

Secondary Battery Types & Recommended Test Chambers

Battery cells

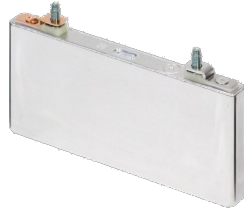
Cylindrical



Pouch



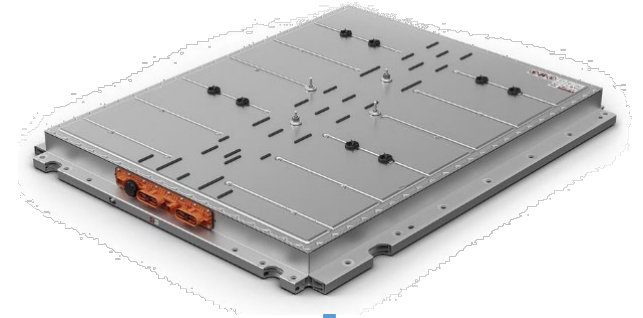
Prismatic



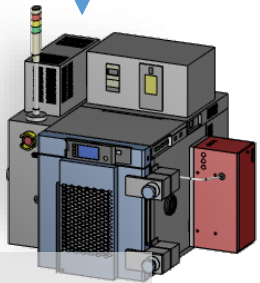
Battery module



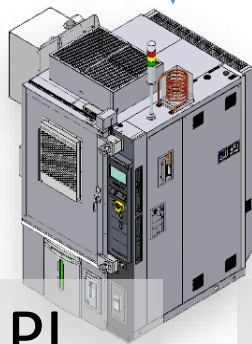
Battery pack



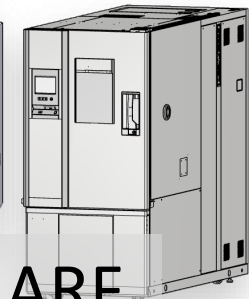
Test Chambers



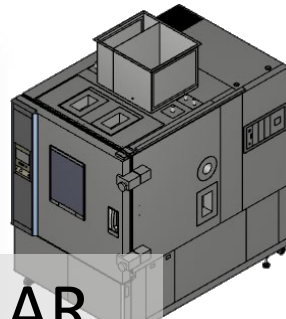
SU



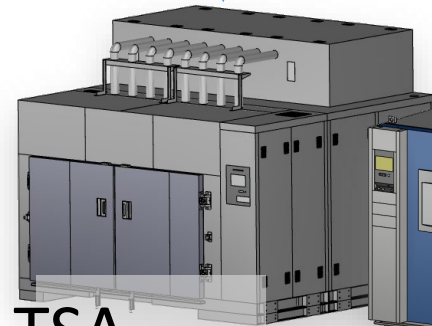
PL



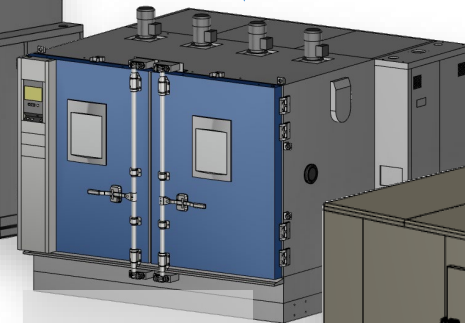
ARF



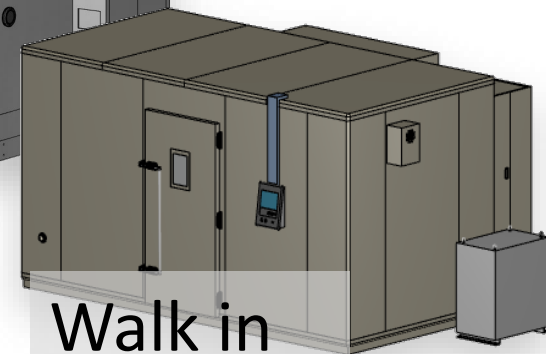
AR



