

Specification Manual for Cell Test Bed Development for Li-ion Cells

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1. ACRYLIC HINGED, FRONT-LOAD CELL TEST CHAMBER

Note: All dimensions mentioned in the following drawings are in cm unless stated otherwise



Fig. 1.1: Acrylic Hinged, Front-Load Cell Test Chamber Drawing – Front view

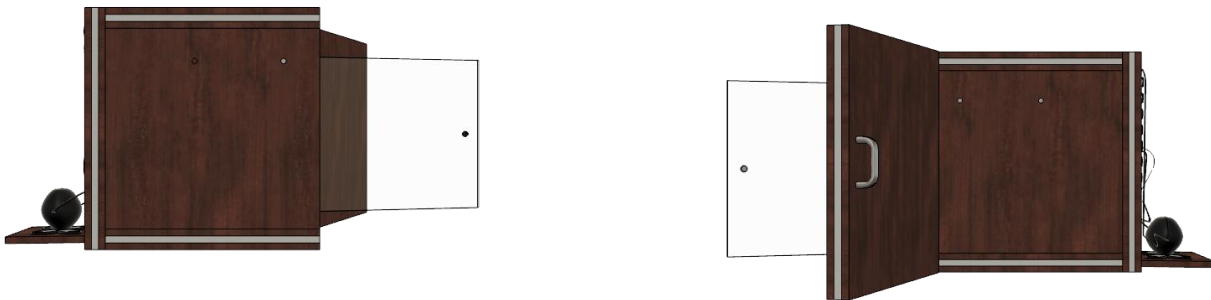


Fig. 1.2: Acrylic Hinged, Front-Load Humidification Unit Drawing – Left and Right view



Fig. 1.3: Acrylic Hinged, Front-Load Humidification Unit Drawing – Rear view

1.1 Specifications:

Table 1: Specifications and Ratings for the Cell Test Chamber

Component	Specification	Dimensions
Cell Chamber	Testing Chamber	457.2x304.8x304.8 mm
Cartridge Heater	12v 40W Ceramic Heater	20mm (l) x 6mm (D)
Humidification Unit	Housing for Humidification	558.8x406.4x406.4 mm
Humidifier	20W - Air Humidifier (Portable)	104x102x80 mm
Dehumidifier	B07Q6J6317, 150ml	180x109x45 mm

