

Quality is more than a word

ESPEC

Large Temperature and Humidity Chamber

FD Series



The FD Series allow you to choose the size and performance best suited to your test applications

The FD series is ideal for testing large assemblies and completed products such as Battery packs/modules, EV powertrain(E-Axle), and Pillar-to-Pillar displays (dashboard).

The perfect solution for your applications and to meet various test standards such as MIL, ISO, IEC and LV124.



Temperature & Humidity Range

Temperature Range : -70°C to +180°C

Humidity Range : 20%rh to 98%rh

Temperature Fluctuation

±0.5K (to +100.0°C)

±0.8K (+100.1 to +180°C)

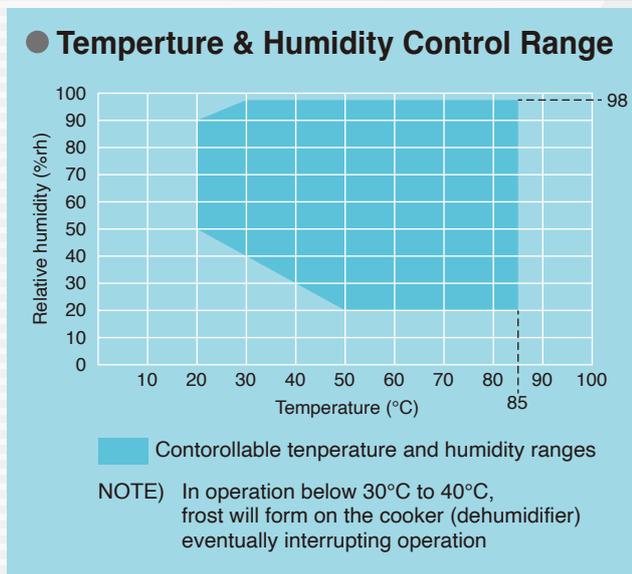
Heat Load up to maximum 29kW

13kW to 29kW at 20°C

0.6kW at +85°C / 85%rh

Please refer to the specification list for details

The FD series complies with international test standards and industry standards.



Test standards

Low temperature test

- IEC 60068-2-1, ISO 16750-4 5.1.1, LV 124 K-03

High temperature test

- IEC 60068-2-2, ISO 16750-4 5.1.2, LV 124 L-02

Temperature and humidity cycle test

- IEC 60068-2-30, LV 124 K-08
- IEC 60068-2-38, LV 124 K-09

Temperature test

- ISO 16750-4 5.2, LV 124 K-01, K-02, K-04

Condensation test

- LV 124 K-15a
- PV 1200, PV 2005

Temperature and humidity test

- IEC 60068-2-78, ISO 16750-4 5.7, LV 124 K-14

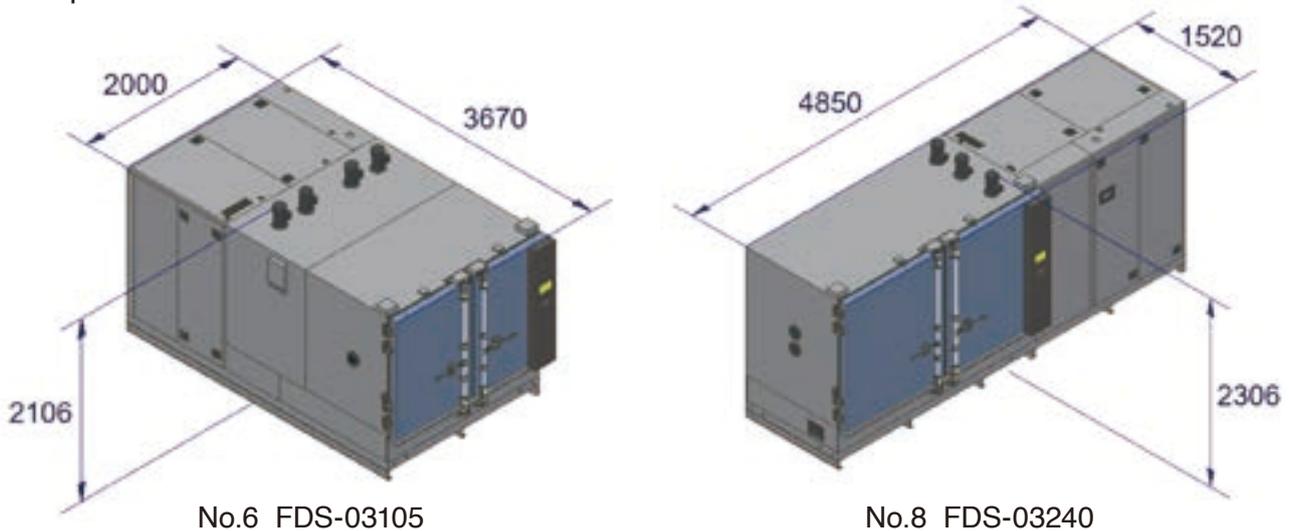
Terrestrial photovoltaic (PV) modules: Test procedures

