

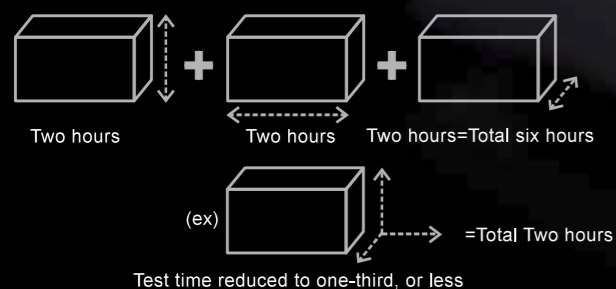
# Vibration Test Systems

## Multi-axis systems

- 2-Axis Changeover Systems     **DC-series** >> P.31
- 3-Axis Changeover Systems     **TC-series** >> P.32
- 2-Axis Simultaneous Systems   **DS-series** >> P.33
- 3-Axis Simultaneous Systems   **TS-series** >> P.34
- 6 Degrees of Freedom Systems **TTS-series** >> P.35

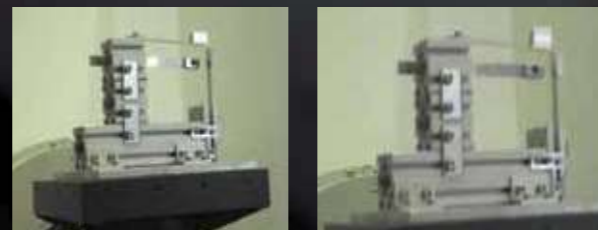
### Reduced test time

Testing in three-axis simultaneously instead of sequentially can reduce overall test time by eliminating the time taken to reconfigure the system, and time to run tests in each axis.



### Reproduction of failure modes

Three-axis simultaneous vibration testing reproduces real environments more accurately than sequential single-axis tests can.

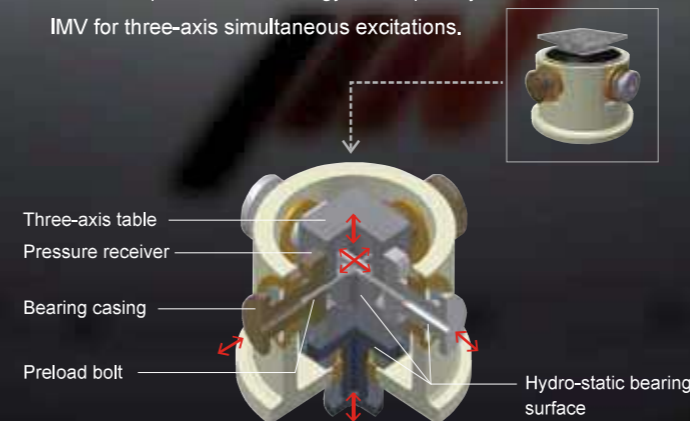


A single-axis system does not achieve realistic simulation of real-world vibration.

Simultaneous three-axis testing reproduces the stress placed on specimens by complex resonances which may not be detected in single-axis testing.

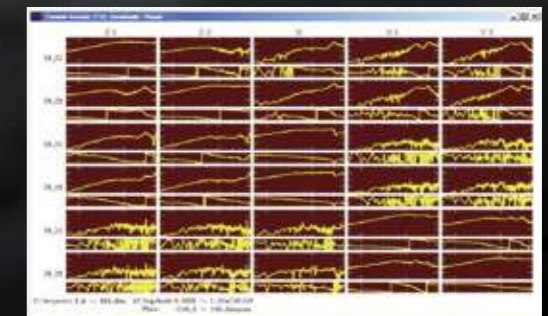
### ICCU (Integrated Cross Coupling Bearing Unit)

ICCU is a patented technology developed by IMV for three-axis simultaneous excitations.



### Highly accurate multi-axis multi-point control

High-precision multi-axis, multi-point control which can compensate for rotational moments generated by the specimen and fixture and accurately reproduce the vibration measured in the field.



