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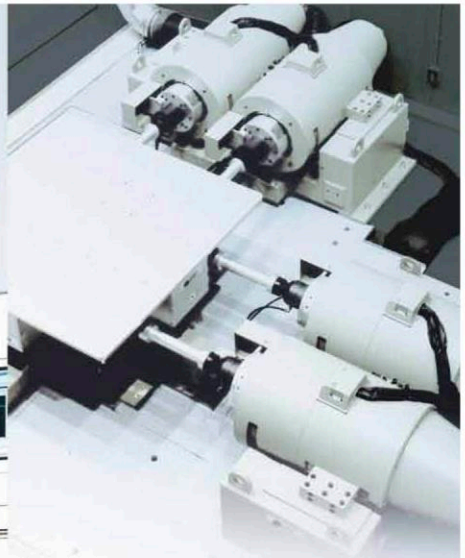
Dynamic Simulation System
Full Line up Catalogue

World's leading vibration company in building reliable systems.

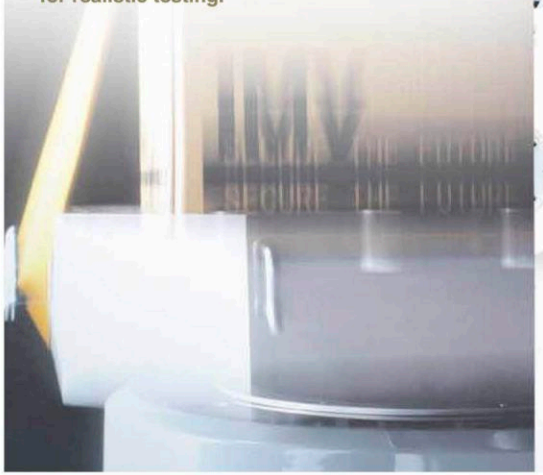
Established since 1957, being in the forefront of research and development in the field of Vibration dynamics, IMV are proud to provide technical solutions for vibration testing with safety, reliability and durability in mind.

IMV supply single axis, sequential or simultaneous up to 6 degree of freedom multi-axis vibration simulation systems and vibration measurement or diagnostic instruments. Furthermore, our specialist engineers can assist our customers with vibration testing, measurement and analysing.



Reality

Reproducing enviromental vibration for realistic testing.



Possibility

Development of New Technology to expand Possibility

Qua lity

Pursuit of qual ity to guarantee the best accuracy

Contribution to “Advanced Future Quality” in various fields of industries by Vibration

IMV manufactures and markets “Vibration Simulation Systems” which simulate vibration environments, and “Measuring Systems” which visualise states of vibrations, and also runs the business of “Test and Solution Service” providing consultations or laboratory tests of the products.
We proudly keep contributing to improvements on safety and comfortableness of society by helping upgrade reliability of products as “the partner for solution” of all industries including automotives, aerospace, electrical machineries, structural constructions etc., where they need to solve the problems caused by vibrations. As an expert in vibration system, we are focusing on upgrade our proposing and development skills and overall ability in order to serve society today and tomorrow.

Simulation system

Export of IMV Vibration simulation system products

IMV CORPORATION has been registered by the Japanese Ministry of Economy, Trade and Industry (METI) regarding export controls as a company in good standing compliant with the Japanese export regulations for Electro-dynamic vibration simulation systems or the related products composing the simulation systems (hereafter, "IMV Vibration simulation system products") that are strictly controlled for export from Japan to end users and/or end use that concerns manufacturing or development of ordinal weapons and/or mass destruction weapons including any equipment to transport them. Therefore, IMV has the obligation to confirm to the ministry in Japan that the customers of IMV vibration simulation system products are not related to or concerned with such purposes before arrangement of export of the products, even if the products exported do not require an Export License (E/L) by the Japanese government. Therefore, IMV will ask customers to issue the following information and documentation to us in each of the following stages.
★ marked products in this catalogue require E/L.

(1) Quotation request stage:
IMV requires correct information about the address, name of the end user (including the name of department) and purpose of the end use of the products before we issue the price quotation of the products. Usually, the information is sent to IMV in writing through the sales representative for the end user. Please note that there is a possibility that IMV may not accept the inquiry because of the end user or the end use.

(2) Order stage:
Either an E/L of the Japanese government will be required to export the products from Japan or an E/L will not be required to export the products from Japan. In the former case, IMV will inform the end user of the required details etc. before accepting the order, because IMV has to apply for the E/L in Japan. In the latter case, IMV will always request the end user to prepare the "Certification of End User/End Use" after placing the order with the sales representative or IMV. The certificate is required by and will be requested by IMV.

(3) Export arrangement stage:
IMV has to obtain the E/L or the Certification of End User/End Use before our export arrangements are made for the products. If not, IMV will have to stop the export arrangements.
Please contact the sales representative or IMV should you have any questions regarding contents of the Japanese export control system or regulations.

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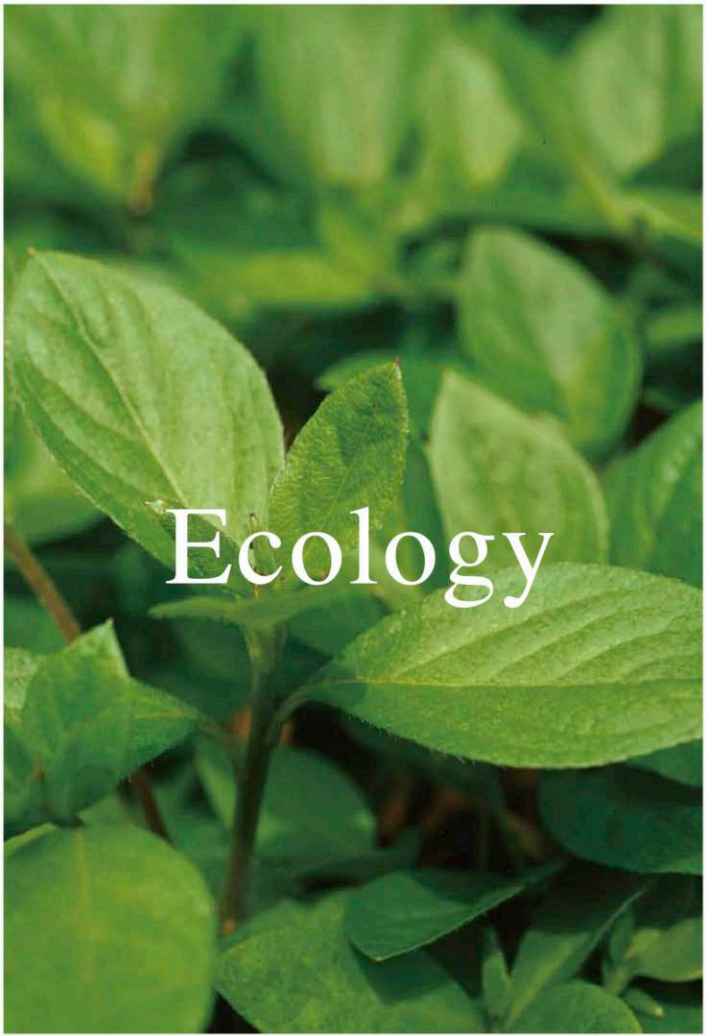


Ecology

Environmentally friendly vibration system

Always developing vibration simulation systems

IMV's dynamic simulation systems have been developed with "intelligence" in mind and endeavour to support customers testing. The new Eco technology has been used in the IMV range.

ECO-shaker

ECO-shaker [EM series]

Achievement of low acoustic noise and better working environment conditions.

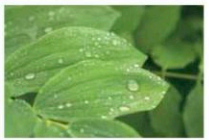
Expect improvement of low acoustic noise and better working environment conditions.

Noise from ambient air interference and cooling system during testing may create limitations of installment and working place. Our ECO-Shaker can control the noise level by controlling the blower at optimum speed. Controlling of the cooling system will not only cut waste in power consumption or noise level according to test conditions, but also maintain room temprature around the unit from rising.

Contribution to ECO environment

Contribution to well being of society through quality and environment.

By Clean Development Mechanism (CDM) in January 2008 and revision of Rationalisation in Energy Use law in April 2009 were introduced in Japan, all enterprises have been obliged to be more energy efficient. ECO-Shaker promotes reduction of costs and CO_2 by saving electricity consumption, costs, and consequently contributes to society.



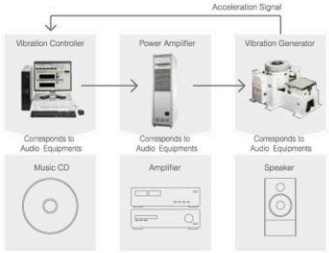
System

Each component is independently controllable and harmonises each other

Mechanism of Vibration Simulation System

Electrodynamic Vibration Simulation System

The principle is same as of Audio Systems in which the electronic signals from the sources as the CDs are amplified by the amplifiers and converted to sound by loud speakers. For the Vibration Simulation Systems, the vibration generators correspond to the loud speakers of the audio systems.
They have the vibration controllers instead of the sound source to drive the vibration generators feeding the electric current through the amplifiers.
The difference is that the signals from the transducers mounted on the specimens and/or vibration tables to monitor their motions are fed back to the vibration controllers in order to control the vibrations to meet the requested test conditions.



Vibration Controller

The original waveforms will not be reproduced by just applying the vibration data obtained in the field or from test specimens. The waveforms will be totally deformed due to the characteristics of the amplifiers, combined dynamics of the vibration generators and test specimens The vibration controllers the equipments to have the vibration generators generate the designated vibration compensating automatically these characteristics or dynamics. All IMV vibration controllers are of originally designed and made in house reflecting the demands of customers. "User Friendly" has been always pursued.

Complicated tests are possible to be programmed and executed easily.

Vibration Generator

The operation principle is based on "Fleming's left hand rule". When an electric current flows in a wire put in a magnetic field, it gets a force perpendicular both to that field and the direction of that current.

Power Amplifier

The role of the Power Amplifier is to feed driving current to the Vibration Generator converting the small electrical signal generated in the vibration controller to the large current of higher voltage. IMV's Power Amplifiers employ the Switching amplifier system. They use mainly the compact and highly efficient power modules of the top level in this industry to contribute to energy and space saving.

Power Module SA-300

Originality

Invention with IMV's originality

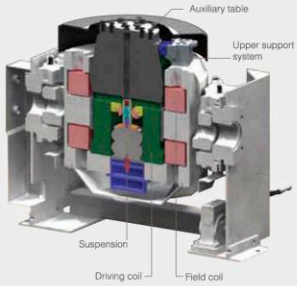
Original technology utilised to improve durability and performance of vibration generators

Upper (armature) support system PS Guide

Vibration generator is given a dynamic stress by its own vibration. The Parallel Support Guide (PSG) design is a patented design to support the armature. PSG significantly improves durability and reliability of the system, and quality of vibration at the same time.

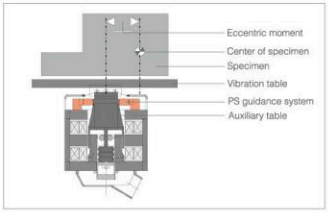
This compact design provides enough stiffness which exceeds such function of roller support system and realized high durability and self-holding supporting system by alternative alignment of gears that have a unique curve.

Vibration Generator cross section view (Image)



Large allowable eccentric moment

When the table working surface of the vibration generator is not wide enough to mount the specimen, it must be expanded using some fixture or auxiliary table. Large lateral rigidity of the table guidance systems is important, because it is hard to bring the center of gravity of the specimen on the center line of the vibration table. The larger the specimen is, its importance is increasing. Our PS guidance system (Parallel Slope Guide) realizes 130% increase of rigidity over those of the same force range conventional models. It achieved that the specimens whose center of gravity are not located on the center line of the vibration table can be tested being applied higher acceleration.



Compatibility of lateral rigidity and Waveform Regeneration accuracy

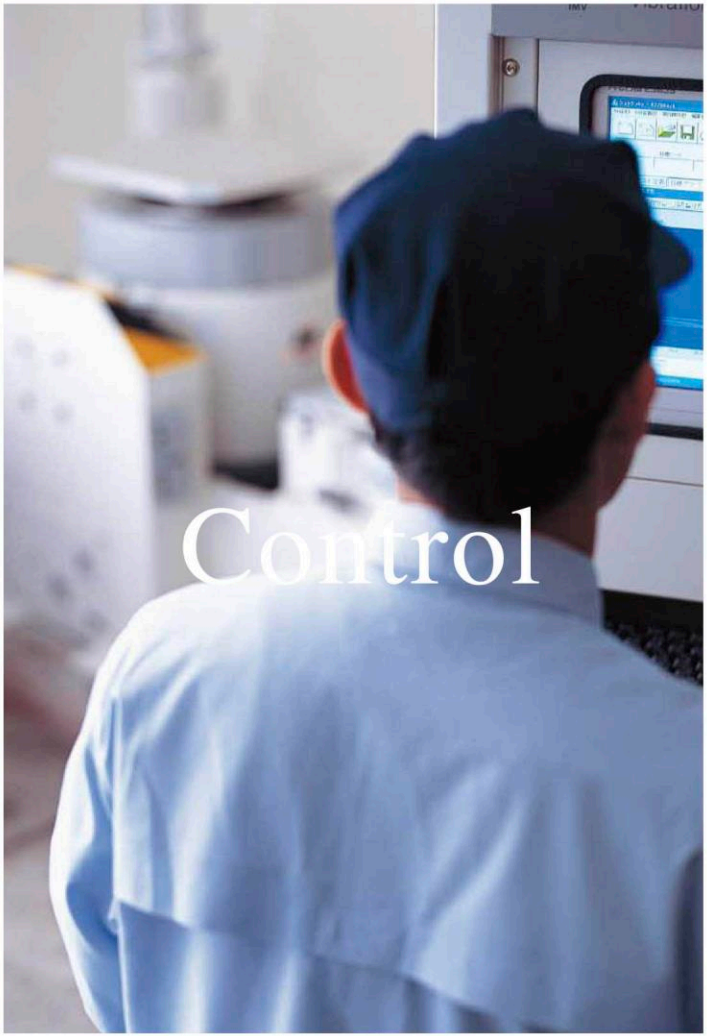
Usually lateral rigidity and Waveform accuracy conflict each other. PS Guidance system achieved their compatibility. It realizes vibrations of lower waveform distortion with high fidelity.

Improvement of durability

10 times longer (compared to conventional system's) life was achieved to make much longer the interval of maintenance.

Flexibility to respond to demand for large displacement tests

Flexibility is provided to respond to demand for 100mm stroke vibration tests.



Control

Control Vibration as you want

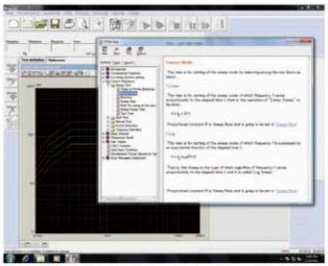
Vibration Controller is the device which you operate to carry out vibration simulation tests. It acts as a brain of the vibration simulation system.
We are particular about vibration controllers as the vibration simulation system manufacturer so that you may carry out your tests as you want.

Totally original products

IMV has persisted to develop in-house both of software and hardware of vibration controllers. All vibration controllers are our totally original products. It has been carried on the data base of Center of History of Japanese Industrial Technology in recognition of our achievement.

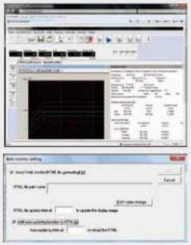
User friendly operation

It was our pleasure to hear from our customers of our newest model K2 that they could operated them without reading the instruction manuals in detail. The setting procedures are guided step by step and any parameter input discrepancies are checked on the P.C. screen. HELP function to see meaning of the items etc. is fully provided.

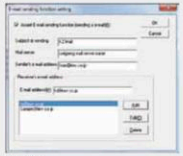


New functions responding to requests from customers

Responding to the requests from the customers as "want to monitor the status of the test at the remote place" "need to make test reports", such useful functions have been added.



Web Monitor (K2)
The status of the specimens under excitation is monitored periodically being shown on the HTML. The test status is poseible to be observed remotely.



E-mail delivery (K2)
Finish of the Test or Abnormal stop is notified by E-Mail to the designated address

Report Generator (K2)
Designated test conditions, Response plots or other graphs etc. are available as WORD format. It helps operators to make reports easily.

Compact space realised an Intense Energy

Power module SA-300

The system output is proportional to the size of power amplifier resulting that the size of amplifier console get larger for the large system. IMV has developed a new module SA-300 which is the advanced version of switching type power module. Compared with 1990's, the advanced type power module is one third in volume which reduces occupation space within the console. For example, even the class i260 of rated Sine force only takes one power module in the amplifier.

Reduction in Installation Space

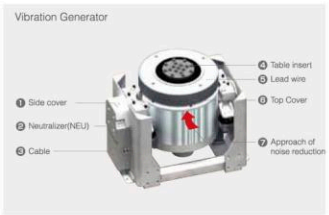
We achieved as maximum as 100kVA per console. The twin-rack is applied to the power amplifier of a larger output vibration simulating system K080/SA10M of excitation force 80kN.

Outstanding Robustness

A stable output in each power module is applied by a feedback and DPWM (Digital Pulse Width Modulator). In addition to the failure detecting function which detects the blowout of a fuse, RMS overcurrent protection and peak current limit functions are also mounted. Along with the monitoring function of the controller, the amplifier provides over load protection forming double protection system. Regarding the peak output faculty as important, a customized module was developed for use in output stage. These comprise the strong power module which minimises the breakdown from transient output.

Advanced Features of IMV Vibration Generators

i・J series



1 Side cover

Connection terminal for sensor cable and operation indication lamp for vibration-isolation air spring are located inside the side cover.

A : Junction terminal for sensor cable
B : Operation bulb for vibration-proof air spring

2 Neutraliser (NEU)

When putting the specimen on the vibration table, the mechanism of "Armature center (neautral) position" starts to work to detect the position gap from the neautral position, automatically adjust it by air spring.

3 Cable

The tangle-proof cable arrangement design allows external cables to be connected inside of side cover. Even in horizontal motion, cable doesn't move.

4 Table insert

Table inserts can get damages by repeated removal of the fixtures or the specimens. Mount inserts used to be removed in the factory, while, new type allows customer to replace it by themselves.

5 Lead wire

Lead wires which supply current to drive coil are usually exposed to severe vibration. The wires need to be changed regularly and regarded as the consumable components. IMV vibration generator adopted the flexible cable, it is no longer consumable.

6 Top Cover

FRP (Fiber Reinforced Plastics) top cover makes work maintenance easier and secures safety by covering the whole cable connection terminal.

7 Approach to noise reduction

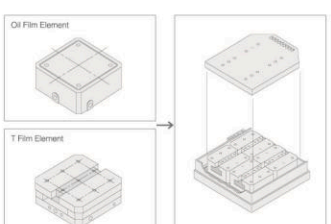
Our optimised design of top cover and intake for cooling air flow which are based on fluid dynamics have much lower air flow rate and air-intake noise if compares to conventional systems.

Breaking through common knowledge of Horizontal Auxiliary Table

T-Film Bearing type Horizontal Table

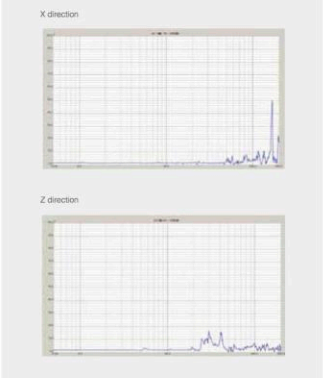
T-Film Bearing type Horizontal Tables support the horizontal vibration tales rigidly by the U.S.patented "T-Film Bearing Elements" and "Oil Film Elements" arranged in grid pattern. The oil films which are forming between the bottom of the tables and the top surface of these elements act to suppress their resonance modes. Horizontal Vibrations which free from serious transverse motions or waveform distortions are applied to the specimens of complicated dynamics. These T-Film Bearing type Horizontal Tables have been highly appreciated in the Aerospace industries as the standard type of the high quality vibration tests.

"T-Film Bearing Element" is excellent in rigidity and damping having a slider of high stiffness and a function to make an oil film on the top surface. "Oil Film Element" has a function to support load and give tables and specimen assemblies enough damping by means of an oil film. The effects of drastic reduction of vibration waveform distortion and transverse motions are achieved by proper arrangement of these elements



Very little Transverse Motion

Transverse Motion smaller than 5% (typical) in the frequency range up to 1,500 Hz (Crosstalk sensitivity of accelerometer is about 1%) was achieved ,which had never been realised before.



Customised Produce

IMV Vibration Simulation Systems are used in various industries.

Electrodynamic Multi-axis: 4 Posters

Accurate waveform regenerations are achieved in wide frequency range up to 500Hz by employing electrodynamic vibration generators as actuators.

All Weather Simulation System

Combined Environmental Testing System combining vibration, surround temperature, gasoline circulation, oil circulation and rotational driving.

Squeak & Rattle Test System

Natural air cooling type aiming at evaluating Squeak & Rattle noise problem in dashboard or other in-car accessories.

Thermal/Shock Combined Environmental Test System

Combined Environmental Test System provides Heat and Dynamic stress to the specimen simultaneously.

Muffler Durability Test System

Heat and Vibration durability tests are possible by supplying 2-10m³/min, 200-900 ℃ hot air flow into mufflers.

Turbine Blade Vibration Simulation System

Measurements of resonance frequency, resonance amplitude amplification factor and resonance dwell tests in turbine spinning temperature are possible.

Bi-Axial Sequential Vibration Simulation System for Combined Environmental Tests

Temperature/Humidity Chamber moves up and down to carry out Vertical / Horizontal sequential vibration test in one chamber.

Multi-axial All Weather Simulation System

Multi-axis plus Combined Environmental Test System applied for simultaneous X,Y,Z directions vibration plus Heat, cool and humidity testing.

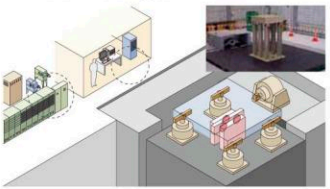
Dynamic Spring Constant measuring system

Highly accurate tests and analysis are possible in wide frequency range down from 1Hz up to 2000Hz.

2 Axial Simultaneous Vibration Simulation System with Sound Insulation Box

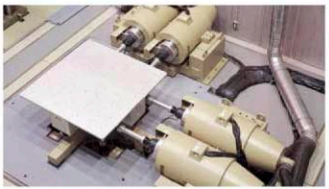
Usage of the sound insulation box to house the vibration generator assembly allows acoustic noise measuring on the exciting specimens. This system has high durability and easiness of maintenance.

Large Bi- axial Simultaneous Multi- point Excitation Vibration Simulation System



Large Vibration Simulation System with Table size: 4,500mm×4,500mm, Rated Horizontal Displacement: 400mm^{p-p}, Rated Vertical Displacement: 200mm^{p-p}, Rated Pay Load: 20,000Kg

6 Degree of Freedom Vibration Simulation System



Long stroke 6 Degree of Freedom Excitation reaching up to 100Hz or higher are realized by employing Hydro-static Spherical Couplings

Customised Produce

IMV Vibration Simulation Systems are used in various industries.

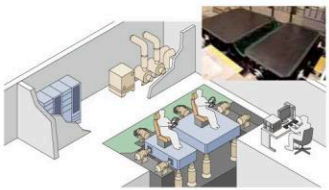
Large Exciting Force Vibration Simulation System

Excitation Force 294KN Rated Acceleration 980m/s²
Large force excitation in Wide frequency range is achieved.

Multi-axial Multi-point Vibration Simulation System

Multi-point Vibration Simulation system of three axis simultaneous excitation by adding single axis excitation together can carry out tests of very long specimens in high frequency range.

6 DOF Ride Comfort Evaluation System



Road Data are accurately regenerated as 6 Degree of Freedom Motion. By use of 6 Axis Vibration Measurement System, ride comfort evaluation in accordance with ISO-2631 Mechanical vibration and shock –Evaluation of human exposure to whole-body vibration.

6 DOF Squeak Noise Evaluation System

Combined 8 compact vibration generators aiming at evaluation of squeak noise.