- IEC 61215-2 MQT11, MQT12, MQT13

Features

The layout of the chamber can be selected according to the size of the installation site.

<Example>

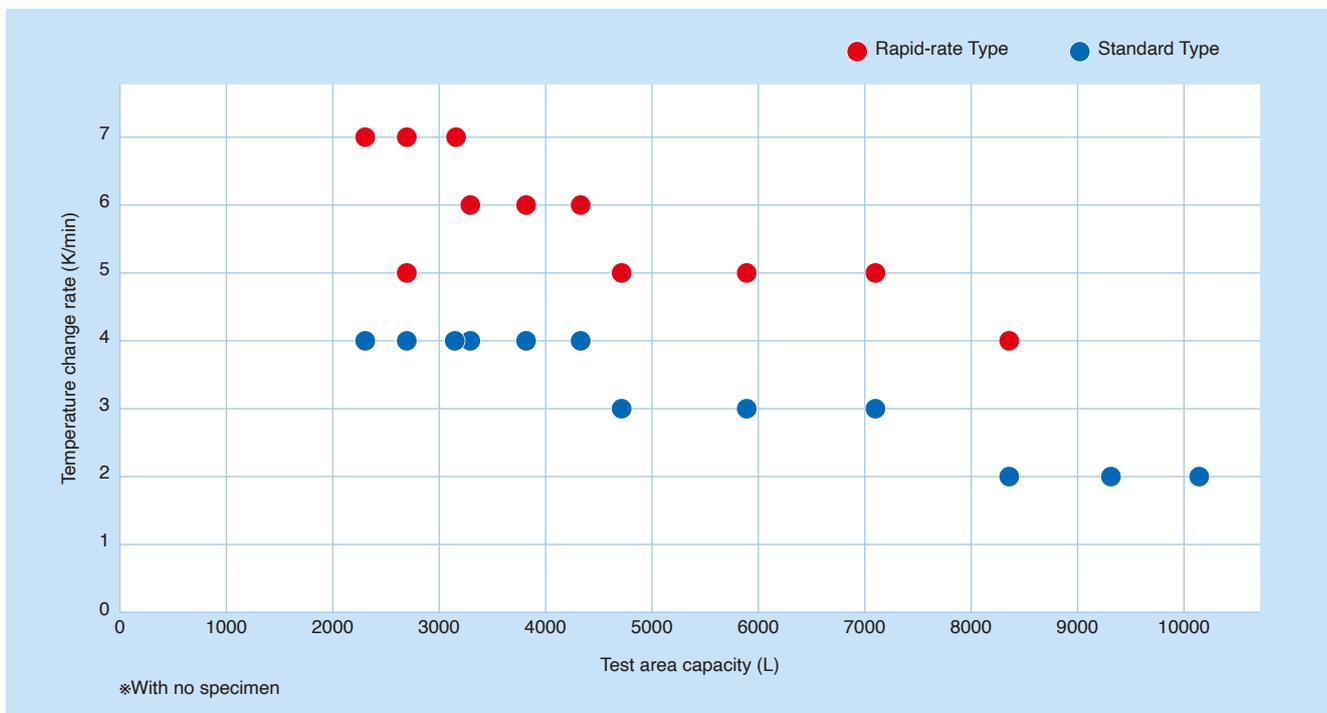


*Dimensions exclude protrusions.

