as air mounts or rubber mounts. The swings can be made small on active vibration isolator because it is feedback-controlled to keep the position stable. And, if the movement of the stage can be outputted as an electric signal in advance, it is possible to get an environment which hardly

swings because MAPS can be feed-forward controlled so that the swings may become the smallest

MAPS is excellent in accurate positioning and precise leveling.

When the size of a device becomes large, inclination causes a trouble, too. It leans and sags when it inclines because of its heaviness, and the precision is affected remarkably. MAPS makes inclination small, and can keep the precision in good condition. For example, MAPS makes the smooth delivery of wafer or LCD panel possible.

All types of MAPS are easy to install.

We listen to the customer's request, and make all the functions which should be necessary crowded in MAPS series. It only needs small space to install MAPS, and you can get an environment which isn't influenced by vibration. Because the control system of the MAPS series is very stable, we can handle you MAPS series confidently not only as an equipment of your factory but also as attachments to the products for sale.

MAPS is one of the important parts which compose your precise devices.

It seems that there are a lot of customers who use vibration isolation devices only from anxiety to the vibration. When high precisionization, high function, and enlargement are proceeding today, an environment with no influence of vibration is necessary to show the full performance of the device

CHAPTER 7 VIBRATION CONTROL



described in the specification sheet. Vibration isolation device is one of the indispensable parts to construct a system of the precise machine rather than the assist-tant device.

Make contact with us when you start development.

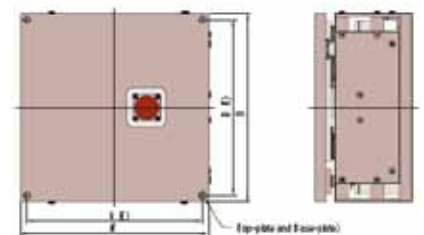
MAPS series has all the functions which are necessary for vibration isolation, positioning, and leveling. And it doesn't need a large space to install. Even after development of a device is completed, MAPS can be assembled into the device. But, in that case, various restrictions often come out. And this is not a good method from neither vibration isolation performance nor cost. When development of a new device is begun, we would like to hear your ideas about the device, and would like to start arrangements about the installation space of MAPS, vibration isolation performance, and the positioning precision which should be necessary. Your vibration environment can be drawn to the ideal by adopting this way that we recommend.



| Model | MAPS-008 | MAPS-016 | MAPS-033 | MAPS-065 | MAPS-130 | MAPS-240 |
|------------------------------------|---------------------------|------------------------|--------------------------|--------------------------|----------------------------|------------------------------|
| Payload Range [kN] ([kgf]) | 4 - 8 (400 - 800) | 8 - 16 (800 - 1600) | 16 - 33 (1600 - 3400) | 33 - 65 (3400 - 6600) | 65 - 130 (6600 - 13300) | 130 - 240 (13300 - 24500) |
| Dimensions WxDxH [mm] | 235x235x130 | 295x295x140 | 350x350x150 | 450x450x190 | 600x480x190 | 700x600x267 |
| Mass of a Unit [kg] | 13 | 42 | 63 | 110 | 180 | 230 |
| Supplied Air Pressure [MPa] | 0.6 - 0.8 (Dry Clean Air) | | | | | |
| Typical Air Consumption [l/min] | 45 - 65 | | 120 - 170 | | | |
| Maximam Air Consumption [l/min] | 120 | | 300 | | | |
| Power Supply Voltage [V] | 100 - 240 (AC, 50/60Hz) | | | | | |
| Rated Power Consumption [W] | 130 | | | | | |
| Positioning Tolerance [mm] | 0.001 - 0.050 | | | | | |
| Active Degrees of Freedom | <=6 | | | | | |

*Notice: The vibration transmissibility curves and the positioning tolerance sometimes vary according to not only the environmental conditions of the place where MAPS will be installed but also the structure or behavior of the precision machine mounted on MAPS. All specifications are subject to change without notice. MAPS which is not in this specifications table can be available, too. Contact the following

- Third angle projection.
- All dimensions are in millimeters.
- MAPS' appearance varies according to the type.



AET DESKTOP & ADZ-A DESK TYPE SERIES AIR SUSPENSION VIBRATION ISOLATOR

The AET is a series of desktop vibration isolators that bring a high-performance vibration isolation system. The AET Series, which combines vibration isolators with steel honeycomb surfaces tables, consists of desktop air suspension vibration isolators optimal for optical experiments using a small surface area.