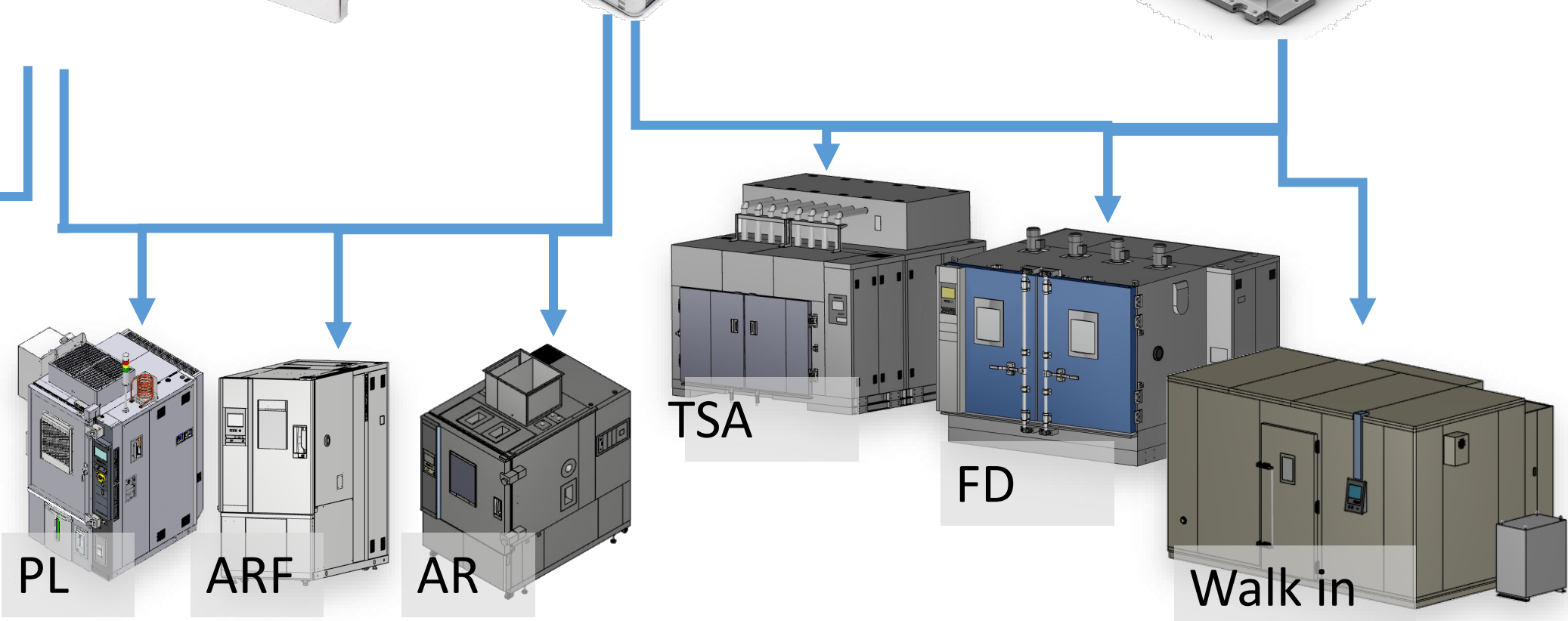
TSA



FD



Walk in



HAZARD LEVEL AND RECOMMENDED SAFETY DEVICE OPTIONS

Safety device options	EU CAR Hazard level		
	0 - 2	3 - 4	5 - 6
Emergency stop switch	✓	✓	✓
Status indicator light	✓	✓	✓
Fastener door lock	✓	✓	
Electronic door lock	✓	✓	✓
Window protection cover		✓	✓
Gas sensor(CO,H2,HC)		✓ -1	✓
Sheathed fin heaters		✓	✓
Forced air supply/exhaust damper		✓	✓
External signal terminal		✓	✓
Smoke sensor		✓	✓
Screw door lock			✓
Pressure relife vent			✓
CO2 fire extinguisher			✓
Specimen overhear protector			✓