SPECIFICATIONS

No.	Model	Capacity (L)	Inside dimensions (W×H×D mm)	Outside dimensions (W×H×D mm)	Temp. range	Temp. range of change Heat up (K/min)	Temp. range of change Pull down (K/min)	Max. allowable heat load @+20°C (kW)	Temp. & humid. range	Max. allowable heat load @+85°C/85%rh (kW)
1	FDS-02277	2277	1800×1150×1100	2000×2106×3270	-70°C to +180°C	4.0	4.0	15	+20°C to +85°C 20%rh to 98%rh	0.6
2	FDS-02277-7	2277	1800×1150×1100	2000×2140×4120		7.0	7.0	29		0.6
3	FDS-02691	2691	1800×1150×1300	2000×2106×3470		4.0	4.0	15		0.6
4	FDS-02691-5	2691	1800×1150×1300	2000×2106×3470		5.0	5.0	19		0.6
5	FDS-02691-7	2691	1800×1150×1300	2000×2143×4320		7.0	7.0	29		0.6
6	FDS-03105	3105	1800×1150×1500	2000×2106×3670		4.0	4.0	15		0.6
7	FDS-03105-7	3105	1800×1150×1500	2000×2143×4520		7.0	7.0	29		0.6
8	FDS-03240	3240	2000×1350×1200	4850×2306×1520		4.0	4.0	15		0.6
9	FDS-03240-6	3240	2000×1350×1200	5650×2343×1520		6.0	6.0	29		0.6
10	FDS-03780	3780	2000×1350×1400	4850×2306×1720		4.0	4.0	15		0.6
11	FDS-03780-6	3780	2000×1350×1400	5650×2343×1720		6.0	6.0	29		0.6
12	FDS-04320	4320	2000×1350×1600	4850×2306×1920		4.0	4.0	15		0.6
13	FDS-04320-6	4320	2000×1350×1600	5650×2343×1920		6.0	6.0	29	0.6	
14	FDS-04680	4680	2600×1500×1200	2840×2276×3390		3.0	3.0	14	+20°C to +85°C 20%rh to 95%rh	0.6
15	FDS-04680-5	4680	2600×1500×1200	3840×2333×3190		5.0	5.0	29		0.6
16	FDS-05850	5850	2600×1500×1500	2840×2276×3690		3.0	3.0	14		0.6
17	FDS-5850-5	5850	2600×1500×1500	3840×2333×3490		5.0	5.0	29		0.6
18	FDS-07020	7020	2600×1500×1800	2840×2276×3990		3.0	3.0	14		0.6
19	FDS-07020-5	7020	2600×1500×1800	3840×2333×3790		5.0	5.0	29		0.6
20	FDS-08320	8320	2600×2000×1600	2840×2806×3790		2.0	2.0	13		0.6
21	FDS-08320-4	8320	2600×2000×1600	3640×2833×3790		4.0	4.0	29		0.6
22	FDS-09360	9360	2600×2000×1800	2840×2806×3990		2.0	2.0	13		0.6
23	FDS-10400	10400	2600×2000×2000	2840×2806×4190		2.0	2.0	13		0.6

Temperature Change Rate
Up to approx. 7.0K/min is available



Numerous types and sizes of specimens can be installed.