2. REFRIGERATION UNIT

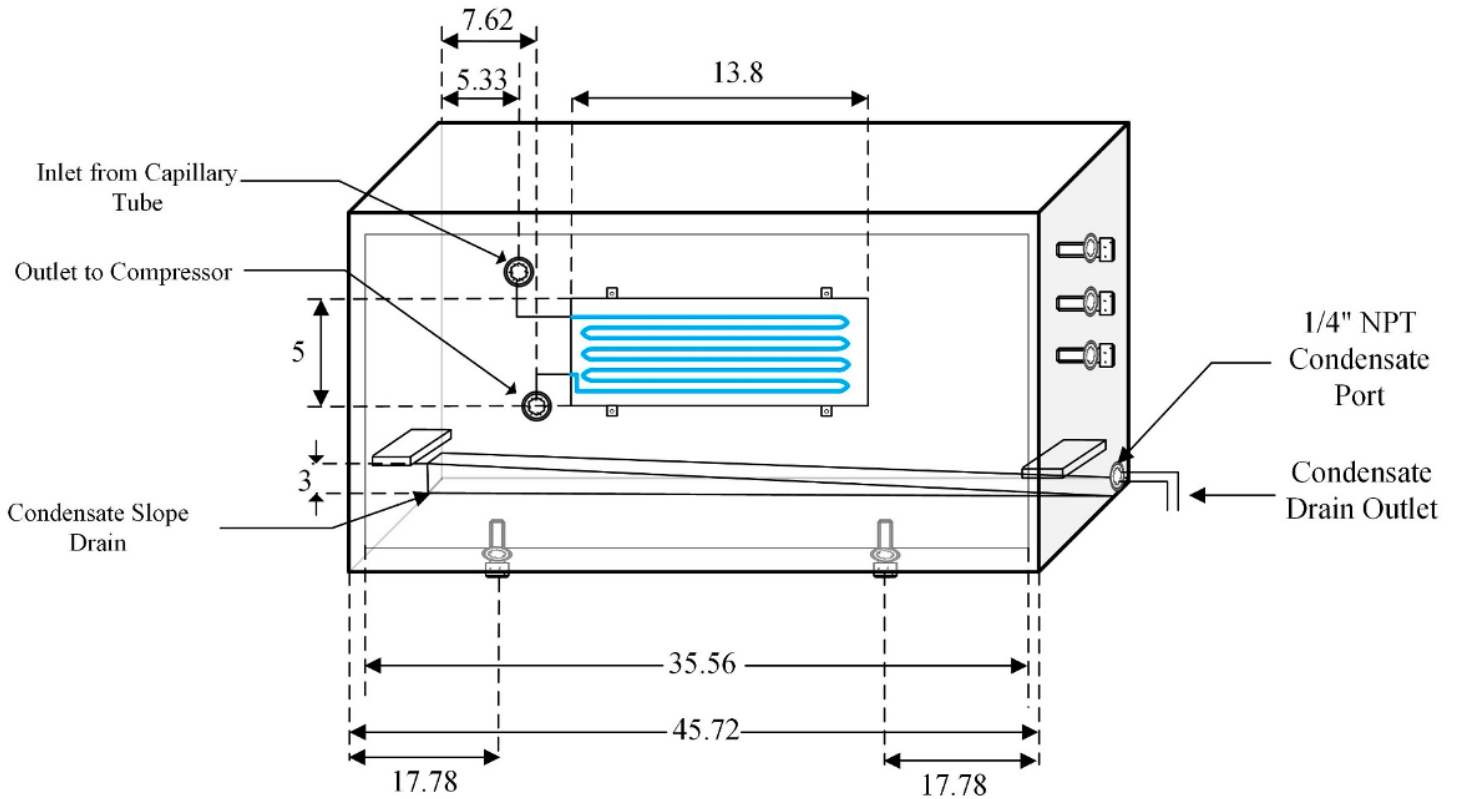


Fig. 2.1: Acrylic Hinged Front Load Chamber Drawing (Refrigeration Unit)

