

# Arabidopsis Chamber MTAC40 Multi Tier Reach In



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## Multi Tier Reach In

### Product Overview/ Applications

The MTAC40 employs a top-mounted refrigeration system. This design minimizes the product footprint, accommodates servicing from the front of the chamber, and simplifies onsite installation. Using two shelves, each with 31.5 inches of growth height, the MTAC40 offers nearly 40 ft<sup>2</sup> of growth area and accommodates medium to large size plants. This combination of features provides an excellent product for growing Arabidopsis from seed to full maturity, as well as other taller, medium-light plant species. Standard on the MTAC40 is a flood tray at each tier to simplify plant irrigation. Please consult Meditech regarding specific requirements.

### Lighting

The standard lighting package for the MTAC40 combines fluorescent and incandescent lamps which produces a very broad based light spectrum of low-to medium light intensity. Heat from the two lamp canopies is removed by the refrigeration system. The lamps are separated from the growth area by a transparent barrier which minimizes heat transfer to the plants. Standard light intensity is 250 micromoles/m<sup>2</sup>/s which is measured by a quantum light meter and transmitted to the controller for user readout. Lighting is switched in three levels for each lamp type. A high light option is available which increase the intensity to 500 micromoles/m<sup>2</sup>/s.

### Airflow

Airflow is distributed horizontally, via a perforated back wall plenum, across each shelf. This helps to establish uniform air distribution and a consistent temperature gradient around the growth area that is independent of plant loading. The unit includes fresh air intake and exhaust which are adjustable to allow up to 20 ft<sup>3</sup>/min (0.57m<sup>3</sup>/min.) of air exchange.

### Refrigeration System

Cooling for the MTAC40 is provided by a top-mounted, water cooled condensing unit with a hot-gas bypass system for continuous compressor operation. An electronic modulating valve rejection information and other options for cooling

provides tight temperature control while ensuring quiet operation. Pressure transducers are included for monitoring the status of the refrigeration system. Consult the factory for heat rejection information and other options for cooling.

### Experiment Protection

User programmable “set and forget” alarms track the chamber’s operation versus user-defined set points. This allows for exceptionally accurate monitoring without the need for adjustment every time the set point is redefined. Backup “high/low” alarms provide a further level of protection while visual and audible notification is provided when any alarm is activated. Contacts for connection to a building management system are also included.

### Key Product Attributes

- Large growth area over two shelves (each with 31.5 inch growth height) with minimal product footprint
- Top-mounted machine compartment minimizes footprint, accommodates serviceability, and simplifies installation
- Growth area drain pans double as irrigation trays for convenient mass watering of plants
- Product certifications/markings; CE



### Performance Data

Temperature Range (°C)	Interior Capacity	Growth Area	Growth Height	Exterior Dimensions (WxDxH)	Light Intensities (6in. from lamp)	Electrical Service	Weight
-2°C to +40°C Lights Off	103ft <sup>3</sup>	38ft <sup>2</sup>	32"	100" x 35½" x 101"	250 µmoles/m <sup>2</sup> /s	120-1Ø-60Hz	1900lb.
+5°C to +45°C Lights On	2915 L	3.5m <sup>2</sup>	800mm	2540 x 900 x 2565 (mm)	@ 25°C	220-1Ø-50Hz	860 kg

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**1.0 Control System:** Meditech 7 inch Touch Screen Controller

**2.0 Construction: (Note: All dimensions are nominal.)**

- 2.1 Exterior Dimensions: 100"W x 35.5"D x 101"H (2540mmW x 900mmD x 2565mmH) (106"H with service cover opened)
- 2.2 Interior Dimensions: 97"W x 30.5"D (2465mmW x 775mmD)
- 2.3 Growth Area: 38ft<sup>2</sup> (3.5m<sup>2</sup>) on two shelves.
- 2.4 Growth Height: 32" (810mm) per shelf.
- 2.5 Perforated aluminum back wall, providing horizontal air flow.
- 2.6 Cabinet Construction: Bonded paneling using CFC-free insulation.
- 2.7 Exterior Finish: Blue-green enamel baked on patterned aluminum.
- 2.8 Interior Finish: Reflective white enamel baked on smooth aluminum on front wall and doors. Back wall has a perforated bare aluminum finish. End walls have reflective specular aluminum finish.
- 2.9 Condensing Unit Access: Compressor and refrigeration components located on top front of chamber, easily accessible from front of unit.
- 2.10 Doors: Two reach-in doors with keyed magnetic locks
- 2.11 Observation Window: Two (2) dual pane windows with light tight cover.
- 2.12 Control Panel: Center mounted.
- 2.13 Each growth area drain pan doubles as an irrigation tray for convenient watering of plants
- 2.13.1 Control: Manually adjustable via syphon valve
- 2.13.2 See option list for automatic irrigation flow control option – EFIS.
- 2.14 Instrument Ports: Two ports, 2" (50mm) with light tight caps.
- 2.15 Anchoring: Unit is secured to floor using concrete anchors. This is required due to high centre of gravity.
- 2.16 Packaging: Factory assembled and tested. Machine compartment is then removed for crating and shipping requires re-installation on site.