• S Type with Automatic Leveler

The S type is equipped with an automatic leveler. This keeps the surface table level even when the load distribution on the spring system is changed.

• Manual Leveling N Type

The N type is provided with a hand pump used for supplying air to the system in order to maintain the surface table level.

• Clamp-Equipped NC and SC Type

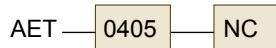
The SC and NC type are equipped with clamps that allow you to fix the surface table in position both quickly and easily



| | |
|----|------------------------------|
| S | Automatic Leveling, No Clamp |
| SC | Automatic Leveling, Clamp |
| N | Manual Leveling, No Clamp |
| NC | Manual Leveling, Clamp |

| Item | Model | AET-0405 | AET-0506 | AET-0605 | AET-0806 | AET-1007 |
|----------------------------|-------|--|---------------|---------------|---------------|----------------|
| Natural frequency | | 2.5 ~ 2.7 Hz | | | | |
| Vibration isolation method | | Special diaphragm air spring | | | | |
| Damping method | | Air damping using orifices | | | | |
| Load weight (kg) | | 60 | 60 | 60 | 60 | 80 |
| Table dimensions (mm) | | 430x530x50 | 530x630x50 | 630x530x50 | 800x600x50 | 1000x750x50 |
| Machine height (mm) | | 430x530x115.5 | 530x630x115.5 | 630x530x115.5 | 800x600x115.5 | 1000x750x115.5 |
| Machine weight (kg) | | 30 | 39 | 39 | 50 | 72 |
| Standard accessories | | S-type: Urethane tube φ6x3, piping (PT 1/4 male threads)x1 N-type: Hand pump, Screw driver for adjustment of air supply and exhaust valve | | | | |

Ordering Information



Note: Load weight up to 200kg can be customized

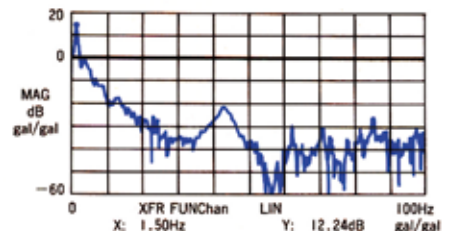
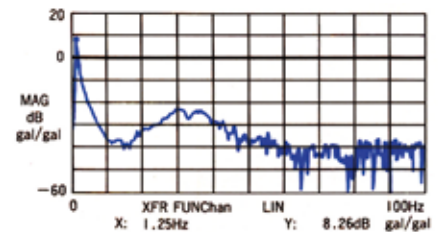


FEATURES:

- Improved performance on both Vertical and Horizontal vibration isolation
- Application of Light Steel Honeycomb platform
- Selection of automatic level maintenance system to suit purpose of use
- Instant stop to vibration of platform
- Bunch of options for various requirements

SPECIFICATIONS

| Model | ADZ-A0806 | ADZ-A1007 | ADZ-A1207 |
|----------------------------|--|----------------------|--|
| Natural frequency | Vertical:1.2-1.5Hz | Horizontal:1.2-1.5Hz | Vertical:1.5-1.8Hz Horizontal:1.5-1.8Hz |
| Vibration isolation method | Vertical:Diaphragm air spring(Air damping by orifices) | | Horizontal:antivibration rubber |
| Leveling method | Height control valves keeps the surface table level automatically | | |
| Table dimensions (mm) | 800x600x50 | 1000x750x50 | 1200x750x50 |
| Table materials | Steel Honeycomb core, Top plate SUS430 5t(6t), Bottom plate SS400 (3.2t) | | |
| Height (mm) | | 750 | |
| Dimensions (mm) | 900x700 | 1100x850 | 1300x850 |
| Weight (kg) | 110 | 145 | 165 |
| Load weight (kg) | 200 | 250 | 300 |
| Air Supply (MPa) | 0.35-0.70 (Air regulator with filter attached) | | |



CHAPTER 7 VIBRATION CONTROL

AVT SERIES BOARDS

Desktop vibration absorption boards featuring advanced air suspension type vibration isolators. All vibration isolation functions are incorporated in a compactly designed body. This design is sophisticated considering operation conditions sufficiently. Precision machines and those for machining minute parts.

• Automatic leveler incorporated S-type

automatically keep the surface table level, even when the load distribution on the spring system is changed due to a replaced or repositioned loading device. The automatic leveler is indispensable for automatic measuring and machining devices which are continuously accompanied by changes in load distribution.