# DC-series

## 2-Axis Changeover Systems



DC-2000-5H

### ■ Specifications

System Model		DC-1000-4H	DC-1000-6H	DC-1000-8H	DC-1000-10M	DC-2000-5H	DC-2000-8M	DC-2000-10M	DC-2000-15M	DC-3000-5H	DC-3000-8M	
System Specifications	Table Size (mm)	□400	□600	□800	□1000	□500	□800	□1000	□1500	□500	□800	
	Rated Force	Sine (kN)	9.8	9.8	9.8	9.8	19.6	19.6	19.6	19.6	29.4	29.4
		Random (kN)	4.9	4.9	4.9	4.9	9.8	9.8	9.8	9.8	14.7	14.7
		Shock (kN)	14.7	14.7	14.7	14.7	29.4	29.4	29.4	29.4	44.1	44.1
	Maximum Acceleration (m/s <sup>2</sup> )	108	75	54	32	150	81	67	28	196	140	
	Maximum Velocity (m/s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	90	130	180	300	130	240	290	680	150	210	
	Maximum Frequency	Horizontal (Hz)	1000	800	700	350	800	500	350	250	800	500
		Vertical (Hz)	1000	1000	700	500	800	800	500	350	800	800
	Maximum Load (kg)	100	100	200	200	200	300	500	500	200	300	
	Power Requirements (kVA)	25	25	25	25	43	43	43	43	52	52	
Cooling Water (L/min)	-	-	-	-	-	-	-	-	-	-		

System Model		DC-3000-10M	DC-3000-15M	DC-5000-6H	DC-5000-8H	DC-5000-10M	DC-5000-15M	DC-6000-6H	DC-6000-8H	DC-6000-10M	DC-6000-15M	
System Specifications	Table Size (mm)	□1000	□1500	□600	□800	□1000	□1500	□600	□800	□1000	□1500	
	Rated Force	Sine (kN)	29.4	29.4	49	49	49	49	61.7	61.7	61.7	61.7
		Random (kN)	14.7	14.7	29.4	29.4	24.5	24.5	37	37	30.8	30.8
		Shock (kN)	44.1	44.1	73.5	73.5	58.8	58.8	92.5	92.5	74	74
	Maximum Acceleration (m/s <sup>2</sup> )	91	47	350	204	163	59	385	268	102	75	
	Maximum Velocity (m/s)	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.9	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	320	620	140	240	300	820	160	230	600	820	
	Maximum Frequency	Horizontal (Hz)	350	250	800	700	350	250	800	700	350	250
		Vertical (Hz)	500	350	1000	800	500	350	1000	800	500	350
	Maximum Load (kg)	500	500	300	300	500	700	300	300	500	700	
	Power Requirements (kVA)	52	52	75	75	73	73	93	93	91	91	
Cooling Water (L/min)	-	-	195	195	190	190	230	230	225	225		

\*Depending on the reference PSD or other operating conditions such as the specimen, one part of the controlled response may deviate from the reference PSD. Please contact us for more information.



# TC-series

## 3-Axis Changeover Systems



TC-3000-6H

### ■ Specifications

System Model		TC-1000-4H	TC-1000-6H	TC-1000-8H	TC-1000-10M	TC-2000-5H	TC-2000-8M	TC-2000-10M	TC-2000-15M	TC-3000-5H	TC-3000-8M	
System Specifications	Table Size (mm)	□400	□600	□800	□1000	□500	□800	□1000	□1500	□500	□800	
	Rated Force	Sine (kN)	9.8	9.8	9.8	9.8	19.6	19.6	19.6	19.6	29.4	29.4
		Random (kN)	4.9	4.9	4.9	4.9	9.8	9.8	9.8	9.8	14.7	14.7
		Shock (kN)	14.7	14.7	14.7	14.7	29.4	29.4	29.4	29.4	44.1	44.1
	Maximum Acceleration (m/s <sup>2</sup> )	98	65	42	33	163	98	65	30	196	113	
	Maximum Velocity (m/s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	100	150	230	290	120	200	300	640	150	260	
	Maximum Frequency	Horizontal (Hz)	1000	800	700	350	800	500	350	250	800	500
		Vertical (Hz)	1000	1000	700	500	800	800	500	350	800	800
	Maximum Load (kg)	100	100	200	200	200	300	500	500	200	300	
	Power Requirements (kVA)	27	27	27	27	43	43	43	43	52	52	
Cooling Water (L/min)	-	-	-	-	-	-	-	-	-	-		

