

MICRO GROW

GREENHOUSE SYSTEMS, INC.

42065 Zevo Dr., Unit B-1, Temecula, CA 92590

Phone (951) 296-3340 Fax (951) 296-3350

www.microgrow.com

GROWSTAT

Control Series

GROWSTAT

INSTALLATION PROCEDURES

CONTROL MOUNTING

Mount the Growstat control in an accessible location. Make sure that the location is free of vibration and in close proximity to Relay/Contactor cabinet or other equipment. Always consider voltage drop of electrical current when locating the Relay/Contactor cabinet or other equipment. Securely mount the Growstat control.

SWITCHING CONTACTORS AND RELAYS

The Growstat control will operate the greenhouse equipment via load contactors and load relays. **ALL LOAD CONTACTORS USED MUST HAVE A SURGE SUPPRESSOR INSTALLED ACROSS THE COIL OF THE LOAD CONTACTOR.**

These surge suppressors are readily available from Micro Grow Greenhouse Systems, Inc. All load contactors and relays are also readily available from Micro Grow Greenhouse Systems. To decide which to use, follow this guide:

LOAD CONTACTORS:

Exhaust fans, pad pumps, horizontal air flow fans, heating pumps, fan jets, large heaters, crop lighting and all other larger electrical loads over 1/6 H.P.

LOAD RELAYS:

Signal switching such as the small control lines for gas fired heaters, control lines for vent and shade system controls, small loads such as motorized shutters, and other loads up to 1/6 H.P.

CUSTOM CONTACTOR AND RELAY PANEL AVAILABLE

A UL, custom pre-wired load contactor and load relay panel is available from Micro Grow Greenhouse Systems, Inc. This panel will contain all of the required switching apparatus for your project, as well as a correctly sized Machine Tool Transformer. Contact Micro Grow Greenhouse Systems, Inc. for pricing and availability.

TRANSFORMERS

The control panel is to be powered by a 24 VAC transformer. It is most important to use a MACHINE TOOL TYPE. A Machine Tool Transformer is a heavy-duty variety that allow for high inrush currents that are associated with the use of load contactors and relays. Micro Grow Greenhouse Systems, Inc. stocks this type of transformer. Use no smaller than a 40 VA Machine Tool Transformer.

ELECTRICAL CIRCUITS

The electrical circuit that feeds the Machine Tool Transformer must have no other loads connected to it. This will prevent a damaging surge from other related electrical devices. Follow all local and national codes in the connection of all the greenhouse equipment. Always allow for voltage drop conditions. Always consider that the greenhouse is a wet environment. Always follow the code rulings for disconnect switches and overcurrent devices on greenhouse equipment.

USE A QUALIFIED AND LICENSED ELECTRICIAN AT ALL TIMES.

WIRING METHODS

Always use stranded wire when connecting cables or conductors to the actual circuit board of the Growstat control. This will allow flexibility. Use no smaller than #18 gauge stranded wire for all outputs. Use no smaller than the recommended wire size of stranded cable for inputs, generally #22 gauge.

SENSOR CONDUCTORS: Route sensor conductors separately from control conductors.

This is very important so as to reduce electrical interference. Never route sensor conductors in conduits used for other voltages. This is in violation of the electrical code and will cause dangerous interference to the control system. Always locate the actual sensor in the center of the range that is being controlled for accurate readings. Do not allow the sensor to come in contact with any greenhouse structure member such as a post that would give off any radiated heat and cause a false temperature reading. Do not locate the sensor where a particular piece of equipment would cause false readings, such as a heater blowing directly on the sensor.

Mount all wind/rain sensor in a clear area, free of any wind obstructions.

CONTROL CONDUCTORS: Route all control conductors separately from sensor conductors.

This is very important so as to reduce electrical interference. Control conductors may be routed in conduits that contain other power system wiring only if the insulation material on the conductors is the same as the power system wiring. Consult the national electrical code or local codes if in doubt about the insulation ratings of the wire in use. Remember, always use a qualified and licensed electrician.

VENT SYSTEMS, ROLL UP CURTAINS

When connecting a vent system or roll up curtain ventilation system to the control panel, you must use a separate control box designed for that particular vent system. These are readily available from Micro Grow Greenhouse Systems, Inc. Generally these separate control boxes feature overcurrent protection for the particular motor on the vent or shade system, provisions for direct limit switch connections, and a manual means of operating the vent system independent of the main control system. These separate control boxes will connect the main control system either directly through the outputs of the control system, or they will require control relays for interconnection to the main control system. Consult the individual instructions that come with the vent or shade controls for detailed information.