**3.0 Lighting:**

- 3.1 Intensity<sup>1</sup>: Approximately 250 micromoles/m<sup>2</sup>/s over each shelf.
- 3.2 Programming and Control: 3 level programming of lamps.
- 3.3 Lamps: Balanced spectrum for plant growth using T8 fluorescent lamps and tungsten incandescent lamps evenly spaced over each of the three growth areas.
- 3.4 Lamp Fixture: Separated from the growth area by a transparent barrier. Barrier is hinged for easy lamp access from inside the growth area.
- 3.5 Lamp Heat: Removed by refrigeration system.
- 3.6 Ballasts: High efficiency electronic and easily accessible.
- 3.8 Light Meter: Quantum light meter with alarm capability
- 3.5 Ballasts: High efficiency electronic and easily accessible.

**4.0 Temperature Control:** (Maximum design ambient temperature is +35°C)

- 4.1 Range: +4°C to +45°C lights OFF, +10°C to +45°C lights ON.
- 4.2 Control 2: ±0.5°C, at control point.
- 4.3 Temperature Safety Limits:

**Primary:** A programmable min and max temperature limit alarm or a limit tracking alarm that automatically follows the programmed set point.

**Secondary:** An independent factory-set high and low temperature limit is also provided for increased assurance.

An audible alarm is standard for both limits. Activation of temperature safety limit set points turns off power to the chamber.

Average Light measurement at 6"(150mm) from a lamp barrier on a 6-inch grid, chamber temperature of 25°C. Light intensities are nominal values measured at the rated chamber supply voltage. (Measured by a LI190 Quantum Sensor).



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**4.4 Aspirator:** Located in the machine compartment to provide a remote location for sensors for accurate controlling and recording, unaffected by lamp radiation.

### **5.0 Refrigeration:**

**5.1 Condensing Unit:** Cabinet is supplied with a water-cooled hermetically sealed condensing unit with hot gas bypass system for continuous compressor operation, extended compressor life and close temperature control. Condensing unit is located in the machine compartment, and includes a 3-way water modulating valve and hand operated shut off bypass valve. Maximum pressure drop across the condenser and water valve not to exceed 10psi (0.7 bar).

**5.2 Valve:** Electromagnetic 3-way proportional valve that smoothly modulates the heating and cooling functions of the chamber.

**5.3 Heat Exchanger Coil(s):** Copper-tubed construction.

**5.4 Refrigerant:** Refrigeration system is charged with CFC-free refrigerant.

**5.5 Monitoring:**

- a) Refrigeration system operation is monitored by the control system, including visual and audible alarm.
- b) Pressure transducers allow for real-time diagnostics for preventative maintenance & repair.

### **6.0 Air Flow:**

**6.1 Distribution:** Conditioned air is directed horizontally across each growth area by a pressurized perforated rear wall plenum to ensure air flow and temperature uniformity.

**6.2 Fresh Air:** Filtered inlet and adjustable exhaust to 20ft<sup>3</sup>/min (0.57m<sup>3</sup>/min).

### **7.0 Humidity Control: (Optional)**

**7.1 Range:** No control on basic unit. (Refer to Humidity under Optional Accessories)

### **8.0 Carbon Dioxide Additive Control: (Optional)**

**8.1 Range:** No control on basic unit. (Refer to Carbon Dioxide Additive Control under Optional Accessories)

### **9.0 Utility Requirements<sup>3</sup>: (Rating increases with some options.)**

**9.1 Electrical Service:**

60Hz: 120/208-3Ø-60Hz-4 wire plus ground

50Hz: 220/380-3Ø-50Hz-4 wire plus ground

**9.2 Drain:** Floor drain must be provided outside footprint of cabinet.

### **10.0 Installation: (Optional)**

**10.1** Not included, to be performed by others. Installation is available upon request, please consult factory.

**10.2** Should installation or technical support be required through Convirons' Technical Service group, additional charges may apply