System Model		TC-3000-10M	TC-3000-15M	TC-5000-6H	TC-5000-8H	TC-5000-10M	TC-5000-15M	TC-6000-6H	TC-6000-8H	TC-6000-10M	TC-6000-15M	
System Specifications	Table Size (mm)	□1000	□1500	□600	□800	□1000	□1500	□600	□800	□1000	□1500	
	Rated Force	Sine (kN)	29.4	29.4	49	49	49	49	61.7	61.7	61.7	61.7
		Random (kN)	14.7	14.7	29.4	29.4	24.5	24.5	37	37	30.8	30.8
		Shock (kN)	44.1	44.1	73.5	73.5	58.8	58.8	92.5	92.5	74	74
	Maximum Acceleration (m/s <sup>2</sup> )	73	43	306	222	158	67	342	257	199	84	
	Maximum Velocity (m/s)	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.9	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	400	680	160	220	310	730	180	240	310	730	
	Maximum Frequency	Horizontal (Hz)	350	250	800	700	350	250	800	700	350	250
		Vertical (Hz)	500	350	1000	800	500	350	1000	800	500	350
	Maximum Load (kg)	500	500	300	300	500	700	300	300	500	700	
	Power Requirements (kVA)	52	52	77	77	75	75	93	93	91	91	
Cooling Water (L/min)	-	-	195	195	190	190	230	230	225	225		

\*Depending on the reference PSD or other operating conditions such as the specimen, one part of the controlled response may deviate from the reference PSD. Please contact us for more information.



# DS-series

## 2-Axis Simultaneous Systems



DS-2000-4H

### ■ Specifications

System Model		DS-1000-4H	DS-1000-6H	DS-1000-8H	DS-1000-10M	DS-2000-5H	DS-2000-8M	DS-2000-10M	DS-2000-15M	DS-3000-5H	DS-3000-8M	
System Specifications	Table Size (mm)	□400	□600	□800	□1000	□500	□800	□1000	□1500	□500	□800	
	Rated Force	Sine (kN)	9.8	9.8	9.8	9.8	19.6	19.6	19.6	19.6	29.4	29.4
		Random (kN)	4.9	4.9	4.9	4.9	9.8	9.8	9.8	9.8	14.7	14.7
		Shock (kN)	14.7	14.7	14.7	14.7	29.4	29.4	29.4	29.4	44.1	44.1
	Maximum Acceleration (m/s <sup>2</sup> )	108	75	54	32	150	81	67	28	196	140	
	Maximum Velocity (m/s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	90	130	180	300	130	240	290	680	150	210	
	Maximum Frequency	Horizontal (Hz)	1000	800	700	350	800	500	350	250	800	500
		Vertical (Hz)	1000	1000	700	500	800	800	500	350	800	800
	Maximum Load (kg)	100	100	200	200	200	300	500	500	200	300	
	Power Requirements (kVA)	30	30	30	30	66	66	66	66	76	76	
Cooling Water (L/min)	-	-	-	-	-	-	-	-	-	-		