SYSTEM TESTING

It is always important to completely and fully test the electrical system by energizing circuits and verifying equipment operations before automatically operating the equipment from the Growstat control. This would include setting all of the vent and shade limit switches at the individual control panels.

Growstat Configuration

The Growstat control has three (3) sensor inputs and two (2) dry switched outputs.

- ▶ Sensor Input 1 controls Output 1.
- ▶ Sensor Input 2 controls Output 2.
- ▶ Sensor Input 3 is used for the Photocell if installed.

The Growstat control comes with an air temperature sensor (standard) and a Photocell that detects sunrise and sunset. Refer to page 8 of this manual for wiring diagram. It will show an example of the connections for both sensors. If you are using two (2) air temperature sensors refer to page 7 for the correct wiring diagram.

If both outputs are to be controlled by the same air temperature sensor you will need to share the sensor. This is done by wiring the air temperature sensor to both inputs 1 and 2. You will need to install a jumper between sensor Input 1 and sensor Input 2, then cut the pull-up resistor R16. The R16 resistor is located to the left on the sensor input connector. If you are sharing the air temperature for both outputs you can refer to page 7 of this manual for the wiring diagram.

The Growstat control has two (2) dry switched outputs. They can be set for either COOLING or HEATING or a combination of both. These and several other features can be set via the S1 dip switch. The S1 dip switch features are listed on page 9 of this manual.

Setting S1 Dip Switch

If you want to change the factory default settings follow these steps:

1. Remove power from the Growstat control.
2. Set the S1 dip switch to your preferred settings.
3. Reapply power to Growstat.
4. When Growstat displays the current temperature, hold down both the **RUN/SET** switch and the **VALUE** switch at the same time for approximately four (4) seconds. The Growstat display will flash all eights (8) across it (example: 88888). Once you see this, release both switches and the Growstat will power up with the new dip switch values that you have selected.

Set Temperature:

1. Depress the **SET** switch once. The OUTPUT 1 indicator will be “ON”. Use the **VALUE** switch to set the correct desired setting. This will be the Day mode setting. Depress the **SET** switch again to light the NIGHT indicator along with the OUTPUT 1 indicator. Set the desired Night level here.
2. (If DIF is not used, this instruction will not apply) If DIF is being used, the temperature setting for the DIF time period will be set next. Continue to depress the **SET** switch until the word “DIF” is displayed. The control will show the DIF temperature. Use the **VALUE** switch to set the desired DIF temperature. See Pg. 5 for DIF settings.
3. Depress the **SET** switch again. The OUTPUT 2 indicator will be “ON”. Use the **VALUE** switch to set desired settings for Output 2. This will be the Day mode setting. Depress **SET** switch again to light up the Night indicator along with OUTPUT 2 indicator, set desired Night level here.
4. Return to the Run mode by toggling the **RUN** switch up.

To Check High and Low History:

The control will automatically track the High and Low readings for the past 24 hours on both inputs. To check them, depress the **SET** switch until the word “HIGH” appears in the display. The control will automatically indicate the highest reading for the past 24 hours. Depress the **SET** switch until the word “LO” appears in the display. The control will automatically indicate the lowest reading for the past 24 hours for input 1. Press **SET** switch again to see the High for Input 2. Press **SET** switch again to display the Low for input 2. If you would like to reset these values, depress the **VALUE** switch once while the system is in the High and Low mode. The system will automatically update these readings continuously.

To Set the Clock:

Continue to depress the **SET** switch until the SET TIME indicator is “ON”. The item to be set will be flashing. Use the **VALUE** switch to raise or lower the flashing value. The first value will be Hours. Depress the **SET** switch again to set the Minutes, and once more to set if it is AM or PM.

To Set the Day and Night Mode Times:

Growstat can detect night automatically with the use of the Photocell. If no Photocell is connected, it will use the internal 24-hour time clock. You can also use a combination of both if desired.

1. Continue to depress the **SET** switch until the SET DAY MODE indicator is “ON”. If a Photocell is connected to the system adjust the Hours setting until the word “PHO” appears in the display. If a Photocell is not connected, a time can be set. Use the **VALUE** switch to change the setting.
2. Depress the **SET** switch again and repeat the above procedure to set Night mode. If you do not want the Night mode to be used, adjust the Hours setting until “OFF” appears in the display.