• Manual leveling N-type

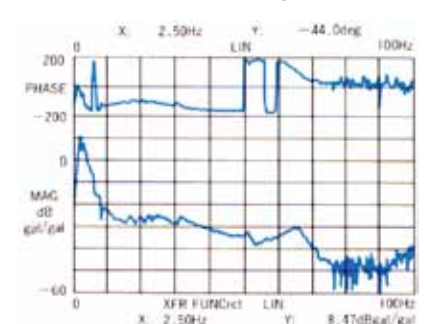
The N-type uses an attached hand pump to supply air for leveling. The well designed adjusting inlet requires no experience for initial leveling. Once it is set, you need not supply air for 1 or 2 weeks. This type is recommended if no air source is available in your installation room or the setting location is likely to be changed frequently.

• One-touch clamber provided C-type

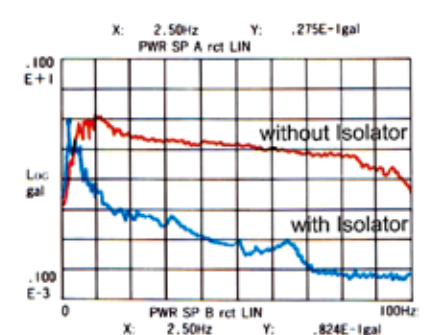
A clamp mechanism can be added to the S-and N-mechanism types. Using a lever you can fix the surface table when you replace a specimen, a lens, and so forth with another.

The compact special air spring can effectively suppress a wide range of vibrations from low frequencies to high frequencies. An orifice used in the air damper is incorporated to immediately suppress surface table fluctuations that may occur during operation. This ensures smooth measurement and machining, free from troublesome fluctuations.

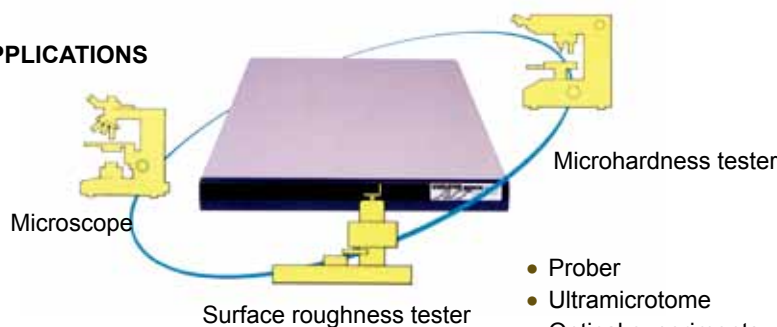
Vibration transmissibility



Power spectrum



APPLICATIONS



- Prober
- Ultramicrotome
- Optical experiments
- Other precision equipment

Ordering Information

AVT — 0405 — SC

| | |
|----|------------------------------|
| N | Manual Leveling, No Clamp |
| NC | Manual Leveling, Clamp |
| S | Automatic Leveling, No Clamp |
| SC | Automatic Leveling, Clamp |

| Item | Model | AVT-0405 | AVT-0506 | AVT-0605 | AVT-0806 |
|----------------------------|-------|--|--------------|--------------|--------------|
| Natural frequency | | 2.5~2.7Hz | | | |
| Vibration isolation method | | Special - diaphragm air spring | | | |
| Damping method | | Air damping using an orifice | | | |
| Leveling method | | S-type: an automatic lever keeps the surface table level automatically N-type: hand operated with an attached hand pump | | | |
| Load weight(kg) | | 55 | 60 | 60 | 70 |
| Table dimensions(mm) | | 430x530 | 530x600 | 600x300 | 800x600 |
| Machine dimensions(mm) | | 430x548x60±3 | 530x610x60±3 | 600x548x60±3 | 800x618x60±3 |
| Machine weight(kg) | | 18 | 23 | 23 | 32 |

Standard accessories
 S type : urethane tube φ6x3m , piping joint (PT 1/4 male threads)x1
 N type: hand pump, screw driver for adjustment of air supply and exhaust valve, high gage.

