



# Plant Growth Chamber MS10H

## Product Overview/Applications

The MS10H plant growth chamber offers a wide-range humidity control. Plant pathology, entomology, and plant physiology are prime examples of the type of research and teaching programs that are suitable with the MS10H and that can benefit from its humidity control capabilities. The MS10H accommodates tall plants, with its generous 59" (1500mm) growth height, and offers 10ft<sup>2</sup> (0.9 m<sup>3</sup>) of growth area. Barriercd and ventilated canopies reduce the load on the refrigeration system thereby lowering operating costs. Please consult Meditech for your specific requirements.

## Lighting

The standard lighting system on the MS10H provides a broad based light spectrum for plant growth by employing a combination of fluorescent and incandescent lamps. The lamps are housed within a barriercd canopy which reduces heat transfer to the growth area. Excess heat in the canopy is ventilated to ambient. Standard light intensity is 500 micromoles/m<sup>2</sup>/s which is measured by a quantum light meter and transmitted to the controller for user readout. Standard lighting control provides four levels per lamp type.

## Airflow

Airflow for the MS10H is distributed uniformly upward using Meditech's innovative Uni-floor air distribution plenum. The unit includes fresh air intake and exhaust which are adjustable up to 10ft<sup>3</sup>/min (0.28m<sup>3</sup>/min.) which also helps to ensure adequate ambient gas exchange.

## Refrigeration

Cooling is provided by a self-contained air-cooled condensing unit with hot gas bypass for continuous compressor operation. An electronic modulating valve 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 alternative refrigeration methods.

## 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

- Wide-range humidity control as a standard feature
- Barriercd and ventilated canopies reduce refrigeration system load and operating costs.
- Shipped fully assembled – fits through standard doorways
- 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
10 – 45 lights on	49ft <sup>3</sup>	10ft <sup>2</sup>	59"	79.5" x 33.25" x 79"	500 $\mu$ moles/m <sup>2</sup> /s	120-1 $\emptyset$ -60Hz	1000lb.
4 – 40 lights off	1380L	0.93m <sup>2</sup>	1500mm	2020 x 845 x 2010 (mm)	@ 25°C	220-1 $\emptyset$ -50Hz	454kg

**1.0 Control System:** 7" Meditech touch screen controller

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

- 2.1 Exterior Dimensions: 79.5"W x 33.25"D x 79"H (2020mmW x 845mmD x 2010 mmH).
- 2.2 Interior Dimensions: 47.75"W x 30"D x 59"H (1215mmW x 760mmD x 1500mmH).
- 2.3 Growth Area: 10ft<sup>2</sup> (0.93m<sup>2</sup>).
- 2.4 Growth Capacity: 49ft<sup>3</sup> (1380 liters).
- 2.5 Floor: Perforated aluminum channel floor for uniform upward air flow – Uni-floor.
- 2.6 Cabinet Construction: Bonded panelling using CFC-free insulation.
- 2.7 Growth Height: 59" (1500mm).
- 2.8 Exterior Finish: Blue-green enamel baked on patterned aluminum.
- 2.9 Interior Finish: Reflective white enamel baked on smooth aluminum.
- 2.10 Door: One reach-in door with keyed magnetic lock, clear opening 25.75"W x 55.75"H (1415mmH x 655mmW).
- 2.11 Control Panel: Left hand.
- 2.12 Instrument Port: One port, 1" (25mm) diameter with light tight cap.
- 2.13 Shelves: Corrosion resistant wire adjustable on 0.5" (12mm) centers.
- 2.14 Packaging: Factory assembled, tested and fully crated.

### 3.0 Lighting:

- 3.1 Intensity<sup>1</sup>: 860 micromoles/m<sup>2</sup>/s (Higher light intensities are optional.)
- 3.2 Programming and Control: Independent, 4 level programming of each light type.
- 3.3 Lamps: Balanced spectrum for plant growth using T8 fluorescent and tungsten incandescent lamps.
- 3.4 Lamp Fixture: Counterbalanced for adjustable light intensities – Light right
- 3.5 Lamp Heat: Removed by refrigeration system.
- 3.6 Ballasts: High efficiency electronic and easily accessible.
- 3.7 Light Meter: Quantum light meter for display and recording of light output.