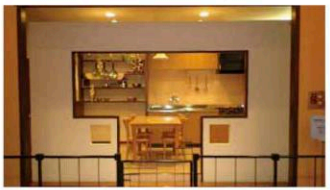
Multi-axial Tire Dynamic Characteristics Measuring System

Tire Dynamic Characteristic Measuring system covering frequency range up to 500Hz. Electrodynamic Vibration Simulation System makes tests in high frequency range realised.

Sensor Calibration Vibration Simulation System

Pure Single axis Vibration which had been hard to be generated by conventional single axis systems, is obtained by locating 4 vibration generators around the vibration table assembly.

Earthquake Vibration Simulation System



Implementing a large electrodynamic vibration simulation system to simulate real earthquake generation.

Human body Vibration Simulation System

Measurements and evaluations of vibration transmission through vibration isolation globes (ISO10819)

Long Stroke Low Frequency Vibration Simulation System

A system to regenerate low frequency vibrations of earthquakes. These systems are used for the production lines or any development purpose.

Electrodynamic Mechanical Shock Simulation System

Mechanical shock test system used on the production line of passenger car air bag sensors. Mechanical shocks of long displacement are obtained in excellent accuracy.

Energy Saving Vibration Simulation System

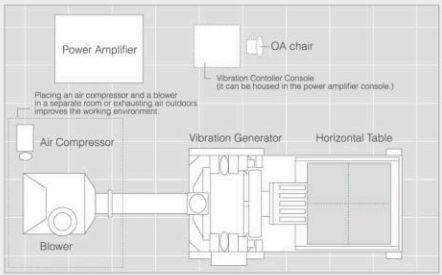
Energy Saving during vibration test is difficult for the conventional vibration generators to be realised. ECO-shaker automatically enable vibration tests carried out at optimum power consumption only by inputting normal test conditions.

Large-scale 6 DOF Vibration Simulation System

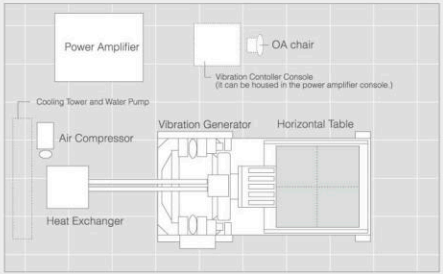
Combination of 10 vibration generators (6 vertical and 4 horizontal) and 4000 by 3500 millimeter large-scale table allows the simultaneous multi-point vibration testing. This versatile vibration platform is ideal for testing large items such as railway carriage parts and fuel battery.

How to Select System

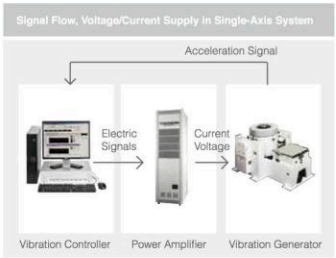
Installation Image of Air cooling system (with an air cooled system and a horizontal table)

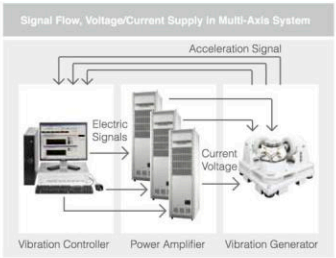


Installation Image of Water cooling system (with an water cooled system and a horizontal table)



Principles of Operation



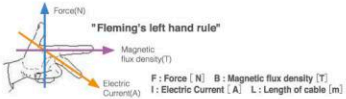


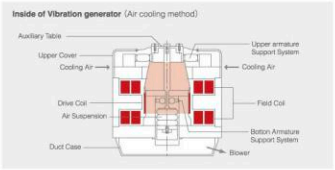
Vibration generator

The operation principle is based on "Fleming's left hand rule".

The formula below represents the Fleming's left hand rule.

$$F = B \times I \times L$$





Cooling method of vibration generator

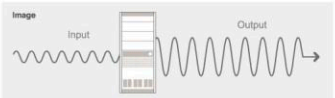
The Vibration Simulation System can employ either of two methods to cool : air or water cooling. Each method has its own key feature. Selecting a cooling method that meets to your installation requirements based on the key feature as below;

Cooling method	Air cooling	Water cooling
How to cool	Cools the coils by using air from outside. Forces exhaust by blower.	The coils are made of pipe and distilled water is circulated to cool the coils using a heat exchanger and a cooling tower.
Key feature	Employs only a blower as cooling equipment. Easy to install.	Operation noise is significantly lower compared to air cooling.
Points to ponder	Duct connection or soundproof treatments may be necessary to reduce suction noise from the vibration generator and exhaust noise from the blower.	A primary cooling water facility is necessary.

Power Amplifier

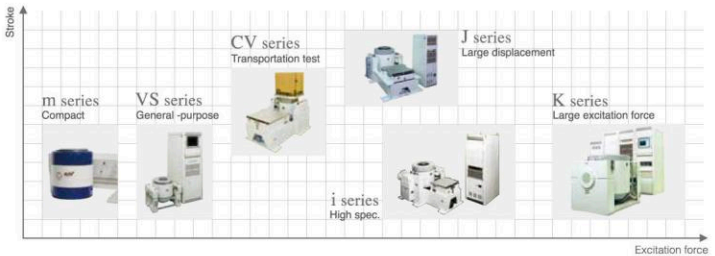
A power amplifier in the system supplies electric power to the vibration generator. The power amplifier generates higher current of higher voltage in response to low power electric signals from the vibration controller.

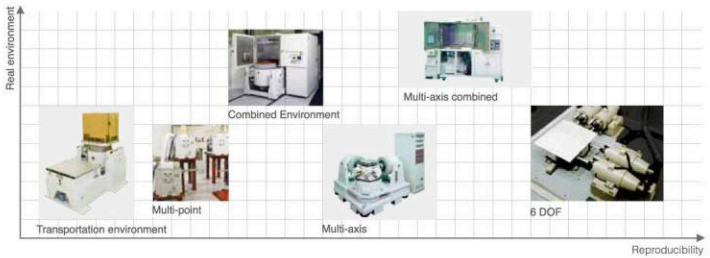
$$\text{Electric power (VA)} = \text{Electric Voltage (V)} \times \text{Electric Current (A)}$$



Series Arrangements

Vibration Simulation System Lineup Chart





	Automobile	Aerospace	Electronic Parts	Information and Telecommunications	Precision Equipment	Electrical Equipment	Transportation Environment	Usage Environment
EM series	"Reduction of Power Consumption" & "Improvement of Laboratory Environment"							
i・J VS series	Car Audio・Navigation system・Door mirror・Inverter・Motor・Light associated part・ECU associated part・Solenoid・Car-mounted meter・Electric power station motor・Combination meter・Fuel pump・Inlet system part・Hybrid associated part・ECU・Battery・Electric pump・Muffler・Catalyst・Fuel battery・ABS coil・Seat belt・Braking system	Personal monitor TV・Communications equipment・Resin product・Seal material・Dish・Chair・Aircraft engine component・Space environment utilization・Airborne equipment・Rocket-mounted equipment・Defense associated equipment	LCD television・Connector component・Car mounted electric component・General-purpose motor・In-rack equipment・PC・Printed-circuit board・Impact from transportation	Navigation system・Car mounted telecommunications equipment・Vending machine on the expressway・Industrial motor・Antennа associated component・Large antenna	Industrial robot・Digital camera・Lens・Optical equipment・Surface mounter associated component・Mobile phone・Copy machine・Video camera	Withstanding voltage transformer・Fuel battery・Inverter associated component・Space battery・Large lithium battery	Rail vehicle component・Equipment for construction・Shipping on a rough dirt road	Combination meter・Instrument panel associated component・Solar system・Other car-mounted component・PC
CV series	Door mirror		Packaged products・Packaging & shipping・Usage environment shipping・Usage environment shipping)・Major Home Appliance・Projector	Packaging associated component	Packaging products・Packaging & Shipment・Usage environment shipping・Video game instrument	Inverter equipment	Shipping medicines・Packaging products	Packaging material
K series	Brake・Catalyst・Heat insulation・Hydraulic sensor・Starter・alternator・muffler・Hybrid Motor・Battery・Sensor・dynamo・Power unit	Satellite equipment・Rocket-mounted component・Defense associated equipment・Rocket・Missile associated component・Propeller・Engine	Servomotor・Refrigirator・Heater・Washing mashine・Major electronics	Large parabolic anternna・Antennа associated component		Large battery equipment	Rail vehicle component・Railway component	Display
m series	Airconditioner vent・ETC・ITS device・Car-mounted sensor・Car audio・Navigation system		Board・Mobile phone・Mobile products・Electronic component・Compact motor	ETC for two-wheeled car・Mobile phone	Medical Instrument・Usage board・Digital camera・Semiconductor component			Structure (Miniature)
Compact series	O_2 sensor・Exhaust sensor		Filled material・Piezoelectric element・Sensor associated component・SW associated component					
3 axis	Car Audio・Navigation system・Air conditioner・Vibration-proof mount・Radiator	Total Rocket・Total Space Vehicle	Real environmental shipping・Car audio・LCD panel・Major Home Appliance	Navigation system (Jumpness of HDD and DVD)	Video camera・Digital camera	Large battery equipment	Cushioning material	Earthquake simulation machine
6 DOF	Ride quality・Construction equipment	Total Rocket・Total Space Vehicle						Cabin for construction equipment

EM-series

Energy Saving Type Vibration Simulation System

Ecology

ECO-Shaker

ECO-shaker
[EM series]
(with Horizontal Table)

Complicated settings are not needed.
Electricity consumption might be managed manually on electrodynamic systems, but this could be quite difficult for the system operator to optimise the consumption due to payload and test conditions. Our ECO-Shaker can achieve optimisation of power consumption refering to payload conditions.

You can confirm the result of reduction of CO_2 and electricity consumption at glance.
By combination with IMV vibration controller 'K2', ECO-shaker system will confirm real-time electricity consumption during testing. It was never available by conventional systems. Power consumption can be reported numerically after each test.

You can expect improvement of laboratory environment.
Noise to be expected from the conventional test system will give limitaion to installation place selection. Our ECO-Shaker can suppress the noise level by controlling the engine blower at optimised speed. Optimum control of the cooling system will reduce power consumption and noise level refering to test conditions.

We will contribute to well being of society from both sides of quality and environment
By Clean Development Mechanism (CDM) in January 2008 and revision of Rationalisation in Energy Use law in April 2009 were introduced in Japan, all enterprises have been obliged to be more energy efficient. ECO-Shaker promotes reduction of costs and CO_2 by saving electricity consumption, costs, and consequently contributes to society.

Real automatic energy saving driving

Complicated settings are not needed.

ECO-shaker is a electrodynamic vibration test system which automatically optimize output of power amplifier, power input to vibration and cooling blower rotation speed refering to payload and test conditions. So, complicated manual settings are not needed anymore. Since it is real automatic control according to working environment conditions, "drastic change in output levels due to change of test sample characteristics during the test", "temperature up in system caused by rising heat during operation" etc.. even if those phenomenon happen, it is possible to keep operation without stopping the test.

■POINT

- **Only need setting of test conditions.**
- **Automatically respond to the characteristic change of test sample**
- **Automatic control of the cooling blower speed by temperature monitoring.**

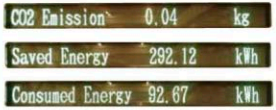
Operational condition selection system and method(JP Patent No. 4231095)
Operational condition selection system and program(JP Patent No. 4263229)

You can confirm reduction of CO_2 and electricity consumption at real-time.

You can confirm the result of reduction of CO_2 and power consumption at glance.

By combination with IMV vibration controller 'K2', ECO-shaker system will confirm real-time electricity consumption during testing. It was never available by conventional systems. Power consumption can be reported numerically after each test, which clearly shown on monitor or display. So you can confirm the result at glance.

Display screen image of Energy-saving results



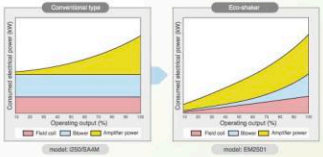
Display screen image of power amplifier ※Optional

Figures are calculated by comparing system with conventional system of same sine force rating. Results may vary for systems, test conditions and cases.

Comparison of electricity consumption with conventional shaker

The less system output, the more saving-energy you can expect.

Calculation method	Conditions
Calculation of CO_2 reduction, referring to actual data of our i250/SA4M (max force 30kN)	[1]random [2]average operating output : 25% [3]average operating ratio per year : 70%



Operation of ISM-EM (Power consumption)

Power consumption on conventional vibration systems would require manual calculation refering to test conditions. ISM-EM technology of the ECO-Shaker can automatically control the output of the power amplifier, force generation of the shaker, and rotation speed of the cooling blower to achieve best efficiency refering to test conditions.

Correspondence to existing system [Retro fit]

Saving energy by ISM-EM technology can be applied on existing IMV vibration simulation systems by adding the ISM-EM unit and some calibrations. Contact us for further information and delivery.

Specifications

System Model		EM2201	EM2301	EM2401	EM2501	EM2502	EM2551	EM2601
System Specifications	Freq. Rang (Hz)	0～3300	0～3000	0～2600	0～2500	0～2500	0～2600 ⑤	0～2600 ⑤
Rated Force	SINE (kN)	8	16	24	32	40	49	54
Rated Force	RANDOM (kNrms)[2]	8	16	24	32	40	49	54
Rated Force	SHOCK (kN)	16	32	48	64	80	98	108
Max. Acc.	SINE (m/s²)	1250	1250	1200	914	1142	907	1000
Max. Acc.	RANDOM(m/s²rms)	875	875	840	640	800	635	700
Max. Acc.	SHOCK (m/s²)	2500	2500	2400	1828	2284	1814	2000
Max. Vel.	SINE(m/s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Max. Vel.	SHOCK(m/s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Max. Disp.	SINE(mm*1)	51	51	51	51	51	51	51
Max. Disp.	Max. TRAVEL(mm*1)	60	64	68	68	68	64	64
	Max. Load. (kg)	200	300	400	600	600	1000	1000
	Power Requirements (kVA) ※1	16.4	26	36	51	57	80	83
Vibration Generator	Model	i220	i230	i240	i250	i250	i255	i260
	Armature Mass (kg)	6.4	12.8	20	35	35	54	54
	Armature Diameter (ϕmm)	190	200	290	440	440	446	446
	Allowable eccentric moment (N-m)	294	700	850	1550	1550	1550	1550
	Dimensions (mm) W×H×D	1020x903x550	1124x957x860	1234x997x890	1463x1187x1100	1463x1187x1100	1527x1196x1100	1527x1196x1100
	Mass (kg)	900	1500	2000	3000	3000	3500	3500
Power Amplifier	Model	SA1M-20EM	SA2M-30EM	SA3M-40EM	SA4M-50EM	SA5M-50EM	SA7M-55EM	SA7M-60EM
	Max. Output (kVA)	10	20	29	40	50	58	64
	Dimensions (mm) W×H×D	580×1750×850	580×1750×850	580×1750×850	580×1950×850	580×1950×850	1160×1950×850	1160×1950×850
	Mass (kg)	330	350	460	900	930	1400	1400
Console	Vibration Controller	See Vibration Controller K2						
Cooling Power	Cooling Method	Air cooling						
	Dimensions (mm) W×H×D	492x1128x627	606x1315x844	707x1531x896	1057x1841x1078	1057x1841x1078	1328x2140x1033	1328x2140x1033
	Mass (kg)	70	125	210	250	250	370	370

＊1) 1)Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In the band of more than 2000Hz, excitation force pitches at the rate of -6dB/oct.
★ E/L is required for exporting.(See P.4)

Specifications (Large Displacement Type)

System Model		EM2305	EM2405	EM2505	EM2506	EM2555	EM2605
System Specifications	Freq. Rang (Hz)	0～3000	0～2400	0～2200	0～2200	0～2600 ⑤	0～2600 ⑤
Rated Force	SINE (kN)	16	24	35	40	49	54
Rated Force	RANDOM (kNrms)[2]	16	24	35	40	49	54
Rated Force	SHOCK (kN)	40	55	70	87	98	112
Max. Acc.	SINE (m/s²)	941	923	777	888	777	857
Max. Acc.	RANDOM(m/s²rms)	658	646	544	622	544	600
Max. Acc.	SHOCK (m/s²)	2352	2115	1555	1933	1555	1777
Max. Vel.	SINE(m/s)	2.4	2.4	2.4	2.4	2.4	2.4
Max. Vel.	SHOCK(m/s)	2.4	2.4	2.4	2.4	2.4	2.4
Max. Disp.	SINE(mm*1)	100	100	100	100	100	100
Max. Disp.	Max. TRAVEL(mm*1)	120	120	120	120	116	116
	Max. Load. (kg)	300	400	600	600	1000	1000
	Power Requirements (kVA) ※1	28	38	53	57	82	86
Vibration Generator	Model	J230	J240	J250	J250	J255	J260
	Armature Mass (kg)	17	26	45	45	63	63
	Armature Diameter (ϕmm)	200	290	440	440	446	446
	Allowable eccentric moment (N-m)	700	850	1550	1550	1550	1550
	Dimensions (mm) W×H×D	1124X1079X850	1234X1145X890	1463X1301X1100	1463X1301X1100	1527x1319x1100	1527x1319x1100
	Mass (kg)	1800	2400	3500	3500	4100	4100
Power Amplifier	Model	SA3M-50DEM	SA4M-40EM	SA5M-50DEM	SA6M-60DEM	SA7M-55EM	SA7M-60EM
	Max. Output (kVA)	23	34	50	57	64	70
	Dimensions (mm) W×H×D	580X1750X850	580X1750X850	580X1950X850	580X1950X850	1160x1950x850	1160x1950x850
	Mass (kg)	380	490	930	960	1400	1400
Console	Vibration Controller	See Vibration Controller K2					
Cooling Power	Cooling Method	Air cooling					
	Dimensions (mm) W×H×D	606X1315X844	707X1531X896	1057X1841X1078	1057X1841X1078	1328x2140x1033	1328x2140x1033
	Mass (kg)	125	210	250	250	370	370

＊1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In the band of more than 2000Hz, excitation force pitches at the rate of -6dB/oct.
★ E/L is required for exporting.(See P.4)

Specifications (High Power Water Cooled Type)

System Model		EMK0301	EMK0621	EMK0622	EMK0801	EMK1251	EMK1252	EMK2001	EMK2002
System Specifications	Freq. Rang (Hz)	0～3000	0～2500	0～2500	0～2500	0～2500	0～2500	0～2000	0～2000
Rated Force	SINE (kN)	30.8	49.0	61.7	80	100	125	160	200
Rated Force	RANDOM (kNrms)[2]	21.5	49.0	61.7	80	100 ⑥	125 ⑥	160 ⑥	200 ⑥
Rated Force	SHOCK (kN)	61.6	98	123.4	160	200	250	320	400
Max. Acc.	SINE (m/s²)	1000	1000	1000	1000	1000	1000	941	1000
Max. Acc.	RANDOM(m/s²rms)	700	700	700	700	700	700	658	700
Max. Acc.	SHOCK (m/s²)	2000	2000	2000	2000	2000	2000	1882	2000
Max. Vel.	SINE(m/s)	1.8 ⑤	2.0 ⑤	2.0 ⑤	2.0 ⑤	2.0 ⑤	2.0 ⑤	1.8 ⑤	1.8 ⑤
Max. Vel.	SHOCK(m/s)	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max. Disp.	SINE(mm*1)	51	51	51	51	51	51	51	51
Max. Disp.	Max. TRAVEL(mm*1)	58	58	60	59	62	62	60	60
	Max. Load. (kg)	500	1000	1000	1000	2000	2000	2000	2000
	Power Requirements (kVA) ※1	49	76	87	100	150	170	200	280
Vibration Generator	Model	K030	K060	K060	K080	K125	K125	K200	K200
	Armature Mass (kg)	27	40	40	60	70	70	170	170
	Armature Diameter (ϕmm)	320	400	400	446	560	560	560	560
	Allowable eccentric moment (N-m)	980	980	980	1550	2450	2450	4900	4900
	Dimensions (mm) W×H×D	1100x1090x824	1380x1085x1000	1380x1085x1000	1595x1050x1200	1776x1360x1300	1776x1360x1300	2415x1843x1740	2415x1843x1740
	Mass (kg)	3000	3700	3700	5000	7000	7000	13000	13000
Power Amplifier	Model	SA6M-20DEM	SA6M-60DEM	SA6M-60DEM	SA10M-60DEM	SA13M-125EM	SA15M-125EM	SA25M-200EM	SA25M-200DEM
	Max. Output (kVA)	33	43	60	100	98	124	230	280
	Dimensions (mm) W×H×D	1160X1950X850	1160X1950X850	1160X1950X850	1160X1950X850	1740X1950X850	1740X1950X850	2900X1950X850	2900X1950X850
	Mass (kg)	1300	1350	1400	1750	2250	2350	3350	3500
Console	Vibration Controller	See Vibration Controller K2							
Cooling Power	Cooling Method	Shaker:Water Cooling/Amp:Air Cooling							
	Primary Cooling Water Supply (l/min)	195	260	260	390	390	390	650	650
Main Console	Dimensions (mm) W×H×D	580×1700×850	580×1700×850	580×1700×850	580×1700×850	580×1700×850	580×1700×850	950X1900X800	950X1900X800
	Mass (kg)	400	400	400	400	400	400	600	600

＊1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In SINE test, excitation time at the maximum velocity value in the sheet is limited within 1 minute. If the tests (SWEEP or SPOT) need high velocity for more than 1 minute, the maximum velocity value should be reduced to 1.4m/s.
6) It is system capability including an output transformer.
★ E/L is required for exporting.(See P.4)

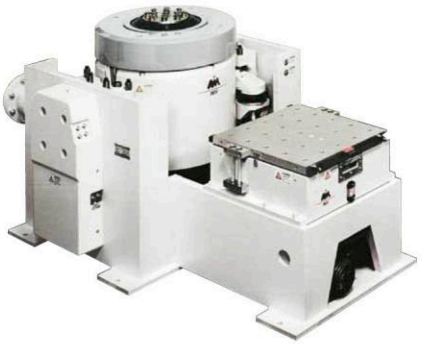
CE

i-series
High Grade Type

Enhanced Performance will Expand Test Range

Vibration tests have become diversified and specifications have become increasingly strict. The i-series offer a user-friendly lineup with enhanced performance and durability.

i260/SA7M
(Vibration Generator)



i230/SA2M
(with Horizontal Table)

Expanded test range: maximum values that the i-series can offer
◎Max. acceleration: 1250m/s² ◎Max. velocity: 2.2m/s ◎Max. displacement: 51mm*¹ ◎Max. loading mass: 1,000kg

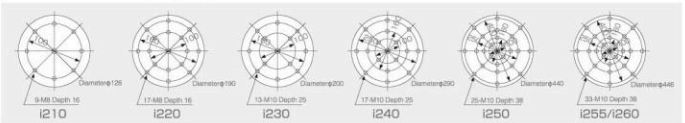
Patented upper (armature) support system PS Guide
Parallel slope guide is standard

Low noise
Optimised design of the air intake based on fluid dynamics has reduced the air-intake noise.

World's largest class air cooling system
Optimised magnetic circuits based on fine magnetic field analysis, and unique cooling technologies have enabled 54kN excitation force with air cooling.

All models can directly couple (Chamber Direct Coupling) to climatic test chamber.