Large specimen



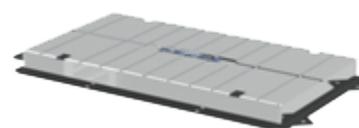
Pillar-to-Pillar display



E-Axle



DC charger

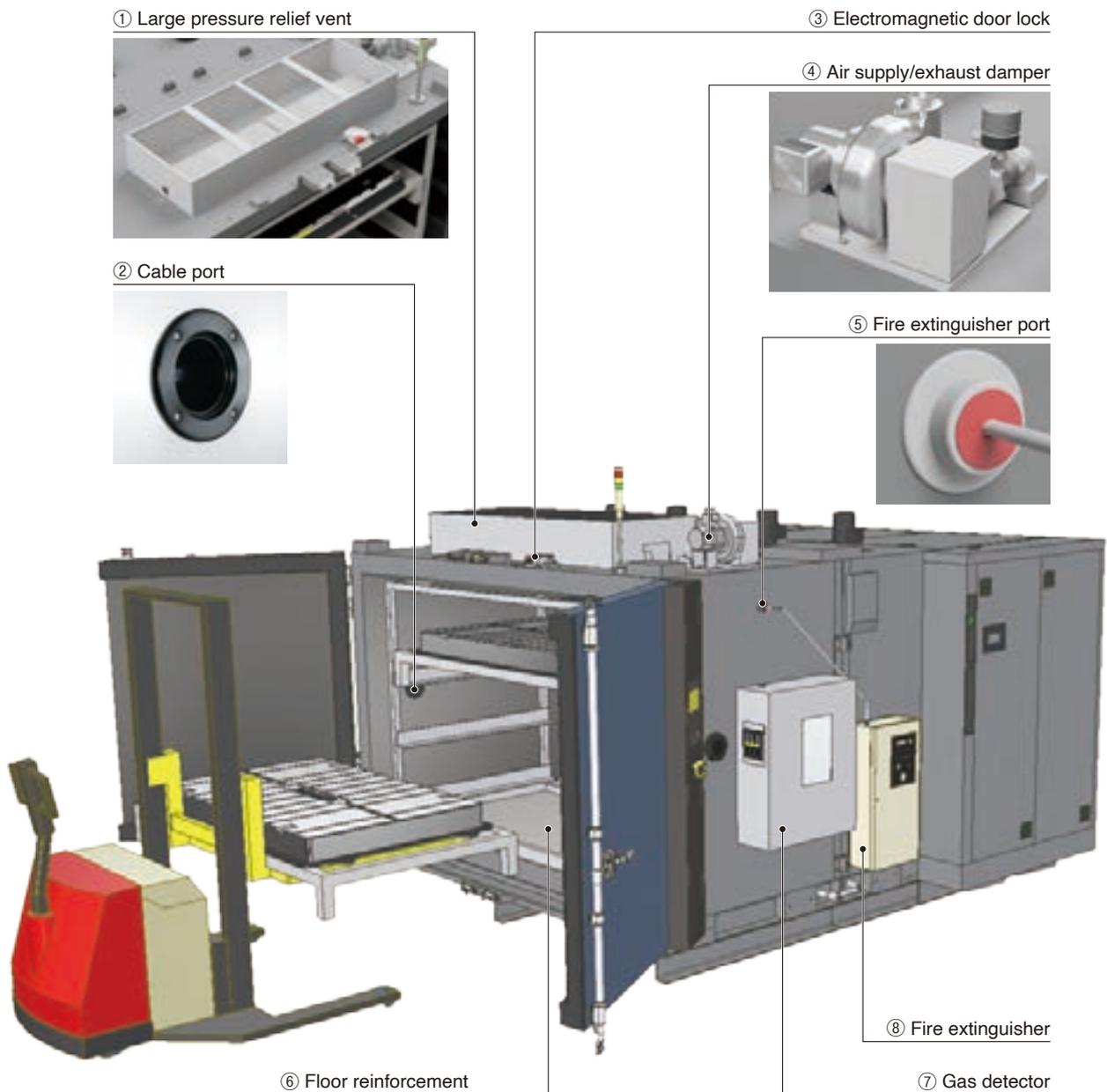


Secondary battery pack

Applications

It is essential that the time-consuming process of testing multiple units in a single operation can be managed efficiently. The FD chamber, equipped with a safety device, can process a large quantity of large EV secondary batteries in one step.