-1 Select one of the detectors

HAZARD LEVEL AND RECOMMENDED SAFETY DEVICE OPTIONS

Hazard Level 0-2

- Status indicator light
- Emergency stop switch
- Electronic door lock
- Lever door lock

Hazard Level 3-4

- Forced air supply/exhaust damper
- Window protection cover
- Gas sensor (CO, H₂, HC)
- Smoke sensor
- Sheathed fin heaters
- External Signal terminal

Hazard Level 5-6

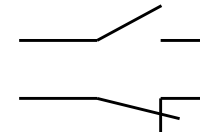
- Pressure relief vent 300 × 300 mm
- Screw door lock
- Additional overhear protector
- Port for CO₂ fire extinguisher

External signal interface

No.	Signal name	Digital I/O	Contact	Voltage		EU CAR HAZARD LEVEL		
				dry	voltage	0 - 2	3 - 4	5 - 6
1	External equipment alarm	input	N.C.		24V DC		✓	✓
2	Emergency stop	input	N.C.		24V DC		✓	✓
3	Operation permission	input	N.O.		24V DC		✓	✓
4	Door open	output	N.O. / N.C.	✓			✓	✓
5	Chamber alarm	output	N.O. / N.C.	✓			✓	✓
6	Smoke detector	output	N.O. / N.C.	✓			✓	✓
7	Gas detector (CO, H2, HC, H2S)	1st stage	N.O. / N.C.	✓			✓	✓
		2nd stage	N.O. / N.C.	✓			✓	✓
		Failure detection	N.O. / N.C.	✓			✓	✓
8	Suction damper / Exhaust damper	output	N.O. / N.C.	✓			✓	✓
9	Pressure relief vent open	output	N.O. / N.C.	✓				✓
10	Fire extinguisher	input	N.O.		24V DC			✓
		output	N.O. / N.C.	✓				✓
11	Heat detector	output	N.O. / N.C.	✓				✓

N.O. : Normally open

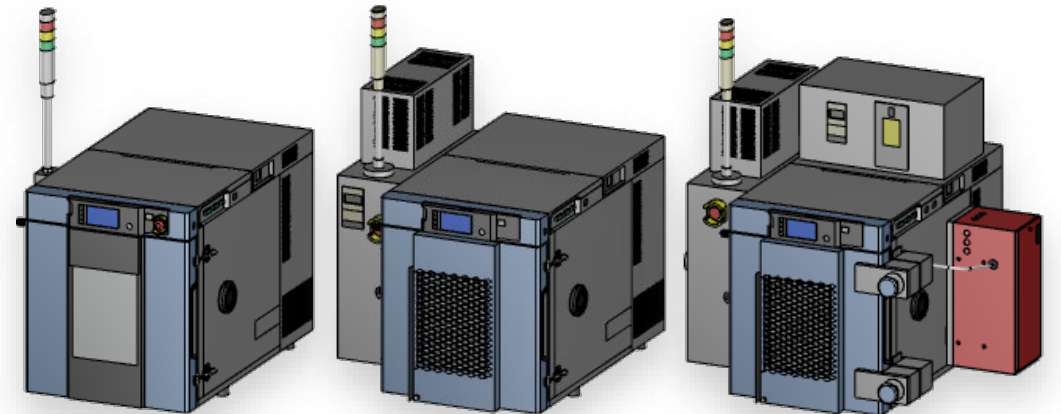
N.C. : Normally closed



63 liters

Bench top chamber

- Test area volume : 63 liters
- Test area dimensions
W 400 × H 400 × D 400
- Outside dimensions
W 540 × H 665 × D 921
- Temperature range : -40°C to +150°C
- Cooling down rate : 1.7K/min
- Heating up rate : 2.9K/min
- Model: SU-642



