Tall Plant growth chambers and rooms are specifically designed to provide maximum growth height and high lighting levels. They are ideal for experiments with cereal crops, shrubs, saplings and horticulture plants.

**Features:**
- 1.5m² (16ft²) of plant growth area
- 1485mm (58½") of growth height
- 1000µmoles/m²/s P.A.R. of lighting
- Ideal for cereal crops and other plants requiring high light intensities
- Counterbalanced height adjustable lamp canopy maximizing light intensity
- Channel floor system for uniform airflow
- Easy access to mechanical/electrical system for ease of service
Quality product.
Excellent service.
Innovative designs.
INTRODUCTION

BioChambers’ plant growth chamber model TPC-15 was specifically designed to maximize the light intensity at the tip of the plants by incorporating a counterbalanced adjustable height lamp canopy. As the plants grow, the researcher easily adjusts the height of the lamp canopy to maintain the light intensity at the tip of the plants. The chamber features an open channel floor delivering upward airflow providing uniform conditions on a horizontal plane. The electrical and refrigeration systems are located at waist height with ease of service in mind. BioChambers’ plant growth chambers provide tight uniform control of temperature, a balanced lighting spectrum using a mixture of fluorescent and halogen 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: Remote secure 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 use of the LAN/internet. VNET Viewer can be installed at 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: Simulation of multi-day changing environmental conditions can be scheduled.

1.8 Ramping: Temperature ramping from setpoint to setpoint. Available options: humidity, carbon dioxide, and dimmable lighting can also be ramped.

1.9 Astronomical Clock: Researchers can produce photo-period 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 researchers/administrators 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 sent to a cell phone or laptop PC, 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 setting temperature 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: 2690mmW x 890mmD x 2005mmH (106"W x 35"D x 79"H). Add 865mm (34") to the width to service the chamber (custom heights are available).

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

2.3 Interior Dimensions: 1840mmW x 815mmD (72½"W x 32"D).

2.4 Growth Area: 1.50m² (16.1ft²).

2.5 Growth Height: 1485mm (58½").

2.6 Growth Capacity: 2.2m³ (79ft³).

2.7 Interior: Pre-painted white smooth aluminum.

2.8 Exterior: Powder coated painted green aluminum.

2.9 Lamp Canopy: One 790mmD x 1830mmW (31"D x 72"W) adjustable height, non-barriered lamp canopy, counter balanced with ball bearing style pulleys allows fingertip adjustment of the lights vertically.

2.10 Drain Pan: 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 side of the chamber.

2.14 Instrument Ports: Two 50mm (2") with light tight covers.

2.15 Reach-In Doors: Two 650mmW x 1460mmH (25½"W x 57½"H) with light tight magnetic gaskets and self closing cam-lift hinges.

2.16 Observation Window: One 380mm x 280mm (15" x 11") dual pane glass window with light tight cover.

2.17 Control Panel: Display mounted on the left side of the chamber when facing the doors (right side available upon advanced request).

2.18 Aisle/Vestibule: N.A.

3.0 TEMPERATURE

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

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 researcher runs a schedule. One high/low and one lamp safety temperature limit sensor independent of the main temperature sensor.

