

MICRO GROW

GREENHOUSE SYSTEMS, INC

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Revision 1.0 11-14-01

**Weathermaster Greenhouse
Weather Station**

INSTALLATION PROCEDURES

WEATHERMASTER SERIES OF CONTROLLERS

PANEL MOUNTING

Mount the control panel in an accessible location. Make sure that the location is free of vibration and in close proximity to the devices being controlled. Always consider voltage drop of electrical current when locating the control panel. Securely mount the panel.

SWITCHING CONTACTORS AND RELAYS

The control panel will operate the greenhouse equipment via load contactors and load relays. **ALL RELAYS AND LOAD CONTACTORS USED MUST HAVE A SURGE SUPPRESSOR INSTALLED ACROSS THE COIL OF THE RELAY OR 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, Inc. 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, other loads up to 1/6 H.P.

CUSTOM CONTACTOR AND RELAY PANEL AVAILABLE A custom built 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

A 24 VAC transformer will power the control panel. It is most important to use a MACHINE TOOL TYPE. A Machine Tool Transformer is a heavy-duty variety that will allow for high inrush currents that are associated with the use of load contactors and relays. Micro Grow Greenhouse Systems, Inc. stocks these types of transformers. Use no smaller than a 50 VA Machine Tool Transformer. For a system that has more than three load contactors connected, use a 100 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 damaging surges from other related electrical devices. Follow all local and national codes in the connection of all of 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 control panel. 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.

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 control panel. This would include setting all of the vent and shade limit switches at the individual control panels.

WEATHERMASTER OPERATION AND PROGRAMMING INSTRUCTIONS

PROGRAMMING LIGHTS

RUN-Indicates that the system is in the running mode.

SET PROGRAM-Set the clock, system identifications.

SET REPORTS-This will enable the REPORT feature of the Weathermaster.

CALIBRATE-This will put the Weathermaster in the calibration mode.

SET WIND-Set the criteria for wind outputs here.

SET RAIN-Set the criteria for rain output here.

SET TEMPERATURE-Set the criteria for the temperature output here.

PROGRAMMING SWITCHES

There are three main programming switches located on the Weathermaster front panel. These are:

RUN-SET SWITCH

RUN-Puts the control in the RUN mode.

SET-Puts the control in the SET mode in order to set all functions as outlined on the programming lights.

PRIOR-NEXT SWITCH

PRIOR-Advances to the prior item in the menu.

NEXT-Advances to the next item in the menu.

VALUE UP-VALUE DOWN SWITCH

VALUE UP-Increases the value in the display.

VALUE DOWN-Decreases the value in the display.

(The VALUE switch is also used to toggle between selected item choices available)

SET SYSTEM

The **SET PROGRAM** mode is used to set the system clock and date, the setpoint to turn on the temperature output, and to set the custom identification that will appear on the display during the run mode. Finally, the remote ID code for use with the GROWLINK PC communications program is set here.

1. Enter the **SET SYSTEM** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired item to set.
3. Use the **VALUE** switch to increase or decrease the display reading. Also use this switch to toggle between desired choices that the system has internally provided.

**Set Clk (12:00) PM
Mon 01/ 02/ 94**

Set the correct time and date.

**Custom System ID
(OFF)**

By changing this to **PROGRAM**, you may enter a custom ID that will appear on the screen when the system is running. This may include the name of the range, or other information. If **PROGRAM** is selected, then use the **VALUE** switch to select the desired alphanumeric information, and the **PRIOR/NEXT** switch to advance to the next digit. A blank space may also be selected if desired.

**Remote ID Code:
(0)**

Used in setting the ID code for the optional GROWLINK PC program available for the WEATHERMASTER system.

**Temperature
Setpoint = (60)**

Set the desired value for the flashing segment.

RUN REPORTS

The **RUN REPORTS** mode allows the grower to run selected reports on the sensor history.

1. Enter the **RUN REPORTS** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired report.
3. Continue to use the **PRIOR-NEXT** switch to advance and view reports.

**Display Report
(Outside)**

Select the desired report for display.

CALIBRATE

The **CALIBRATE** mode is used in order to calibrate all of the sensor readings.

1. Enter the **CALIBRATE** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired item to calibrate.
3. Use the **VALUE** switch to increase or decrease the display reading.

Calibrate: Air Temp (80)° F

Set the desired value. The calibration procedure should be done with a reliable thermometer, out of direct solar influence when calibrating temperatures. Set desired value for the flashing segment.

SET RAIN

The **SET RAIN** mode will be used to set the desired sensitivity of the rain sensor.

1. Enter the **SET RAIN** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired item to set.
3. Use the **VALUE** switch to toggle between desired choices that the system has internally provided.

Rain Sensitivity (Medium)

Set the desired sensitivity of the rain sensor.