Safety devices for Secondary Battery Production Test



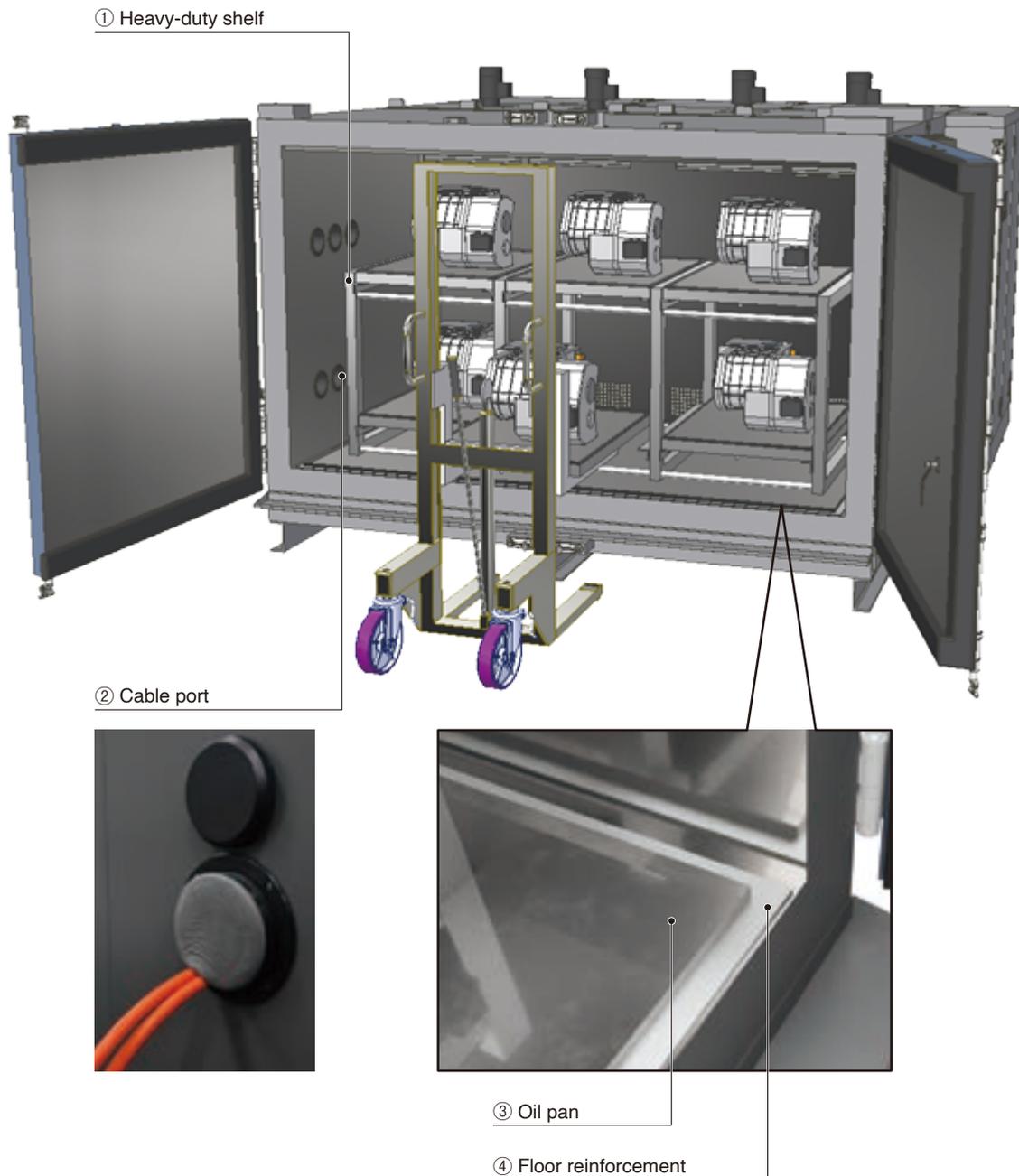
RECOMMEND OPTIONS		
1	Large pressure relief vent	Releasing pressure when an explosion has occurred in the test area. It prevents the door flying open.
2	Cable port	For easy connection of charging/discharging cable.
3	Electromagnetic door lock	The door is locked so that it cannot lead to injury or accident when the user releases the high/low temperature air.
4	Air supply/exhaust damper	Ventilation of the test area.
5	Fire extinguisher port	Port for piping when equipping fire extinguisher.
6	Floor reinforcement	Reinforcement floor for heavy load specimens.
7	Gas detector	Detection of specific gas in test area.
8	Fire extinguisher *ESPEC provides only a port for fire extinguisher	For safety in the test area, CO ₂ is injected into the test chamber.

EUCAR HAZARD LEVELS

Hazard Level	Description	Classification criteria, effect
0	No effect	No effect. No loss of functionality.
1	Passive protection activated	No defect; no leakage; no venting, fire or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell reversibly damaged. Repair is needed.
2	Defect / Damage	No leakage; no venting, fire or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell irreversibly damaged. Repair is needed.
3	Leakage Δ mass < 50%	No leakage; no venting, fire or flame; no rupture; no explosion; no exothermic reaction or themrmal runaway. Cell irreversibly damaged. Repair is needed.
4	Venting Δ mass \geq 50%	No fire or flame, no rupture; no explosion. Weight loss \geq 50% of electrolyte weight (electrolyte = solvent + salt).
5	Fire or Flame	No rupture; no explosion (i.e., no flying parts).
6	Rupture	No explosion, but flying parts of the active mass.
7	Explosion	Explosion (i.e. disintegration of the cell)

Applications

The FD series has the capacity to easily accommodate multiple E-Axles and can provide optimal environmental test conditions for the components. Long-term testing is possible due to the ease of equipment management and maintenance.