To Activate the DIF Mode

The Growstat has a built-in DIF mode of operation. The DIF mode is used to control plant growth based on a temperature differential between the day and night modes. The Growstat allows the user to set a special time for this mode. For truly automatic operation, a Photocell should be used to detect the actual sunrise time.

To set the DIF time period:

1. Continue to depress the **SET** switch while the SET TIME indicator is "ON" and while the DIF indicator is also lit, the word "OFF" will be shown. This means that the DIF mode is disabled. By toggling the **VALUE** switch, a number preceded by a negative sign will be shown "-8.0" (example). This will be the number of hours before sunrise, or before the Set Day mode time that the Growstat will use to enter the DIF mode. Set any value in .5 hour increments desired. After this negative number is set, depress the **SET** switch again. A number will appear without a negative sign in front of it "2.0" (example). This will be number of hours after sunrise or after the set Day mode that the Growstat will use to exit the DIF mode.
2. Return to the Run mode when finished.

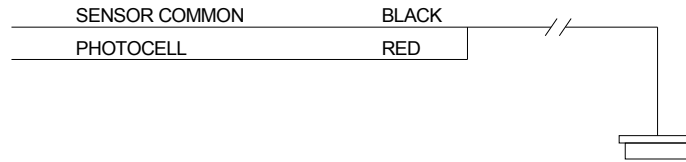
To Calibrate the Control:

The Growstat control can be calibrated easily. Calibration is best performed in the early or late hours to prevent the interaction of the solar influence. Using a good digital thermometer, obtain the value to calibrate the control to.

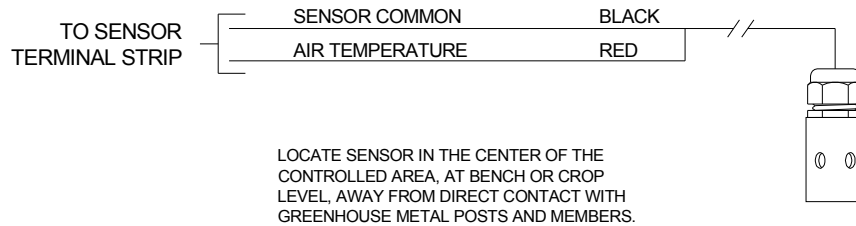
1. Continue to depress the **SET** switch until "CALIB" is on the display. The first number to appear afterwards will be the temperature. Use the **VALUE** switch to change the setting.
2. Depress the **SET** switch again for Output 1 and repeat the above procedure to set the temperature reading for Output 2 if two (2) sensors are in use. Return to Run mode when finished.

Note: The temperature sensors are very accurate and should not need to be calibrated more than a few degrees.

PHOTOCELL



AIR TEMPERATURE SENSOR



GROWSTAT SENSORS



MICRO GROW GREENHOUSE SYSTEMS, INC.
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 Phone 951.296.3340 Fax 951.296.3350