Hazard level : HL 0-2

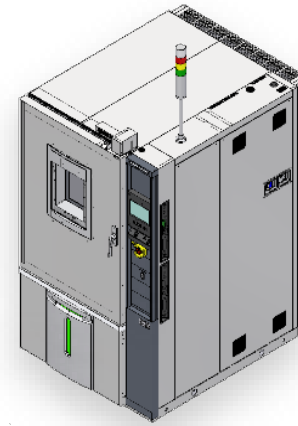
HL 3-4

HL 5-6

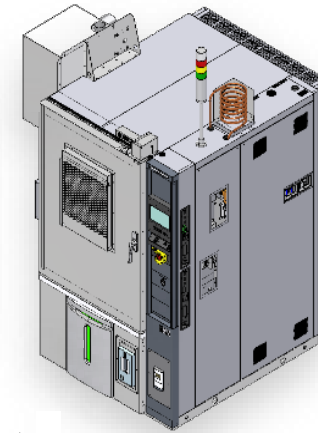
120-800 liters

Platinous chamber

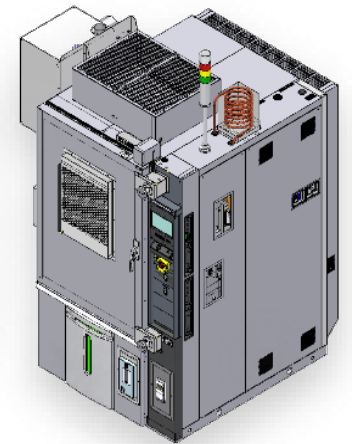
- Test area volume : 120/225/408/800 liters
- Test area dimensions of 800 liters
W 1000 × H 1000 × D 800
- Outside dimensions of 800 liters
W 1410 × H 1840 × D 1273
- Temperature range : -40°C to +100°C
- Humidity range : 20 %rh to 98 %rh
- Cooling down rate : 2.0K/min
- Heating up rate : 3.0K/min
- Model: PL-1J, PL-2J, PL-3J, PL-4J



Hazard level : HL 0-2



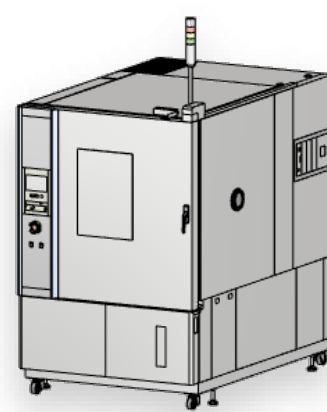
HL 3-4



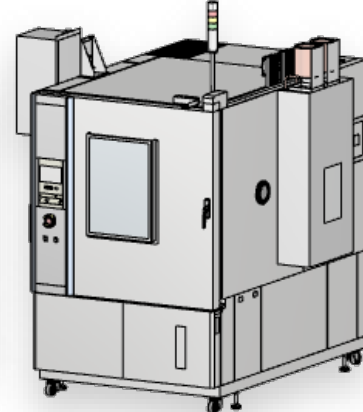
HL 5-6

220-1100 liters AR chamber

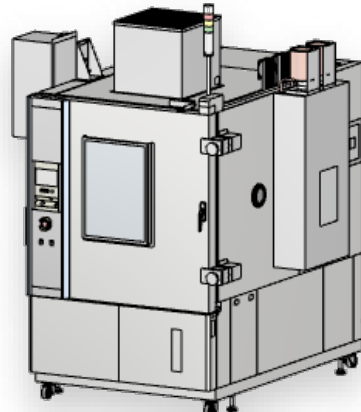
- Test area volume : 220/390/680/1100 liters
- Test area dimensions of **1100** liters
W 1100 × H 1000 × D 1000
- Outside dimensions of **1100** liters
W 1300 × H 1955 × D 2005
- Temperature range : -45°C to +180°C
- Humidity range : N/A
- Cooling down rate : **4.4**K/min
- Heating up rate : **4.8**K/min
- Heat load : **4350**W(at+20°C)
- Model: ARG-0220,ARG-0390
ARU-0680,**ARU-1100**



