Features:
- 0.3m² (3ft²) of seed germination area per tray
- 230mm (9") of growth height per tray with 5 trays supplied with chamber (maximum 30 trays)
- 18µmol m⁻² s⁻¹ PPFD of lighting
- Ideal for seed germination trials requiring high humidities
- Externally mounted lights allowing high humidities inside the chamber
- Stainless steel interior finish
- Small footprint maximizes floor space in the facility
INTRODUCTION

BioChambers’ seed germination chamber model SGC-3 was specifically designed with the lights mounted external to the growth area to allow high humidity levels inside the chamber creating an ideal environment for seeds to germinate. The chamber features a stainless steel interior for superior corrosion resistance, comes with five trays providing five tiers of shelving with space to accommodate up to thirty trays, and a perforated back wall delivering horizontal airflow ensuring each tier of shelving is under the same environmental conditions. BioChambers’ seed germination chambers provide tight uniform control of temperature, lighting using LED lamps, and adjustable airflow.

1.0 CONTROLLER

1.1 Controller Version: BioChambers VNET.
1.2 Interface: Fanless panel PC with a 305mm (12”) color touch screen.
1.3 Ethernet Connection: Secure remote access using a unique site specific webkey allowing the chambers/rooms to be connected to a facility supplied local area network (LAN)/internet.
1.4 Security: Multiple levels of password security for researchers, administrators, service technicians, and BioChambers’ factory technicians.
1.5 VNET Viewer: Instantly view the status of all your experiments. Single or multiple chambers/rooms can be remotely monitored and operated from a central location via the LAN/internet. VNET Viewer can be installed on up to three existing computer stations.
1.6 Schedule: Multi-line schedule can be created for temperature, lighting, and fan speed using the touch screen interface or remotely using the facility provided LAN/internet. Available options: humidity, carbon dioxide, auxiliary circuits primarily for automatic watering, light intensity, etc… can also be scheduled.
1.7 Multi-Day: Multi-day changing environmental conditions can be scheduled.
1.8 Ramping: Temperature changes gradually (ramping) from setpoint to setpoint. Available options: humidity, carbon dioxide, and dimmable lighting can also be ramped.
1.9 Astronomical Clock: Researchers can produce photoperiod schedules for locations worldwide by simply entering the latitude and longitude.
1.10 Graphing: Controlled parameters such as temperature and the following available options: humidity, carbon dioxide, and light intensity can be graphed to show setpoint versus actual conditions.
1.11 Research Data: Controller equipped with a compact flash memory card to store multiple schedules and logged data such as temperature, alarms, etc… Log rate and duration can be set by the user.
1.12 Data Export: Data can be exported to the researcher’s/administrator’s computer for further analysis.
1.13 Start-up: Provisions for chamber/room start-up delay in facilities with multiple chambers/rooms helping to reduce the initial inrush current after a power outage.
1.14 Alarms: Notification via e-mails, building alarm contacts connected to a facility supplied building security system, and on chamber/room audible alarm with red indicator light.
1.15 Service Data: Refrigeration system pressures and temperatures along with other service parameters are logged. Log rate and duration can be set independently of the research log.
1.16 Service Screen: Displays compressor discharge and suction pressures and temperatures, facility water supply and return temperatures, automatic temperature setting safety limits status, lamp hours, sensor calibration hours, temperature control valve position, and more.
1.17 Service: Two manual toggle switches with a 10 minute schedule bypass are provided for the service technician to place the chamber/room into full cooling or heating and all lights on or off. This enables faster and easier service work as the technician does not need to learn how to use the control system.
2.0 CONSTRUCTION

2.1 Exterior Dimensions: 735mmW x 915mmD x 2085mmH (29"W x 36"D x 82"H). Add 150mm (6") to the depth for the display and electrical raceways.

2.2 Assembly: Chamber shipped assembled as one unit for easy installation in the facility.

2.3 Interior Dimensions: 585mmW x 710mmD x 1170mmH (23"W x 28"D x 46"H).

2.4 Growth Area: 0.32m² (3.4ft²) per 565mmW x 565mmD (22¼"W x 22¼"D) per stainless steel tray (5 trays supplied with chamber, maximum 30 tray capacity).

2.5 Growth Height: 230mm (9") per tray with 5 trays, 35mm (1-7/16") per tray with 30 trays.

2.6 Growth Capacity: 0.4m³ (13ft³) total with 5 trays.

2.7 Interior: Stainless Steel.

2.8 Exterior: Powder coated painted green aluminum.

2.9 Lamp Canopies: Two (one per side) fixed, and barriered lamp canopies.

2.10 Drain Pan/Floor: Constructed of stainless steel for superior corrosion resistance.

2.11 Insulation: 38mm (1½") CFC free, high-density expanded polystyrene.

2.12 Electronics: Filtered air blown into the control panel, providing cooling to the electronics and positive pressure in the control panel keeping dust out, extending the life of the electronics.

2.13 Service: Easy access to electronics and mechanical components located on the roof of the chamber.

2.14 Instrument Port: One 50mm (2") with light tight cover.

2.15 Reach-In Door: One 580mmW x 1170mmH (22¾"W x 46"H) with light tight magnetic gaskets and self closing cam-lift hinges.

2.16 Observation Window: Available as an option.

2.17 Control Panel: Display mounted on the center of the chamber when facing the door.

2.18 Aisle/Vestibule: Not applicable.

3.0 AIR TEMPERATURE

3.1 Ambient: Designed for a maximum ambient of 35°C outside the chamber.

3.2 Range: 4°C to 40°C all lights off, 10°C to 40°C all lights on (extended temperature options are available).

3.3 Control: PID control, +/-0.5°C at the aspirated sensor.

3.4 Temperature Limits: Automatically set when the user selects a schedule. One high/low and one lamp safety temperature limit sensor independent of the main temperature sensor.