Project

GROWSTAT SENSORS

Drawn by

Date

Distributor

Order ID

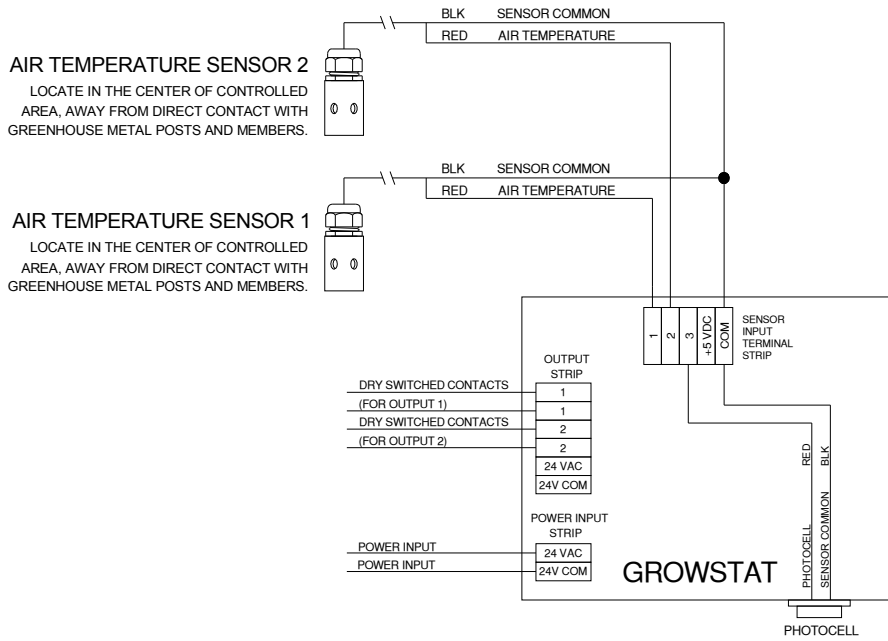
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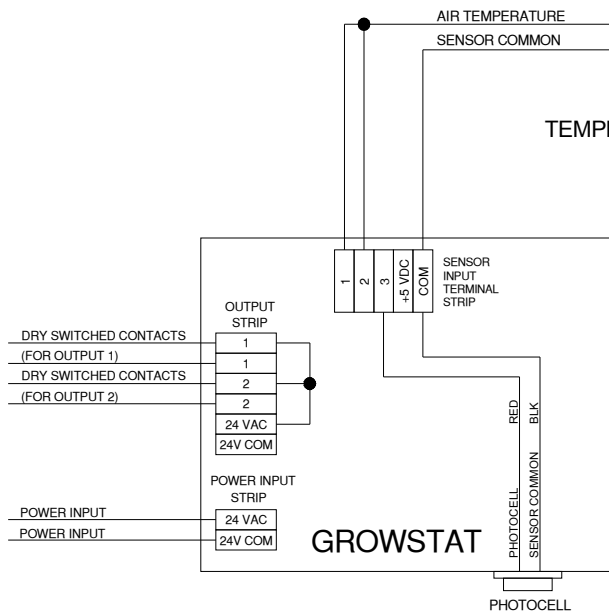
MICRO GROW

N/A

INDOOR / OUTDOOR TEMPERATURE SENSOR CONNECTION