Hazard level : HL 0-2



HL 3-4

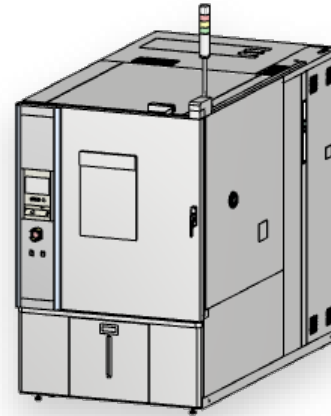


HL 5-6

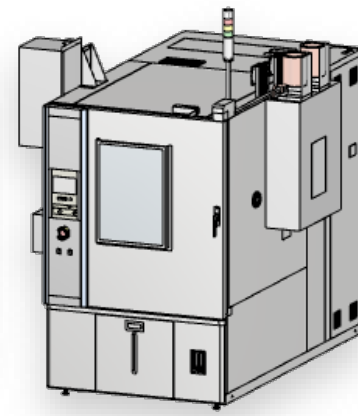
250-800 liters

ARxF chamber

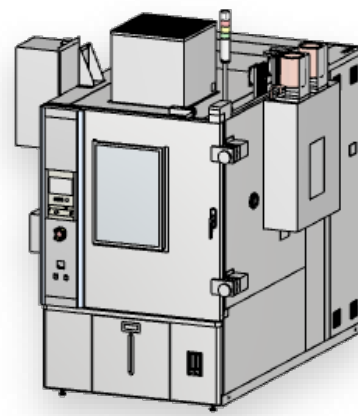
- Test area volume : 250/400/800 liters
- Test area dimensions of 800 liters
W 1000 × H 980 × D 800
- Outside dimensions of 800 liters
W 1200 × H 1853 × D 2200
- Temperature range : -70°C to +180°C
- Humidity range : N/A
- Cooling down rate : 15.0K/min
- Heating up rate : 15.0K/min
- Heat load : 900W(at+20°C)
- Model: ARGF-0250-10/15
ARGF-0400-10/15
ARGF-0800-10/15



Hazard level : HL 0-2



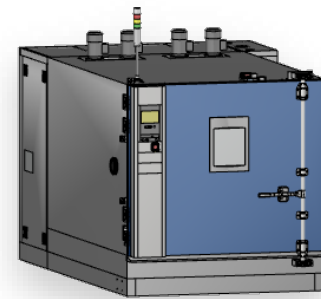
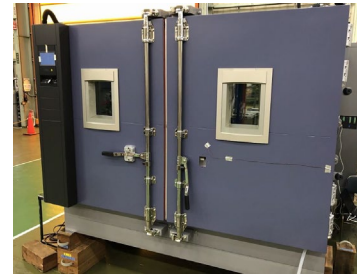
HL 3-4



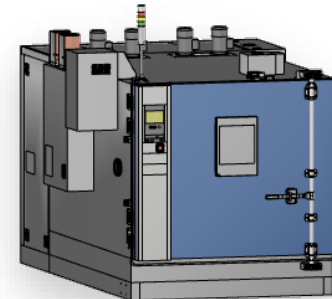
HL 5-6

1920-7020 liters FD chamber

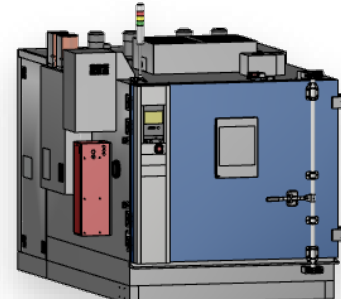
- Test area volume : 1920/2400/2700/3600/3750/5850/7020 liters
- Test area dimensions of 7020 liters
W 2600 × H 1500 × D 1800
- Outside dimensions of 7020 liters
W 3140 × H 1910 × D 3733
- Temperature range : -40°C to +180°C
- Humidity range : N/A
- Cooling down rate : 1.3K/min
- Heating up rate : 3.0K/min
- Model: FDU-1920, FDU-2400
FDU-2700, FDU-3600
FDU-3750, FDU-5850, **FDU-7020**