3.5 Sensor Box: Moveable, aspirated, and sensors are shielded from the radiative heat produced by the lights.

3.6 Temperature Sensor: High precision fast responding thermistor sensor.

4.0 LIGHTING

4.1 Type: T5 LED with energy efficient ballasts (other lighting options are available).

4.2 Intensity: 18µmol m² s⁻¹ PPFD (Photosynthetic Photon Flux Density measured in the PAR (Photosynthetically Active Radiation) range of 400-700nm) measured at the shelf at 25°C and averaged on a 150mm (6") grid.

4.3 Light Source: 1220mm (48") 24W T5 LED lamps.

4.4 Programming: Via VNET controller.

4.5 Light Intensity Control: Total of two lighting levels.

4.6 Lamp Heat: Passive air cooling of lamps, heat from lamps rejected to laboratory (no mechanical cooling system).

4.7 Lighting Relays: 100% solid state for increased reliability.

5.0 COOLING SYSTEM

5.1 Type: Direct expansion cooling system with a self-contained air-cooled condenser (other options are available).

5.2 Temperature Valve: No maintenance electronic proportional hot gas bypass system for close temperature control and continuous compressor operation.

5.3 Compressor: Scroll compressor.

5.4 Coolant: HFO based R-449a or R-448a.

5.5 Cooling Coil: Copper tube and aluminum fin construction.

5.6 Analysis: Compressor discharge pressure, suction pressure, and temperatures are logged for ease of service.

5.7 Safety: One suction pressure switch and one discharge pressure switch with a manual reset is provided for the refrigeration system to prevent short cycling and compressor burn out.
5.8 **Barriered Lamploft:** Passive air cooling of lamps, heat from lamps rejected to laboratory (no mechanical cooling system).

5.9 **Defrost Cycle:** Not applicable.

### 6.0 AIR DISTRIBUTION

6.1 **Air Flow:** Horizontal back wall airflow through shaped plenums and perforated walls to provide uniform conditions on each tier of shelving.

6.2 **Fan Type:** Energy efficient electronically commutated (EC) motor with built in fan speed control and tach output.

6.3 **Fan Speed:** Can be programmed from 50% to 100% in the controller, enabling researchers to vary the airflow through the plants (85% or higher recommended, temperature gradients increase at lower fan speeds).

6.4 **Fresh Air:** Filtered fresh air with a manually adjustable vent: 0.3m³/min (10ft³/min).

### 7.0 RESEARCH SAVER

7.1 **Surge Protector:** Over voltage protection of the controller and control circuit from electrical surges.

7.2 **Uninterruptible Power Supply (UPS):** Protects the controller and control circuit from brown outs, surge conditions, and momentary loss of power.

7.3 **Power Phase Detector:** Loss of power phase alarm protects the compressor and other components.

7.4 **Air Flow:** Tach output of each fan displayed in the controller with automatic low rpm alarm to detect fan failure.

7.5 **Factory Diagnostics:** Through a facility supplied LAN/internet connection a BioChambers’ factory technician can remotely access the chamber/room to analyze the mechanical, electrical, and control systems.

7.6 **Testing:** 100% assembled, tested, and run-in at the factory before being disassembled for shipment to the site reducing on-site assembly time and disruptions.

7.7 **Quality Standard:** ISO 9001:2015 certified company.

### 8.0 WARRANTY

8.1 **Duration:** Two years parts and labor.

8.2 **Diagnostics:** Additional years three to five remote diagnostics service.

### 9.0 ELECTRICAL

9.1 **Service:** 120/208-240V/1-phase/60Hz, 3-wire + ground (NEMA L14-20R) (50Hz option: 240V/1-phase/50Hz/2-wire + ground). Electrical service to be provided by others (contact BioChambers for utility requirements).

9.2 **Electrical Safety:** Chamber/Room is CSA inspected (CE where applicable).

### 10.0 INSTALLATION & CUSTOMER TRAINING

10.1 **Manuals:** Controller manual, operation & maintenance manual, and electrical schematics provided.

10.2 **Training:** Please consult with BioChambers for training options.

10.3 **Installation:** Please consult with BioChambers for installation options.

### 11.0 OTHER

11.1.a **ADDITIVE HUMIDITY**

11.1.1 **Type:** Stainless steel spray nozzle humidification.

11.1.2 **Ambient:** Designed for an ambient condition of 21°C and 50%RH.

11.1.3 **Range:** Up to 90% with all lights on or off and limited by a 25°C dewpoint temperature (e.g. 56.3%RH at 35°C, 74.6%RH at 30°C, 90%RH at 20°C).

11.1.4 **Control:** PID control, +/-3%RH at the aspirated sensor.

11.1.5 **Components:** Humidity sensor, stainless steel spray nozzles, stainless steel tubing, stainless steel on/off solenoid, solid state relay, inline water filter, controls, and data logging by the controller.

11.1.6 **Operation:** The user programs the desired relative humidity (% RH) setpoint on one or multiple schedule lines and using the humidity sensor as a closed loop feedback the controller sends an on/off signal to the solenoid which controls the flow of water to the spray nozzles which adds moisture to the circulating air stream inside the chamber/room to achieve above ambient humidity levels (see dehumidification option to achieve below ambient levels).

11.1.7 **Sensor Specifications:** Vaisala humidity sensor, range 0 to 100%, accuracy from 0 to 40°C: ± 3% (0 to 90% RH).
Available Options

BioChambers Rooms and Chambers are available with a variety of options and accessories. If your research has specific requirements, BioChambers can outfit your equipment to meet your needs. These are just a few of the standard options we have available. Ask for more information.