SET WIND

The **SET WIND** mode will be used to set the desired wind setpoint and direction to activate the wind output. heating stage temperature separations and differentials. The internal time delays that will prevent rapid cycling are also set here.

1. Enter the **SET WIND** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired item to set.
3. Use the **VALUE** switch to toggle between desired choices that the system has internally provided.

Wnd1 (20) MPH N NE E SE S SW W NW

Set the desired wind speed and direction that the output will activate on.

Wind 1 On Delay (2 Sec.)

Set the desired time delay here. The time delay will be active on energizing the output.

Wind 1 Off Delay (1 Min)

Set the desired time delay here. The time delay will be active on de-energizing the output.

SET TEMPERATURE

The **SET TEMPERATURE** mode will be used to set the desired outdoor temperature differentials. The internal time delays that will prevent rapid cycling are also set here.

1. Enter the **SET TEMPERATURE** mode.
2. Use the **PRIOR-NEXT** switch to advance to the desired item to set.
3. Use the **VALUE** switch to toggle between desired choices that the system has internally provided.

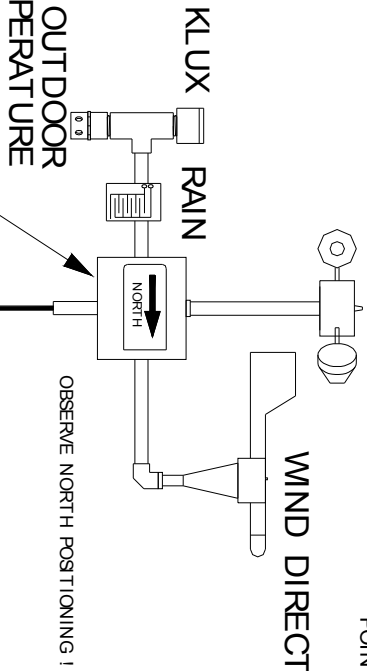
Temperature Differential (2)^o

Set the desired differential of the outdoor temperature stage here. The differential is the amount of temperature increase that the sensor must see before turning off a temperature stage.

Temperature Timing (2 Sec.)

Set the desired time delay here. The time delay will be active on both energizing and de-energizing stages.

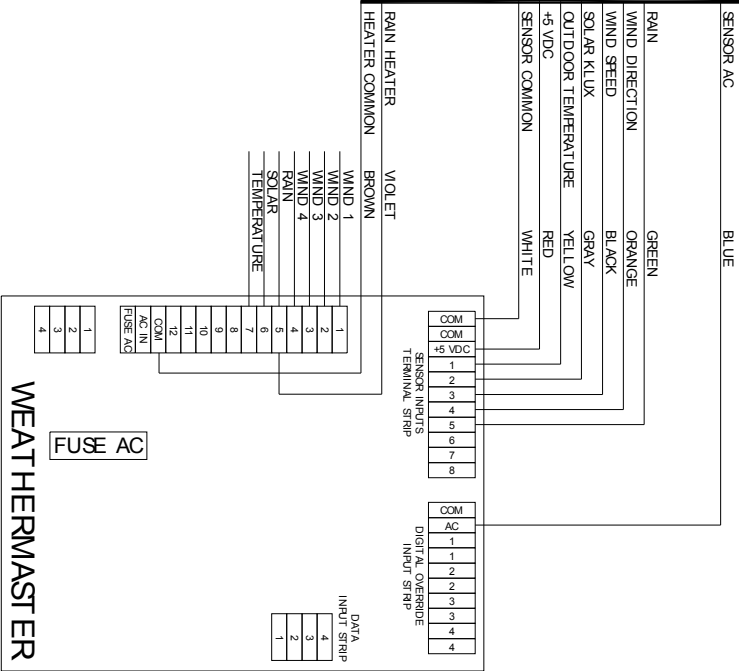
WIND SPEED
WIND DIRECTION
SECURELY MOUNT THE OUTDOOR
SENSOR AT THE HIGHEST UNOBSTRUCTED
POINT ON THE GREENHOUSE.



* TERMINATION DETAILS *

| | | |
|----|----------------|-----|
| 1 | HEATER COMMON | BRN |
| 2 | RAIN HEATER | VIO |
| 3 | WIND DIRECTION | ORG |
| 4 | SOLAR KLUX | GRY |
| 5 | FUSED 24 VAC | BLU |
| 6 | SENSOR COMMON | WHT |
| 7 | +5 VDC | RED |
| 8 | OUTDOOR TEMP | YEL |
| 9 | WIND SPEED | BLK |
| 10 | RAIN | GRN |

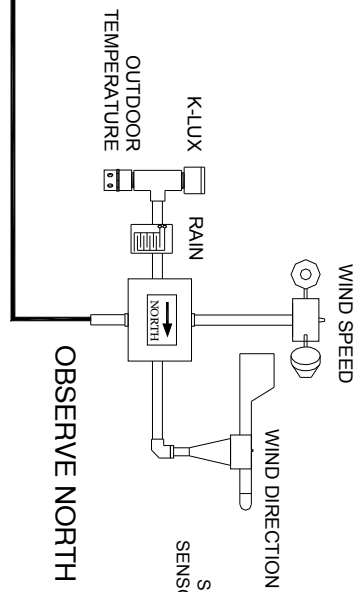
INSIDE WEATHERMASTER
TO WEATHERMASTER
SENSOR INPUTS
16COND. SHLD.