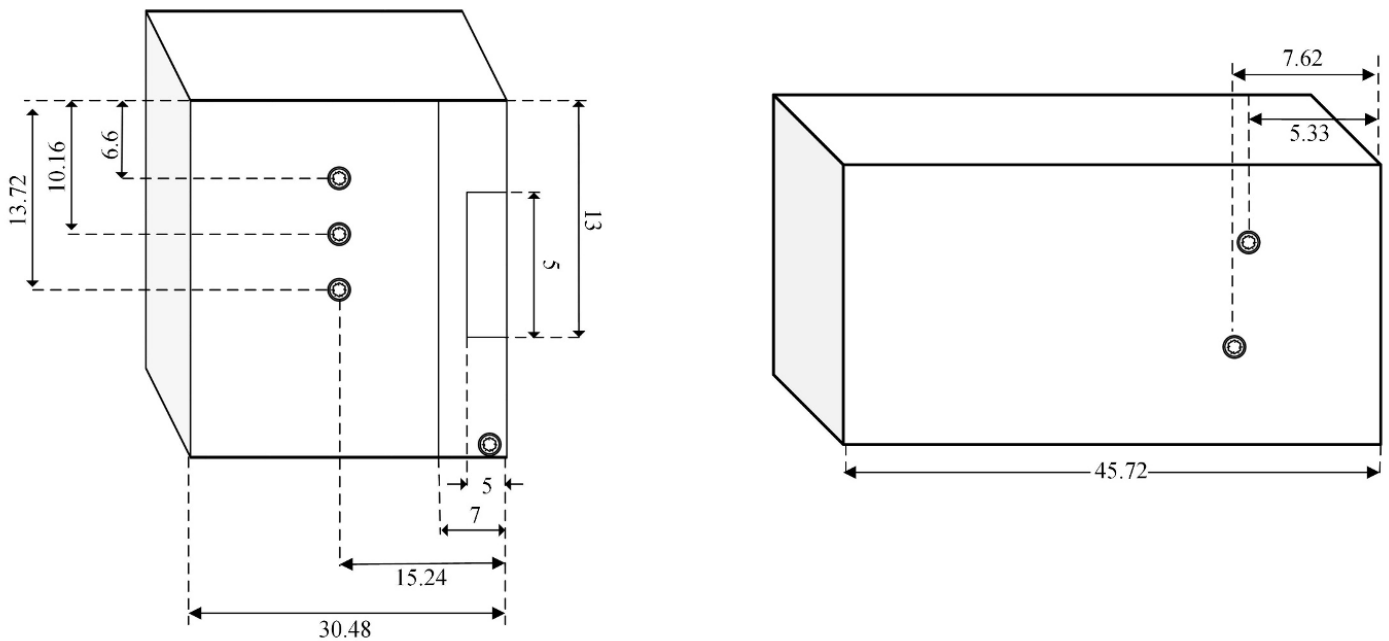


Fig. 2.2: Acrylic Hinged Front Load Chamber Drawing (Refrigeration Unit)