3.5 Aspirator: Adjustable, aspirated, and shielded from the lights sensing of temperature.

3.6 Temperature Sensor: High precision fast responding thermistor sensor.

4.0 LIGHTING

4.1 Lighting: T5HO with energy efficient electronic ballasts (other lighting options are available).

4.2 Intensity: 1000µmoles/m²/s measured at 150mm (6") from the lamp canopy at 20°C and averaged on a 150mm (6") grid.

4.3 Lamps: Combination of 915mm (3ft) T5HO fluorescent lamps, T5HO fluorescent end lamps and halogen lamps.

4.4 Programming: Via VNET controller.

4.5 Lighting Levels: 4 Levels of fluorescent lighting and 4 levels of halogen lighting, total of 8 lighting levels.

4.6 Lamp Heat: Refrigeration system sized to remove all heat generated by the lights.

4.7 Lighting Relays: 100% solid state for increased reliability.
5.0 REFRIGERATION
5.1 Condenser: Self-contained water-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 Refrigerant: HFC-404A.
5.5 Evaporator: Copper tube and aluminum fin construction.
5.6 Refrigeration Analysis: Compressor discharge and suction pressures as well as temperatures, and facility water supply and return temperatures are provided and logged for ease of service.
5.7 Safety: One suction pressure switch and one discharge pressure switch with a manual reset is provided on the refrigeration system to prevent short cycling and compressor burn out.
5.8 Barried Lamploft: N.A.
5.9 Defrost Cycle: N.A.

6.0 AIR DISTRIBUTION
6.1 Air Flow: Vertical uniformly upward through an aluminum open channel floor providing uniform conditions on a horizontal plane.
6.2 Fan Speed: Adjustable from 60% to 100% (85% or higher recommended, temperature gradients increase at lower fan speeds). Fan speed can be programmed in the VNET controller enabling researchers to vary the airflow through the plants.
6.3 Fresh Air: Filtered fresh air with a manually adjustable vent: 1.4m³/min (50ft³/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 Factory Diagnostics: Via a facility supplied LAN/internet connection a technician at the factory can access the chamber/room to analyze the mechanical, electrical, and control systems.
7.5 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.

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: 120/208V/3-phase/60Hz/4 Wire + ground (50Hz option: 240/415V/3-phase/50Hz/4 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: On-site training on the controller, electrical, and refrigeration system by a factory technician. (Extra charges may apply to chambers/rooms shipped outside of Canada or the U.S.A.)
10.3 Installation: Installation not included. Please consult with BioChambers for installation 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 Biochambers has available. Ask for more information.

**Available Options**

**LIGHTING**
- Dimmable Lighting
- T5 High Output Lighting
- UV-B Lighting
- HID Lighting

**WARRANTY**
- Extended Warranty

**CONSTRUCTION**
- Additive Humidity
- Humidity Sensors
- Dehumidification

**ADDITIVE HUMIDITY**
- Additive Humidity Spray Nozzles
- Relative Humidity Data Logging

**DEHUMIDIFICATION**
- Dehumidification by Desiccant
- Dehumidification by Refrigeration

**CONDENSER**
- Remote Air Cooled Condenser
- Remote Air Cooled Condenser W/EC Motor

**COATING**
- Evaporator Coating

**REFRIGERATION**
- Refrigeration

**TEMPERATURE**
- Temperature
- Low Temperature Defrost

**TEMPERATURE RANGE**
- Extended Temperature Range

**CO2 SCRUBBER**
- Additive CO2
- CO2 Scrubber

**IRRIGATION**
- Irrigation
- Programmed Output

**DISPLAY**
- Display

**CONTAINMENT**
- Containment
- Containment +/- Pressure

**DISPLAY RECEPTACLE**
- Programmable Receptacle

**LED LIGHTING**
- Long Life LED Lighting

**CONSTRUCTION**
- Custom Growth Height
- Left or Right Hand Control Panel

**HOSE BIB**
- Manual Irrigation
- Programmated Output

**TPC-1S Chamber - Options**
BIOCHAMBERS CAN MANUFACTURE THIS PRODUCT WITH THE CONTROL PANEL MOUNTED ON THE RIGHT SIDE UPON ADVANCED REQUEST.

BIOCHAMBERS CAN MANUFACTURE THIS PRODUCT AT CUSTOM HEIGHTS.

1. Control Panel
2. VNET View or VNET Touch Display
3. Door Opening 648 [25-1/2] x 1461 [57-1/2]
4. Fresh Air
5. Exhaust Air
6. Refrigeration System
7. Instrument Ports
8. Ballast
9. Viewing Window
10. Height Adjustable Lamp Canopy
11. Counter Weight
12. Air Plenum