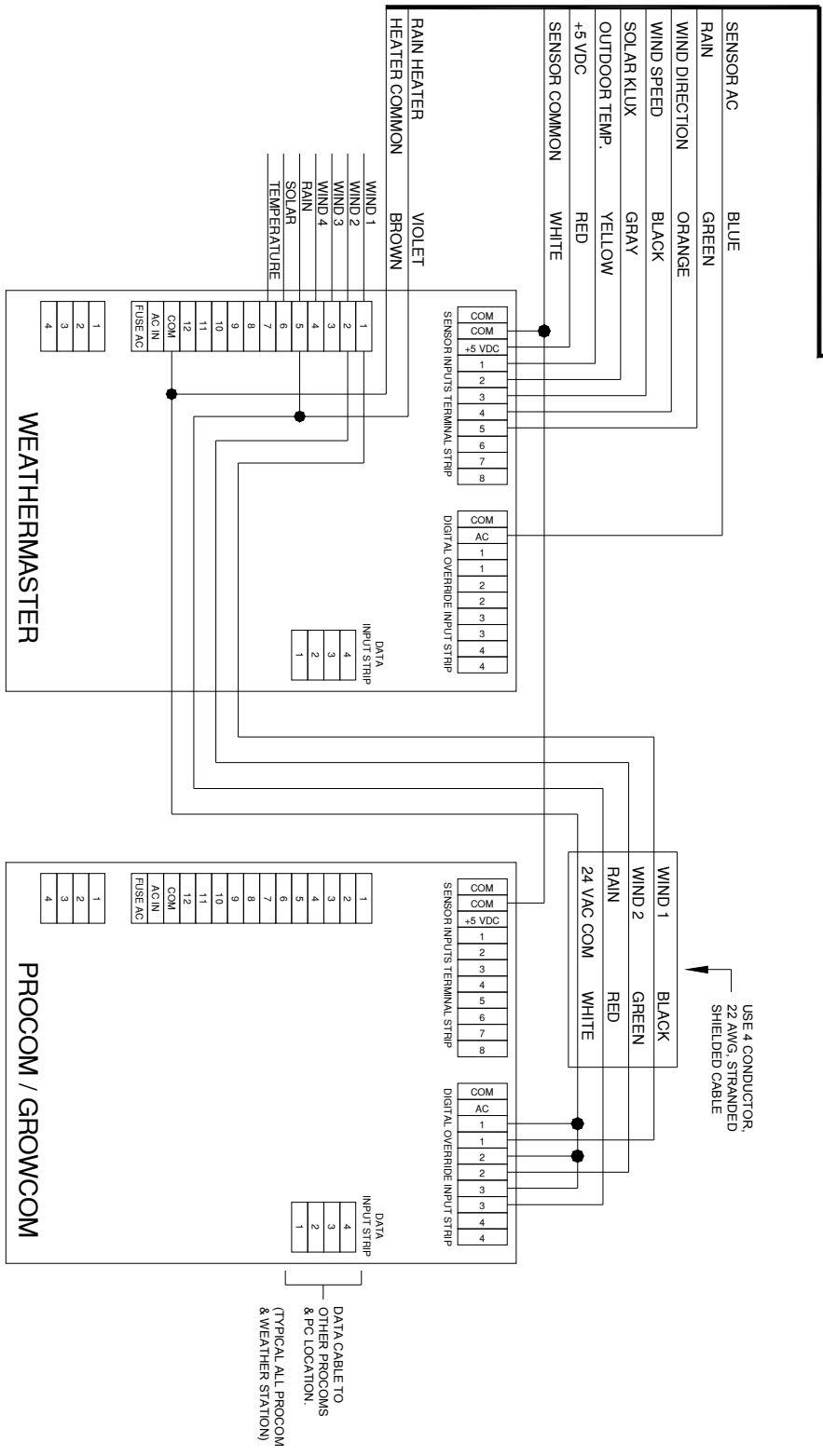
TYPICAL WEATHERMASTER SENSOR CONNECTION

NOTE:
ALL WIRE CONNECTIONS ARE TO
BE MADE AT TERMINAL STRIPS
WITHIN THE CONTROLS. DO NOT
SPICE WIRES.

| | | | |
|---------------------------------|----------|-------------|----------|
| Project | | | |
| WEATHERMASTER SENSOR CONNECTION | | | |
| Drawn by | Date | Distributor | Order ID |
| GH | 11/01/01 | N/A | N/A |




NOTE:
 ALL WIRE CONNECTIONS ARE TO BE MADE AT TERMINAL STRIPS WITHIN THE CONTROLS. DO NOT SPLICE WIRES.