AP SERIES AIR SUSPENSION VIBRATION ISOLATORS



APPLICATIONS:

- Semiconductor fabrication and wafer inspection
- LCD manufacture and inspection
- Electron Microscopy
- Optical Inspection
- SEMs/TEMs
- Other Precision equipments

| Item | Model | AP-80 | AP-100 | AP-120 | AP-140 | AP-160 |
|----------------------------|-------|--|-------------|-------------|-------------|-------------|
| Natural frequency | | Vertical / Horizontal: 2.5~3.0Hz | | | | |
| Vibration isolation method | | Air spring | | | | |
| Damping method | | Air damping using orifices | | | | |
| Leveling method | | Automatic levelers keep the surface table level automatically (graduation $\pm 200\mu\text{m}$) | | | | |
| Size(WxDxH mm) | | 170x170x185 | 180x180x185 | 200x200x185 | 210x210x185 | 240x240x185 |
| Weight(Kg) /1pc | | 10.5 | 14 | 15 | 19 | 21 |
| Max Loading(kg)(4pcs/set) | | 560 | 880 | 1200 | 1700 | 2200 |
| Screw hole pitch(mm) | | 150x150 | 160x160 | 176x176 | 186x186 | 210x210 |
| Screw hole Diameter(mm) | | 10 | 10 | 10 | 10 | 13 |
| Air pressure requirement | | 0.40~0.70MPa | | | | |

| Item | Model | AP-180 | AP-200 | AP-230 | AP-270 | AP-330 | AP-380 |
|----------------------------|-------|--|-------------|-------------|-------------|-------------|-------------|
| Natural frequency | | Vertical / Horizontal:2.5~3.0Hz | | | | | |
| Vibration isolation method | | Air spring | | | | | |
| Damping method | | Air damping using orifices | | | | | |
| Leveling method | | Automatic levelers keep the surface table level automatically (graduation $\pm 200\mu\text{m}$) | | | | | |
| Size(WxDxH mm) | | 250x250x185 | 260x260x185 | 300x300x185 | 380x380x185 | 410x410x185 | 430x430x185 |
| Weight(Kg)/1pc | | 27.5 | 32 | 43.5 | 52 | 67.5 | 90 |
| Max Loading(kg)(4pcs/set) | | 2800 | 3600 | 4600 | 6400 | 9600 | 13000 |
| Screw hole pitch(mm) | | 230x230 | 230x230 | 270x270 | 290x290 | 340x340 | 400x400 |
| Screw hole Diameter(mm) | | 13 | 13 | 13 | 13 | 13 | 13 |
| Air pressure requirement | | 0.40~0.70MPa | | | | | |

CHAPTER 7 VIBRATION CONTROL

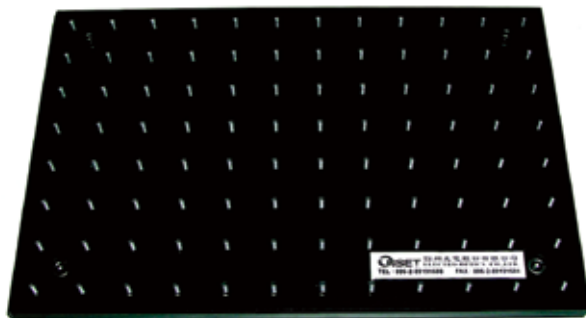
OPTICAL BREADBOARDS

Honeycomb breadboard



| Item | Model | HSB-0405K4 | HSB-0605K4 | HSB-0806K4 | HSB-1007K4 |
|--------------------|-------|--|------------|------------|------------|
| Dimensions(mm) | | 430x530 | 630x530 | 800x600 | 1000x750 |
| Thickness(mm) | | 50 | | | |
| Materials | | Steel honeycomb: top plate SUS430(5t) : bottom plate SS400(3.2t) | | | |
| Mounting hole type | | M6 mounting holes on 25mm grid | | | |
| weight(kg) | | 18 | 27 | 38 | 59 |

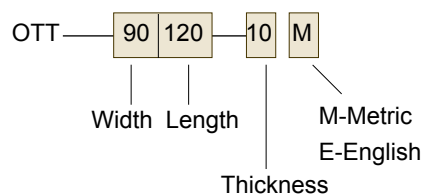
Aluminum Breadboards



| Model NO. | OTT2030 | OTT3030 | OTT3045 | OTT3060 | OTT4560 | OTT6060 | OTT4590 | OTT6090 |
|---------------|---------------------------|---------|---------|---------|---------|---------|---------|---------|
| Material | Anodized, Aluminum 6061T6 | | | | | | | |
| Size(mm) | 200X300 | 300X300 | 300X450 | 300X600 | 450X600 | 600X600 | 450X900 | 600X900 |
| Thickness(mm) | 10/13/20 | | | | | | | |
| Mounting Hole | M6(M), 1/4-20(E) | | | | | | | |

Custom size available on request

Ordering Information



PORTABLE VIBRATION MEASUREMENT SYSTEM



A portable vibration measurement system for simple and efficient measurement/analysis of microvibration.