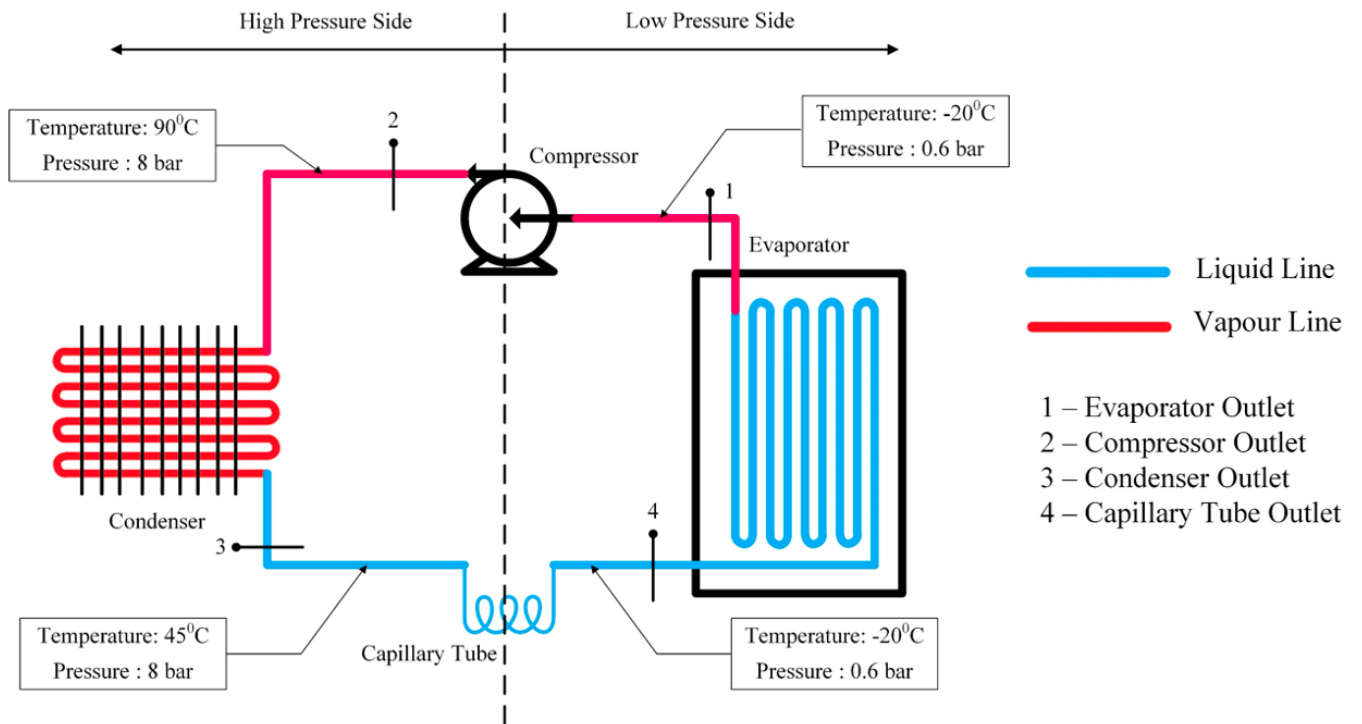


Fig.2.3: Schematic illustration and components layout of the refrigeration system

2.1 Specifications:

a. Capillary Tube



Fig.2.4: Capillary Tube

Table 2: Specifications of Capillary Tube

Model (ASIN)	B0713V24QV
Manufacturer	Generic
Thickness	0.6mm
Length	2m
Make	Copper

b. Compressor



Fig 2.5: 12 V DC Mini compressor

Table 3: Specifications of Compressor

Model	Voltage	Mount Type	Displacement	Cooling Capacity		Power	Speed Range	Height
			cm ³ /rev	W	Btu/h	W	RPM	mm
FSQX019Z12	12V	Vertical	1.9	300	1023	130	2000-6000	80

b. Evaporator and Condenser



Fig 2.6: Evaporator



Fig 2.7: Mini Condenser

Table 4: Specifications of Evaporator and Condenser

Evaporator	SUS Stainless Coil 304	Stainless Steel Plate
Condenser	Micro Channel 8310	Fin Tube
Fan Voltage	12V @ 3200 RPM	

c. Mini Refrigeration Unit

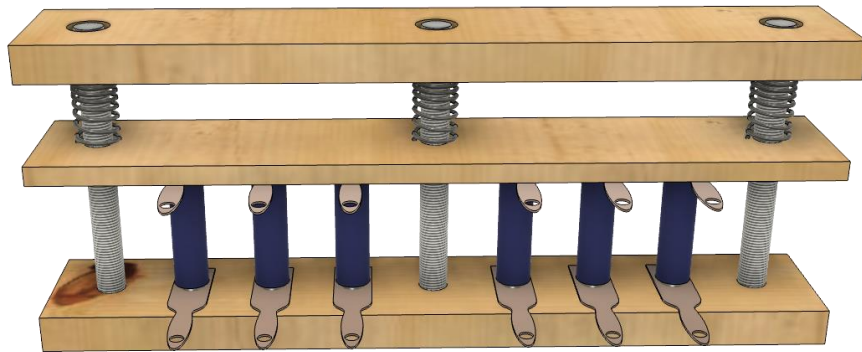


Fig 2.6: DC Mini Refrigeration Module Unit

Table 5: Specifications of Mini Refrigeration Unit

Name	DC Mini Refrigeration Module unit	
Refrigeration parts	Mini DC compressor & driver	Mini condenser with axial flow fan
	Stainless Steel Plate evaporator	Capillary Tube / Throttle Valve
Voltage	DC 12V	
Dimension	275*175*138 mm	
Net weight	3.0 kg	
Cooling capacity	100~400W (360~1444Btu)	

