

Highly Accelerated Stress Test System (HAST Chamber)



CAT.NO.E96160-Y509

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Creates temperature, humidity, and pressure environments to IEC60068-2-66 standard.

Humidity resistance evaluation tests for electronic components Customers require test results that correlate accurately to those from the field in a minimal amount of time. The Highly Accelerated Stress Test Chamber EHS Series offer high performance, functionality and ease of use, and are compliant with the international IEC60068-2-66 standard. Many convenient functions and safety features are included for bias testing.

EHS-411M

EHS-411MD



EHS-221M

EHS · 221MD



Utility

Improved Functionality and Ease-of-use for Bias Testing



Chamber interior



Customized sliding rack (example)





Specimen signal terminals

Signal terminals inside chamber

The chamber interior is formed for easier specimen loading

The pressure vessel is of spherical form which distributes pressure evenly and has superior strength. The test area is expanded to its maximum size to easily load printed circuit boards and other specimens.

The double stage model answers the need for diverse test conditions and large capacity (MD type)

The units are designed so that the test condition of each chamber can be set individually, enabling this model to effectively reproduce diverse test conditions on a large number of specimens.

Customized racks that free complicated wiring

We can customize racks to fit the client's specimens to enable voltage and signal application, simply by setting a printed circuit board to the connector. We also offer sliding racks, for easier positioning and wiring of specimen. (optional)

Specimen signal terminals can be added depending on requirements

The standard configuration is 12 specimen signal terminal pins. For doublestage type, 12 pins for each chamber. The EHS-211($M \cdot MD$) and 411($M \cdot MD$) can be expanded up to a maximum of 60 pins, in 12-pin units (optional), and the EHS-221($M \cdot MD$) to 72 pins for each chamber. (optional)

Utility

Even Greater Convenience and Safety

Easy program setting

Program capacity of 10 patterns with 30 steps per pattern. Simple operation using up and down keys for program setting, as well as adjustment of temperature, humidity and time values.

Safe and reliable door

The system employs a button operated automatic door locking mechanism. It prevents the door from being opened while the test chamber is pressurized.

Automatic humidifying water supply system

At the start of testing, the humidifying water needed for that test is automatically taken from a water tank. A slit on the front side allows the remaining amount of water in the tank to be checked at a glance.

Protection measures for specimen

Standard equipment includes a specimen power supply control terminal, which output contact signals to allow voltage and signals to be applied to the specimen during testing. When a problem occurs, specimens and chamber are fully protected. Power supply to the specimen is halted, and protection mechanisms for preventing overheating and boil-dry are activated.

Supports anxiety-free use

A variety of protective mechanisms include; overheat/overpressure protector, boil-dry protector, detection of water supply failure and incomplete door-lock, leakage breaker, and temperature sensor disconnection protector. The system also employs an external alarm terminal with an alarm buzzer and lamp. When a problem occurs, those in the vicinity are immediately warned.



Instrumentation panel



The bottom of the unit includes a water tank and storage space for a power supply unit or peripheral equipment.

Control operation

Complies with IEC60068-2-66 standard testing while maintaining compatibility with conventional test methods

Conforms to international IEC60068-2-66 standard

IEC60068-2-66 is an environmental testing standard of the IEC (International Electro-technical Commission). With ESPEC's unique wet and dry bulb temperature control function, the EHS Series meets all requirements for test equipment and test operation specified in IEC60068-2-66.

The EHS Series can also satisfy other test conditions of EIAJED 4701, JEDEC and EIA/ JESD22-A110-A as well as IEC.

* ESPEC was directly involved in drawing up the IEC60068-2-66 standard, and our technical concepts and measurement data were used in its development.

A personal computer can control and monitor test chambers, and store the test data.



Environmental Testing Centralized Control Software ERC-100M/ 300M (optional)

The ERC-100M application software makes it easier to set test parameters, monitor operations, program, and process data for up to 16 ESPEC test chambers remotely, using a PC. ERC-300M enables remote monitoring of up to 16 chambers and PC via Ethernet (Intranet).

- *With the HAST Chamber, only monitoring is available.
- *Pressure monitoring is not available.
- *Up to 4 HAST Chambers can be connected.
- *English software is available.
- *Chambers must be equipped with an E-BUS port when using the software.