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

- 4.1 Range: +4°C to +45°C lights OFF, +4°C to +40°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.

- 4.4 Air Sensor : This vertically adjustable sensing device located in the growth area directs a continuous sample of chamber air over the remote sensors for accurate controlling and recording, unaffected by lamp radiation.

<sup>1</sup> Average Light measurement at 6" (150mm) from lamp barrier on 6-inch grid, chamber and ambient temperature of 25°C. Light intensities are nominal values measured at the rated chamber supply voltage. (Measured by a LI190 Quantum Sensor).

<sup>2</sup> Measured by Precision Thermistors, measured without test materials or optional accessories.

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

### 6.0 Air Flow:

- 6.1 Vertical: Optimized air flow, provided by centrifugal impellers, is directed to growth area uniformly upward via Uni-floor system.
- 6.2 Fresh Air: Filtered inlet and adjustable exhaust 55ft<sup>3</sup>/min (1.55m<sup>3</sup>/min).

### 7.0 Humidity Control: (Optional)

- 7.1 Range: at +15°C: 50 to 90% RH.  
at +25°C: 40 to 85% RH.  
at +35°C: 40 to 55% RH.  
High RH level indicated is limited by a +25°C dew point.
- 7.2 Programming: See Control System.
- 7.3 Control at Sensor: ±3% RH. System uses a dry humidity sensor to directly measure humidity in %RH (no wet sock).
- 7.4 Additive Humidity By: Centrifugal atomizing humidifier.
- 7.5 Dehumidification By: Refrigeration and reheat.

### 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: 50Hz:

(Alternative services available, consult factory)

120/208-3ph-60Hz-4 wire plus ground

220/380-3ph-50Hz-4 wire plus ground

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

9.3 Humidity: Centrifugal atomizing humidifiers must be supplied with clean water to the following specification; pH = 7.0 ± 0.5, filtration <2 microns (0.00008 in) and resistivity between 0.5 and 1.0 Meg Ohms.

### 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 thorough Convirons' Technical Service group, additional charges may apply.

**OPTIONAL ACCESSORIES**

<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>LIGHTING</b>		
<b>HUMIDITY</b> (Based on +21°C and 50% RH ambient condition)		

**Carbon Dioxide Additive Control**

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

OW	Observation Window	11" x 15" (280mm x 380mm) dual pane with light tight cover.
S	Shelves	Additional corrosion resistant wire shelves may be added. (One supplied with basic unit.)
CAST	Casters	Heavy duty swivel casters.
MAN	Manual	Additional Operator's Manual. (One supplied with basic unit.)

**REFRIGERATION**

GLY	Glycol	Glycol heating/cooling designed to work with a central chiller refrigeration system. Includes 3-way proportional valve control.
WC	Water Cooled Operation	Water-cooled hermetically sealed condensing unit with hot gas bypass system for continuous compressor operation, extended compressor life and close temperature control. Condensing unit to be 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 10pis (0.7 bar).



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## NOTES:

1. STANDARD REFRIGERATION SYSTEM IS SELF-CONTAINED AIR-COOLED. WATER COOLED REFRIGERATION (1/2"Ø (13mmØ) CONNECTION) IS OPTIONAL.
2. REQUIRE A MINIMUM OF 2" (51mm) FROM REAR OF CHAMBER TO BACK WALL.
3. DEPTH DIMENSION IS CHAMBER SIZE ONLY. DIMENSION DOES NOT INCLUDE DOOR LATCH OR PIPING ON BACK WALL.
4. LENGTH AND WIDTH DIMENSIONS  $\pm 1/4$  (6mm), HEIGHT DIMENSION  $\pm 1$ " (25mm). DO NOT SCALE DRAWING.