Table Insert Pattern 'mm' pattern (Unit:mm)



Specifications

	System Model	i210/D6	i210/SA1M	i220/SA1M	i230/SA2M	i240/SA3M	i250/SA4M	i250/SA5M	i255/SA7M	i260/SA7M
System Specifications	Freq. Rang (Hz)	0～4000	0～4000	0～3300	0～3000	0～2600	0～2500	0～2500	0～2600 [5]	0～2600 [5]
	Rated force SINE (kN)	1.17	3	8	16	24	32	40	49	54
	Rated force RANDOM (kNrms) [2]	0.59	3	8	16	24	32	40	49	54
	Max. Acc. SHOCK (kN)	1.17	9	16	32	48	64	80	98	108
	Max. Acc. SINE (m/s²)	390	1000	1250	1250	1200	914	1142	907	1000
	Max. Acc. RANDOM(m/s²rms)	273	700	875	875	840	640	800	635	700
	Max. Acc. SHOCK (m/s²)	390	2000	2500	2500	2400	1828	2284	1814	2000
	Max. Vel. SINE(m/s)	0.85	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Max. Vel. SHOCK(m/s)	0.85	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Max. Disp. RANDOM(mm*²)	30	30	51	51	51	51	51	51	51
	Max. Disp. MAX. TRAVEL(mm*²)	40	40	60	64	68	68	68	64	64
	Max. Load. (kg)	120	120	200	300	400	600	600	1000	1000
	Power Requirements (kVA) ※1	3.7	6.8	16.4	26	36	51	57	80	83
Vibration Generator	Model	i210	i210	i220	i230	i240	i250	i250	i255	i250
	Armature Mass (kg)	3	3	6.4	12.8	20	35	35	54	54
	Armature Diameter (φmm)	128	128	190	200	290	440	440	446	446
	Allowable eccentric moment (N-m)	160	160	294	700	850	1550	1550	1550	1550
	Dimensions (mm) WxHxD	869×700×458	869×700×458	1023x903x650	1124x957x860	1234x957x860	1463x1187x1100	1463x1187x1100	1527x1196x1100	1527x1196x1100
	Mass (kg)	350	350	900	1500	2000	3000	3000	3500	3500
Power Amplifier	Model	VAD6-1 10	SA1M-1 10	SA1M-1 20	SA2M-1 30	SA3M-1 40	SA4M-1 50	SA5M-1 50	SA7M-N55	SA7M-1 60
	Max. Output (kVA)	0.6	5	10	20	30	40	50	58	64
	Dimensions (mm) WxHxD	580×1750×850	580×1750×850	580×1750×850	580×1750×850	580×1750×850	580×1950×850	580×1950×850	580×1950×850	580×1950×850
	Mass (kg)	200	240	280	300	410	850	880	1000	1000
Control	Vibration Controller	See Vibration Controller K2								
Cooling Power	Cooling Method	Air cooling								
	Dimensions (mm) WxHxD	389x892x370	389x892x340	492x1129x713	606x1315x932	707x1531x946	1218x2006x1033	1218x2006x1033	1219x2006x1033	1219x2006x1033
	Mass (kg)	22	22	70	140	190	270	270	430	430

※ 1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In the band of more than 2000Hz, excitation force pitches at the rate of -6dB/oct.
★ E/L is required for exporting.(See P.4)

Approach to low noise

Our optimised design of top cover and intake for cooling air flow which are based on fluid dynamics have much lower air flow rate and air-intake noise if compares to conventional systems.

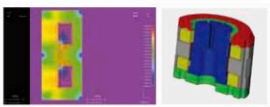
Upper (armature) support system PS Guide

Vibration generator is given a dynamic stress by its own vibration. The Parallel Support Guide (PSG) design is a patented design to support the armature. PSG significantly improves durability and reliability of the system, and quality of vibration at the same time.

This compact design provides enough stiffness which exceeds such function of roller support system and realized high durability and self-holding supporting system by alternative alignment of gears that have a unique curve.

World's largest class air cooling system

Combination of magnetic circuits based on fine magnetic field analysis, the optimized magnetic circuits and cooling technologies has brought the world's largest class air cooled system (54kN) to this i-series. The air cooling system of IMV eliminates the initial costs and maintenance trouble inherent in a water cooling system.

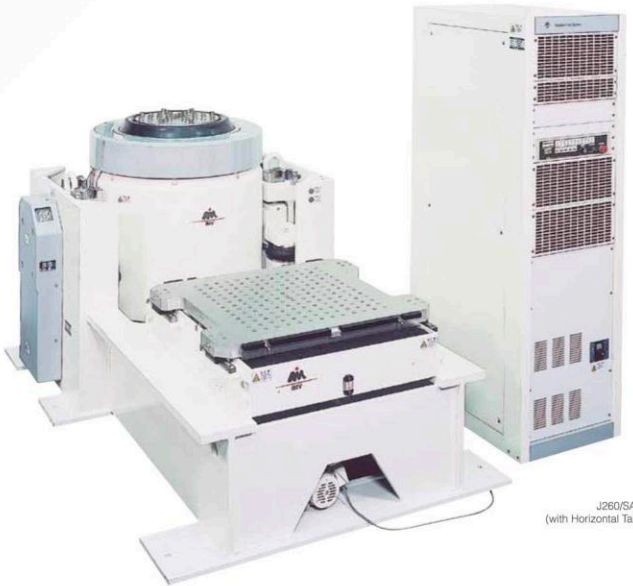


CE

J-series
Large Displacement Type

J-series – Accommodates High Velocity, Large Displacement Testing

Long duration shock tests require high velocity and large displacement.
The J-series is a high-functionality system that offers usability and durability furnished with functions that accommodate high velocity and large displacement testing.



J260/SA7M
(with Horizontal Table)

Expanded maximum test range
◎Max. velocity of SINE force: 2.4m/s, Max. velocity of SHOCK force: 4.6m/s ◎Max. displacement: 100mm$^{p\text{-}p}$

Patented upper (armature) support system PS Guide
Parallel slope guide is standard

Low noise
Optimised design of the air intake based on fluid dynamics has reduced the air-intake noise.

All models can directly couple (Chamber Direct Coupling)to climatic test chamber

Sample Mount Screw Location 'mm' pattern (Unit:mm)

Specifications

System Model		J230/SA3M	J230S/SA7M	J240/SA4M	J240S/SA6M	J250/SA5M	J250/SA6M	J255/SA7M	J260/SA7M	J260S/SA30M
System Specification	Rated Force	Freq. Rang (Hz)	0~3000	0~3000	0~2400	0~2400	0~2200	0~2200	0~2600 5)	0~2600 5)	0~2000 5)
		SINE (kN)	16	16	24	24	35	40	49	54	54
		RANDOM (kNrms)2)	16	16	24	24	35	40	49	54	54
		SHOCK (kN)	40	40	55	70	70	87	98	112	196
	Max. Acc.	SINE (m/s²)	941	888	923	857	777	888	777	857	857
		RANDOM (m/s²rms)	658	622	646	600	544	622	544	600	600
		SHOCK (m/s²)	2352	2222	2115	2500	1555	1933	1555	1777	2500
	Max. Vel.	SINE (m/s)	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
		SHOCK(m/s)	2.4	3.5	2.4	3.6	2.4	2.4	2.4	2.4	4.6
	Max. Dis.	SINE (mm$^{p\text{-}p}$)	100	100	100	100	100	100	100	100	100
		MAX. TRAVEL(mm$^{p\text{-}p}$)	120	120	120	120	120	120	116	116	116
	Max. Load. (kg)		300	300	400	400	600	600	1000	1000	1000
	Power Requirements (kVA)※1		28	38	38	52	53	57	82	86	127
Vibration Generator	Model		J230	J230S	J240	J240S	J250	J250	J255	J260	J260S
	Armature Mass (kg)		17	19	26	28	45	45	63	63	63
	Armature Diameter (φmm)		200	200	290	290	440	440	446	446	446
	Allowable eccentric moment (N·m)		700	700	850	850	1550	1550	1550	1550	1550
	Dimensions (mm) WXHXD		1124X1079X850	1124X1079X850	1234X1145X890	1234X1145X890	1483X1301X1100	1483X1301X1100	1527X1319X1100	1527X1319X1100	1657X1319x1100
	Mass (kg)		1800	1800	2400	2400	3500	3500	4100	4100	4100
Power Amplifier	Model		SA3M-J30	SA7M-J30S	SA4M-J40	SA6M-J40S	SA5M-J50	SA6M-J50	SA7M-J55	SA7M-J60	SA30M-J60S
	Max. Output (kVA)		23	30	34	40	50	57	64	70	76
	Dimensions (mm) WXHXD		580X1750X850	580X1950X850	580X1750X850	1160X1950X850	580X1950X850	580X1950X850	580X1950X850	580X1950X850	2320X1950X850
	Mass (kg)		330	500	440	1200	880	910	1000	1000	3200
Remote	Vibration Controller		See Vibration Controller K2								
Cooling	Cooling Method		Air cooling								
	Blower	Dimensions (mm)WXHXD	606X1315X932	606X1315X932	707X1531X946	707X1531X946	1218X2006X1033	1218X2006X1033	1219x2006x1033	1219x2006x1033	1219x2006x1033
		Mass (kg)	140	140	190	190	270	270	430	430	430

※ 1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In the band of more than 2000Hz, excitation force pitches at the rate of -6dB/oct.
★ E/L is required for exporting.(See P.4)

Approach to low noise

Our optimised design of top cover and intake for cooling air flow which are based on fluid dynamics have much lower air flow rate and air-intake noise if compares to conventional systems.

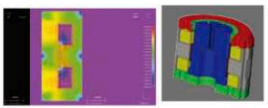
Upper (armature) support system PS Guide

Vibration generator is given a dynamic stress by its own vibration. The Parallel Support Guide (PSG) design is a patented design to support the armature. PSG significantly improves durability and reliability of the system, and quality of vibration at the same time.

This compact design provides enough stiffness which exceeds such function of roller support system and realized high durability and self-holding supporting system by alternative alignment of gears that have a unique curve called an involute curve.

World's largest class air cooling system

Combination of magnetic circuits based on fine magnetic field analysis, the optimized magnetic circuits and cooling technologies has brought the world's largest class air cooled system (54kN) to this J-series. The air cooling system of IMV eliminates the initial costs and maintenance trouble inherent in a water cooling system.



CE

K-series

High Excitation Force Water Cooled Type

High Excitation Force and Silent Water Cooled System for Improving Test Environment

High exciting force water cooled vibration simulating systems developed by IMV line up K-series. Cooling noise emitted during testing is significantly lower compared to air cooling systems. Performance of the K-series will definitely improve the user's testing environment.

K062/SA8M

K125/SA16M
(with a horizontal table)

Silent system design
The water cooling system produces neither the intake nor exhaust sounds that an air cooling system emits.

Record of significant accomplishments
IMV has been developing the water cooling system ahead of other domestic manufacturers.

Table Insert Pattern 'mm' pattern (Unit:mm)

Specifications

	System Model	K030/SA4M	K049/SA6M	K062/SA8M	K080/SA10M	K100/SA13M	K125/SA16M	K160/SA20M	K200/SA26M
System Specifications	Freq. Rang (Hz)	0~3000	0~2500	0~2500	0~2500	0~2500	0~2500	0~2000	0~2000
	Rated Force SINE (kN)	30.8	49.0	61.7	80	100	125	160	200
	Rated Force RANDOM (kNrms)	21.5	49.0	61.7	80	100 [6]	125 [6]	160 [6]	200 [6]
	Rated Force SHOCK (kN)	61.6	98	123.4	160	200	250	320	400
	Max. Acc. SINE (m/s²)	1000	1000	1000	1000	1000	1000	941	1000
	Max. Acc. RANDOM (m/s²rms)	700	700	700	700	700	700	658	700
	Max. Acc. SHOCK (m/s²)	2000	2000	2000	2000	2000	2000	1882	2000
	Max. Vel. SINE (m/s)	1.8 [5]	2.0 [5]	2.0 [5]	2.0 [5]	2.0 [5]	2.0 [5]	1.8 [5]	1.8 [5]
	Max. Vel. SHOCK(m/s)	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Max. Disp. SINE (mm P-P)	51	60	51	51	51	51	51	51
	Max. Disp. MAX. TRAVEL(mm P-P)	58	60	60	60	62	62	60	60
	Max. Load. (kg)	500	1000	1000	1000	2000	2000	2000	2000
	Power Requirements (kVA) ※1	49	76	87	100	150	170	200	280
Vibration Generator	Model	K030	K060	K060	K080	K125	K125	K200	K200
	Armature Mass (kg)	27	40	40	60	70	70	170	170
	Armature Diameter (dmm)	320	400	400	446	560	560	560	560
	Allowable eccentric moment (N·m)	980	980	980	1550	2450	2450	4900	4900
	Dimensions (mm) WXHXD	1100X1090X824	1380X1085X1000	1380X1085X1000	1585X1050X1200	1778X1360X1300	1778X1360X1300	2415X1843X1740	2415X1843X1740
	Mass (kg)	3000	3700	3700	5000	7000	7000	13000	13000
Power Amplifier	Model	SA4M-K30	SA6M-K60	SA6M-K60	SA10M-K80	SA13M-K125	SA16M-K125	SA23M-K200	SA26M-K200
	Max. Output (kVA)	33	43	60	100	98	124	230	280
	Dimensions (mm) WXHXD	580X1950X850	1160X1950X850	1160X1950X850	1160X1950X850	1740X1950X850	1740X1950X850	2900X1950X850	2900X1950X850
	Mass (kg)	950	1300	1350	1700	2200	2300	3300	3450
Controller	Vibration Controller	See Vibration Controller K2							
Cooling	Cooling Method	Cooling Method Shaker : Water cooling/Power Amplifier:Air Cooling							
	Primary Cooling Water Supply (Litres/min)	195	260	260	390	390	390	650	650
Shaft Accessories	Dimensions (mm) WXHXD	580X1700X850	580X1700X850	580X1700X850	580X1700X850	580X1700X850	580X1700X850	950X1900X800	950X1900X800
	Mass (kg)	400	400	400	400	400	400	600	600

※ 1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
2) Rated force of RANDOM follow the ISO5344 standard. Please contact us for further information on RANDOM force conditions of each system.
3) Each value of specification indicates maximum power of the system. In the case of a long hours of test, it needs to be operated less than 70% of maximum power. (The continuous use could be the cause of a premature failure.)
4) In the case of RANDOM durability test, please set the test definition of the peak value of acceleration waveform to be operated less than 1400 m/s².
5) In SINE test, excitation time at the maximum velocity value in the sheet is limited within 1 minute. If the tests (SWEEP or SPOT) need high velocity for more than 1 minute, the maximum velocity value should be reduced to 1.4m/s.
6) It is system capability including an output transformer.
★ E/L is required for exporting.(See P.4)

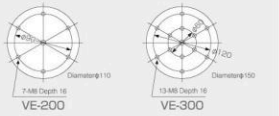
VS-series

Multi Purpose Air Cooled Type

Precise and Versatile Variation

The VS-series is a general-purpose, versatile system that precisely commodates certain intended uses. Unlike our customizable series, the VS-series is a standard system with in-depth after-sales maintenance service support.

Sample Mount Screw Location (Unit:mm)




VS-300-2

Versatile lineup 20 system types that accommodate independent excitation force, maximum velocity, etc.

Improvement in performance The power supply level of the shaker varies according to the combination with a power amplifier.

Specifications

System Model		VS-120-06	VS-150-1	VS-170-2	VS-200-2	VS-250-2	VS-300-2	VS-300-3
System Specifications	Freq. Rang (Hz)	0~4500	0~4500	0~4500	0~4500	0~4000	0~4000	0~4000
	Rated Force SINE (kN)	1.17	1.47	1.66	1.96	2.45	2.94	2.94
	Rated Force RANDOM (kNrms)	0.823	1.02	1.16	1.37	1.71	2.05	2.05
	Rated Force SHOCK (kN)	2.34	2.94	3.32	3.92	4.9	5.88	5.88
	Max. Acc. (m/s²)	585	735	830	980	907	980	980
	Max. Vel. (m/s)	0.7	1.15	2.0	1.75	1.35	1.1	1.7
	Max. Disp.(mm^{p-p})	25	25	25	25	25	25	25
	Max. Load. (kg)	70	70	70	70	120	120	120
	Power Requirements (kVA)※1	3.7	4.5	6.5	6.5	6.5	6.5	7.5
Vibration Generator	Model	VE-200	VE-200	VE-200	VE-200	VE-300	VE-300	VE-300
	Armature Mass (kg)	2	2	2	2	2.7	2.7	2.7
	Armature Diameter (mm)	110	110	110	110	150	150	150
	Allowble eccentric moment (N·m)	140	140	140	140	160	160	160
	Dimensions W×H×D (mm)	660×625×530	660×625×530	660×625×530	660×625×530	720×640×550	720×640×550	720×640×550
	Mass (kg)	320	320	320	320	450	450	450
Power Amplifier	Model	VA-06-02	VA-1	VA-2	VA-2	VA-2	VA-2	VA-3
	Max. Output (kVA)	0.6	1	2	2	2	2	3
	Dimensions W×H×D (mm)	580×1750×850	580×1750×850	580×1750×850	580×1750×850	580×1750×850	580×1750×850	580×1750×850
	Mass (kg)	180	230	270	270	270	270	310
Controller	Vibration Controller	See Vibration Controller K2						
Cooling	Cooling Method	Air cooling						
	Blower Dimensions W×H×D (mm)	386×882×370	386×882×370	386×882×370	386×882×370	386×882×370	386×882×370	386×882×370
	Blower Mass (kg)	22	22	22	22	22	22	22

※1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage down transformer (Step-down transformer) is required for other voltage.

Sample Mount Screw Location 'mm' pattern (Unit:mm)

Specifications

System Model		VS-600/SA1M	VS-1030/SA1M	VS-1031/SA2M
System Specifications	Freq. Rang (Hz)	5~3000	5~3000	5~3000
	Rated Force SINE (kN)	5.88	9.8	9.8
	Rated Force RANDOM (kNrms)	4.11	6.86	6.86
	Rated Force SHOCK (kN)	11.76	19.6	19.6
	Max. Acc. (m/s²)	980	1031	1031
	Max. Vel. (m/s)	1.4	1.4	2.0
	Max. Disp.(mm^{p-p})	25	51	51
	Max. Load. (kg)	200	140	140
	Power Requirements (kVA)※1	10.5	18.2	20.0
Vibration Generator	Model	VE-600	VE-1030	VE-1031
	Armature Mass (kg)	5.5	9.5	9.5
	Armature Diameter (mm)	200	200	200
	Allowble eccentric moment (N·m)	245	392	392
	Dimensions W×H×D (mm)	790×675×580	920×785×712	920×785×712
	Mass (kg)	620	950	950
Power Amplifier	Model	SA1M-VE06	SA1M-VE1030	SA2M-VE1031
	Max. Output (kVA)	4.5	8	10
	Dimensions W×H×D (mm)	580×1750×850	580×1750×850	580×1750×850
	Mass (kg)	240	280	290
Controller	Vibration Controller	See Vibration Controller K2		
Cooling	Cooling Method	Air cooling		
	Blower Dimensions W×H×D (mm)	492x1128x713	606x1315x932	606x1315x932
	Blower Mass (kg)	70	140	140

※1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage down transformer (Step-down transformer) is required for other voltage.
★Vibration Generators VE-1030 and VE-1031 are possible to be coupled directly to the chamber (which equipped with heat insulators) for Combined Environmental Tests.

System Model		VS-2000A/SA2M	VS-2000/SA3M	VS-3000/SA3M	VS-3000/SA4M
System Specifications	Freq. Rang (Hz)	5~3000	5~3000	5~2500	5~2500
	Rated Force SINE (kN)	19.6	19.6	29.4	29.4
	Rated Force RANDOM (kNrms)	13.7	13.7	20.5	20.5
	Rated Force SHOCK (kN)	39.2	39.2	58.8	58.8
	Max. Acc. (m/s²)	980	980	980	980
	Max. Vel. (m/s)	1.4	2.0	1.5	2.0
	Max. Disp.(mm^{p-p})	51	51	51	51
	Max. Load. (kg)	300	300	500	500
	Power Requirements (kVA)※1	30	33	42	49
Vibration Generator	Model	VE-2000A	VE-2000	VE-3000	VE-3000X
	Armature Mass (kg)	18	18	25	25
	Armature Diameter (mm)	280	280	320	320
	Allowble eccentric moment (N·m)	686	686	870	870
	Dimensions W×H×D (mm)	900×990×790	900×990×790	1000×1085×895	1000×1085×895
	Mass (kg)	1600	1600	2000	2000
Power Amplifier	Model	SA2M-VE20A	SA3M-VE20	SA3M-VE30	SA4M-VE30X
	Max. Output (kVA)	18	21	26	35
	Dimensions W×H×D (mm)	580×1750×850	580×1750×850	580×1750×850	580×1750×850
	Mass (kg)	390	410	410	430
Controller	Vibration Controller	See Vibration Controller K2			
Cooling	Cooling Method	Air cooling			
	Blower Dimensions W×H×D (mm)	707×1531×946	707×1531×946	707×1531×1022	707×1531×1022
	Blower Mass (kg)	190	190	240	240

※1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage down transformer (Step-down transformer) is required for other voltage.
★Vibration Generators (VE-2000, VE-2000X, VE-3000 and VE-3000X) are possible to be coupled directly to the chamber (which equipped with heat insulators) for Combined Environmental Tests.

m-series
Low Acoustic Noise and Compact Type

Silent Type Appropriate for Abnormal Noise Inspection

Compact & Silent type, but still powerful system for full-scale test.

Soundless Design by build-in Cooling Fan
DC Powered Cooling Fan is build-in. Natural Air Cooling is available in a halt of the Cooling Fan (with limitation of performance).

Vibration Simulation System combined with environmental test chamber
Combined with such chamber, it enables the system offer "Temperature/humidity & vibration" simulation test.

m030/MA1

Accessories

A pair of Carrier Handles.
Easy to be moved safely by one or two persons.
Removable.

* for m030 and m060

Air Pump
Vibration Table Positions got down loaded with specimens are elevated to the original level by pumping up.

Option

Vertical auxiliary table

Type	Dimensions W×H×D (mm)	Mass (kg)	Upper Frequency (Hz)	m030	m060	m120
TBV-125-□-A	125×125×t20	0.9	~2000	○	○	
TBV-200-□-A	200×200×t20	2.5	~1500	○※	○	○
TBV-315-□-A	315×315×t30	8.5	~1000		○※	○
TBV-400-□-A	400×400×t30	13	~600			○※

"-A" at the end of model number shows that material is alloyed aluminum.
The identification symbol of the vibration generator is put in "□".
※)The Linear Bearing type supplementary guidance system is applied to the combination of the compact vibration generator and the head expander.


Supplementary Guidance System (GDP)


Vertical auxiliary table


Horizontal Table

Horizontal auxiliary table

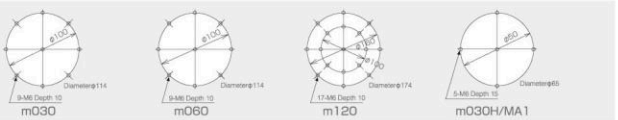
Type	Dimension W×H×D(mm)	Upper Frequency (Hz)	m030	m060	m120
TBH-2	200×200	~500	4	4	5.5
TBH-3	315×315	~500	7.5	7.5	9

Combined Environmental Tests that was hard for the conventional small vibration generators to be realized, is now achieved using the specially designed Temperature/Humidity Chamber. m Series Systems expand into the application of tests.

Changes on m-series system for use coupled with their exclusive Temperature/Humidity chamber.