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## OPTIONAL ACCESSORIES

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<b>PROGRAMMING</b>	Can be modified according to customers requirements	
<b>UPS</b>	Uninterrupted Power Supply	Surge protection and uninterrupted power supply, on controller only, for continuous operation of the controller during power interruptions, duration of the UPS is approx. 15 minutes. (Consult factory for increased duration, if required.)
<b>TEMPERATURE</b>	Consult Factory	
<b>HUMIDITY</b> (Based on +21°C and 50% RH ambient condition)		
<b>DHS</b>	Dry Humidity Sensor	Dry Electronic Sensor that directly measures and displays relative humidity in %RH by means of constant display (Not required if ordering additive humidity control option.)
<b>SNH</b>	Spray Nozzle Humidification	Range: Up to 90% RH lights OFF and 85% RH lights ON, limited by a +25°C maximum. Dew point. Additive humidity through use of spray nozzles. Range given in an empty chamber. Chamber may achieve higher levels with plant loading. Programming: See Control System documentation. Control: $\pm 3\%$ RH. System uses a dry humidity sensor to directly measure humidity in %RH (no wet sock). Spray nozzles require a 60 psi (4.2 bar) pressure and must be supplied with clean water to the following specification; pH = $7.0 \pm 0.5$ , filtration <2 microns (0.00008 in) and resistivity between 0.5 and 1.0 Meg Ohms. Maximum water usage to maintain specified levels is 2 liters/hr. If the above water pressure is not available the CPSNH option is required to supply necessary pressure. Note: When ordered with units requiring temperatures below 4°C, humidity system is provided with a low pressure air clean out system. Low pressure air must be supplied to cabinet (35 psi).
<b>CPSNH</b>	Compact Pump Spray Nozzle Humidification	Compact pump and reservoir for spray nozzles. Order this option with SNH if the minimum 60 psi (4.2 bar) water pressure is not available. Supplies pressurized water for up to 12 nozzles
<b>RES</b>	Reservoir	Pressure reservoir at downstream chambers. Must be ordered for all downstream chambers fed from CPSNH.
<b>SCD</b>	Separate Dehumidification	Coil (Please contact factory with requirements.)



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### Carbon Dioxide Additive Control

**CO2** Carbon Dioxide Package includes gas analyzer, control valve, and injection system. Additive Control CO2 tank not included.

### CONSTRUCTION

**GH** Growth Height Two-tier chamber design increases growth height to 35" (890mm), exterior height becomes 106"H (2690mmH) (111" (2820mmH with service cover opened).

**EFIS** Irrigation System Automatic control of irrigation system through the control system. System requires dedicated supply of irrigation water.

**Man** Manual Additional Operator's Manual. (One supplied with basic unit.)

**RAC** Remote Outdoor Air-Cooled Condenser Remote outdoor air-cooled condenser complete with all weather housing, low ambient operation controls and low noise level operation. Remote location (up to 50' [15m] combined horizontal and vertical distance) of condenser only - compressor, receiver and other refrigeration components remain in cabinet machine compartment. Order "RACH" for climates with ambient temperatures from +35°C to +45°C for extended periods. Electrical: 60Hz - 208-230-1Ø-60Hz-3 wire plus ground, 50Hz - 220-1Ø-50Hz-2 wire plus ground. Consult factory for either amperages or other voltages available.

#### Notes:

1. Inter-connecting refrigeration and electrical lines are not included and must be provided by others.
2. RAC and RACH require a separate electrical service.
3. For remote location distances over 50' (15m) please consult factory.
4. Must be ordered with an electronic 3-way proportional valve [PV].

**GLY** Glycol Glycol heating/cooling designed to work with a central chiller refrigeration system. Includes 3-way proportional valve control.

**FMU** Floor Mounted Condensing Unit Where ceiling space above cabinet does not allow roof top location, unit is placed on floor adjacent to cabinet. All refrigeration and electrical interconnecting piping and wiring is supplied, providing condensing unit is no more than 5' (1525mm) from cabinet.

**ACSC** Air Self Contained Condenser -Cooled An air-cooled, self-contained condenser. Note: Amp draw increases, consult factory.

**OACU** Outdoor Air-Cooled Condensing Unit Outdoor air-cooled condensing unit containing condenser, compressor, receiver, suction accumulator, control and pressure regulating valves and electrical disconnect. The OACU comes complete with weatherized hood and crankcase heater for low ambient conditions. Inter-connecting refrigeration and electrical lines are not included and must be provided by others. OACU requires a separate electrical service. Electrical: 60Hz - 208-3Ø 60Hz-3wire plus ground, 50Hz - 400-3Ø-50Hz-3wire plus ground. Consult factory for either amperages or other voltages available

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### NOTES:

1. STANDARD REFRIGERATION SYSTEM IS WATER COOLED, (1/2" Ø (13mmØ) CONNECTION).
2. CHAMBER MUST BE SECURELY FASTENED TO FLOOR.
3. DEPTH DIMENSION IS CHAMBER SIZE ONLY. DIMENSION DOES NOT INCLUDE DOOR LATCH OR HINGES.
4. FOR BACK TO BACK INSTALLATION, ALLOW 2" (50mm) SPACE BETWEEN CHAMBERS.
5. LENGTH AND WIDTH DIMENSIONS ±1/4" (6mm), HEIGHT DIMENSION ±1" (25mm).  
DO NOT SCALE DRAWING.