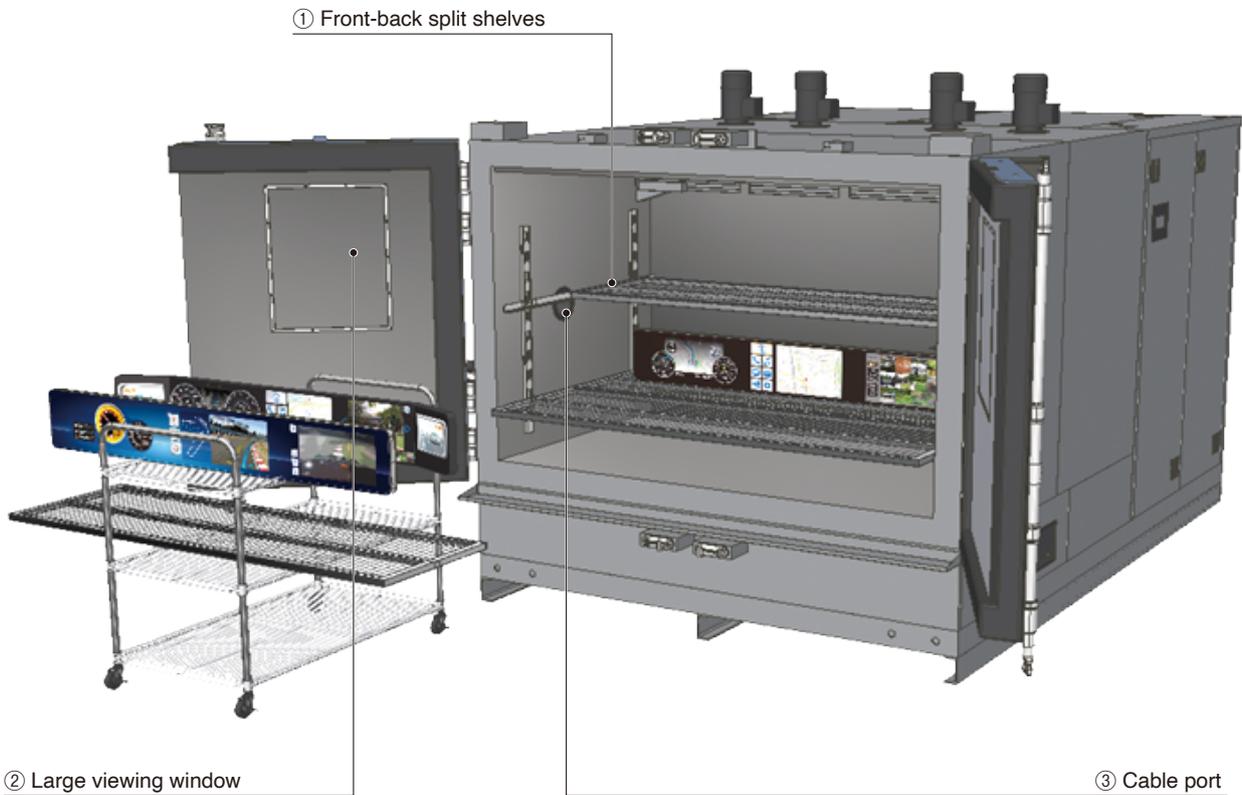
RECOMMEND OPTIONS		
1	Heavy-duty shelf	Reinforced shelf for heavy specimens. Suitable for the substantial weight of E-Axles (more than 100kg)
2	Cable port	For easily connecting coolant pipes and power lines to the E- Axle.
3	Oil pan	To prevent deterioration of the rubber gasket on the door due to oil leakage. Facilitates easy up of oil prevents slips on the floor.
4	Floor reinforcement	Reinforced floor for heavy specimens. Suitable for the substantial weight of E-Axles (more than 100kg)
5	Stainless steel evaporator	To prevent damage in evaporator by salt etc.

Wide opening design for easier handling large and heavy specimen



Applications

The FD Series is ideal for testing Pillar to Pillar display.