SHARED AIR TEMPERATURE SENSOR



NOTE:
IF AIR TEMPERATURE SENSOR IS SHARED YOU MUST CUT R16 PULL UP RESISTOR FOR AN ACCURATE AIR TEMPERATURE READING.



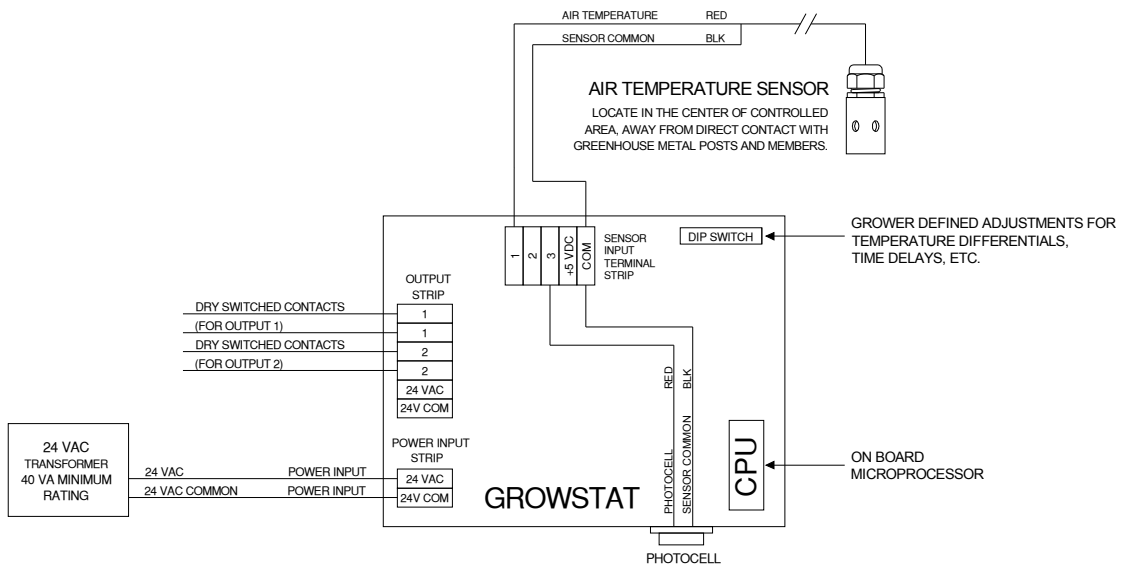
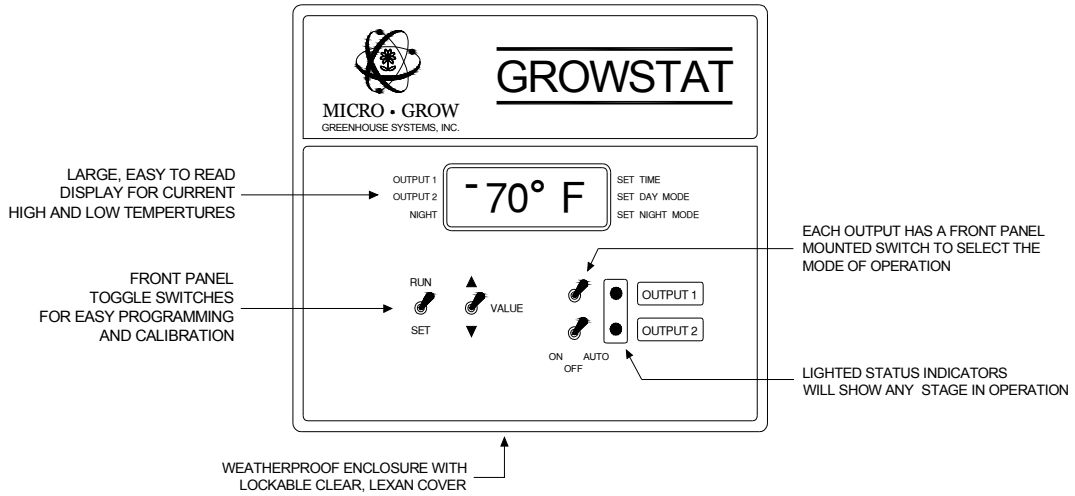
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Project