With built-in servo type accelerometer and sensor amplifier, a small and light-weight all-in-one attache case designed based on the concept of "Simple and Anywhere" is easy for carrying and move between measurement points. With battery/AC power supply, analysis can be performed simply anywhere.

Time domain signal, power spectrum, coherence, phase and vibration transmittivity can be displayed on real time basis using easy-to-use user interface and easy-to-see graphic layout. The system is full of required vibration analysis functionalities, such as online analysis of the required portion by extracting data from long-length of vibration data recorded using data recording function, and graph print-out and measurements of acceleration/velocity/displacement etc.. It can export CSV data file (text file using comma for separation), which can be used for further data analy-

sis using software like Microsoft Excel etc.

HANDYSAM makes the large-scale complicated microvibration measurement to be so simple!

The microvibration measurement and evaluation at nanometer accuracy level of semiconductor related manufacturing inspection equipment and electronic microscope, required setup of large-scale measurement HANDYSAM brings all components (PC, ampli-

fier unit, sensor and carrying case etc.) required for microvibration measurement into an integrated all-in-one system. You do not need to buy any more. Further more, complicated adjustment and setup of sensor, amplifier, FFT analyzer is unnecessary. It is a handy type vibration measurement system which can simply be used anywhere by anyone.

- **Real time multi-channel display of various vibration data**
 - Time domain signal
 - Power spectrum
 - Vibration transmittivity
 - Phase
 - Coherence
- **Real time display for 3 types of vibration mode**
 - Acceleration
 - Velocity
 - Displacement
- **Data record functionality**
 - Long time vibration data recording
 - Offline analysis of saved data
 - Analysis of data extracted from long-time recording
- **Graph print-out functionality**
 - Time domain signal
 - Power spectrum
 - Vibration transmittivity
 - Phase
 - Coherence
- **Data export functionality**
 - It can export CSV data file (text file using comma for data separation), which can be used for further data analysis using software like Microsoft Excel etc..
- **Other functionalities**
 - Various graphic handling --- Cursor search, Scale change, Zoom and pan
 - Software upgrade via internet --- Automatic software version check functionality, Automatic software version upgrade functionality
 - Various measurement conditions for different purpose ---
 - Various Window functions, Peak hold functionality, Overlap

| Model NO. | HM4-01 | HM4-02 | HM4-03 | HM4-04 | HM4-05 | HM4-06 |
|--------------------------------------|---|--------|--------|-------------|--------|--------|
| Channel No. | 1ch | 2ch | 3ch | 4ch | 5ch | 6ch |
| Frequency Range | 50, 100, 200, 400Hz | | | | | |
| Measurement Frequency | 0.1 - 400Hz (acceleration), 1 - 400Hz (Velocity, Displacement) ⁽¹⁾ | | | | | |
| Spectrum Lines | 400 lines | | | | | |
| Window Function | Hanning /Rectangular | | | | | |
| Averaging Mode (Frequency domain) | Addition Average/Peak Hold | | | | | |
| Overlap | 0, 25, 50, 75, 87.5% (vary with measurement conditions) | | | | | |
| Sensor Type | Servo type accelerometer | | | | | |
| Sensor Sensitivity | 5.1x10 ⁻⁷ m/s ² | | | | | |
| A/D Converter | 16bit | | | | | |
| Graphic Display and Printing | Time domain signal, Power spectrum, Vibration transmittivity, Phase, Coherence, Tripartite, 1/3 Octave | | | | | |
| Data Recording functionality | standard 12 hours for each measurement ⁽²⁾ | | | | | |
| Operating System | Windows XP Home Edition | | | | | |
| Screen Display | XGA (1024x768) | | | | | |
| System Dimensions (W x D x H) | 490x390x175 | | | 530x470x175 | | |
| Weight (Approximately) | 10kg | 11kg | 12kg | 13kg | 14kg | 15kg |
| External Power Supply | AC100 - 240V | | | | | |

1. Velocity and Displacement are calculated data
2. Vary with Channel No. and hard disk space
3. Vary with measurement environment and usage condition

System Configuration

Note PC
A/D card
Amplifier unit
Accelerometer
Carrying case
Measurement software



Accelerometer
(44x44x50mm)



Carrying Case



In Storage
(3ch model)