System Model		DS-3000-10M	DS-3000-15M	DS-5000-6H	DS-5000-8H	DS-5000-10M	DS-5000-15M	DS-6000-6H	DS-6000-8H	DS-6000-10M	DS-6000-15M	
System Specifications	Table Size (mm)	□1000	□1500	□600	□800	□1000	□1500	□600	□800	□1000	□1500	
	Rated Force	Sine (kN)	29.4	29.4	49	49	49	49	61.7	61.7	61.7	61.7
		Random (kN)	14.7	14.7	29.4	29.4	24.5	24.5	37	37	30.8	30.8
		Shock (kN)	44.1	44.1	73.5	73.5	58.8	58.8	92.5	92.5	74	74
	Maximum Acceleration (m/s <sup>2</sup> )	91	47	350	204	163	59	385	268	102	75	
	Maximum Velocity (m/s)	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.9	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	320	620	140	240	300	820	160	230	600	820	
	Maximum Frequency	Horizontal (Hz)	350	250	800	700	350	250	800	700	350	250
		Vertical (Hz)	500	350	1000	800	500	350	1000	800	500	350
	Maximum Load (kg)	500	500	300	300	500	700	300	300	500	700	
	Power Requirements (kVA)	76	76	104	104	106	106	126	126	128	128	
Cooling Water (L/min)	-	-	370	370	360	360	440	440	430	430		

\*Depending on the reference PSD or other operating conditions such as the specimen, one part of the controlled response may deviate from the reference PSD. Please contact us for more information.



# TS-series

## 3-Axis Simultaneous Systems



TS-1000-4H

### ■ Specifications

System Model		TS-1000-4H	TS-1000-6H	TS-1000-8H	TS-1000-10M	TS-2000-5H	TS-2000-8M	TS-2000-10M	TS-2000-15M	TS-3000-5H	TS-3000-8M	
System Specifications	Table Size (mm)	□400	□600	□800	□1000	□500	□800	□1000	□1500	□500	□800	
	Rated Force	Sine (kN)	9.8	9.8	9.8	9.8	19.6	19.6	19.6	19.6	29.4	29.4
		Random (kN)	4.9	4.9	4.9	4.9	9.8	9.8	9.8	9.8	14.7	14.7
		Shock (kN)	14.7	14.7	14.7	14.7	29.4	29.4	29.4	29.4	44.1	44.1
	Maximum Acceleration (m/s <sup>2</sup> )	98	65	42	33	163	98	65	30	196	113	
	Maximum Velocity (m/s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	100	150	230	290	120	200	300	640	150	260	
	Maximum Frequency	Horizontal (Hz)	1000	800	700	350	800	500	350	250	800	500
		Vertical (Hz)	1000	1000	700	500	800	800	500	350	800	800
	Maximum Load (kg)	100	100	200	200	200	300	500	500	200	300	
	Power Requirements (kVA)	41	41	41	41	94	94	94	94	110	110	
Cooling Water (L/min)	-	-	-	-	-	-	-	-	-	-		

System Model		TS-3000-10M	TS-3000-15M	TS-5000-6H	TS-5000-8H	TS-5000-10M	TS-5000-15M	TS-6000-6H	TS-6000-8H	TS-6000-10M	TS-6000-15M	
System Specifications	Table Size (mm)	□1000	□1500	□600	□800	□1000	□1500	□600	□800	□1000	□1500	
	Rated Force	Sine (kN)	29.4	29.4	49	49	49	49	61.7	61.7	61.7	61.7
		Random (kN)	14.7	14.7	29.4	29.4	24.5	24.5	37	37	30.8	30.8
		Shock (kN)	44.1	44.1	73.5	73.5	58.8	58.8	92.5	92.5	74	74
	Maximum Acceleration (m/s <sup>2</sup> )	73	43	306	222	158	67	342	257	199	84	
	Maximum Velocity (m/s)	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.9	
	Maximum Displacement (mmp-p)	51	51	51	51	51	51	51	51	51	51	
	Armature Mass (kg)	400	680	160	220	310	730	180	240	310	730	
	Maximum Frequency	Horizontal (Hz)	350	250	800	700	350	250	800	700	350	250
		Vertical (Hz)	500	350	1000	800	500	350	1000	800	500	350
	Maximum Load (kg)	500	500	300	300	500	700	300	300	500	700	
	Power Requirements (kVA)	110	110	149	149	153	153	182	182	182	186	
Cooling Water (L/min)	-	-	550	550	530	530	650	650	640	640		