	Rated Acceleration (m/s²)	Armature Mass (kg)
m030/MA1	500⇒400	0.6⇒0.75
m060/MA1	500⇒428	1.2⇒1.4
m120/MA1	500⇒400	2.4⇒3.0


Table Insert Pattern
Sample Mount Screw Location 'mm' pattern (Unit:mm)



Specifications

Name of the products		Compact type			
System Model		m030/MA1	m060/MA1	m120/MA1	m030H/MA1
System Specifications	Freq. Rang (Hz)	5～3000	5～3000	5～2000	1000～10000
	Rated Force SINE (kN)	300	600	1200	380
	Rated Force RANDOM (kNrms)	210	420	840	266
	Rated Force SHOCK (kN)	300	600	1200	380
	Max. Acc. No load (m/s²)	500	500	500	200
	Max. Acc. 0.5kg load (m/s²)	272	352	413	158
	Max. Acc. 1.0kg load (m/s²)	187	272	352	131
	Max. Vel. (m/s)	1.6	1.6	1.6	−※3
	Max. Disp. (mm^{p-p})	26	30	30	−※3
	Max. Load. (kg)	15	15	120	15
	Power Requirements (kVA/※1	0.4	0.7	1.1	0.4
Vibration Generator	Model	m030	m060	m120	m030H
	Armature Support Method		Diaphragm Spring		Rubber Spring
	Armature Mass (kg)	0.6 ※2	1.2 ※2	2.4 ※2	1.9 ※2
	Armature Diameter (mm)	114	114	174	65
	Dimensions W×H×D (mm)	φ190×H240	φ230×H281	410×410×H372	φ190 X H274
	Mass (kg)	22	40	110	26
Power Amplifier	Model	MA1	MA1	MA1	MA1
	Max. Output (kVA)	1.0	1.0	1.0	1.0
	Dimensions W×H×D (mm)	430×149×430	430×149×430	430×149×430	430x149x430
	Mass (kg)	25	25	25	25
Etc.	Cooling Method	Air cooling			
	Blower	Housed in Vibration Generator			

※1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.
※2) The above are specifications under bare table condition. The maximum acceleration decreases when accelerometer and mounting adapter are mounted.
※3) It is the value which is limited by the lower limit of frequency 1000Hz and Max. acceleration 200m/s². (As the value is so small, there is no certified value.)

2 Axis Switchover Vibration Test System DC-120-2.5L

m-series Multi-Axis System

Small size Muti-Axis Systems (including 2 axial simultaneous,3 axial simultaneous)developed combining populated m-series vibration generators and patented ICCU Multi-Axis armature/load support technologies.

Feature

- Compact design
- Low noise (Squeak-Rattle test)
- High-precision measurement
- Small power consumption

System Specifications

Reter Force	1200N
Table Size	200×200mm
Freq.Range	~500Hz
Max Accel.	30m/s²
Max Disp.	10mm^{p-p}
Max.payload	10kg
Cooling	Air cooling
System Noise	55dB(A)
Shipping Weight	About730kg
Power Requirements	3φ200V, 4kVA

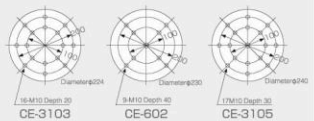
CV-series

Transportation Vibration Simulation System

High Lateral Support Stiffness enables CV-series to Accommodate Various Types of Specimens

CV-series is suitable for transportation tests. The lateral support stiffness and maximum displacement of the CV-series are large enough to be accommodate vibration tests of the specimens with high center of gravity.

Table Insert Patern 'mm' pattern (Unit:mm)



CV-600/SA1M
(with a horizontal table)

High lateral support stiffness: The CV-series systems have been designed to be accommodated to vibration tests of specimens which center of gravity is high or off center.

Large maximum displacement: The CV-series is suitable for transportation tests that require large displacement in low vibration frequency range.

Specifications

System Model			CV-150-06	CV-200-1	CV-300-2	CV-600/SA1M	CV-1000/SA1M
System Specifications		Freq. Range (Hz)	2~2000	2~2000	2~2000	2~2000	2~2000
	Rated Force	SINE (kN)	1.47	1.96	2.94	5.88	9.80
		RANDOM (kNrms)	0.73	0.98	1.47	2.94	4.90
		SHOCK (kN)	2.94	3.92	5.88	11.76	19.6
	Max. Acc. (m/s²)		183	245	367	490	653
	Max. Vel. (m/s)		0.5	0.7	1.0	1.0	0.8
	Max. Disp. (mm*²)		40	40	40	51	51
	Max. Load. (kg)		130	130	130	300	300
	Power Requirements (kVA)※1		4	4.8	7.1	10.5	16.0
Vibration Generator	Model		CE-3103	CE-3103	CE-3103	CE-602	CE-3105
	Armature Mass (kg)		8	8	8	12	15
	Armature Diameter (φmm)		224	224	224	230	240
	Allowable eccentric moment (N·m)		490	490	490	490	686
	Dimensions (mm) WXHXD		790X710X592	790X710X592	790X710X592	790X710X592	1000X850X750
	Mass (kg)		350	350	350	600	1200
Power Amplifier	Model		VA-06-03	VA-1	VA-2	SA1M-CE06	SA1M-CE05
	Max. Output (kVA)		0.6	1	2	4.5	6.5
	Dimensions (mm) WXHXD		580X1750X850	580X1750X850	580X1750X850	580X1750X850	580X1750X850
	Mass (kg)		180	230	270	240	190
Controller	Vibration Controller		See Vibration Controller K2				
Cooling	Cooling Method		Air cooling				
	Blower	Dimensions (mm) WXHXD	386×882×370	386×882×370	386×882×370	492x1128x713	608x1315x932
		Mass (kg)	22	22	22	70	140

※1) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz. Voltage Down Transformer (Step-down transformer) is required for other voltage.

PET・VSH

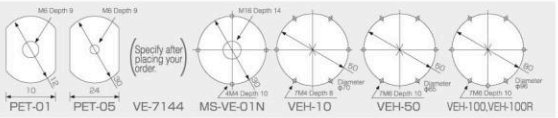
Midget・Wide Frequency Band Type

Suitable for Bench-top Simulation

Suitable for various types of bench-top testing.

Vibration controller: Enables complicated vibration tests being coupled with the vibration controller.

Table Insert Patern
'mm' pattern (Unit:mm)



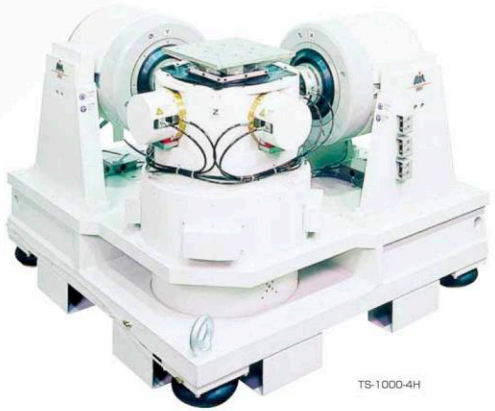
Name of the products			Midget-Type Vibro Pet		Vibration Calibrator	XYR Measure with pre-loading system	Wide Frequency Band Type				
System Model			PET-01-0A	PET-05-05A	CE-7144 ※2	MS-VS-10	VSH-10-03	VSH-30-06	VSH-50-1	VSH-100-1	VSH-100R-1
System Specifications		Freq. Range (Hz)	2~12000	2~14000	2~20000	5~5000	5~12000	5~10000	5~10000	5~8000	5~10000
	Rated Force	SINE (N)	9.8	49	49	98	98	294	490	980	980
		RANDOM (Nrms)	—	—	—	—	39	117	196	392	392
		SHOCK (N)	—	—	—	—	98	294	980	1960	1960
	Max. Acc. (m/s²)		490 ※1	326 ※1	49 ※1	196 ※1	245 ※1	392 ※1	653 ※1	980 ※1	980 ※1
	Max. Vel. (m/s)		—	—	—	0.54	—	—	1.2	0.8	0.8
	Max. Disp. (mm*²)		5	5	2	3	5	8	8	10	10
	Max. Load. (kg)		Up to the Spring Constant								
	Power Requirements (kVA)		0.08	0.1	0.1	0.8	0.5	1.5	2.3※2	3.5※2	3.5※2
Vibration Generator	Model		PET-01	PET-05	VE-7144	MS-VE-01N	VEH-10	VEH-50	VEH-50	VEH-100	VEH-100R
	Armature Support Method		Diaphragm Spring	Diaphragm Spring	Flexures/Rollers	Flexures/Rollers	Flexures/Rollers	Diaphragm Spring		Roller/Air suspension	Flexures/Rollers
	Armature Support Spring Constant (N/m)		9.8	15.6	3.9	49	12.2	29.4	29.4	Max. load 30kg	49
	Armature Mass (kg)		0.02 ※1	0.15 ※1	1 ※1	0.5 ※1	0.4 ※1	0.75 ※1	0.75 ※1	1.0 ※1	1.0 ※1
	Armature Diameter (φmm)		12	30	82	40	70	65	65	96	96
	Dimensions (mm) WXHXD		□75×H72	□116×H115	φ148×H200	330×235×190	φ180×H214	φ310×H322	φ310×H322	φ390×H306	φ390×H306
	Mass (kg)		1.3	5.0	14.2	14.5	26	70	70	120	120
Power Amplifier	Model		PET-0A	PET-05A	CE-7144	VA-ST-03	VA-ST-03	VA-ST-06	VAG-1	VAH-1	VAH-1
	Max. Output (kVA)		0.03	0.045	0.05	0.3	0.3	0.6	1	1	1
	Dimensions (mm) WXHXD		300X140X280	300×140×280	300X140X280	430X200X500	430×200×500	430X200X500	580×1750×850	580×1750×850	580×1750×850
	Mass (kg)		9	9	9.3	30	30	35	230	230	230
Cooling	Cooling Method		Air cooling								
	Blower	Dimensions (mm) WXHXD	—	—	—	159×173×149	188×198×204	229×234×247	229×234×247	247×252×284	247×252×284
		Mass (kg)	—	—	—	2.5	5.5	8.5	8.5	10.5	10.5
Vibration Motor Unit	System Model		PET-01-0AM	PET-05-05AM							
	Dimensions of Power Amp. (mm) WXHXD		300X140X280	300×140×280							
	Mass of Power Amp. (kg)		9.3	9.3							
	Freq. Range (Hz)		5~5000 (Accelerometer VP-32 is used)								
	Acceleration Measurement (m/s²)		10, 100, 1000								
	Accelerometer Sensitivity (m/s²)		1.0~9.99								

※1) The above are specifications under bare table condition.
The maximum acceleration decreases when accelerometer and mounting adapter are mounted.
※2) Except Model CE-7144 system, IMV supplies many calibration systems such as for seismic sensors, vibration monitoring system sensors.. Highly accurate sensor calibration systems are also availble. Contact the sales representative or IMV when you need further information.
※3) Power supply voltage 1 phase 100V AC 50/60Hz ±10%
※4) Power supply required is 3-phase 200/220/240/380/400/415/440V,50/60Hz.
※3) ※4) Votage Down.Transformer [Step-down Transformer]is required for other voltage.

TS/DS-series

Multi-Axis Simulation System (3 Axis/2 Axis)

Aiming at "Reproduction of More Realistic Vibration"



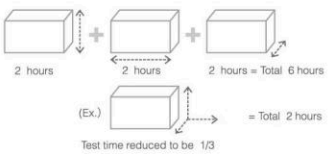
TS-1000-4H

Shorter Test Time
Three axis simultaneous excitation will finish the tests in drastically shorter time than single axis excitation for each axis will do.

Reproduction of Defective Modes
Three axis simultaneous excitation will simulate the actual environments more realistically than the popular single axis excitation will do. The analysis of the defective modes which are related to the inter axis dynamics will be possible.

Temperature humidity · vibration combined test
By combining with dedicated Temp./Humid. Climatic Test Chamber, it can be used as combined simulation system.

Minimize the test time



Reproduce of failure mode

A single-axis system can't provide realistic vibration happenning in the actual field.

By generating 3 axis vibration simultaneously, it is enabled to reproduce the failure mode which the conventional test cannot reproduce.

Specifications

System Model		TS-1000-4H	TS-1000-8M	TS-1000-10L	TS-3000-4H	TS-3000-8M	TS-3000-10L
System Spec. Rated Force	Freq. Rang (Hz)	2000	350	200	2000	350	200
	SINE (kN)	9.8	9.8	9.8	29.4	29.4	29.4
	RANDOM (kNrms)	5.88	4.9	4.9	17.6	14.7	14.7
	Max. Vel. (m/s)	1.0	1.0	1.0	1.2	1.0	1.0

TC/DC-series

Multi-axis Vibration Simulation System (3 Axis/2 Axis Sequential)

Improvement of Set up/Test Efficiency

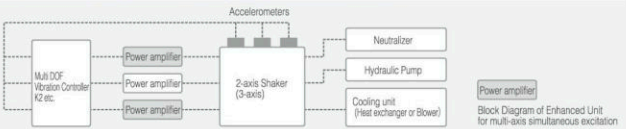
TC-3000-6H

Elimination of Specimen Remount
Remount of Specimens that is necessary for the 2 or 3 axis tests by single axis simulation systems will be totally eliminated.

Expandability into Simultaneous Excitation
Expanding to simultaneous excitation is possible by adding the power amplifiers and vibration controllers.

Temperature humidity · vibration combined test
By combining with dedicated Temp./Humid. Climatic Test Chamber, it can be used as combined simulation system.

Standard System Block Diagram of 2 Axis (3 Axis) Simultaneous System



Specifications

System Model		TC-1000-4H	TC-1000-8M	TC-1000-10L	TC-3000-4H	TC-3000-8M	TC-3000-10L
System Spec. Rated Force	Freq. Rang (Hz)	2000	350	200	2000	350	200
	SINE (kN)	9.8	9.8	9.8	29.4	29.4	29.4
	RANDOM (kNrms)	5.88	4.9	4.9	17.6	14.7	14.7
	Max. Vel. (m/s)	1.0	1.0	1.0	1.2	1.0	1.0

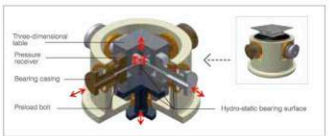
IMV Revolution

Elements essential for Multi-axis Vibration Simulation

ICCU Bearing (Japanese patent No 2860745 U.S. patent No 5549005)

ICCU (Integrated Cross Coupling Bearing Unit)

Some bearings which support armature and table assembly allowing three dimensional motions without solid frictions to achieve three axis simultaneous excitations. ICCU is a patented technology developed by IMV for three axis simultaneous excitations.



Applicable to the tests in high frequency range

The conventional bearings are unsuitable for the high frequency tests due to their complicated mechanism. ICCU Bearing makes realized the tests in the frequency range up to 2000Hz employing the compact and highly rigid integrated bearing systems.

Flexible Expandability

The conventional systems could not respond to such requests as modification of a two axial system to three axial one, or conversion making a multi-axis system using single-axis systems due to quite different design concept between single-axial system's and multi-axial system's. ICCU is a completely stand alone bearing system which can respond to those requests.

Vibration tables are changeable for every application

The larger vibration tables are used for the tests of the larger specimens and they are replaced by smaller ones to test the smaller specimens. Although replacement of the tables is not possible generally for the Multi-axis Vibration Simulation Systems due to difficulty of alignment of the bearing systems and the vibration, it is possible for ICCU bearings which need not such alignment because of coupling on just one pair of surfaces.

Cruciform Bearing

To support large tables of the Multi-axis systems Cruciform Bearings having plane bearings arranged in crosswise. The allowable eccentric moment is improved to respond to demands from the vibration tests of large specimens.

Spherical Bearings

Spherical hydrostatic bearings are used to generate rotational motions as Rolling, Pitching or Yawing in addition to linear motions in direction of X, Y or Z for the Vibration Test Systems as of 6 Degree of Freedom.

Hydra Ball

[Features]
Larger allowable rotational angle (approx. ±20°)
Smaller load capacity

[Use for]
6 DOF system (large displacement, smaller excitation force)

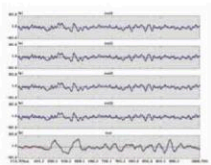
Spherical Coupling

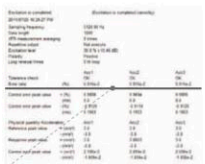
[Features]
Large load capacity
Smaller allowable rotational angle (approx ±6°)

[Use for]
Various purpose including 6 DOF system (Large exciting force with smaller rotational angles)

IMV presents total systems covering controllers to vibration generators of high compatibility.

High performance of control is requested for Multi-axis simultaneous excitation. All IMV Vibration Controllers are in-house original products. We present total systems composed by the components of high compatibility.





Software Display

High fidelity waveform reproduction is possible over wide frequency range.

Multi-axis Combined Environmental Vibration Simulation System

ICCU Bearing Units are employed to make Multi-axis Combined Environmental Systems which are combination of the Multi-axis vibration test systems and Temperature/Humidity Chamber. The tests simulating real environments are possible adding three axis excitations on temperature / humidity environments to be used for quality or durability evaluations of the electronic parts etc.

Excitation Axis	Rectangular coordinate axis X, Y, Z
Excitation Force	19.6kN (SINE force)
Rated Displacement	51mmP-P
Frequency Range	5Hz ~ 500Hz
Vibration Table	550mm×550mm
Vibration Generator arrangement X	1set , Y: 1set , Z: 1set

Multi-axis Sensor Calibration System

- Tri-axis Simultaneous Excitation System using 1 vibration generator for vertical (Z) axis, 2 vibration generators for horizontal (Y) axis, 2 vibration generators for horizontal (X) axis.
- Pure (transverse motion less than 1%) vertical vibrations are available using the horizontal vibration generators as cross axis motion suppressors.
- Application: Sensor Calibration

Excitation Axis	Rectangular coordinate axis X, Y, Z
Excitation Force	10kN (SINE force)
Rated Displacement	25mmP-P
Frequency Range	5Hz ~ 1,500Hz
Vibration Table	Φ300mm
Vibration Generator arrangement X	2 sets, Y: 2 sets , Z: 1set

Customised Products

Installation Case Study for Multi-axis simulation systems

Application of Multi-axis vibration simulation systems

Realistic vibration testing can be achieved using multi-axis system to recreate actual real-life situations.

Superior technology that achieved 6DOF type excitation

Useing electro dynamic vibration generators, our system can reproduce waveform which have components in wide frequency range low to high bands with a high degree of accuracy.

Reproduce waveforms in wide frequency range with a high degree of accuracy.

You can reproduce waveforms in wide frequency range with high degree of accuracy by useing electro dynamic vibration generators, which is difficult to achieve for servo-hydronic systems.

Silence

Noise is suppressed lower using integrated air intake system. It relieves operations from psychological stress.

Smooth test start-up

Electro dynamic systems can immediately start testing when the vibration controller test parameters and conditions are set. However, servo-hydraulic systems will require a warming up time before testing, increasing total operation time.

Easy maintenance: Adopting electrodynamic vibration generators , oil maintenance is not necessary.

Ride Comfort Evaluation System

Adding Rotating function to 3-axis simultaneous excitation, 6 DOF excitation can be achieved. It makes possible to perform the tests to evaluate car seat comfort.

Excitation Direction	X-Axis	Y-Axis	Z-Axis
Excitation Force	3.9kN	7.8kN	16kN
Max Disp.	150mmP-P	150mmP-P	100mmP-P
Frequency Range	1Hz ~ 100Hz		
Table size	1800mm×1800mm		
Vibration Generator	1	2	4

Earthquake sensory system

Earthquake sensory system reproducing more realistic earthquake

Excitation Direction	X-Axis	Z-Axis
Excitation Force	19.6kN	19.6kN
Max Disp.	100mmP-P	51mmP-P
Frequency Range	0.5Hz ~ 10Hz	
Table size	2400mm×1450mm	
Vibration Generator	1	1

Earthquake-resistant qualification 6 DOF System

Equipped with 4 vibration generators of vertical (Z-axis), 2 vibration generators of horizontal (X-axis) and 2 vibration generators of horizontal (Y-axis), it can reproduce 6 DOF vibration.

The Hydrostatic Spherical Bearlings are used to guide rotational motions. Accurate simulations of Pitching and Rolling motions free from non-linear distortion caused by solid friction are possible.

Adaptive control function is provided to make the reference signal adapt to any dynamics of the vibration tables or specimens. Here, the time-lag in the control system is compensated by the Robust Feedback Control.

Excitation Direction	X-Axis	Y-Axis	Z-Axis
Max. Acc.	19.6kN	19.6kN	39.2kN
Max Disp.	200mmP-P	200mmP-P	150mmP-P
Frequency Range	5Hz ~ 100Hz		
Table size	1500mm×1500mm		
Vibration Generator	2	2	4

Multi points multi axis vibration simulation systems

The test for large samples had been considered to be possible only by large sized vibration generators, while this state of art system achieves vibration tests for large specimens by placing small vibration generators at multi-points.

"4 Poster" type simulation system directly vibrating vehicle wheels.

- Applications: Vehicle durability, squeak & rattle test
- Features Tread Width 1290 ~ 1760mm
  Wheel Width 2360 ~ 3100mm Variable

Standby sound noise: Less than 50dB (A)
Large Disp. Application 250mmP-P

Specification

Excitation Direction	X-Axis	Z-Axis
Excitation Direction	20kN	25kN
Max. Acc	100m/s²	125m/s²
Max. Vel.	2.0m/s	
Max. Disp	250mmP-P	
Frequency Range	0.1 ~ 50Hz	

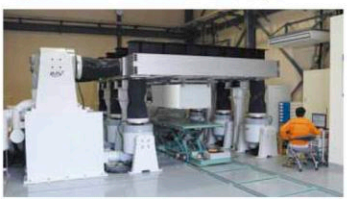
High furequency Multi axis Multi point simultaneous vibration test system

- It is composed of a multi-point 3 axis simultaneous Vibration Test System composed of two vibration generators in Z-axis, one in X-axis and two in Y-axis.
- The system balances and cancels moment force by two points of Vibration inputs.
- Simplified fixtures for long sized test samples, high frequency range up to 2000Hz.

Specification

Excitation Direction	X-Axis	Y-Axis	Z-Axis
Excitation Force	26.4kN	29.4kN (SINE)	29.4kN
Max. Displacement	250mmP-P		
Frequency Range	5Hz ~ 2000Hz		
Table size	Adaptable to the size of specimen		
Vibration Generator	1	2	2

Large-scale 6 DOF vibration simulation system



A total of 10 vibration generators (6 vertical and 4 horizontal) and a 4000 by 3500 millimeter large size table allow the simultaneous 6DOF vibration testing. This versatile platform is ideal for testing large items such as railway carriage parts.

Specification

Excitation Direction	X-Axis	Y-Axis	Z-Axis
Excitation Force	80kN	78kN	96kN
Max Disp.	51mmP-P		
Frequency Range	2Hz ~ 150Hz		
Table size	4000mm×3500mm		
Vibration Generator	2	2	6

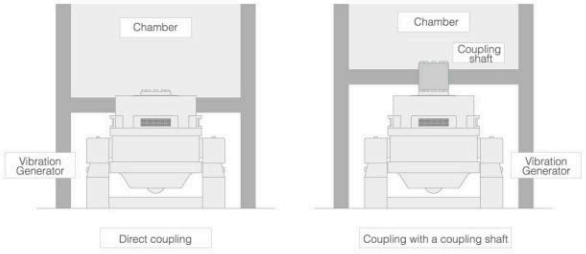
Enviromental Test Chamber

Temperature, Humidity & Vibration combined simulation system

Replication of Combined Environmental Stress

Industrial products are always exposed to environmental impacts, which are "climate" and "physical" environmental impacts. These are not separately impacting, but in intricately intertwined way as a combined stress. We offers temperature and humidity chamber with vibration simulation system and meet the customer's requests immediately.

Docking Image of Combined system



Features

Centralized control system
By adopting a centralized control system, it can control whole system not only vibration, but also temperature and humidity.

Various option
We can offer a variety of options such as a side door, a back door and a see-through door.

Chamber base direct coupling method
IMV vibration simulation systems as of i , J , VS series (with some exceptions) employ Direct Coupling to dock the vibration generators to the chambers. It eliminates troublesome works of connection shaft replacement and loss of excitation force. It also eliminate necessity of specimen remount in the chamber.

Moving attachment for shaker
Shaker and chamber can be separately used moving smoothly on rails.

Items needed for selection of Temperature/Humidity Chambers

Presents of information about following items are requested for estimation.

Working volume
Working volume size meeting to your specimen size

Temperature range
Upper temperature limit and lower temperature limit fulfilling the conditions of the projected tests

Humidity range
Humidity range fulfilling the conditions of the projected tests

Temperature Up and Down times
Temperature Up time and Temperature Down time needed for the cycle operations of the projected tests

Load Condition
Mass, Material and Calorific value (if any) of specimens
We are pleased to offer the Temperature/Humidity Cambers which will fulfill all requirements of above items.