Wet and dry bulb temperature control (M type) conforms to IEC60068-2-66 standard

With ESPEC's unique wet and dry bulb temperature control on M type chamber, temperature and humidity are measured directly using a wet and dry bulb temperature sensor. This ensures highly precise temperature and humidity control over the entire testing process, from before testing to the post-testing temperature decrease or hold process. After testing is complete, the temperature and humidity are allowed to drop for a fixed period. In the hold process, the chamber is kept at a fixed environment until the door is opened and specimens are removed. This makes it possible to place a specimen in a constantly controlled temperature/humidity environment, and keep it from drying after returning to atmospheric pressure.

Free from pressure and temperature shock and drying of specimens after test

In all control modes, abrupt changes in pressure and temperature after testing have been eliminated through mechanisms for gradual depressurization, and air/water discharge. This prevents vaporization of moisture contained in the specimen, and provide accurate test results in correlation to the field.

Control operation

Control functions to enable use of previous data

The control mode can be switched to match previous data.

M type:

Wet and dry bulb temperature control Unsaturated control Wet saturated control Standard type: Unsaturated control Wet saturated control

Three Modes of Operation Control



The temperature and humidity gradient before and after testing can be controlled.

After testing is complete and chamber pressure reaches 0.010MPa (Gauge), only air is discharged; humidifying water is retained.

In the hold process, temperature and humidity inside the chamber are maintained at the specified level. (+50 to+95 /75 to 95%rh)

Unsaturated Control (humidifying water temperature control)



During temperature heat-up when condensation can easily occur on the reverse side of the specimen, the temperature of the humidifying water automatically increases while keeping it 30 lower than the chamber temperature.

After testing is complete, the chamber is left to cool and depressurize naturally until chamber pressure reaches 0.010MPa (Gauge). Then both air and water are discharged.



Chamber temperature is controlled through a humidifying heater.

(chamber temperature = humidifying water temperature)

After testing is complete, the chamber is left to cool and depressurize naturally until chamber pressure reaches 0.010MPa (Gauge). Then only air is discharged; humidifying water is retained.