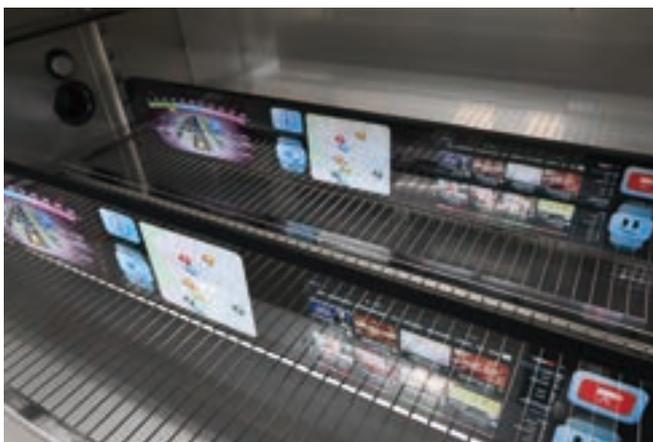


RECOMMEND OPTIONS

1	Front-back split shelves	Improved access to work on the wires of the Pillar-to-Pillar display
2	Large viewing window *1	Used to observe the Pillar-to-Pillar display in the chamber.
3	Cable port	For easy connection of wires to Pillar-to-Pillar display.

*1: Temperature and humidity performance would be different to standard specification.

The split shelves make your work easier and save your time.

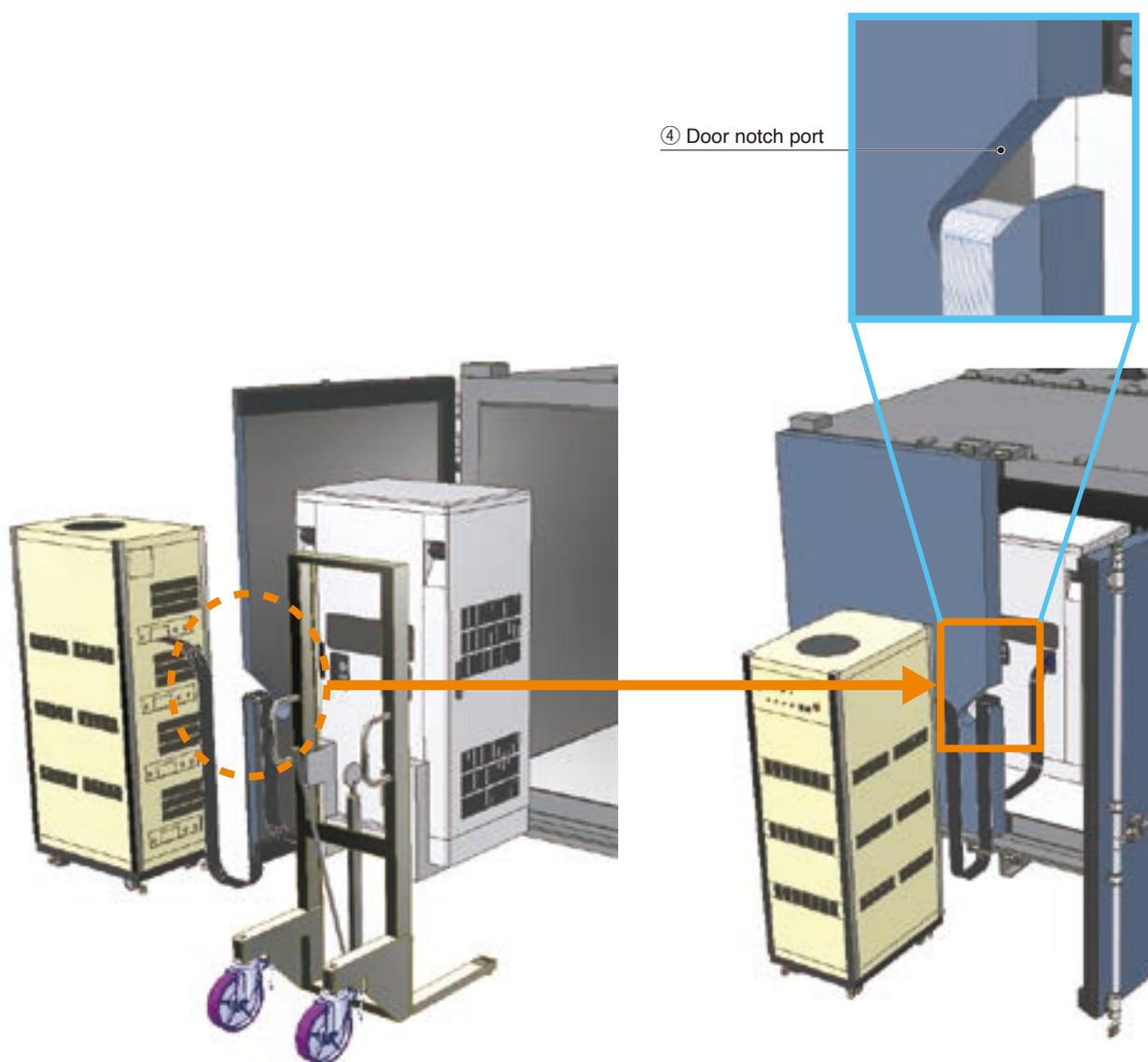


Applications

The FD series has options that make it easy to install a large DC charger and associated wiring, therefore it is possible to prepare for tests efficiently.