Lineup

Lineup of Temperature/Humidity Chambers

Advanced Features of New Products

■Smaller Foot Prints and Easier Maintenance
- The foot prints are 20% smaller1) compared with those of the conventional vertical/horizontal excitation changeover system to make installation easier.
- With simplification of elevator mechanism, total system mass and risk of failures are reduced.

■Easier Access, Improved Safety
- Work to mount specimens is easier than ever by opening one side of the vibration generator.
- Revolving light with buzzer is equipped for more safety

■Expanded Feasibility
- Different types of combined environmental tests are possible by one Temperature/Humidity chamber2) using the vibration generators of corresponding types arranged in line.
- By adding the optional Horizontal Base Floor to the system made oriented to vertical tests can be converted into conventional vertical/horizontal change over system.

1) In house comparison 2) One single set of Combined environmental chamber is usable at same time.

Standard Specifications

- Volume size: W1000×D1000×H1000mm
- Temperature range: −70°C ～+180°C
- Humidity range: 20 ～ 98RH%
- Temperature up rate : 1°C / min or faster (curve gradient)※)
- Temperature down rate: 2°C / min or faster (curve gradient)※)

1) There are ranges where humidity or temperature is controllable.
2) On request

Corresponding models

- i-series: i210, i220, i230, i240
- J-series: J230, J240
- VS-series: VE-600, VE-1031, VE-2000, VE-3000

Horizontal tables of working area size 800mm×800mm or less are available for each series.

Temperature/Humidity Chambers for Multi-axis excitation

Achieved Specifications

1) There are ranges where humidity or temperature is controllable.
2) On request

Temperature/Humidity Chambers for Multi-axis excitation

- Volume size: W1000×D1000×H1000mm
- Temperature range: −70°C ～+180°C
- Humidity range: 20 ～ 98RH%
- Temperature down rate : +20°C→−70°C 40min. (curve gradient)※)
- Temperature down rate: −70°C→+180°C 40min.(curve gradient)※)

Horizontal/Vertical excitation changeover Temperature/Humidity Chamber

Achieved Specifications
Horizontal/Vertical excitation changeover Temperature/Humidity Chamber
- Volume size: W1000×D1000×H1000mm
- Temperature range: −40°C ～+180°C
- Humidity range: 20 ～ 98RH%
- Temperature down rate : +180°C→−40°C 100min. (curve gradient)※)
- Temperature down rate: −40°C→+180°C 50min.(curve gradient)※)

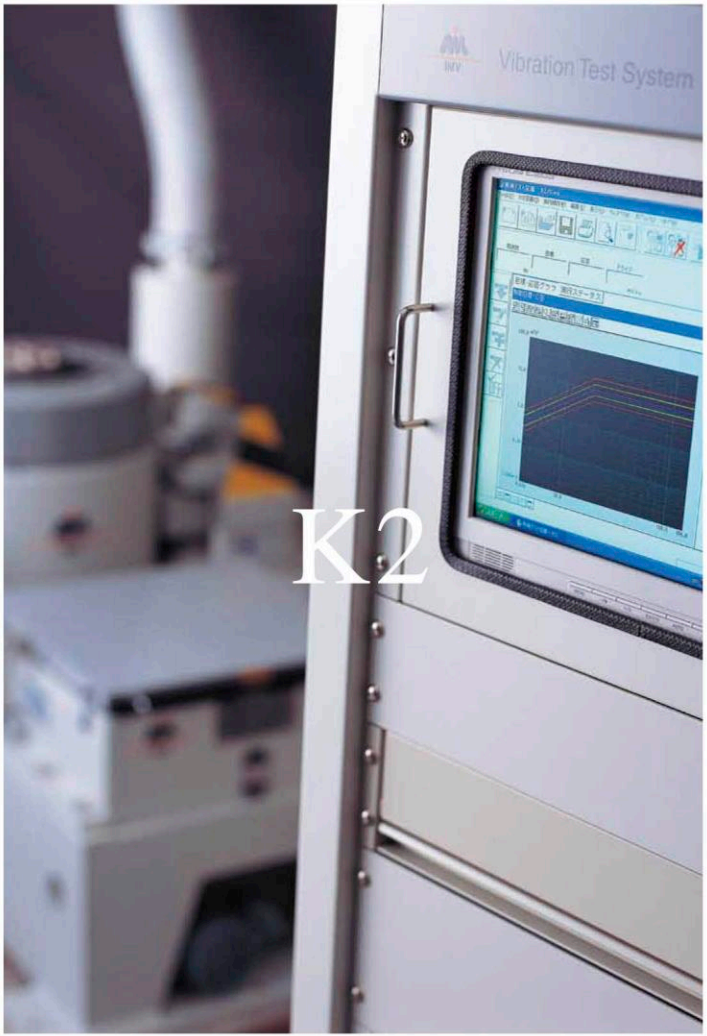
Advanced Feature
A Single Temperature/Humidity chamber is used coupled with both of vertical and horizontal vibration table.

Large Temperature/Humidity Chamber

Achieved Specifications
Large Temperature/Humidity Chamber
- Volume size: W1800×D1900×H1500mm
- Temperature range: −30°C ～+80°C
- Humidity range: 60 ～ 95RH%
- Temperature down rate : +45°C→−30°C 35min. (curve gradient)
- Temperature down rate: −30°C→+80°C 25min.(curve gradient))

Advanced Feature
The tests of large sized specimens as car seats, cut out bodies of cars, large home appliances are possible in large space

1) There are ranges where humidity or temperature is controllable.
2) On request

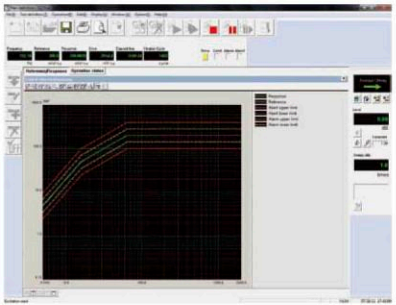


K2

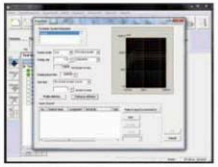
Vibration Controller

Single controller supports all.

The vibration controller is a unit that faithfully enables and implements the tests that our customers need. IMV has always conducted all the development of all the hardware and software of this important system in-house. IMV strives to make complicated tests easy to do. The K2 system offers enhanced functions and operability based on the most advanced technologies and incorporating feedback from our customers.

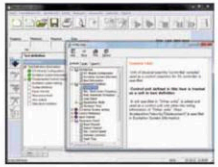


User-friendly Interface



Simplified definition

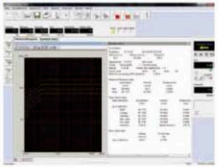
General test definitions are executed by following instructions on the screen using "Simplified definition".



Help

The enhanced Help screen explains meanings of phrases and gives detailed descriptions of the system.

Easy-to-use Functions



Web monitor

Web monitor allows the user to monitor excitation on screen using a LAN-based PC.

Report generator

Report generator saves test results and data graphs in Microsoft Word in any layout.

Intelligent Control Capabilities

K2 employs high-resolution 24 bit A/D and D/A converters to implement intelligent control capabilities.

Enhanced Interlock Function

A hardware mute function immediately cuts off output signals independent of software control.

E-mail notification

Notification of any abnormality during excitation or termination of excitation will be sent to any e-mail addresses desired by the user.

Data saving

The K2 outputs definitions and test results in CSV format.

K2
Vibration Controller

Installation K2 is compatible both with OA desks and instrument racks

Installation image of a desk: Relaxed operation with a chair to sit on

Image of instrument rack installation

Pull out keyboard and mouse to use.

K2 and the PC are housed at the back of the display.

Specifications

Console	
Number of Slots	3 (Move slots can be increased by additional consoles)
AC Power	Single-phase AC, 100V-240V (Auto-selected)
Extension	Connection among the unit cases (Providing support for large-scale system)
External Communication	Contact I/O (for Emergency stop)
Ambient Conditions	0-40℃, below 85% RH, no condensation
Dimensions	430(W)x100(H)x360(D)mm
Mass	3.0Kg (Approx.)
8 ch. Input Module	
Number of Chs.	8
Input Terminal	BNC
Input Signal	Charge or Voltage
Charge Amp. Sensitivity	1.0mV/pC or 10mV/pC
Charge Amp. Cut-off	0.32Hz
Max. Input	Charge Input ±10000pC Voltage Input ±10000mV
Sampling Freq.	Max. 51.2kHz
Coupling	AC or DC
Cut-off at AC Coupling	0.1Hz
A/D Converter	Method : ΔΣmethod Resolution : 24-bit Dynamic Range: 115dB Digital Filter : Ripple in pass band ±0.001dB : Rejection band attenuation quantity 110dB

4 ch.Input and 4 ch.Output Module	
●Input part	
Number of Chs.	4
Input Terminal	BNC
Input Signal	Charge or Voltage
Charge Amp. Sensitivity	1.0mV/pC or 10mV/pC
Charge Amp. Cut-off	0.32Hz
Max. Input	Charge Input ±10000pC Voltage Input ±10000mV
Sampling	Max. 51.2kHz
Coupling	AC or DC
Cut-off Freq. at AC Coupling	0.1Hz
A/D Converter	Method : ΔΣmethod Resolution : 24-bit Dynamic Range: 115dB Digital Filter : Ripple in pass band ±0.001dB : Rejection band attenuation quantity 110dB
●Output part	
Number of chs.	4(a channel is occupied for drive output)
Output Terminal	BNC
Output Signal	Voltage
Max. Output	±10000mV
Sampling Freq.	Max. 51.2kHz : ΔΣmethod
D/A Converter	Method : 24-bit Resolution : 120dB Dynamic Range: Ripple in pass band ±0.001dB Digital Filter : Rejection band attenuation quantity 75dB

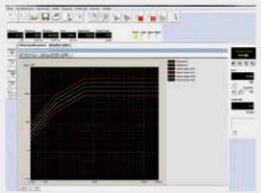
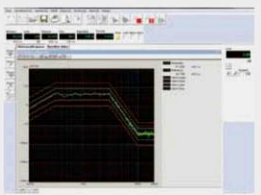
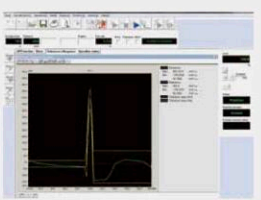
Required PC Specification (Min.)
[PC Specification] 32-bit CPU(faster than Intel Pentium III 800MHz) is recommended. PC must be IBM PC/AT or a compatible machine. (for a system with 4 input channels.) Recommended CPU clock speed increases dependant on the number of input channels.
[Operating System] Later than Microsoft Windows 2000SP1 or Windows XP
[Others] One expansion slot (full PCI Slot)

K2 Sprint

While inheriting all of the performance and features of the K2, the K2 Sprint has improved cost-effectiveness with 2-channel hardware. K2 Sprint is best suited to single monitor channel operation.

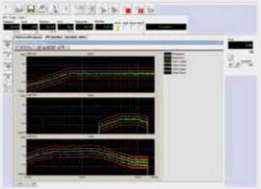
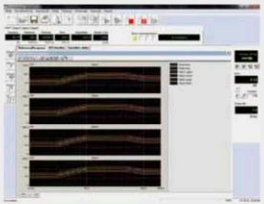
Variations from K2 ● Input 2Chs (No expansion) ● Output 2Chs (No expansion)

Application

Basic Software	Specifications	Optional software
SINE 	■ Control Algorithm Swept-sine amplitude is controlled by feedback ■ Control Freq. Range 0.2-20kHz (May be affected by other conditions) ■ Control Dynamic Range More than 114dB ■ Operation Mode Sweep/Spot/Manual ■ Estimation Method Average, RMS, Tracking ■ Number of Chs. Max.64	■ R_DWELL:Resonance Dwell ■ LIMIT CONTROL ■ A_DWELL: Amplitude Dwell (custom-made)
RANDOM 	■ Control Algorithm PSD of random signal closed loop control by spectrum density for each frequency segment ■ Control Freq. Max.20kHz (May be affected by other conditions) ■ Number of Control Lines L Max.3200 lines ■ Control Dynamic Range More than 94dB ■ Loop Time 200ms (fmas=2000Hz, at L=400line) ■ Averaging Method of Control Response Average control, Max. control ■ Number of Chs. Max.64	■ SOR: Sine on Random ■ RDR: Random on Random ■ PSD LIMIT: PSD limit control
SHOCK 	■ Control Algorithm Finite-length waveform control ■ Control Freq. component Max.20kHz (May be affected by other conditions) ■ Number of Control Lines L Max.3200 lines ■ Control Dynamic Range More than 84dB ■ Reference Waveform Classical Shock Waveform (Half-Sine, Haversine, Saw-tooth, Triangle, Trapezoid), SINE Beat/SINE Burst, Measured Waveform, Symmetric Compensation Defined Waveform ■ Number of Chs. Max.64	■ LONG WAVEFORM: Waveform reproduction option (up to 200k data points) ■ MEGAPOINT: Mega data point option (up to 5000k data points) ■ SRS: Shock Response Spectrum

Common options		
CAPTURE Analogue waveform signal data program	Captures an analogue wave signal, saves the signal as waveform data to use for the reference of SHOCK,BMAC,waveform controls or Random vibration PSD control.	■ Sampling Freq. : Max.51200Hz ■ Data Length: Max.5000k points ■ Number of Chs. : Max.64 ■ Waveform edit/analysis function : Filtering, Frequency Transfer processing, PSD transfer, Transmissibility ratio between channels
SCHEDULER : Test scheduler	Scheduling and execution of defined tests.	
Integrated Control System	In a combined simulation system, a single PC controls, defines, and executes tests and schedules for vibration simulation system and the temperature/humidity climatic test chamber.	

Application

Basic Software	Specifications	Optional software
BMAC 	■Control Algorithm Finite-length waveform control (based on feed-forward method) ■Control Freq.component Max.20kHz (May be affected by other conditions) ■Number of Control Lines L Max.3200 lines ■Control Dynamic Range More than 84dB ■Reference Waveform Max.5000k points ■Number of Chs Max.64	■ENDURANCE: Endurance test option
Multi Random 	■Control Algorithm ①PSD closed loop control of the random signal spectrum density for each frequency segment. ②Real time waveform control ③Cross axis motion suppressing control ■Control Freq. component Max.10kHz (May be affected by other conditions) ■Number of Control Lines L Max.3200 lines ■Control Dynamic Range More than 90dB ■Loop Time 450ms (3-input, 3-output control, 120 DOF, fmax = 2000 Hz, L = 200 line cross-talk information averaging times = 8times/loop) ■Averaging Method of Control Response Average control, Max. control ■ Number of Chs Max.64 (May be affected by other conditions)	■PSD LIMIT : PSD limit control
Multi Sine 	■Control Method ①Amplitude : Level control of the sweep sine by using feedback ②Phase : Real time waveform control of feed-forward method. (cross axis motion suppressing control) ■Control Freq. 0.1 ~ 10,000 Hz (May be affected by other conditions) ■Freq. Resolution Less than 10^{-4} of freq. ■Control Dynamic Range More than 114 dB ■Operation Mode 1) Continuous sweep, Spot test 2) Usable physical quantity : response signal ■Number of Chs Max. 64 channels (Main control channel is Max. 32 chs)	■Limit Control

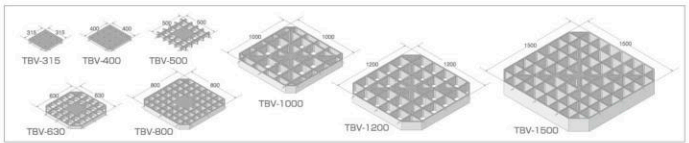
MEMO

Optional Unit

Vertical Auxiliary Table and Cubic Fixture

Vertical Auxiliary Table (Head Expander)

If diameter of the specimen is larger than working surface of the table of vibration generator, the specimen should be mounted on the head expander directly or via a fixture. The larger the specimen is, the lower usable maximum frequency tends to be. Select a head expander based on specimen size and the maximum frequency required. Usable head expanders vary according to the vibration generator. Refer to the table below.



Model names ending with "□" indicate aluminum alloy, "□" magnesium alloy, and shaker model IDs are written in squares.

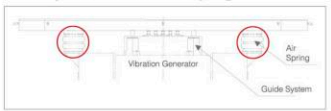
Model	Dimensions mm	Mass kg	Max. Freq. Hz	EM-series i-series							EM-series J-series			
				i210	i220	i230	i240	i250	i260	i260L	J230	J240	J250	J260
TBV-125□-A	125×125 t 20	0.9	~2000	○										
TBV-125□-M		0.6		○										
TBV-315□-A	315×315 t 30	8.5	~1000	○	○	○	○	○	○	○	○	○	○	○
TBV-315□-M		5.8		○	○	○	○	○	○	○	○	○	○	○
TBV-400□-A	400×400 t 30	13	~600	○	○	○	○	○	○	○	○	○	○	○
TBV-400□-M		9		○	○	○	○	○	○	○	○	○	○	○
TBV-500□-A	500×500 t 40	15	~500	○	○	○	○	○	○	○	○	○	○	○
TBV-500□-M		10.4		○	○	○	○	○	○	○	○	○	○	○
TBV-630□-A	630×630 t 45	19	~360	○	○	○	○	○	○	○	○	○	○	○
TBV-630□-M		12.5		○	○	○	○	○	○	○	○	○	○	○
TBV-800□-A	800×800 t 70	45	~350		○	○	○	○	○	○	○	○	○	○
TBV-800□-M		30			○	○	○	○	○	○	○	○	○	○
TBV-1000□-A	1,000×1,000 t 110	110	~350				○	○	○	○	○	○	○	○
TBV-1000□-M		78					○	○	○	○	○	○	○	○
TBV-1200□-A	1,200×1,200 t 125	180	~200					○	○	○		○	○	○
TBV-1200□-M		120						○	○	○		○	○	○
TBV-1500□-A	1,500×1,500 t 200	300	~200					○	○	○			○	○
TBV-1500□-M		200						○	○	○			○	○

Model	VS-series							K-series			For Transportation		
	VE-200	VE-300	VE-600	VE-1030	VE-1031	VE-2000	VE-3000	K030	K060	K080	CE-3103	CE-602	CE-3105
TBV-125□-A	○	○											
TBV-125□-M	○	○											
TBV-315□-A	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-315□-M	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-400□-A	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-400□-M	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-500□-A	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-500□-M	○	○	○	○	○	○	○	○	○	○	○	○	○
TBV-630□-A		○	○	○	○	○	○	○	○	○	○	○	○
TBV-630□-M		○	○	○	○	○	○	○	○	○	○	○	○
TBV-800□-A			○	○	○	○	○	○	○	○	○	○	○
TBV-800□-M			○	○	○	○	○	○	○	○	○	○	○
TBV-1000□-A						○	○	○	○	○	○	○	○
TBV-1000□-M						○	○	○	○	○	○	○	○
TBV-1200□-A						○	○	○	○	○			○
TBV-1200□-M						○	○	○	○	○			○
TBV-1500□-A							○	○	○	○			
TBV-1500□-M							○	○	○	○			

*The table above applies to the IMV standard specifications. You may also place a custom order.

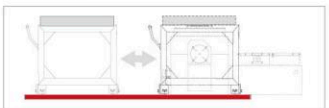
Options for Vertical Table (Head Expander)

Guide System, Additional Air Spring



Reinforcing the support capability of head expander can increase the maximum loading mass.
Reinforcing the guide system can improve the allowable eccentric moment. This is suitable for a specimen that the center of gravity is high or off-centered.
Attaching additional load support air springs under the head expander enables the vibration generator to load a fixture or a specimen. those are heavier than the system's maximum loading mass. *Some models do not support the option above.

Table Carrier



The table carrier reduces the loading and unloading labor required for the heavy head expander. You can remove the table carrier when not in use so that it will not get in the way.

Table Lifter Mechanism

It reduces loading and unloading labor required for the heavy head expander. Space can be used effectively.

High Frequency Use Type

This is a light, magnesium head expander of dual cones with a conical pyramid shape that achieves considerably damped high resonance frequency.

Cubic Fixture

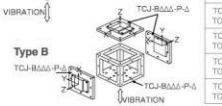
Use a cubic fixture when a specimen must be tested not only in one direction but be also in the X, Y, and Z axes. There are two IMV cubic fixture types :A and B. You can attach specimen to the sides of the type A fixture. You can attach specimen to the sides of the type B fixture with specimen mounting plates as shown.

Type A			
Model	Dimensions(mm)	Mass(kg)	Max. Freq.(HZ)
TCJ-A150□-A TCJ-A150□-M	150×150×150	5.5 4	~2000
TCJ-A160□-A TCJ-A160□-M	160×160×160	6.5 4.6	~2000
TCJ-A200□-A TCJ-A200□-M	200×200×200	8 5.6	~1000
TCJ-A250□-A TCJ-A250□-M	250×250×250	13.5 9.5	~650
TCJ-A300□-A TCJ-A300□-M	300×300×300	20 14	~400

Model names ending with "-A" indicate aluminum alloy, "-M" magnesium alloy, and vibration generator model IDs are written in squares.

Type A

Type B



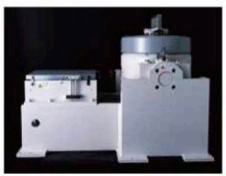
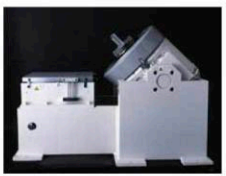
Type B				Mounting Plate	
Model	Dimensions(mm)	Mass(kg)	Max. Freq.(HZ)	Model	Mass(kg)
TCJ-B150□-A TCJ-B150□-M	150×150×150	3.5 2.5	~2000	TCJ-B150-P-A TCJ-B150-P-M	1.5 1.1
TCJ-B160□-A TCJ-B160□-M	160×160×160	4 2.8	~2000	TCJ-B160-P-A TCJ-B160-P-M	1.7 1.3
TCJ-B200□-A TCJ-B200□-M	200×200×200	10 7	~2000	TCJ-B200-P-A TCJ-B200-P-M	3.5 2.5
TCJ-B250□-A TCJ-B250□-M	250×250×250	20 14	~1000	TCJ-B250-P-A TCJ-B250-P-M	4.5 3.2
TCJ-B300□-A TCJ-B300□-M	300×300×300	20 14	~600	TCJ-B300-P-A TCJ-B300-P-M	6.5 4.5

Optional Unit

System and Key Feature of Horizontal Tables

Horizontal Table

A horizontal table is necessary to test large or heavy specimens horizontally. The horizontal table is designed to make almost no friction on horizontal direction, provide high accuracy of waveforms, and support heavy loads.


System and Key Feature of Horizontal Tables

The horizontal table has two types to allow you to select the most suitable one according to specimen size and weight.

	Slip table type	Hydro-static bearing type	T-Film Bearing Type
Principle	Support of the table using oil film.	Support of the table using hydro-static bearings and air film.	Support of the table using hydro-static bearingsand air film.
Feature	Friction is low.	Compatible with large eccentric moment. Size of the table can be well damped.	Compatible with large eccentric moment. Low crosstalk and distortion rate.
Reminder	Not suitable for high acceleration tests that create large eccentric moments.	Requires a separate hydraulic unit. Installation space for the hydraulic unit is necessary.	Requires a separate hydraulic unit. Installation space for the hydraulic unit is necessary.

Slip table type

The type has a V-shaped guide system at a bearing section under the slip table in order to prevent transverse and vertical motion. Slip tables have been extensively used and are widely acknowledged to be superior. When used for high-frequency tests, slip tables offer remarkably high accuracy of waveform and a wide frequency range.