SPECIFICATIONS

Model				EHS-211(M)	EHS-211MD	EHS-221(M)	EHS-221MD	EHS-411(M)	EHS-411MD		
System				Single vessel type							
50	System			Fixed value continuous temperature and humidity control; program operation; humidity control when temperature is rising or falling (M/ MD type)							
ntr		Ten	nperature and humidity setting	Direct setting of temperature and relative humidity							
ÖĚ	O E Control			PID control. SSR drive system							
Power supply			vlac								
Propouro vocasi tura				Cmall procedure vessel (as specified in the Japanese Enforcement Order of Industrial Cafety & Health Law Ham C. Avitale 1)							
				Sinal pressure ves							
Iotal load current for 200V/220V			current for 200V/220V	15A/14A	30A/28A	20A/18.5A	40A/37A	15A/14A	30A/28A		
No	se	e level		below 46dB	below 50dB	below 46dB	below 50dB	below 46dB	below 50dB		
	2	Те	mperature control range	+	- 105.0 to + 142.9	(+221 to +289.2°)	F)	+ 105.0 to + 162.2	(+221 to +324°F)		
	l	Humidity control range		75 to 100%rh							
	ğ	Pressure range		0.020 to 0.196MPa (Gauge) 0.020 to 0.392MPa (Gauge)							
	rate	Temperature and humidity fluctuation		±0.5 / ±3%rh							
	satu	Те	mperature uniformity	±0.5 at 100%rh. ±0.7 at 75%rh							
	Sun -	Hea	t up and pressurization time (at BT + 23)	0. 0.196MPa (Gauge) Approx 30 min. 0. 0.196MPa (Gauge) Approx 60 min. 0. 0.392MPa (Gauge) Approx 45 mi							
F	- -	То			- 105 0 to + 122 0	$(+221 t_{0} + 280 2^{\circ})$		+ 105 0 to + 151 1	(+ 221 to + 204°E)		
	ontr				0.000 to 0.10	(-2210 - 209.2))	0.000 to 0.000	(+22110+3041)		
•	be	-		0.020 to 0.196MPa (Gauge) 0.020 to 0.392MPa (Gauge)							
	turat	Temperature fluctuation		±0.5							
	et sa	Temperature uniformity		±0.5							
	₿ 8	Hea	at up and pressurization time (at RT + 23)	0 0.196MPa (Ga	uge) Approx 45 min	0 0.196MPa (Gau	uge) Approx 75 min	0 0.392MPa (Gau	uge) Approx 60 min		
	()	at-up	Temperature control range	+	- 105.6 to + 142.9	(+221 to +289.2°	F)	+ 105.0 to + 151.1	(+221 to +324°F)		
nce	typ	o. hei	Humidity control range			75 to 9	95%rh				
rme	Σ	Temp	Heat up and pressurization time (at RT + 23)	0 0.196MPa (Gau	uge) Approx 60 min	0 0.196MPa (Gau	uge) Approx 90 min	0 0.392MPa (Gau	uge) Approx 75 min		
erfo	<u>0</u>		Temperature control range	+	- 105.6 to + 142.9	(+221 to +289.2°	F)	+ 105.0 to + 162.2	(+221 to +324°F)		
ፈ	lo	ess	Humidity control range			75 to 9	98%rh		, ,		
	e	roc	Pressure range								
	ratu	st p	Tomporature and humidity fluctuation	0.020 to 0.190km a (Gauge) 0.020 to 0.992MPa (Gauge)							
	Ibel	Чe									
	ten	E		±0.5 at 98%rh, ±0.7 at 75%rh							
:	qIn	Nob-lli	Temperature control range			+ 50.0 to + 95.0	$(+112 \text{ to } + 203^{\circ} \text{F})$				
•	dry b	Temp. pr	Temperature pull-down time (at RT + 23 , no specimen)	From + 142.9 / 75%rh to + 85.0 / 85%rh Approx 120 min				From + 162.2 + 85.0 / 85%rh	2 / 75%rh to Approx 120 min		
ľ	and	process	Temperature control range	+ 50.0 to + 95.0 (+ 112 to + 203° F)							
	Vet	망	Humidity control range	75 to 95%rh							
	>	We	et-bulb wick	Ca	n be used continuou	usly for about 200 h	ours (with no specim	nen: +162.2 /75%	rh)		
	Pressure vessel material			Stainless steel (SUS-316L)							
	Door material			Stainless steel (SUS-316L)							
	Exterior material			Cold-rolled steel plate (SPC, Class1) with melamine resin baked finish (Similar to Munsell 10YR7/1)							
	Insulation material			Glass wool							
tion	Pressure vessel			Temperature sensor: heater: specimen signal terminals; fan: fan motor: overheating prevention detector: boil-dry prevention detector							
truc	Door			Automatic locking type (radiating rod system)							
Suc	Test area			Specimen rack and 2 rack holders (per chamber)							
ŏ	Co	ntra	l nanel	Temperature and humidity indicator: time indicator: key switch: setting keys: process indicator lamps: alarm indicator lamps: door open/ close key							
	Wo	tor									
	Water supply amount (at start)		supply system	11 1.51 11							
	Other		Supply amount (at start)	Air outlet valve: air inlet valve: drain filter: drain valve: air lead in numer weter ouenly numer weter ouenly unter ou							
s		Jtner		An outlet valve, an milet valve, oram miler, oram valve, an lead-in pump; water supply pump; water supply valve							
sorie	Ter	Temperature and humidity controller									
seo	Specimen signal terminals		nen signal terminals	Connector type, 12-pin (125V AC/DC 1A)							
Dimensions Acc	Pressure gauge (Bourdon type)				Scale: - 0.1 to 0	0.4MPa (Gauge)		Scale: - 0.1 to	1MPa (Gauge)		
	Internal capacity of test area (L)			18	18×2	46	46 × 2	18	18×2		
	Internal dimensions of test area (mm)			W255×H2 (W10×H10	255 × L318 0 × L12.5in)	W355×H3 (W14×H14	355 × L426 4 × L16.8in)	W255×H2 (W10×H10	255 × L318) × L12.5in)		
	Outer dimensions (mm)			W640 × H1483 × D850 (W25.2 × H58.9 × L33.5in)	W760 × H1795 × D1000 (W29.9 × H70.7 × L39.4in)	W740 × H1553 × D1000 (W29.1 × H61.1 × L39.4in)	W860 × H1795 × D1000 (W33.9 × H70.7 × L39.4in)	W640 × H1483 × D850 (W25.2 × H58.4 × L33.5in)	W760 × H1795 × D1000 (W29.9 × H70.7 × L39.4in)		
	We	Weight (kg)		Approx 190	Approx 350	Approx 230	Approx 390	Approx 190	Approx 350		
	Dim	nens	sions required for installation (mm)	W690 × H1540 (W25.2 × H21.3in)	W810 × H1850 (W31.9 × H72.8in)	W790 × H1610 (W31.1 × H63.4in)	W910 × H1850 (W35.8 × H72.8in)	W690 × H1540 (W25.2 × H21.3in)	W810 × H1850 (W31.9 × H72.8in)		

For humidifying water, please use pure water of not less than 0.05M $\,\cdot\,\text{cm}$ (20µS/ cm or below).