3. Battery Cell Holder



4. HDPE INLET/OUTLET PORTS

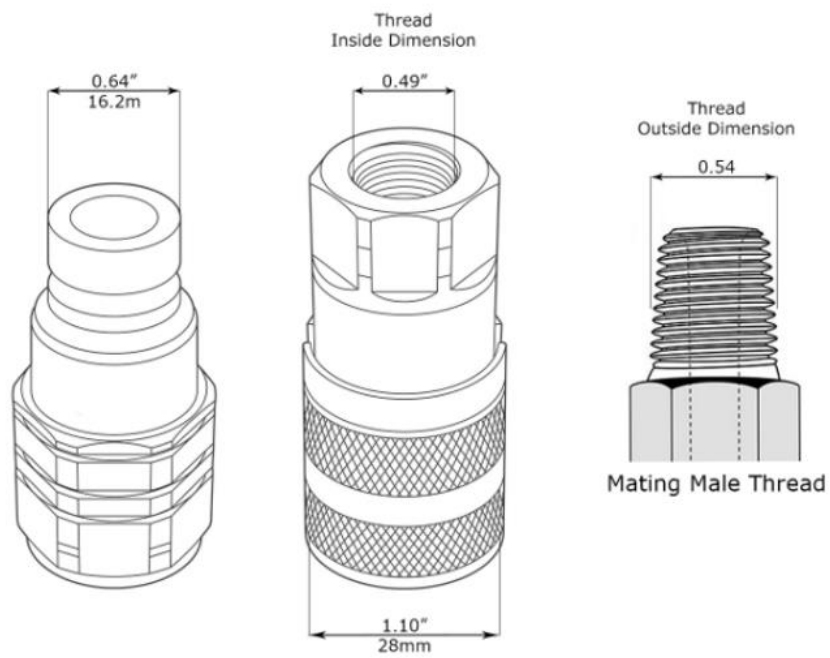


Fig. 3.1: 1/4 Inch NPT Thread Body Dimensions

3.1 Specifications

Table 6: Inlet/Outlet Port Dimensions

Inlet/Outlet Port	Thread Dimensions
Sensor Port (HDPE)	1/4" NPT
Battery Terminals Port (HDPE)	1/4" NPT
Heating/Cooling Supply Port (HDPE)	1/4" NPT
Humidifier Port (HDPE)	1/4" NPT
Dehumidifier Port (HDPE)	1/4" NPT
Capillary Tube Inlet (HDPE)	1/4" NPT
Compressor Outlet (HDPE)	1/4" NPT

5. SMPS POWER SUPPLY



Fig 4.1: FRONTECH PS-0005 230V/450W SMPS

4.1 Specifications

Table 7: Specifications of FRONTECH 230V/450W SMPS

Brand	FRONTECH
Manufacturer	FRONTECH
Package Dimensions	15 x 11 x 8 cm
Item part number	FRTSMPS
Wattage	450 Watts
Item Weight	593 g

6. POWER SOCKET



Fig 5.1: AC Power Socket with Switch, Indicator and Fuse

5.1 Specifications

Table 8: Specifications of AC Power Socket

Product Dimensions	12 x 8 x6 cm
Manufacturer	Anchor
ASIN	B00V4VHXKY
Item model number	DE 14619
Item Weight	150 g
Included Components	Anchor 20 A Polycarbonate Penta 5-in-1 Combined Box 2 Hole Switch (White)
Fuse	250V,10A, 20mm, Glass Fuse

7. COOLING FAN FOR DATA ACQUISITION UNIT



Fig 6.1: SUNON 8025 12VDC 1.44W Cooling Fan

6.1 Specifications

Table 8: Specifications of SUNON Cooling Fan

Model	MF80251V1-1000U-A99
Rated Speed (RPM)	3200
Operating Voltage (VDC)	12
Operating Current (A)	0.138
Operating Temperature (°C)	-10 to 70
Power Consumption (Watt)	1.44
Insulation Class	UL Class A
Length (mm)	80
Width (mm)	25
Height (mm)	80
Weight (gm)	75
Cable Length (cm)	30

8. ABS-PC BATTERY CELL HOLDER



Fig 7.1: PC-ABS Material Cell Holder

7.1 Specifications

Table 9: Specifications of Battery Cell Holder

Model	18650 / 21700 Radiating Battery Spacers
Material	ABS/PC (Remarkable Flame Retardant Plastic)
Dimension	40mmx20x8mm / 47mmx24mmx9mm (LxWxH)

9. THERMAL SPECIFICATIONS OF COMPONENTS

Table 10: Thermal Properties of the components

Component	Min (°C)	Max (°C)
Acrylic Thermo-Plastic	-40	80
HDPE Plastic	-45	120
PTFE Wiring	-240	260
PC-ABS Plastic	-30	230
Buna – O ring Seal	-40	120