Model	TBH-5		TBH-6		TBH-8		TBH-10	
Dimensions	500mm×500mm		630mm×630mm		800mm×800mm		1000mm×1000mm	
Max. Load.	200kg		300kg		400kg		500kg	
Vibration Generator	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz
i210	33	2500	45	2000	—	—	—	—
i220					65	2000	100	1250
i230								
i240								
i250					98		143	
i255	53	2000	70					
i260								
J230	—	—	—	—	—	—	—	—
J240	—	—	—	—				
J250	—	—	—	—	—	—	—	—
J255	—	—	—	—				
J260	—	—	—	—				
VE-200	33	2500	45	2000	—	—	—	—
VE-300					—	—	—	—
VE-600					65	2000	100	1250
VE-1030								
VE-1031								
VE-2000	33	2500	45	2000	65	2000	100	1250
VE-3000								
K030	33	2000	45	2000	65	2000	100	1250
K060	60		80		115		170	
K080	—	—						
CE-3103	33	2000	45	2000	65	2000	100	1250
CE-602								
CE-3105								

Hydro-static bearing type

The type supports a table by attaching a number of hydro-static bearing blocks to the bottom surface table. This offers significantly high stiffness against eccentric load and eccentric moment of a specimen, and restrains transverse and vertical motions. Frequency range can be set widely. Specimens or fixtures can be directly mounted on this type. This type accommodates tables of different sizes.

Model	HB-5		HB-6		HB-8		HB-10	
Dimensions	500mm×500mm		630mm×630mm		800mm×800mm		1000mm×1000mm	
Max. Load.	800kg		1200kg		1600kg		2000kg	
Vibration Generator	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz	Mass kg	Max. Freq. Hz
i210	60	2500	70	2000	115	2000	165	1250
i220	63	2500	83	2000	118	2000	168	1250
i230	65	2500	83	2000	120	2000	170	1250
i240	68	2500	88	2000	123	2000	173	1250
i250	78	2000	95	2000	133	2000	180	1250
i255	78	2000	95	2000	133	2000	180	1250
i260	78	2000	95	2000	133	2000	180	1250
J230	68	1600	88	1600	125	1250	175	1000
J240	70	1600	90	1600	130	1250	175	1000
J250	83	1600	100	1600	143	1250	188	1000
J255	83	1600	100	1600	143	1250	188	1000
J260	83	1600	100	1600	143	1250	188	1000
VE-200	60	2500	80	2000	115	2000	165	1250
VE-300	60	2500	80	2000	115	2000	165	1250
VE-600	63	2500	83	2000	116	2000	166	1250
VE-1030	63	2500	83	2000	120	2000	170	1250
VE-1031	63	2500	83	2000	120	2000	170	1250
VE-2000	68	2500	85	2000	123	2000	173	1250
VE-3000	68	2500	88	2000	123	2000	173	1250
K030	68	2000	88	2000	123	2000	173	1250
K060	93	2000	108	2000	155	2000	193	1250
K080	78	2000	95	2000	133	2000	180	1250
CE-3103	60	2000	80	2000	118	2000	168	1250
CE-602	68	2000	85	2000	123	2000	173	1250
CE-3105	68	2000	85	2000	123	2000	173	1250

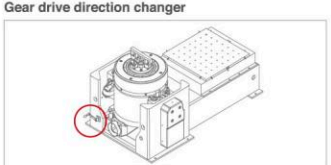
*The table above shows IMV standard specifications. You may also place a custom order.

T-Film Bearing


T-Film Bearing table is the newest generation horizontal table which is comprised of a number of one-feel square bearing elements side by side under the the table. Each bearing consistes of a US patented hydrostatic "T beam" bearing element and a hydrostatic oil film surface for the slip table to ride upon. T-Film Bearing table which can provide horizontal excitation of excellent linearity has been evaluated as the most advanced one in the Aerospace research labs and industries.

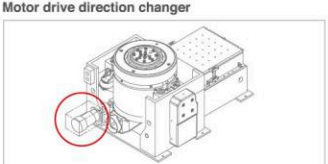
Options for Horizontal Table

Gear drive direction changer



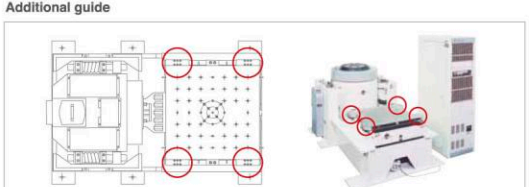
Turning a handle to rotate the Vibration Generator. Preinstalled in i240, i250, i260, J240, J250, J260, and K Series.

Motor drive direction changer



Electrically rotates the Vibration Generator. The motor drive direction changer can be optionally installed on systems equipped with gear drive direction changer.

Additional guide

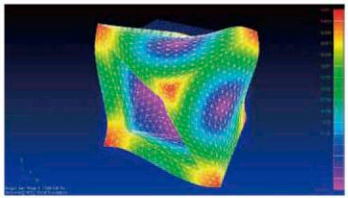


Improves allowable eccentric moment of the slip table type horizontal table.

Optional Unit

Fixure, Air spring base, Load distribution table

Fixture



IMV recommends various types of fixtures according to the test conditions. Besides of Cube and L shaped fixtures which are popularly used, IMV can offer appropriate fixtures for customer's test specimen.

Vibration Insulation

IMV offers optional items that reduce a transmitted floor vibration from a vibration generator to affect to other areas of structural elements.

Insulation pad

The simplest way to insulate vibration; just lay the pad under the vibration generator.

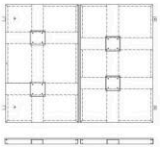
Air spring base

Air springs placed under the column base directly supports the vibration generator. The air spring base method is significantly effective in damping high frequencies (over 5Hz).

Reinforcement

Load spreader base

The load spreader base distributes the load when installed on a floor with low allowable floor load.



Optional Unit

Sound booth for blower, Concentrated suction, Flexible duct connection Others

Sound booth for blower

Sound booth for blower of Air-cooling simulation system which lowers the blower noise. The noise falls by 20~30dB at most.

Concentrated suction

The conventional air-cooled vibration simulation system sucks air from operating room and cools the vibration generator, while a concentrated suction is the way of sucking air from outside, which prevents the change in room tempreture and ambient pressure down.

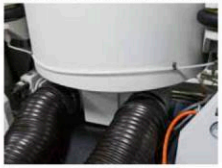
Flexible duct connection

When operating vibration generator with horizontal table, the blower ducts should be placed in the position for use in such direction as switching. With the flexible duct connection, it reduces its burden of replacing.

Test in horizontal way

Switching to Vertical

Completed in Switching to Vertical



Technical Guidance

For Installation of Vibration Simulation System

Basic units used for vibration test

There are four important basic units for vibration test. They are Force [N], Acceleration [m/s²], Velocity [m/s] and Displacement [mm*¹]. Let's start with the force. The force "F" required to give an object of mass "m" acceleration "A" is:

$$F = mA$$

		SI units	Gravitational units
F	: force	[N]	[kgf]
m	: mass	[kg]	[kg]
A	: acceleration	[m/s²]	[G]

That is to say, when the acceleration of 1 [m/s²] is applied to a mass of 1 [kg], the required force is 1 [N]. And gravity acceleration "G" equals to 9.8 [m/s²].
Assume here we have an object moving on sine wave. The displacement is;

$$D = D_0 \sin \omega t$$

The velocity is obtained by differentiation of the displacement. Therefore;

$$V = \frac{dD}{dt}$$

$$V = \omega D_0 \cos \omega t$$

The acceleration is obtained by differentiation of the velocity. Therefore;

$$A = \frac{dV}{dt}$$

$$A = -\omega^2 D_0 \sin \omega t$$

As we substitute

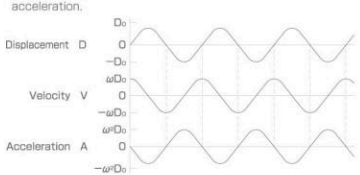
$$\omega = 2\pi f t$$

We have formulas indicated only in amplitude;

$V = \omega D = (2\pi f) \cdot D$ $A = \omega^2 D = (2\pi f)^2 \cdot D$

D : Displacement [mm*¹]
V : Velocity [m/s]
A : Acceleration [m/s²]

Followings are waveforms for displacement, velocity and acceleration.



We get below formulas by transforming above.

$$f = \frac{A}{2\pi V}$$

$$A = \frac{V^2}{D}$$

$$V = 2\pi f D$$

$$D = \frac{A}{(2\pi f)^2}$$

In vibration test field, we use "d [mm*¹]" for the peak to peak displacement.
So all the above formulas are substituted by $\frac{d}{2000}$

$$f = \frac{A}{2\pi V}$$

$$A = \frac{(2\pi f) \cdot d}{2000}$$

$$V = \frac{2\pi f d}{2000}$$

$$d = \frac{2000A}{4\pi^2 f}$$

f : Frequency [Hz]
A : Acceleration [m/s²]
V : Velocity [m/s]
d : displacement [mm*¹]

Let's try examples;

Ex. i) If f = 50 [Hz] and d = 2 [mm*¹] then:

$$V = \frac{2\pi f d}{2000} = \frac{2 \times \pi \times 50 \times 2}{2000} = 0.314 \text{ [m/s]}$$

$$A = \frac{(2\pi f) \cdot d}{2000} = \frac{4 \times \pi^2 \times 50 \times 2}{2000} = 98.7 \text{ [m/s²]}$$

ii) A = 100 [m/s²] and V = 0.5 [m/s] then:

$$f = \frac{A}{2\pi V} = \frac{100}{2 \times \pi \times 0.5} = 31.8 \text{ [Hz]}$$

$$d = \frac{2000V^2}{A} = \frac{2000 \times 0.5^2}{100} = 5 \text{ [mm*¹]}$$

Please see Convertion Chart (Exchange Table) on the last page, and use it for calculation.

About [dB]

We use "dB" as a unit when we talk about physical proportion. Especially, in a case the value is thousands or millions of times multiple of a reference value, we use logarithmic scale "dB" instead of linear scale. This is suitable for our sense and it is a proven fact. "dB" is expressed as following:

$$a = 20 \log \frac{A_1}{A_0} \text{ (dB)}$$

A_1 = comparison_value
A_0 = reference_value

One million times is:

$$a = 20 \log \frac{1{,}000{,}000}{1} = 120 \text{ [dB]}$$

Not only it reduces the digit number but also simplifies calculations.
For example, 25dB and 30dB makes 55dB but if you do it in a linear way;

25 [dB] = 20 log A $A = 10^{\frac{25}{20}} = 17.78$
30 [dB] = 20 log B $B = 10^{\frac{30}{20}} = 31.62$
A×B = 17.78×31.62 = 562.3 = 55dB (25+30) dB=55dB

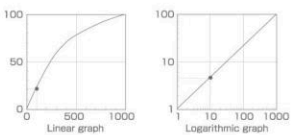
Now you see you can use addition instead of multiplication by using "dB". Followings are conversion tables for "dB" and multiple.

dB	0	0.1	1	3	6	10	20	30	40	60
Multiple	1	1.01	1.12	1.41	2.0	3.16	10	31.6	100	1000

dB	0	−0.1	−1	−3	−6	−10	−20	−30	−40	−60
Multiple	1	0.99	0.891	0.709	0.501	0.316	0.1	0.0316	0.01	0.001

Use of Logarithmic Graph

We often use logarithmic graph when we need to plot data for vibration testing or the other physical phenomena.



On the linear graph, we can read 20 for Y when X is 100. But we can hardly read Y when X is 10 or 1, whereas on the logarithmic graph, we can read Y when X is 10 or 1 as 4.5 or 1. In fact, we can read the value even if it is 1/100 or 1/1000 of the maximum value. We use logarithmic graph for the benefit like this.

Graph for Sine Test

We often use the graph like below when we execute sine vibration test. This is a log-log graph that we learned before. Asymptotes of disp., vel. and acc. staying constant are there. Let's start with a asymptote of constant velocity. From the formulas we learned before;

$$A = 2\pi f V$$

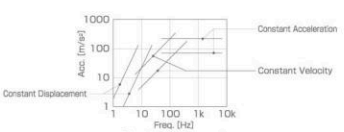
A : Acceleration
f : Frequency
V : Velocity

Here we can read that acceleration A is enlarged 10 times when frequency f is get higher 10 times. On the graph below, we see the acceleration turns to 100 m/s² from 10 m/s² as the frequency goes to 100 Hz from 10 Hz. In case of constant displacement;

$$A = (2\pi f)^2 D$$

D : Displacement

Here we can read that acceleration A is enlarged 100 (10^2) times when frequency f is enlarged 10 times being proportioned to second power of f. On the graph below, we see the acceleration turns to 100 m/s² from 1 m/s² as the frequency goes to 10 Hz from 1 Hz.



That is to say, when velocity or displacement stays constant, inclination of asymptote is settled as shown above.

Technical Guidance

Vibration Insulation for Vibration Simulation System (VSS)

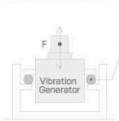
When you operate VSS, its vibration is transmitted to the building and or other facilities through the floor. Especially in the frequency range 2 to 20 Hz, even a small leakage of vibration from VSS can cause large effect on buildings because they have their own resonances there. Therefore, VSS needs vibration insulation system. Followings are some examples.

1) No insulation

F : force

All generated force by the vibration generator is transmitted to the floor. It may give rise building and or other facilities ther resonances. The vibration generator itself sometimes may jump up and down.

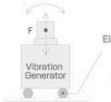
2) Body suspension



Elastic objects or Air springs

IMV takes this method except for compact series. It may limit system's max. displacement when frequency is low. (See "Limitation of maximum displacement") In such a case, you need to lock the body suspension. Then the vibration is transmitted to the floor.

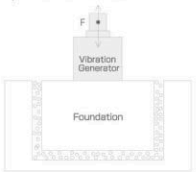
3) Bottom suspension



Elastic objects or Air springs

It has effect of insulation like body suspension but it can also cause lateral motion at low frequency (See P.45.)

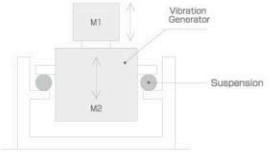
4) Isolated foundation



This is the best way of vibration insulation. Generally, the mass of foundation should be ten times heavier than the rated force of the system in kg number. Normally, the mass of foundation should be twenty times heavier than the rated force of the system in kg number.
If you are interested in this method, please contact us.

Limitation of maximum displacement

There are several ways of vibration insulation. These ways all bring limitations on maximum displacement. In case of body suspension, VSS reacts against movement of the sample.

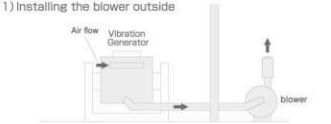


Especially in the case of body suspension,the vibration generator body will be excited by the reaction force. If the excitation frequency is of 2～ 7 Hz where the armature suspension system and the body suspension system may have their resonances, the armature and body motion should be of almost 'anti-phase' causing that the absolute value of available armature displacement is badly limited. It can be expected that only 10mm displacement is available for 51mm^{p-p} rated vibration generator. If you take the means of "Isolated Foundation",the effective mass of the foundation plus vibration generator body could much heavier than specimen/armature assenbly. Therefore, limitation for the available displacement can be negligible.

Noise control

When the vibration simulation system is installed, it is necessary to think about the noise. There are several types of noises such as excitation noise, suction noise (for the air cooling system), blower noise, blower exhaust noise, and power amplifier's fan noise, etc. so, there are several ways of noise control. The excitation noise might exceed 100dB at maximum acceleration 980m/s^2. The suction noise is about 90dB, and blower noise + blower exhaust noise is about 80dB though it differs depending on the model.

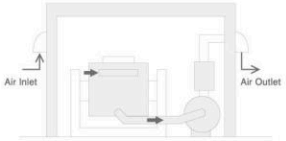
1) Installing the blower outside



This is a general simple method. The blower noise and the blower exhaust noise can be reduced. But it doesn't change the suction noise or the excitation noise of the vibration generator.

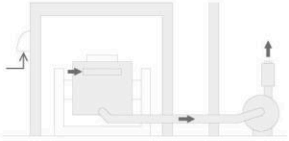
2) Sound booth

A. Vibration generator and blower



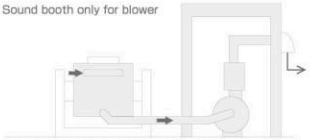
It reduces the excitation noise and the blower noises

B. Vibration generator only (blower is outside)



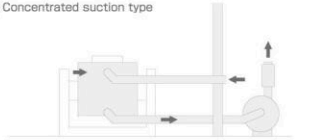
The excitation noise and the blower suction noise are lowered.

C. Sound booth only for blower



The blower noise falls. It doesn't change the suction noise nor the excitation noise of the vibration generator.

3) Concentrated suction type



The suction noise of the vibration generator falls by about 5dB. The intended purpose must be to take air from the outside without using the air in the room (clean room etc.)

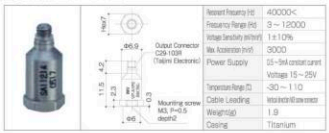
Related Product

Accelerometer Variation

Accelerometer

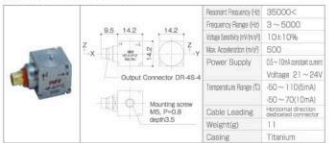
IMV has developed and manufactured accelerometers using nomemade tranceducer elements, so we offer wide variety of vibration pickup.

■Small VP-A1P0



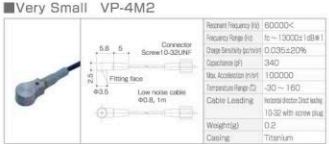
Resonant Frequency (Hz)	40000<
Frequency Range (Hz)	3～12000
Voltage Sensitivity (mV/m/s²)	1±10%
Max. Acceleration (m/s²)	3000
Power Supply	0.5～9mA constant current Voltage 15～25V
Temperature Range (℃)	-30～110
Cable Leading	Integrated 10 screw connector
Weight(g)	1.9
Casing	Titanium

■Small VP-A1P1Z



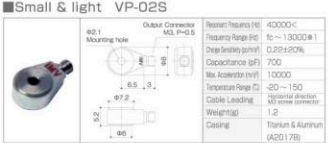
Resonant Frequency (Hz)	35000<
Frequency Range (Hz)	3～5000
Voltage Sensitivity (mV/m/s²)	1.0±10%
Max. Acceleration (m/s²)	500
Power Supply	0.5～10mA constant current Voltage 21～24V
Temperature Range (℃)	-50～110(5mA) -50～70(10mA)
Cable Leading	Horizontal direction dedicated connector
Weight(g)	11
Casing	Titanium

■Very Small VP-4M2



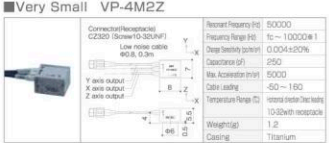
Resonant Frequency (Hz)	60000<
Frequency Range (Hz)	fc～13000±1dB※1
Charge Sensitivity (pc/m/s²)	0.035±20%
Capacitance (pF)	340
Max. Acceleration (m/s²)	100000
Temperature Range (℃)	-30～160
Cable Leading	Horizontal direction Direct leading 10-32 with screw plug
Weight(g)	0.2
Casing	Titanium

■Small & light VP-02S



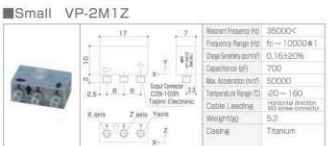
Resonant Frequency (Hz)	40000<
Frequency Range (Hz)	fc～13000±1
Charge Sensitivity (pc/m/s²)	0.22±20%
Capacitance (pF)	700
Max. Acceleration (m/s²)	10000
Temperature Range (℃)	-20～150
Cable Leading	Horizontal direction M3 screw connector
Weight(g)	1.2
Casing	Titanium & Aluminum (A20178)

■Very Small VP-4M2Z



Resonant Frequency (Hz)	50000
Frequency Range (Hz)	fc～10000±1
Charge Sensitivity (pc/m/s²)	0.004±20%
Capacitance (pF)	250
Max. Acceleration (m/s²)	5000
Cable Leading	-50～160
Temperature Range (℃)	Horizontal direction Direct leading 10-32with receptacle
Weight(g)	1.2
Casing	Titanium

■Small VP-2M1Z



Resonant Frequency (Hz)	35000<
Frequency Range (Hz)	fc～10000±1
Charge Sensitivity (pc/m/s²)	0.16±20%
Capacitance (pF)	700
Max. Acceleration (m/s²)	50000
Temperature Range (℃)	-20～160
Cable Leading	Horizontal direction M3 screw connector
Weight(g)	5.2
Casing	Titanium

■Wide temperature VP-32

Resonant Frequency (Hz)	30000<
Frequency Range (Hz)	fc～10000±1dB※1
Charge Sensitivity (pc/m/s²)	3.0±10%
Capacitance (pF)	1500
Max. Acceleration (m/s²)	9800
Temperature Range (℃)	-40～160
Cable Leading	Horizontal direction 10-32 screw connector
Weight(g)	24
Casing	Stainless (SUS303)

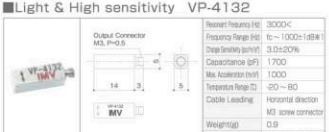
■High sensitivity VP-301

Resonant Frequency (Hz)	12000<
Frequency Range (Hz)	fc～3500±1dB※1
Charge Sensitivity (pc/m/s²)	35±10%
Capacitance (pF)	1500±20%
Max. Acceleration (m/s²)	1500
Temperature Range (℃)	-20～150
Cable Leading	Horizontal direction 10-32 screw connector
Weight(g)	100
Casing	Stainless (SUS303)

■High sensitivity VP-101

Resonant Frequency (Hz)	15000<
Frequency Range (Hz)	fc～5000±1dB※1
Charge Sensitivity (pc/m/s²)	10±10%
Capacitance (pF)	2200
Max. Acceleration (m/s²)	3000
Temperature Range (℃)	-20～150
Cable Leading	Vertical direction 10-32 screw connector
Weight(g)	48
Casing	Stainless (SUS303)

■Light & High sensitivity VP-4132



Resonant Frequency (Hz)	3000<
Frequency Range (Hz)	fc～1000±1dB※1
Charge Sensitivity (pc/m/s²)	3.0±20%
Capacitance (pF)	1700
Max. Acceleration (m/s²)	1000
Temperature Range (℃)	-20～80
Cable Leading	Horizontal direction M3 screw connector
Weight(g)	0.9
Casing	Aluminum(A20170)

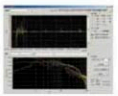
※1 fc determined by charge amplifier time constant setting.
Besides the above-listed pick ups, there are many other vibration sensors.

Environmental Event Recorder TR-1000

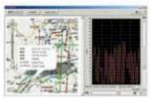
Temperature & Humidity sensor is built-in, so it checks the data on the transportaion route to evaluate the transportation means. With the tailoring function. It is possible to define the acceleration test for the vibration simulation system. The exclusive software of TR-1000 transfers the results of tailoring to the controller, and makes the vibration test reflect the actual environments more realistically.

■Profile

- ○ 3-axis accelerometer and temperature & humidity senser are built-in
- ○ All channels simultaneous sampling
- ○ High speed sampling up to Max. 2.56kHz with 6 channels
- ○ External pickups can be directly connected (Option: Max. 2 pcs. of 3-axis accelerometers Total 9ch.)
- ○ Easy data transfer with USB port
- ○ Rechargeble lithium battery is built-in, so no need to be exchanged.
- ○ Built-in battery records continuously up to 4 days.
- ○ External battery for long-term record
- ○ MicroSD is used for data memory card (Max. 16GB)



Display waveform and PSD display



GPS positioning data display

■Software

(Accessory software) ○ Display waveform of recording data・PSD display
○ CSV output of each waveform data
(Optional software) ○ Records GPS positioning data and display link map
(Analysis software) ○ Tailoring function to generate the optimum test pattern based on the actual measured data
○ Automatically categorize 3 kinds of vibrations "Random" "Shock" "Fall"

Data Acquisition/Analysis System Wave Stocker

(Software is Japanese version only)

This innovative system has been developed by IMV solution engineers with a variety of field experiences in measurement and analysis.

■Max. 16ch waveform and FFT monitoring ■A wide variety of Logging Function
■High-speed transfer with USB2.0 ■Store the collected data into HDD of PC
■All data can be stored in text style file.