\*Depending on the reference PSD or other operating conditions such as the specimen, one part of the controlled response may deviate from the reference PSD. Please contact us for more information.



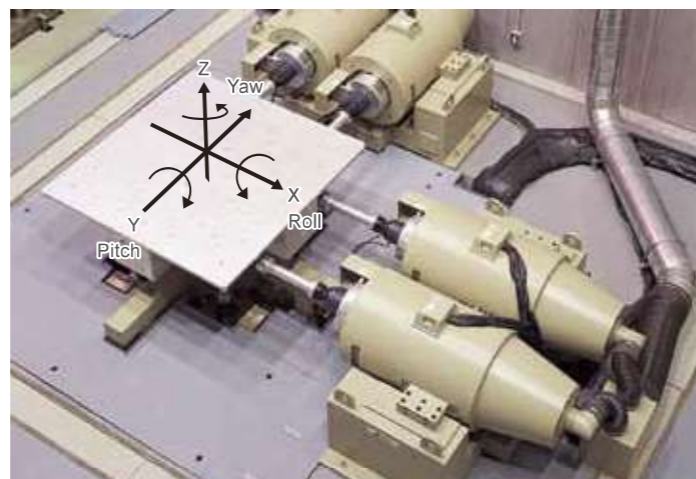
# TTS-series

## 6 Degrees of Freedom Systems



### 6 degrees of freedom systems

At least 6 vibration shakers are located in 3D space with integrated control and can create 6 degrees of freedom motion (3 translation degrees of freedom and 3 rotating degrees). In addition to X, Y, Z axis motion, rotational motion, Roll, Pitch and Yaw is also possible utilising spherical bearings. Using electro dynamic vibration generators, IMV systems can reproduce waveforms which have components in a wide frequency range with a high degree of accuracy. System maintenance is easy. Systems comprise at least six vibration generators to act along orthogonal axes and also to generate the roll, pitch and yaw components of vibration. A spherical bearing is used to allow the rotational motion. By using electrodynamic vibration generators the system can operate over a wide frequency range with a high degree of accuracy. System maintenance is straightforward.



### ■ Ride comfort evaluation system

The addition of rotational motion to a three-axis system enables 6 degree-of freedom testing, as is required for vehicle seat evaluation, for example.



Excitation direction	X axis	Y axis	Z axis
Rated Force (kN)	3,9	7,8	16
Maximum displacement (mmp-p)	150	150	100
Frequency Range (Hz)	1 - 100		
Table Size (mm)	1800x1800		
Vibration Generator	1	2	4

(Per 1 system)

Check the movie on You Tube



### ■ Large-scale 6 DOF vibration test system

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



Excitation direction	X axis	Y axis	Z axis
Rated Force (kN)	80	48	96
Maximum displacement (mmp-p)	51		
Frequency Range (Hz)	2 - 150		
Table Size (mm)	4000x3500		
Vibration Generator	2	2	6

(Per 1 system)

Check the movie on You Tube



### ■ 6 DOF simultaneous squeak and rattle test system for vehicle seats

Air-cooled vibration test system for the evaluation of squeak and rattle noise from an instrument panel or other car interior assemblies.



Excitation direction	X axis	Y axis	Z axis
Rated Force (N)	1600	1600	3200
Maximum displacement (mmp-p)	30		
Frequency Range (Hz)	5 - 100		
Table Size (mm)	1500x3500		
Vibration Generator	2	2	4

(Per 1 system)