Hazard level : HL 0-2



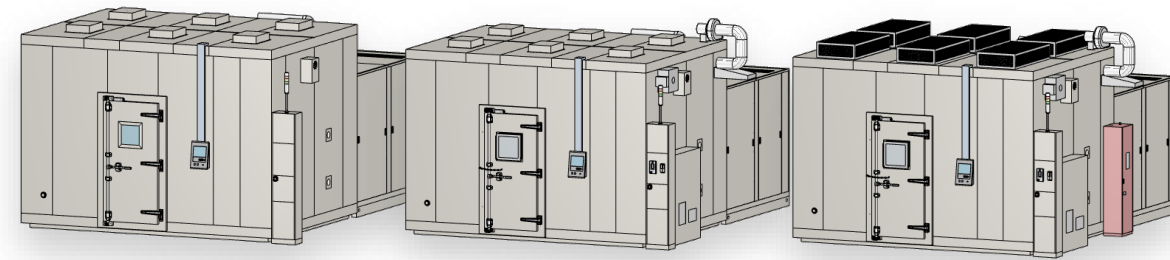
HL 3-4



HL 5-6

16,800-52,700 liters Walk in chamber

- Test area volume : 16,800/25,800/34,700/52,700 liters
- Test area dimensions of **16,800** liters
W 4070 × H 2100 × D 1970
- Outside dimensions of **16,800** liters
W 4200 × H 2305 × D 3395
- Temperature range : -30°C to +80°C
- Humidity range : N/A
- Cooling down rate : **3.0K/min**
- Heating up rate : **3.0K/min**
- Heat load : **32,600W**(at-30°C)
- Model: **EBU-4E45W0PTLR-40**



EBU-6E45W0PT2R-40

Hazard level : HL 0-2

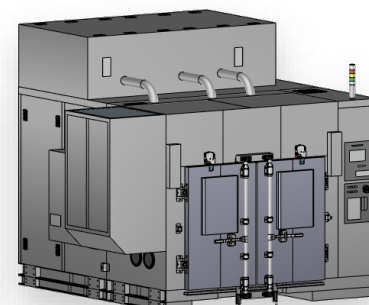
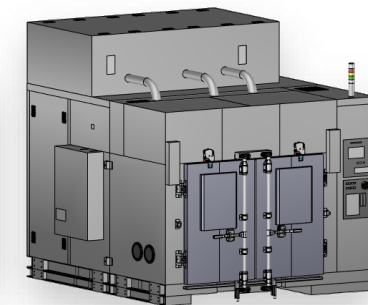
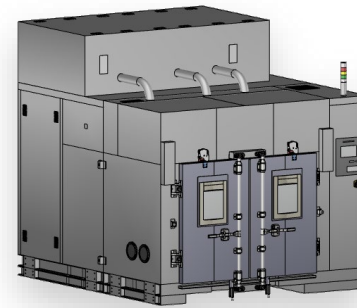
HL 3-4

HL 5-6

EBU-8E50W0PUV-40, EBU-12E50W0PU2V-40

1100-2310 liters Thermal shock chamber

- Test area volume : 1100/1650/2310 liters
- Test area dimensions of 2310 liters
W 2100 × H 1100 × D 1000
- Outside dimensions of 2310 liters
W 3220 × H 2750 × D 2972
- Temperature range : -70°C to +200°C
- Humidity range : N/A
- Cooling down rate : 73.0K/min⁻¹
- Heating up rate : 76.0K/min⁻¹
- Model: TSA-1100, TSA-1650, TSA-2310



-1: -40°C to +150°C of cold heat cycle.

Hazard level : HL 0-2

HL 3-4

HL 5-6