Analysis Tool	Functions
Analysis 000 Data Recording Tool Recording tool for executing waveform pre-processing such as filing real time simultaneous sampling data from 16 channel A/D unit, monitoring waveform functions, reproducing functions, extracting data for analysis and filtering. Monitors the raw waveform and FFT analysis waveform of 16-channel unit in real time. Essential software for using other analysis tools.	•16ch simultaneous sampling recording •FFT real time monitor function •Trigger function •Averaging process •Waveform process function •Text file output function •Waveform monitor function •Data recording function •Logger recording function •Text file output function •Print function •Line number •FFT real time monitor function •Window function •Data display between cursor •ME'scope recording mode (Coherence, •Transfer function)
Analysis 001 Basic Analysis Tool In the recorded multi-channel waveform, the relative relation is compared quantitatively. Functions as the basic processing software to obtain the proceeding analysis result.	•Coherence •Transfer function •Cross spectrum •Transfer function •Lissajou •Autocorrelation •Tripartite •Time series waveform display •Frequency analysis (FFT) •Water fall •Contour map
Analysis 002 Transportation Environmental Analysis Tool To predict damage to product during transportation and the durable lifetime of the product in the market, vibration is applied on the vibration simulation system. Used to determine the test source, test time based on the actual environment data.	•Frequency analysis (FFT):3D display •Grouping •Cumulative distribution
Analysis 003 Machine Diagnosis Tool (1) Used to evaluate the facility and trend control of diagnosis.	•Harmonic analysis •Histogram •FFT of envelope result •Synchronous average •Envelope •Move average •Probability density distribution •S-V curve •Waveform average •accumulated frequency distribution
Analysis 004 Machine Diagnosis Tool (2) Displays the diagnosis result visually.	•Degree ratio analysis •Polar plot •Campbell plot •Cascade plot
Analysis 005 Vibration & Sound Pollution Analysis Tool Recorded data in Wave Stocker is converted to pollution vibration and sound level. Octave analysis data can be generated.	•1/3 octave analysis •Equalizer: ① F.A.C. weighting compensation ② Leg'
Analysis 006 Tool Box Network control, report generation and data editing tool etc are available as optional software.	•Tripartite •Graph data correction tool •Wireless LAN •Tool box

※Standard accessory analysis tool : Analysis 000 Others are all optional.

■Software Screen

■16ch simultaneous sampling

■Serched result of time history

■Time history of transport vibration

■Serched result of resonance freq.

■Setting Screen

IMV Test Lab Network

IMV Test Lab Network provide customers a full-support

The best partner IMV offer a full service in 3 major cities.

Since 1988, IMV has been pioneering the test lab business in Japan. The service is available in Tokyo, Osaka and now in Nagoya. Well-developed facilities became more convenient and familiar to you.

In March, 2009, IMV newly built a new test house and installed a large vibration simulation system This versatile platform is ideal for testing large items such as railway carriage as components full batteries.

IMV is the first company with test laboratories for vibration simulation and shock testing to be authorized by : ISO/IEC 17025

All of IMV's test laboratories are authorized as IECQ independent test laboratories, equipped with quality control management system in accordance with international standard ISO/IEC17025 (JIS Q17025), specifying testing ability and test laboratory calibration.
We see it is trend that the companies operating quality management system (ISO/TC16949) for Auto Industries and the companies who are taking outsourcing for tests prefer to use the test laboratories awarded qualification for ISO/TEC 17025

【Outline】

①Certification number : RCJ-07T-01
②Authorization organization : Reliability Center for Electronic Components of Japan (RCJ)
③Authorization date : December 19, 2008
④Authorized field : all fields of vibration simulation test and shock test to be performed at test laboratory

ISO/IEC 17025 (JIS Q 17025) is the international standard which specifies "General requirements for the competence of testing and calibration laboratories". ISO9001 is only for the quality management system, however ISO/IEC 17025 involves the requirement for both quality management and technological level in test. IECQ the IECQ Independent Testing Laboratory means an accredited independent laboratories according to IECQ standard (International Electrotechnical Commission Quality Assessment System for Electronic Components). This certificate shows that quality management system and technological level for testing in IMV test lab. is acknowledged golobally and we proudly offers our customers the credible test results.

Service

【Vibration test・Shock test】
Sine, Random, Sine on Random, Random on Random, Sine beat, Sine burst, Measured waveform, Shock (Classical shock, Shock Response Spectrum), Single-axis excitation, 3-axis excitation, 6 DOF, Multi-points, 16ch simultaneous sampling recording


■SINE : SINE waveform test

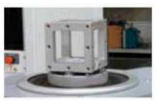

■RANDOM : RANDOM test


■SHOCK : SHOCK test

【Design and manufacture of fixtures】
Material: Alumninum, Magnesium
Process : casting, welding and bolting

【Temperature・humidity/vibraion・combined environment test】
3-axis simultaneous excitation under the combined environment


■Horizontal Table


■立方体治具

【Test Method Consulting】
Guidance of the standards and selection of the test method

【Test tailoring 】
We can support our customers by measurements of actual environments, figuring out test specifications to offer using a method called tailoring and the concept of Cumulative fatigue spectrum.


■All weather simulation system


■Fatigue vibration test system

【Consulting】
Locate problems and offer test plan, others

【Vibration measurement・Analysis】
Spectrum analysis, Transfer character, RPM analysis, Frequency analysis
【Modal analysis】
Using suitable electro dynamic vibration generator and analysis equipment

【Vibration measurement・Analysis consulting 】
Find problems and design the measurement・analysis plan

【Vibration test seminar】
Regularly held in Tokyo Other sites : as requested
【Education and training】
Explanation for Test methods and System instruction.

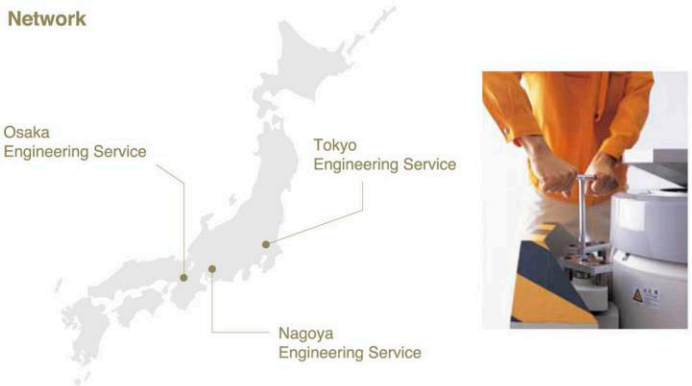
Single・Multi-axis combined vibration simulation system

Fall・Shock vibration simulation system

Coverage & System

Service Area & Management System

Network



Global Network

Quality & Ecology

Contribution to Quality and Ecology

We achieved the award of ISO9001(the International Standard for Quality Assurance System) at Osaka factory, ISO14001 (the International Standard for Environmental Management Systems) at Osaka site facilities, which are mainly engaged in developing, designing and manufacturing Vibration Simulation System.

Global Standard for Quality Control

Acquisition of ISO9001

IMV implemented the most stringent quality control, resulting in the award of ISO9001(the International Standard for Quality Assurance System) at Osaka factory. IMV has a firm commitment to provide customers with the best services and products with the highest quality.

JGA-1573

Standard Establishment for Environmental Management Systems (EMS)

Acquisition of ISO14001

IMV always promotes business activities in harmony with the global environment. IMV pursues environmental conservation activities.

JQA-EM5449

Quality Policy

IMV offers market competitive products and services.

Specification | **Delivery date** | **Readiness** | **Function** | **Reliability**

Environmental Policy

All IMV managements and employees, as a corporate social responsibility, are fully aware of contributing to protection of the global environment, and pursue the better environment in each workplaces.

1. All IMV managements and employees commit the goal-setting and implement the sustainable reform of environmental management.
2. IMV endeavors to achieve resource- and energy-saving, and commit to designing, dveloping and manufacturing of environment-friendly products and supply of services.
3. IMV comply with the environment-related bills and regulations, and complete environmental management and prevention of environmental pollution.
4. IMV assures that this quality is carried out thoroughly and publicly declared.

Energy Saving Type Vibration Simulation System [ECO Shaker]

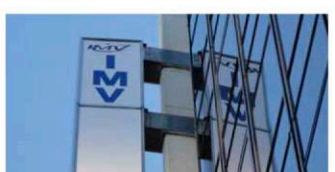
Electrodynamic Vibration generator requires a quite large power consumption. IMV has self-developed ECO-shaker which automatically calculate the optimal electrical power resulting in a substantial reduction in power consumption and CO_2 emission. We keep developing our products which are kind to community safety, comfort and ecology.

Intelligent Shaker Manager

"Saving Energy technology"
ISM-EM EM: Energy Manager

Corporate Profile

Osaka Sales Office
2-6-10,Takejima,Nishiyodogawa-ku,Osaka-shi 555-0011
tel. 06-6478-2575　fax. 06-6478-2537



Tokyo Sales Office
Koyo-Bldg. F9 ,Hamamatsu-cho,Minato-ku,Tokyo 105-0013
tel. 03-3436-3920(代)　fax. 03-3436-3921

Nagoya Sales Office
106-1,Neura,Ukigai-Cho,Miyoshi-Shi,Aichi 470-0207
tel. 0561-35-5188　fax. 0561-36-4460

Specification

Page	Type	System Model [compact]	Freq. range	Rated Force (F) SINE	Rated Force (F) RANDOM	Rated Force (F) SHOCK	Max. Acc. SI	Max. Acc. CGS	Max. Vel.	Max. Disp.	Max. Load	Power Requirements	Armature Mass	Armature support Spring Constant	Vibration Generator	Dimensions (mm) WXHXD	Power Amplifier	Dimensions (mm) WXHXD	Cooling Method	System Type
			Hz	N	N/rms	N	m/s²	G	m/s	mm p-p	kg	kVA	kg	kN/m						
38	Midget-Type	PET-01-0A	2～12000	9.8	1	-	490	50	-	5	Up To the Spring Constant	0.08	0.02	9.8	PET-01	□75xH72	PET-0A	300x140x280	Natural Radiation	PET
		PET-05-05A	2～14000	49.0	5	-	326	34	-	5		0.10	0.15	15.6	PET-05	□116xH115	PET-05A	300x140x280	Natural Radiation	PET
	Pick-Up Calibrator	CE-7144	2～20000	49.0	5	-	49	5	-	2		0.10	1.00	3.9	VE-7144	φ148xH200	CE-7144	300x140x280	Natural Radiation	CE
	Compact Type	MS-VS-10	5～5000	98.0	10	-	196	20	0.54	3		0.80	0.50	49.0	MS-VE-01N	330x235x190	VA-ST-03	430x200x500	Natural Radiation	MS
36	Compact Type	m030/MA1	5～3000	300.0	31	210.00	22.0	300.00	31	500	51	1.60	26	15	0.40	0.60	-	m030	φ190xH240	MA1	430x149x430	Air Cooling	m
		m080/MA1	5～3000	600.0	62	420.00	43.0	600.00	62	500	51	1.60	30	15	0.70	1.20	-	m080	φ230xH281	MA1	430x149x430	Air Cooling	m
		m120/MA1	5～2000	1200.0	123	840.00	86.0	1200.00	123	500	51	1.60	30	120	1.10	2.40	-	m120	410x410xH372	MA1	430x149x430	Air Cooling	m
		m030H/MA1	100～10000	380.0	39	266.00	27.0	380.0	39	200	21	-	-	15	0.40	1.90	-	m030H	φ190xH274	MA1	430x149x430	Air Cooling	m
38	Wide Frequency Band Type	VSH-10-03	5～12000	98.0	10	39.00	4.0	98.00	10	245	25	-	-	5	0.50	0.40	12.2	VEH-10	φ180xH214	VA-ST-03	430x200x500	Air Cooling	VSH
		VSH-30-06	5～10000	294.0	30	117.00	12.0	294.00	30	392	40	-	-	8	1.50	0.75	29.4	VEH-50	φ310xH322	VA-ST-06	430x200x500	Air Cooling	VSH
		VSH-50-1	5～10000	490.0	50	196.00	20.0	980.00	100	653	67	1.20	8	Up To the Spring Constant	2.30	0.75	29.4	VEH-50	φ310xH322	VAG-1	580x1750x850	Air Cooling	VSH
		VSH-100-1	5～8000	980.0	100	392.00	40.0	1960.00	200	980	100	0.80	10		3.50	1.00	-	VEH-100	φ390xH306	VAH-1	580x1750x850	Air Cooling	VSH
		VSH-100R-1	5～10000	980.0	100	392.00	40.0	1960.00	200	980	100	0.80	10		3.50	1.00	49.0	VEH-100R	φ390xH306	VAH-1	580x1750x850	Air Cooling	VSH

Page	Type	System Model [compact]	Freq. range	Rated Force (F) SINE	Rated Force (F) RANDOM	Rated Force (F) SHOCK	Max. Acc. SI	Max. Acc. CGS	Max. Vel.	Max. Disp.	Max. Load	Power Requirements	Armature Mass	Armature support Spring Constant	Vibration Generator	Dimensions (mm) WXHXD	Power Amplifier	Dimensions (mm) WXHXD	Cooling Method	System Type
			Hz	kN	kgf	kN/rms	kgf/rms	kN	kgf	m/s²	G	m/s	mm p-p	kg	VA	kg	N/m					
25	Energy-saving EM-series	EM2201	0～3300	8.00	817	8.00	817	16.00	1633	1250	128	2.20	51	200	16.4	6.4	294	i220	1020x903x550	SA1M-i20EM	580x1750x850	Air Cooling	EM
		EM2301	0～3000	16.00	1633	16.00	1633	32.00	3266	1250	128	2.20	51	300	26.0	12.8	700	i230	1124x957x860	SA2M-i30EM	580x1750x850	Air Cooling	EM
		EM2401	0～2600	24.00	2449	24.00	2449	48.00	4898	1200	123	2.20	51	400	36.0	20	850	i240	1234x997x890	SA3M-i40EM	580x1750x850	Air Cooling	EM
		EM2501	0～2500	32.00	3266	32.00	3266	64.00	6531	914	94	2.20	51	600	51.0	35	1550	i250	1463x1187x1100	SA4M-i50EM	580x1950x850	Air Cooling	EM
		EM2502	0～2500	40.00	4082	40.00	4082	80.00	8164	1142	117	2.20	51	600	57.0	35	1550	i250	1463x1187x1100	SA5M-i50EM	580x1950x850	Air Cooling	EM
		EM2551	0～2600	49.00	5000	49.00	5000	98.00	10000	907	93	2.20	51	1000	80.0	54	1550	i255	1527x1196x1100	SA7M-i55EM	1160x1950x850	Air Cooling	EM
		EM2601	0～2600	54.00	5511	54.00	5511	108.00	11021	1000	102	2.20	51	1000	83.0	54	1550	i260	1527x1196x1100	SA7M-i60EM	1160x1950x850	Air Cooling	EM
26	Energy-saving EM-series	EM2305	0～3000	16.00	1633	16.00	1633	40.00	4082	941	97	2.40	100	300	28.0	17.0	700	J230	1124x1079x850	SA3M-J30EM	580x1750x850	Air Cooling	EM
		EM2405	0～2400	24.00	2449	24.00	2449	55.00	5612	923	95	2.40	100	400	38.0	26.0	850	J240	1234x1145x890	SA4M-J40EM	580x1750x850	Air Cooling	EM
		EM2505	0～2200	35.00	3572	35.00	3572	70.00	7143	777	80	2.40	100	600	53.0	45.0	1550	J250	1463x1301x1100	SA5M-J50EM	580x1950x850	Air Cooling	EM
		EM2506	0～2200	40.00	4082	40.00	4082	87.00	8878	888	91	2.40	100	600	57.0	45.0	1550	J250	1463x1301x1100	SA6M-J50EM	580x1950x850	Air Cooling	EM
		EM2555	0～2600	49.00	5000	49.00	5000	98.00	10000	777	80	2.40	100	1000	82.0	63.0	1550	J255	1527x1319x1100	SA7M-J55EM	1160x1950x850	Air Cooling	EM
		EM2605	0～2600	54.00	5511	54.00	5511	112.00	11429	857	87	2.40	100	1000	86.0	63.0	1550	J260	1527x1319x1100	SA7M-J60EM	1160x1950x850	Air Cooling	EM
		EMK0301	0～3000	30.80	3150	21.50	2200	61.60	6286	1000	102	1.80	51	500	49.0	27.0	980	K030	1100x1090x824	SA4M-K30EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK0621	0～2500	49.00	5000	49.00	5000	98.00	10000	1000	102	2.00	51	1000	76.0	40.0	980	K060	1380x1085x1000	SA6M-K60EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK0622	0～2500	61.70	6300	61.70	6300	123.40	12592	1000	102	2.00	51	1000	87.0	40.0	980	K060	1380x1085x1000	SA8M-K60EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK0801	0～2500	80.00	8163	80.00	8163	160.00	16327	1000	102	2.00	51	1000	100.0	60.0	1550	K080	1595x1050x1200	SA10M-K80EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK1251	0～2500	100.00	10204	100.00	10204	200.00	20409	1000	102	2.00	51	2000	150.0	70.0	2450	K125	1776x1360x1300	SA13M-K125EM	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK1252	0～2500	125.00	12755	125.00	12755	250.00	25511	1000	102	2.00	51	2000	170.0	70.0	2450	K125	1776x1360x1300	SA16M-K125EM	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK2001	0～2000	160.00	16326	160.00	16326	320.00	32654	941	96	1.80	51	2000	200.0	170.0	4900	K200	2415x1843x1740	SA23M-K200EM	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
		EMK2002	0～2000	200.00	20408	200.00	20408	400.00	40817	1000	102	1.80	51	2000	280.0	170.0	4900	K200	2415x1843x1740	SA28M-K200EM	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	EM
28	High Grade i-series	i210/DB	0～4000	1.17	120	0.59	60	1.17	120	390	40	0.85	30	120	3.7	3.0	160	i210	868x700x458	VA06-i10	580x1750x850	Air Cooling	I
		i210/SA1M	0～4000	3.00	307	3.00	215	9.00	919	1000	103	2.20	30	120	6.8	3.0	160	i210	868x700x458	SA1M-i10	580x1750x850	Air Cooling	I
		i220/SA1M	0～3300	8.00	817	8.00	817	16.00	1633	1250	128	2.20	51	200	16.4	6.4	294	i220	1020x903x550	SA1M-i20	580x1750x850	Air Cooling	I
		i230/SA2M	0～3000	16.00	1633	16.00	1633	32.00	3266	1250	128	2.20	51	300	26.0	12.8	700	i230	1124x957x860	SA2M-i30	580x1750x850	Air Cooling	I
		i240/SA3M	0～2600	24.00	2449	24.00	2449	48.00	4898	1200	123	2.20	51	400	36.0	20.0	850	i240	1234x997x890	SA3M-i40	580x1750x850	Air Cooling	I
		i250/SA4M	0～2500	32.00	3266	32.00	3266	64.00	6531	914	94	2.20	51	600	51.0	35.0	1550	i250	1463x1187x1100	SA4M-i50	580x1950x850	Air Cooling	I
		i250/SA5M	0～2500	40.00	4082	40.00	4082	80.00	8164	1142	117	2.20	51	600	57.0	35.0	1550	i250	1463x1187x1100	SA5M-i50	580x1950x850	Air Cooling	I
		i255/SA7M	0～2600	49.00	5000	49.00	5000	98.00	10000	907	93	2.20	51	1000	80.0	54.0	1550	i255	1527x1196x1100	SA7M-i55	580x1950x850	Air Cooling	I
		i260/SA7M	0～2600	54.00	5511	54.00	5511	108.00	11021	1000	102	2.20	51	1000	83.0	54.0	1550	i260	1527x1196x1100	SA7M-i60	580x1950x850	Air Cooling	I
30	Large Displacement J-series	J230/SA3M	0～3000	16.00	1633	16.00	1633	40.00	4082	941	97	2.40	100	300	28.0	17.0	700	J230	1124x1079x850	SA3M-J30	580x1750x850	Air Cooling	J
		J230S/SA7M	0～3000	16.00	1633	16.00	1633	40.00	4082	888	91	2.40	100	300	38.0	18.0	700	J230S	1124x1079x850	SA7M-J30S	580x1950x850	Air Cooling	J
		J240/SA4M	0～2400	24.00	2449	24.00	2449	55.00	5612	923	95	2.40	100	400	38.0	26.0	850	J240	1234x1145x890	SA4M-J40	580x1750x850	Air Cooling	J
		J240S/SA8M	0～2400	24.00	2449	24.00	2449	70.00	7142	857	87	2.40	100	400	52.0	28.0	850	J240S	1234x1145x890	SA8M-J40S	1160x1950x850	Air Cooling	J
		J250/SA5M	0～2200	35.00	3572	35.00	3572	70.00	7143	777	80	2.40	100	600	53.0	45.0	1550	J250	1463x1301x1100	SA5M-J50	580x1950x850	Air Cooling	J
		J250/SA6M	0～2200	40.00	4082	40.00	4082	87.00	8878	888	91	2.40	100	600	57.0	45.0	1550	J250	1463x1301x1100	SA6M-J50	580x1950x850	Air Cooling	J
		J255/SA7M	0～2600	49.00	5000	49.00	5000	98.00	10000	777	80	2.40	100	1000	82.0	63.0	1550	J255	1527x1319x1100	SA7M-J55	580x1950x850	Air Cooling	J
		J260/SA7M	0～2600	54.00	5511	54.00	5511	112.00	11429	857	87	2.40	100	1000	86.0	63.0	1550	J260	1527x1319x1100	SA7M-J60	580x1950x850	Air Cooling	J
		J260S/SA30M	0～2600	54.00	5511	54.00	5511	196.00	20000	857	87	2.40	100	1000	127.0	63.0	1550	J260S	1657x1319x1100	SA30M-J60S	2350x1950x850	Air Cooling	J
33	Multi Purpose Air Cooled VS-series	VS-120-06	5～4500	1.17	120	0.823	84	2.34	239	585	60	0.70	25	70	3.7	2.0	140	VE-200	660x625x530	VA-06-02	580x1750x850	Air Cooling	VS
		VS-150-1	5～4500	1.47	150	1.020	105	2.94	300	735	75	1.15	25	70	4.5	2.0	140	VE-200	660x625x530	VA-1	580x1750x850	Air Cooling	VS
		VS-170-2	5～4500	1.66	170	1.160	119	3.32	339	830	85	2.00	25	70	6.5	2.0	140	VE-200	660x625x530	VA-2	580x1750x850	Air Cooling	VS
		VS-200-2	5～4500	1.96	200	1.370	140	3.92	400	980	100	1.75	25	70	6.5	2.0	140	VE-200	660x625x530	VA-2	580x1750x850	Air Cooling	VS
		VS-250-2	5～4000	2.45	250	1.710	175	4.90	500	907	93	1.35	25	120	6.5	2.7	160	VE-300	720x640x550	VA-2	580x1750x850	Air Cooling	VS
		VS-300-2	5～4000	2.94	300	2.050	210	5.88	600	980	100	1.10	25	120	6.5	2.7	160	VE-300	720x640x550	VA-2	580x1750x850	Air Cooling	VS
		VS-300-3	5～4000	2.94	300	2.050	210	5.88	600	980	100	1.70	25	120	7.5	2.7	160	VE-300	720x640x550	VA-3	580x1750x850	Air Cooling	VS
34	Multi Purpose Air Cooled VS-series	VS-600/SA1M	5～3000	5.88	600	4.110	420	11.76	1200	980	100	1.40	25	200	10.5	5.5	245	VE-600	790x675x560	SA1M-VE06	580x1750x850	Air Cooling	VS
		VS-1030/SA1M	5～3000	9.80	1000	6.860	700	19.60	2000	1031	106	1.40	51	140	18.2	9.5	392	VE-1030	920x785x712	SA1M-VE1030	580x1750x850	Air Cooling	VS
		VS-1031/SA2M	5～3000	9.80	1000	6.860	700	19.60	2000	1031	106	2.00	51	140	20.0	9.5	392	VE-1031	920x785x712	SA2M-VE1031	580x1750x850	Air Cooling	VS
		VS-2000A/SA2M	5～3000	19.60	2000	13.70	1398	39.20	4000	980	100	1.40	51	300	30.0	18.0	686	VE-2000A	900x990x790	SA2M-VE20A	580x1750x850	Air Cooling	VS
		VS-2000/SA3M	5～2500	19.60	2000	13.70	1398	39.20	4000	980	100	2.00	51	300	33.0	18.0	686	VE-2000	900x990x790	SA3M-VE20	580x1750x850	Air Cooling	VS
		VS-3000/SA3M	5～2500	29.40	3000	20.50	2092	58.80	6000	980	100	1.50	51	500	42.0	25.0	870	VE-3000	1000x1085x895	SA3M-VE30	580x1750x850	Air Cooling	VS
		VS-3000/SA4M	5～2500	29.40	3000	20.50	2092	58.80	6000	980	100	2.00	51	500	49.0	25.0	870	VE-3000X	1000x1085x895	SA4M-VE30X	580x1750x850	Air Cooling	VS
32	Water Cooled K-series	K030/SA4M	0～3000	30.80	3150	21.50	2200	61.60	6286	1000	102	1.80	51	500	49.0	27.0	980	K030	1100x1090x824	SA4M-K30	580x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K049/SA8M	0～2500	49.00	5000	49.00	5000	98.00	10000	1000	102	2.00	51	1000	76.0	40.0	980	K060	1380x1085x1000	SA6M-K60	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K062/SA8M	0～2500	61.70	6300	61.70	6300	123.40	12592	1000	102	2.00	51	1000	87.0	40.0	980	K060	1380x1085x1000	SA8M-K60	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K080/SA10M	0～2500	80.00	8163	80.00	8163	160.00	16327	1000	102	2.00	51	1000	100.0	60.0	1550	K080	1595x1050x1200	SA10M-K80	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K100/SA13M	0～2500	100.00	10204	100.00	10204	200.00	20409	1000	102	2.00	51	2000	150.0	70.0	2450	K125	1776x1360x1300	SA13M-K125	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K125/SA16M	0～2500	125.00	12755	125.00	12755	250.00	25511	1000	102	2.00	51	2000	170.0	70.0	2450	K125	1776x1360x1300	SA16M-K125	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K160/SA23M	0～2000	160.00	16326	160.00	16326	320.00	32654	941	96	1.80	51	2000	200.0	170.0	4900	K200	2415x1843x1740	SA23M-K200	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
		K200/SA28M	0～2000	200.00	20408	200.00	20408	400.00	40817	1000	102	1.80	51	2000	280.0	170.0	4900	K200	2415x1843x1740	SA28M-K200	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling:	K
37	Transportation Test CV-series	CV-150-06	2～2000	1.47	150	0.73	75	2.94	300	183	19	0.50	40	130	4.0	8.0	490	CE-3103	790x710x592	VA-06-03	580x1750x850	Air Cooling	CV
		CV-200-1	2～2000	1.96	200	0.98	100	3.92	400	245	25	0.70	40	130	4.8	8.0	490	CE-3103	790x710x592	VA-1	580x1750x850	Air Cooling	CV
		CV-300-2	2～2000	2.94	300	1.47	150	5.88	600	367	38	1.00	40	130	7.1	8.0	490	CE-3103	790x710x592	VA-2	580x1750x850	Air Cooling	CV
		CV-600/SA1M	2～2000	5.88	600	2.94	300	11.76	1200	490	50	1.00	51	300	10.5	12.0	490	CE-602	790x710x592	SA1M-CE06	580x1750x850	Air Cooling	CV
		CV-1000/SA1M	2～2000	9.80	1000	4.90	500	19.60	2000	653	67	0.80	51	300	16.0	15.0	686	CE-3103	1000x850x760	SA1M-CE05	580x1750x850	Air Cooling	CV