GROWSTAT SENSOR CONNECTIONS

| Drawn by | Date | Distributor | Order ID |
|----------|---------|-------------|----------|
| SC | 2/03/10 | N/A | N/A |

| | |
|-----------------|-------------------------------|
| ACCURACY | TEMPERATURE +/- 1 F |
| READOUT | 1/2" LCD, F OR C SELECTABLE |
| PROGRAMMING | TOGGLE SWITCH |
| MANUAL SWITCHES | ALL OUTPUTS |
| TIME DELAY | USER SELECTABLE |
| DIFFERENTIAL | USER SELECTABLE |
| ENCLOSURE | WEATHERPROOF, CLEAR COVER |
| VOLTAGE | 24 VAC |
| PHYSICAL SIZE | 6.625" W x 6.75" H x 4.625" D |



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Project

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Drawn by
SC

Date
2/04/10

Distributor
N/A

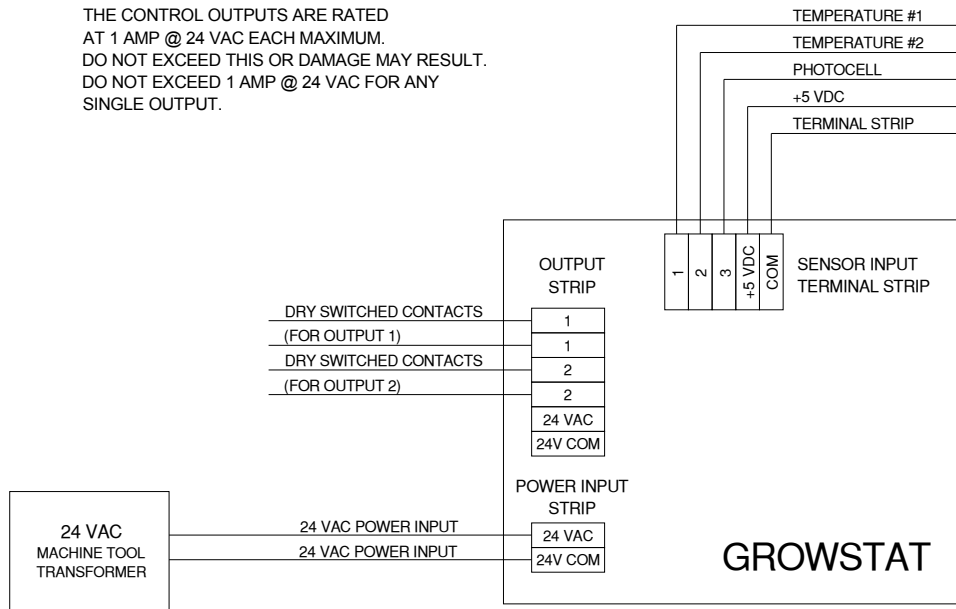
Order ID
N/A

DIP SWITCH SETTINGS


| | |
|--|--|
| <p>TEMPERATURE MODE # 1 OFF FAHRENHEIT # 1 ON CENTIGRADE</p> <p>PHOTOCELL # 2 ON PHOTOCCELL IN USE # 2 OFF NO PHOTOCCELL</p> <p>TEMPERATURE DIFFERENTIAL # 3 OFF # 4 OFF 1 DEGREE # 3 ON # 4 OFF 2 DEGREES # 3 OFF # 4 ON 3 DEGREES # 3 ON # 4 ON 4 DEGREES</p> | <p>DIF ENABLE # 5 OFF DIF OFF # 5 ON DIF ON</p> <p>TIME DELAY # 7 OFF # 8 OFF 2 SECONDS # 7 ON # 8 OFF 30 SECONDS # 7 OFF # 8 ON 60 SECONDS # 7 ON # 8 ON 120 SECONDS</p> <p>OUTPUT DEFINITION # 11 OFF HEATING # 11 ON COOLING # 12 OFF HEATING # 12 ON COOLING</p> |
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OUTPUT NOTE:

THE CONTROL OUTPUTS ARE RATED AT 1 AMP @ 24 VAC EACH MAXIMUM. DO NOT EXCEED THIS OR DAMAGE MAY RESULT. DO NOT EXCEED 1 AMP @ 24 VAC FOR ANY SINGLE OUTPUT.



GROWSTAT INPUTS AND OUTPUTS

| | | | | | |
|---|---|---|--------------------|-----------------|--|
|  | MICRO GROW GREENHOUSE SYSTEMS, INC. 42065 Zevo Dr., Unit B-1 Temecula, CA 92590 Phone 951.296.3340 Fax 951.296.3350 | Project GROWSTAT INPUTS AND OUTPUTS | | | |
| | Drawn by SC | Date 4/07/09 | Distributor N/A | Order ID N/A | |

LIMITED WARRANTY

Micro Grow Greenhouse Systems, Inc. warrants that all of the products Micro Grow Greenhouse Systems, Inc. manufactures are free from defects at the time of shipment by Micro Grow Greenhouse Systems, Inc. This warranty covers defects in workmanship and materials. No warranty is extended on any parts, materials, or components manufactured by others and purchased by Micro Grow Greenhouse Systems, Inc., and any warranty on these products only. This warranty excludes any and all damages caused by installation, by unqualified individuals, damage by misuse or neglect, shipment damage, alterations to original manufacturing, and improper installation or use for any reason than intended by manufacturer. This warranty may not be altered in any manner except with the written authorization of one the officers or owners of Micro Grow Greenhouse Systems, Inc. The only and sole liability of Micro Grow Greenhouse Systems, Inc. under this warranty is limited to repairing, replacing or the issuance of credit for any products returned to Micro Grow Greenhouse Systems, Inc. during the warranty period of twelve (12) months from date of shipment. This warranty is specifically conditioned upon Micro Grow Greenhouse Systems, Inc. being notified in writing promptly upon discovery of any product defects by the buyer or end user. The product must then be returned prepaid to Micro Grow Greenhouse Systems, Inc. within the twelve-month warranty period for inspection by Micro Grow Greenhouse Systems, Inc. Upon inspection of said product, Micro Grow Greenhouse Systems, Inc. will notify buyer or end user of its findings. At Micro Grow Greenhouse Systems, Inc. sole discretion, the product will be replaced, repaired or a credit will be issued for the original sale price of the product, provided that damage has not occurred due to misuse, neglect, improper use or installation as outlined above, shipping damages or accident.

MICRO GROW GREENHOUSE SYSTEMS, INC. SHALL NOT BE LIABLE FOR ANY DAMAGES BEYOND THE ACTUAL ORIGINAL COST OF THEIR PRODUCT EITHER DIRECTLY OR INDIRECTLY ARISING FROM DEFECTIVE.