Temperature and humidity indication and control operations for this equipment are based on the Steam Pressure Table of Table A.1, Annex A, IEC Standard 60068-2-66.

INSTRUMENTATION SPECIFICATION

Program Control

No. of patterns	10
No. of steps	30 steps/ pattern
Control	Ramp, constant setting
Program setting	Loop, skip, end command*
Max. time setting	Total 999.9hrs per pattern

*Time signals can be set for each step when equipped with time signal (option). Each loop command can repeat the specified steps up to 99 times.

TEMPERATURE AND HUMIDITY CONTROL RANGE



*Temperature and humidity indication and control operations for this equipment are based on Table A. 1, Annex A, IEC Standard 60068-2-66. *Humidity range is from 75% to 98% rh for wet and dry bulb control.



TEST AREA DIMENSION DIAGRAM



MODEL E H S - 1 D : double stage M : M type (Wet and dry bulb temperature control) Chamber capacity 1 : 18L 2 : 46L Pressure range 2 : 0.020 ~ 0.196MPa (Gauge) 4 : 0.020 ~ 0.392MPa (Gauge)

SAFETY DEVICES

Overheat protector Boil-dry protector Overpressure prevention switch Power failure default circuit Leakage breaker Safety valve Temperature sensor disconnection alarm Air-circulating fan/motor rotation alarm Wet-bulb wick dry alarm Door lock alarm Water suspension relay External alarm terminal Specimen power supply control terminal

ACCESSORIES

«EHS.211(M)221(M)411(M)»

Shelves	large x 1, small x 1
EHS-211(M)•411(M)	large : 248 W x 288 Dmm
	small : 229 W 🗙 288 Dmm
EHS-221(M)	large : 348 W 🗙 396 Dmm
	small : 285 W x 416 Dmm
Fuse (250V 3A)	
Plug for external alarm termina	al and
specimen power supply control	ol terminal 2
Cable clamp	
Wet-bulb wick (for type M)	50
Portable water tank	
(10L polyethylene tank)	
Brush	
Water drain hose nipple	
Instruction manual	
Warranty	

«EHS-211MD-221MD-411MD»

Shelves	large x 2, small x 2
EHS-211MD-411MD	large : 248 W 🗙 288 Dmm
	small: 229 W 🗙 288 Dmm
EHS-221MD	large : 348 W 🗙 396 Dmm
	small: 285 W x 416 Dmm
Fuse (250V 3A)	
Plug for external alarm term	inal and
specimen power supply con	ntrol terminal 4
Cable clamp	
Wet-bulb wick (for type M)	100
Portable water tank	
(10L polyethylene tank)	
Brush	
Water drain hose nipple	
Instruction manual	
Warranty	



Do not use specimens which are explosive or inflammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or explosion.

CAUTION

Be sure to read the instruction manual before operation.

OPTIONS

Paperless recorder

Records temperature, humidity and pressure inside the chamber. Additional inputs may also be recorded.

- Temperature range: $0 \sim +200$
- Humidity range: 0~100%rh
- Pressure range: 0.1~0.5MPa (Gauge)
- Number of inputs: Temperature 1
 - Humidity1Pressure1
 - (3 more but turned OFF*) • 5 sec
- Data saving cycle: 5 secExternal recording media:
- CF memory card (32MB)

*Setting may be modified.



Paperless recorder Portable type

Temperature, humidity and pressure recorder

Records: Test area temperature Test area relative humidity Test area pressure Recorder scale plate: 0 to + 200 / 0 to + 100%rh - 0.1 to 0.5MPa (Gauge)

Time signal

Contact output specifications Operation: on/off at each step Number of channels: 2

Additional specimen signal terminals

EHS-211(M)• 411(M)

12pins x up to 4 sets EHS-211MD•411MD

12pins \times up to 4 sets per chamber EHS-221(M) 12pins \times up to 5 sets EHS-221MD

 $12pins \times up$ to 5 sets per chamber



Teflon-coated shelves

Standard shelves (large, small) with Teflon coating.

Specimen baskets

Type A: 150W × 50H × 150Dmm Type B: 100W × 50H × 200Dmm Type C: 95W × 20H × 95Dmm



Antiseismic brace

Used to fit chamber onto the floor.

Communication function

Enables management of chamber operation

- E-BUS
- RS-232C

Communication cable

- E-BUS 5/10m
- RS-232C 1/ 2/ 4m

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