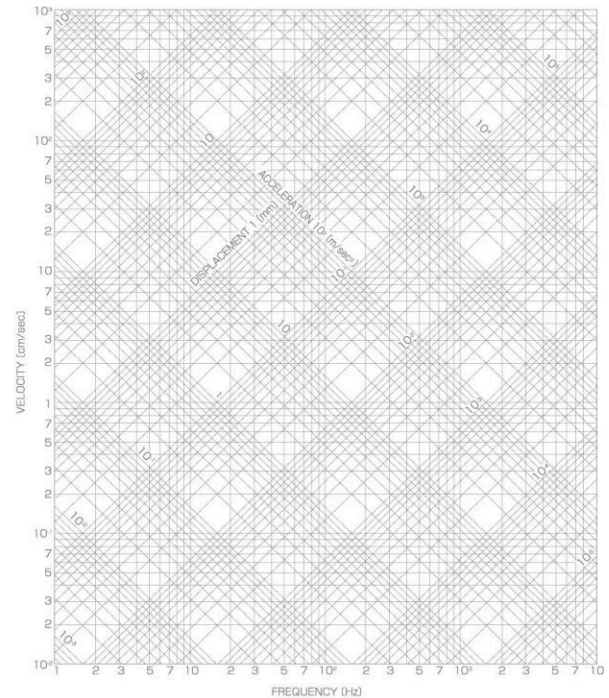
Excitation Force

Page	System Model [compact]	Freq. range	Rated Force (F) SINE		RANDOM		SHOCK		Max. Acc. SI	Max. Acc. CGS	Max. Vel.	Max. Disp.	Max. Load	Power Requirements	Armature Mass	Armature support Spring Constant	Vibration Generator	Dimensions (mm) WxHxD	Power Amplifier	Dimensions (mm) WxHxD	Cooling Method	System Type
		Hz	N	kgf	Nrms	kgfrms	N	kgf	m/s²	G	m/s	mm²⁺	kg	kVA	kg	kN/m						
38	PET-01-0A	2～12000	9.8	1	-	-	-	-	490	50	-	5	Up To the Spring Constant	0.08	0.02	6.8	PET-01	□75xH72	PET-0A	300x140x280	Natural Radiation	PET
	PET-05-05A	2～14000	49.0	5	-	-	-	-	326	34	-	5		0.10	0.15	15.6	PET-05	□116xH115	PET-05A	300x140x280	Natural Radiation	PET
	CE-7144	2～20000	49.0	5	-	-	-	-	49	5	-	2		0.10	1.00	3.9	VE-7144	φ148xH200	CE-7144	300x140x280	Natural Radiation	CE
	MS-VS-10	5～5000	98.0	10	-	-	-	-	196	20	0.54	3		0.80	0.50	49.0	MS-VE-01N	330x235x190	VA-ST-03	430x200x500	Air Cooling	MS
36	m030/MA1	5～3000	300.0	31	210.00	22.0	300.00	31	500	51	1.60	26	15	0.40	0.60	-	m030	φ186xH240	MA1	430x149x430	Air Cooling	m
	m060/MA1	5～3000	600.0	62	420.00	43.0	600.00	62	500	51	1.60	30	15	0.70	1.20	-	m060	φ230xH281	MA1	430x149x430	Air Cooling	m
	m120/MA1	5～2000	1200.0	123	840.00	86.0	1200.00	123	500	51	1.60	30	120	1.10	2.40	-	m120	410x410xH372	MA1	430x149x430	Air Cooling	m
	m030H/MA1	1000～10000	380.0	39	266.00	27.0	380.00	39	200	21	-	-	15	0.40	1.90	-	m030H	φ190xH274	MA1	430x149x430	Air Cooling	m
38	VSH-10-03	5～12000	98.0	10	39.00	4.0	98.00	10	245	25	-	5	Up To the Spring Constant	0.50	0.40	12.2	VEH-10	φ180xH214	VA-ST-03	430x200x500	Air Cooling	VSH
	VSH-30-06	5～10000	294.0	30	117.00	12.0	294.00	30	392	40	-	8		1.50	0.75	29.4	VEH-50	φ310xH322	VA-ST-06	430x200x500	Air Cooling	VSH
	VSH-50-1	5～10000	490.0	50	196.00	20.0	980.00	100	653	67	1.20	8		2.30	0.75	29.4	VEH-50	φ310xH322	VAG-1	580x1750x850	Air Cooling	VSH
	VSH-100-1	5～8000	980.0	100	392.00	40.0	1960.00	200	980	100	0.80	10		3.50	1.00	-	VEH-100	φ390xH306	VAH-1	580x1750x850	Air Cooling	VSH
	VSH-100R-1	5～10000	980.0	100	392.00	40.0	1960.00	200	980	100	0.80	10		3.50	1.00	49.0	VEH-100R	φ390xH306	VAH-1	580x1750x850	Air Cooling	VSH

Page	System Model [compact]	Freq. range	Rated Force (F) SINE		RANDOM		SHOCK		Max. Acc. SI	Max. Acc. CGS	Max. Vel.	Max. Disp.	Max. Load	Power Requirements	Armature Mass	Armature support Spring Constant	Vibration Generator	Dimensions (mm) WxHxD	Power Amplifier	Dimensions (mm) WxHxD	Cooling Method	System Type
		Hz	kN	kgf	kNrms	kgfrms	kN	kgf	m/s²	G	m/s	mm²⁺	kg	kVA	kg	N/m						
28	i210/06	0～4000	1.17	120	0.59	60	1.17	120	390	40	0.85	30	120	3.7	3.0	160	i210	868x700x458	VA06-I10	580x1750x850	Air Cooling	I
33	VS-120-06	5～4500	1.17	120	0.823	84	2.34	239	585	60	0.70	25	70	3.7	2.0	140	VE-200	660x625x530	VA-06-02	580x1750x850	Air Cooling	VS
33	VS-150-1	5～4500	1.47	150	1.020	105	2.94	300	735	75	1.15	25	70	4.5	2.0	140	VE-200	660x625x530	VA-1	580x1750x850	Air Cooling	VS
37	CV-150-06	2～2000	1.47	150	0.73	75	2.94	300	183	19	0.50	40	130	4.0	8.0	490	CE-3103	790x710x592	VA-06-03	580x1750x850	Air Cooling	CV
33	VS-170-2	5～4500	1.66	170	1.160	119	3.32	339	830	85	2.00	25	70	6.5	2.0	140	VE-200	660x625x530	VA-2	580x1750x850	Air Cooling	VS
	VS-200-2	5～4500	1.96	200	1.370	140	3.92	400	980	100	1.75	25	70	6.5	2.0	140	VE-200	660x625x530	VA-2	580x1750x850	Air Cooling	VS
37	CV-200-1	2～2000	1.96	200	0.98	100	3.92	400	245	25	0.70	40	130	4.8	8.0	490	CE-3103	790x710x592	VA-1	580x1750x850	Air Cooling	CV
33	VS-250-2	5～4000	2.45	250	1.710	175	4.90	500	907	93	1.35	25	120	6.5	2.7	160	VE-300	720x640x550	VA-2	580x1750x850	Air Cooling	VS
	VS-300-2	5～4000	2.94	300	2.050	210	5.88	600	980	100	1.10	25	120	6.5	2.7	160	VE-300	720x640x550	VA-2	580x1750x850	Air Cooling	VS
	VS-300-3	5～4000	2.94	300	2.050	210	5.88	600	980	100	1.70	25	120	7.5	2.7	160	VE-300	720x640x550	VA-3	580x1750x850	r Cooling	VS
37	CV-300-2	2～2000	2.94	300	1.47	150	5.88	600	367	38	1.00	40	130	7.1	8.0	490	CE-3103	790x710x592	VA-2	580x1750x850	Air Cooling	CV
28	i210/SA1M	0～4000	3.00	307	3.00	215	9.00	919	1000	103	2.20	30	120	6.8	3.0	160	i210	868x700x458	SA1M-I10	580x1750x850	Air Cooling	I
34	VS-600/SA1M	5～3000	5.88	600	4.110	420	11.76	1200	980	100	1.40	25	200	10.5	5.5	245	VE-600	790x675x580	SA1M-VE06	580x1750x850	Air Cooling	VS
37	CV-600/SA1M	2～2000	5.88	600	2.94	300	11.76	1200	490	50	1.00	51	300	10.5	12.0	490	CE-602	790x710x592	SA1M-CE06	580x1750x850	Air Cooling	CV
28	i220/SA1M	0～3000	8.00	817	8.00	817	16.00	1633	1250	128	2.20	51	200	16.4	6.4	294	i220	1020x903x550	SA1M-I20	580x1750x850	Air Cooling	I
25	EM2201	0～3300	8.00	817	8.00	817	16.00	1633	1250	128	2.20	51	200	16.4	6.4	294	i220	1020x903x550	SA1M-I20EM	580x1750x850	Air Cooling	EM
34	VS-1030/SA1M	5～3000	9.80	1000	6.860	700	19.60	2000	1031	106	1.40	51	140	18.2	9.5	392	VE-1030	920x785x712	SA1M-VE1030	580x1750x850	Air Cooling	VS
	VS-1031/SA2M	5～3000	9.80	1000	6.860	700	19.60	2000	1031	106	2.00	51	140	20.0	9.5	392	VE-1031	920x785x712	SA2M-VE1031	580x1750x850	Air Cooling	VS
37	CV-1000/SA1M	2～2000	9.80	1000	4.90	500	19.60	2000	653	67	0.80	51	300	16.0	15.0	686	CE-3103	1000x850x760	SA1M-CE06	580x1750x850	Air Cooling	CV
28	i230/SA2M	0～3000	16.00	1633	16.00	1633	32.00	3266	1250	128	2.20	51	300	26.0	12.8	700	i230	1124x957x860	SA2M-I30	580x1750x850	Air Cooling	I
30	J230/SA3M	0～3000	16.00	1633	16.00	1633	40.00	4082	941	97	2.40	100	300	28.0	17.0	700	J230	1124x1079x850	SA3M-J30	580x1950x850	Air Cooling	J
	J230S/SA7M	0～3000	16.00	1633	16.00	1633	40.00	4082	888	91	2.40	100	300	38.0	18.0	700	J230S	1124x1079x850	SA7M-J30S	580x1950x850	Air Cooling	J
25	EM2301	0～3000	16.00	1633	16.00	1633	32.00	3266	1250	128	2.20	51	300	28.0	12.8	700	i230	1124x957x860	SA2M-I30EM	580x1750x850	Air Cooling	EM
26	EM2305	0～3000	16.00	1633	16.00	1633	40.00	4082	941	97	2.40	100	300	28.0	17.0	700	J230	1124x1079x850	SA3M-J30EM	580x1750x850	Air Cooling	EM
34	VS-2000A/SA2M	5～3000	19.60	2000	13.70	1398	39.20	4000	980	100	1.40	51	300	30.0	18.0	686	VE-2000A	900x990x790	SA2M-VE20A	580x1750x850	Air Cooling	VS
	VS-2000/SA3M	5～3000	19.60	2000	13.70	1398	39.20	4000	980	100	2.00	51	300	33.0	18.0	686	VE-2000	900x990x790	SA3M-VE20	580x1750x850	Air Cooling	VS
28	i240/SA3M	0～2600	24.00	2449	24.00	2449	48.00	4898	1200	123	2.20	51	400	36.0	20.0	850	i240	1234x997x890	SA3M-I40	580x1750x850	Air Cooling	I
30	J240/SA4M	0～2400	24.00	2449	24.00	2449	55.00	5612	923	95	2.40	100	400	38.0	26.0	850	J240	1234x1145x890	SA4M-J40	580x1950x850	Air Cooling	J
	J240S/SA9M	0～2400	24.00	2449	24.00	2449	70.00	7142	857	87	2.40	100	400	52.0	28.0	850	J240S	1234x1145x890	SA6M-J40S	1160x1950x850	Air Cooling	J
25	EM2401	0～2600	24.00	2449	24.00	2449	48.00	4898	1200	123	2.20	51	400	36.0	20.0	850	i240	1234x997x890	SA3M-I40EM	580x1750x850	Air Cooling	EM
26	EM2405	0～2400	24.00	2449	24.00	2449	55.00	5612	923	95	2.40	100	400	38.0	26.0	850	J240	1234x1145x890	SA4M-J40EM	580x1750x850	Air Cooling	EM
34	VS-3000/SA3M	5～2500	29.40	3000	20.50	2092	58.80	6000	980	100	1.50	51	500	42.0	25.0	870	VE-3000	1000x1085x895	SA3M-VE30	580x1750x850	Air Cooling	VS
	VS-3000/SA4M	5～2500	29.40	3000	20.50	2092	58.80	8000	980	100	2.00	51	500	49.0	25.0	870	VE-3000X	1000x1085x895	SA4M-VE30X	580x1750x850	Air Cooling	VS
32	K030/SA4M	0～3000	30.80	3150	21.50	2200	61.60	6286	1000	102	1.80	51	500	49.0	27.0	980	K030	1100x1090x824	SA4M-K30	580x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK0301	0～3000	30.80	3150	21.50	2200	61.60	6286	1000	102	1.80	51	500	49.0	27.0	980	K030	1100x1090x824	SA4M-K30EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
28	i250/SA4M	0～2500	32.00	3266	32.00	3266	64.00	6531	914	94	2.20	51	600	51.0	35.0	1550	i250	1463x1187x1100	SA4M-I50	580x1950x850	Air Cooling	I
25	EM2501	0～2500	32.00	3266	32.00	3266	64.00	6531	914	94	2.20	51	600	51.0	35.0	1550	i250	1463x1187x1100	SA4M-I50EM	580x1950x850	Air Cooling	EM
30	J250/SA5M	0～2200	35.00	3572	35.00	3572	70.00	7143	777	80	2.40	100	600	53.0	45.0	1550	J250	1463x1301x1100	SA5M-J50	580x1950x850	Air Cooling	J
26	EM2505	0～2200	35.00	3572	35.00	3572	70.00	7143	777	80	2.40	100	600	53.0	45.0	1550	J250	1463x1301x1100	SA5M-J50EM	580x1950x850	Air Cooling	EM
28	i250/SA5M	0～2500	40.00	4082	40.00	4082	80.00	8164	1142	117	2.20	51	600	57.0	35.0	1550	i250	1463x1187x1100	SA5M-I50	580x1950x850	Air Cooling	I
30	J250/SA6M	0～2200	40.00	4082	40.00	4082	87.00	8878	888	91	2.40	100	600	57.0	45.0	1550	J250	1463x1301x1100	SA6M-J50	580x1950x850	Air Cooling	J
25	EM2502	0～2500	40.00	4082	40.00	4082	80.00	8164	1142	117	2.20	51	600	57.0	35.0	1550	i250	1463x1187x1100	SA5M-I50EM	580x1950x850	Air Cooling	EM
26	EM2506	0～2200	40.00	4082	40.00	4082	87.00	8878	888	91	2.40	100	600	57.0	45.0	1550	J250	1463x1301x1100	SA6M-J50EM	580x1950x850	Air Cooling	EM
28	i255/SA7M	0～2600	49.00	5000	49.00	5000	98.00	10000	907	93	2.20	51	1000	80.0	54.0	1550	i255	1527x1196x1100	SA7M-I55	580x1950x850	Air Cooling	I
30	J255/SA7M	0～2600	49.00	5000	49.00	5000	98.00	10000	777	80	2.40	100	1000	82.0	63.0	1550	J255	1527x1319x1100	SA7M-J55	580x1950x850	Air Cooling	J
32	K049/SA6M	0～2500	49.00	5000	49.00	5000	98.00	10000	1000	102	2.00	51	1000	76.0	40.0	980	K060	1380x1085x1000	SA6M-K60	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
25	EM2551	0～2600	49.00	5000	49.00	5000	98.00	10000	907	93	2.20	51	1000	80.0	54.0	1550	i255	1527x1196x1100	SA7M-I55EM	1160x1950x850	Air Cooling	EM
26	EM2555	0～2600	49.00	5000	49.00	5000	98.00	10000	777	80	2.40	100	1000	82.0	63.0	1550	J255	1527x1319x1100	SA7M-J55EM	1160x1950x850	Air Cooling	EM
32	EMK0621	0～2500	49.00	5000	49.00	5000	98.00	10000	1000	102	2.00	51	1000	76.0	40.0	980	K060	1380x1085x1000	SA6M-K60EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
28	i260/SA7M	0～2600	54.00	5511	54.00	5511	108.00	11021	1000	102	2.20	51	1000	83.0	54.0	1550	i260	1527x1196x1100	SA7M-I60	580x1950x850	Air Cooling	I
30	J260/SA7M	0～2600	54.00	5511	54.00	5511	112.00	11429	857	87	2.40	100	1000	86.0	63.0	1550	J260	1527x1319x1100	SA7M-J60	580x1950x850	Air Cooling	J
	J260S/SA3OM	0～2600	54.00	5511	54.00	5511	196.00	20000	857	87	2.40	100	1000	127.0	63.0	1550	J260S	1657x1319x1100	SA3OM-J60S	2320x1950x850	Air Cooling	J
25	EM2601	0～2600	54.00	5511	54.00	5511	108.00	11021	1000	102	2.20	51	1000	83.0	54.0	1550	i260	1527x1196x1100	SA7M-I60EM	1160x1950x850	Air Cooling	EM
26	EM2605	0～2600	54.00	5511	54.00	5511	112.00	11429	857	87	2.40	100	1000	86.0	63.0	1550	J260	1527x1319x1100	SA7M-J60EM	1160x1950x850	Air Cooling	EM
32	K062/SA8M	0～2500	61.70	6300	61.70	6300	123.40	12592	1000	102	2.00	51	1000	87.0	40.0	980	K060	1380x1085x1000	SA8M-K60	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK0622	0～2500	61.70	6300	61.70	6300	123.40	12592	1000	102	2.00	51	1000	87.0	40.0	980	K060	1380x1085x1000	SA8M-K60EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
32	K080/SA10M	0～2500	80.00	8163	80.00	8163	160.00	16327	1000	102	2.00	51	1000	100.0	60.0	1550	K080	1595x1050x1200	SA10M-K80	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK0801	0～2500	80.00	8163	80.00	8163	160.00	16327	1000	102	2.00	51	1000	100.0	60.0	1550	K080	1595x1050x1200	SA10M-K80EM	1160x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
32	K100/SA13M	0～2500	100.00	10204	100.00	10204	200.00	20409	1000	102	2.00	51	2000	150.0	70.0	2450	K125	1776x1360x1300	SA13M-K125	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK1251	0～2500	100.00	10204	100.00	10204	200.00	20409	1000	102	2.00	51	2000	150.0	70.0	2450	K125	1776x1360x1300	SA13M-K125EM	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
32	K125/SA16M	0～2500	125.00	12755	125.00	12755	250.00	25511	1000	102	2.00	51	2000	170.0	70.0	2450	K125	1776x1360x1300	SA16M-K125	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK1252	0～2500	125.00	12755	125.00	12755	250.00	25511	1000	102	2.00	51	2000	170.0	70.0	2450	K125	1776x1360x1300	SA16M-K125EM	1740x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
32	K160/SA23M	0～2000	160.00	16326	160.00	16326	320.00	32654	941	96	1.80	51	2000	200.0	170.0	4900	K200	2415x1843x1740	SA23M-K200	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK2001	0～2000	160.00	16326	160.00	16326	320.00	32654	941	96	1.80	51	2000	200.0	170.0	4900	K200	2415x1843x1740	SA23M-K200EM	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM
32	K200/SA28M	0～2000	200.00	20408	200.00	20408	400.00	40817	1000	102	1.80	51	2000	280.0	170.0	4900	K200	2415x1843x1740	SA28M-K200	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling	K
26	EMK2002	0～2000	200.00	20408	200.00	20408	400.00	40817	1000	102	1.80	51	2000	280.0	170.0	4900	K200	2415x1843x1740	SA28M-K200EM	2900x1950x850	Shaker:Water Cooling/Amp:Air Cooling	EM

Conversion Table

Relations among Frequency, Displacement, Velocity and Acceleration in SINE Vibration



(Displacement) D=d (mm)

(Velocity) $V=\frac{2\pi fd}{10}$ (cm/sec)

(Acceleration) $A=\frac{(2\pi f)^2}{1000}d$ (m/sec²)

f : (Frequency) (Hz)

Note) D, V and A is single amplitude. 1G=9.8m/s²

How to use the chart

1) f =50Hz, D =1mm
V=31cm/sec, A=99m/sec²

2) f =100Hz, V=100cm/sec
D=1.6mm, A=630m/sec²

3) f =600Hz, A =60m/sec²
D=0.0042mm (4.2μm), V=1.6cm/sec