Door notch port enables the test specimen to be inserted into the test chamber with the wires already connected to the external test equipment. This innovative feature streamlines the wiring preparation, saving time and reducing operator workload. This option is equipped with a door notch plug, to prevent heat & moisture leakage.



RECOMMEND OPTIONS

1	Cable port	For easy wiring to DC charger.
2	Floor reinforcement	Reinforced floor for heavy specimens. Suitable for the substantial weight of DC chargers (more than 350kg).
3	Anchoring fixtures	To prevent the FD chamber moving, the floor surface and chamber are both securely fixed.
4	Door notch port	Facilitates easy wiring from the door side to the DC charger. This feature is very useful when wiring from the cable port becomes challenging due to the sizable DC charger in the test area.

OPTIONS

Viewing window

Used to observe the specimen in the chamber.

Effective view : W180 x H260 (mm)



Wick

Used for humidity operation. (For wet bulb)

Shelf (Stainless steel) & shelf brackets

Used for positioning the specimens in the chamber.



Additional overheat protector (Additional overcool protector)

Complementing the standard overheat (overcool) protector, serves to double the prevention of abnormal temperature increases inside the test chamber.



Paperless recorder

The temperature recorder is used to record temperature of each section such as the temperature inside the chamber.



Additional cable port

A through hole provided in the wall of the chamber.

It can be situated on the ceiling, and on the left and right sides.



Cable port dew tray

A tray to catch condensation water generated around cable ports.



Cable port plug

Used to close cable ports



Large viewing window

Used to a wider range of specimens in the chamber

Effective view : Please inquire



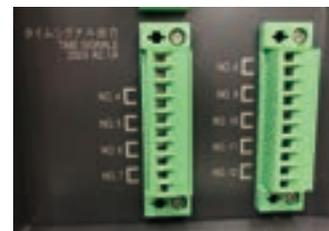
Electrostatic capacitance-type humidity sensor control

Compared to standard product, no need to replace the wick.



Additional time signal terminals

Provided additional time signal terminals when the standard 2 contacts are not sufficient.



Status indicator light

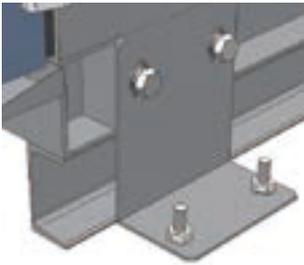
Used for remotely checking the status of the chamber.



OPTIONS

Anchoring fixtures

Used for fixing the chamber to the floor. Mount the L type bracket and fix to the floor by the anchor bolts.



Roller conveyor

A roller conveyor is installed on the floor according to the shape and quantity of specimens. It can be stored smoothly in the test chamber.



Power meter

Integrated wattmeter which indicates cumulative energy.



Water purifier

This option is used for continuously supplying pure water to the chamber.



Gas detector

Detects the generation of specific gases in the chamber that are emitted from the specimen.



Heat detector

An independent sensor detects the heat inside the chamber and issues an alarm.



Electromagnetic door lock

Automatically lock the door during the test.



Smoke detector

Detects smoke in the test chamber emitted from the specimen.



Air supply / exhaust damper

Ventilate the air in the chamber.



Emergency stop switch

Shuts off the power to the chamber in case of emergency, to protect specimens and the chamber. Avoiding erroneous operation, a guard can be selected.

Fire extinguisher port

This is the port to introduce the nozzle of the fire extinguisher.



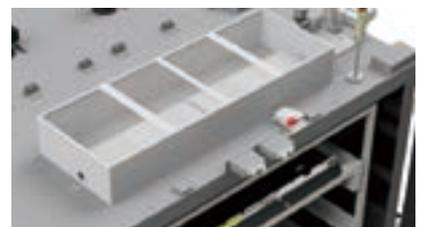
Floor reinforcement

The reinforced floor is used to place heavy specimens and racks on the floor.



Pressure relief vent

When the pressure in the test chamber rises rapidly, it releases the pressure and weakens the explosive force.



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