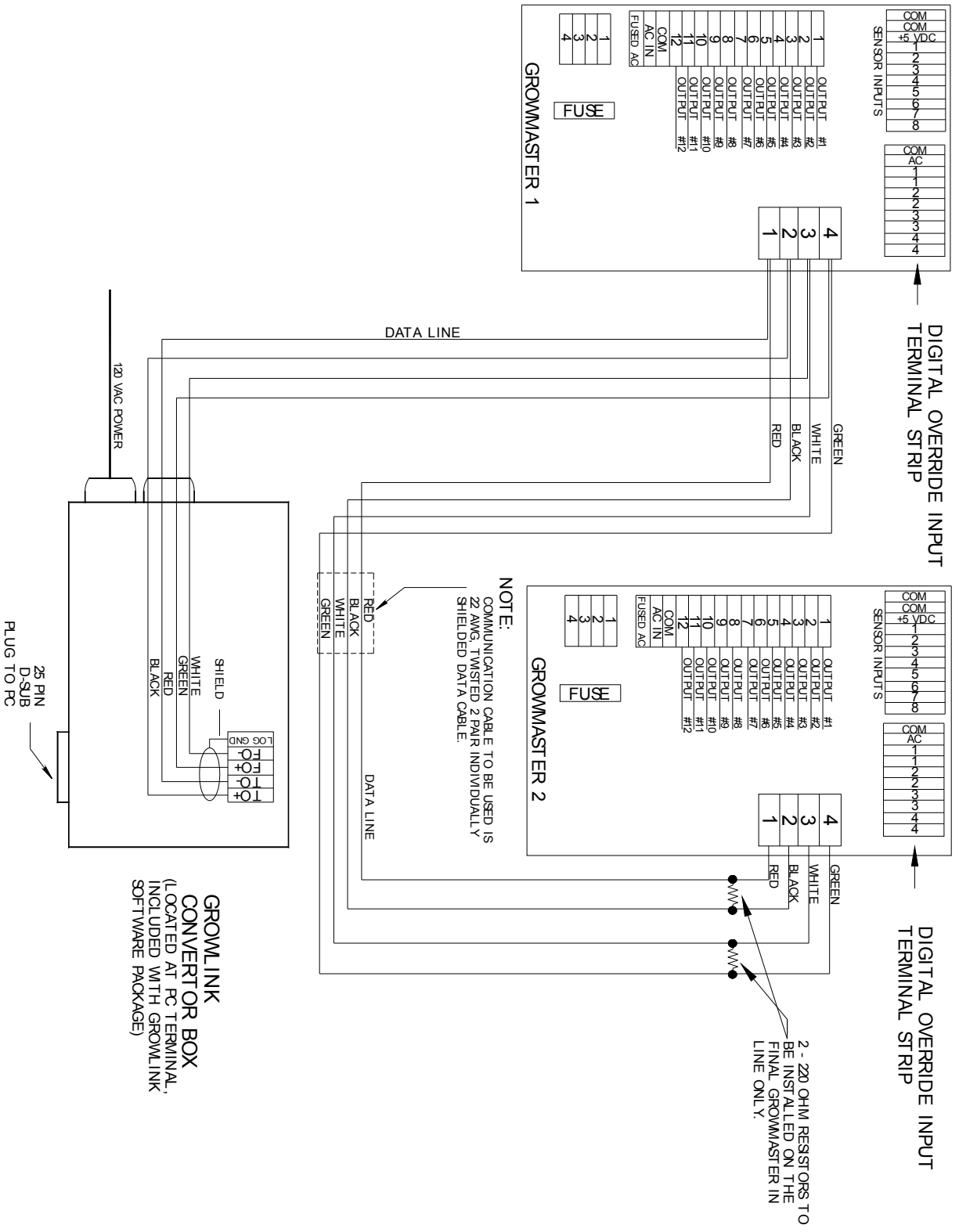


USE 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE

DATA CABLE TO OTHER PROCOMS & PC LOCATION. (TYPICAL ALL PROCOM & WEATHER STATION)

TYPICAL WEATHERMASTER CONNECTION TO PROCOM / GROWCOM

| | | | | |
|--|---|------------------------|---------------------------|------------------------|
|  <p>MICRO GROW GREENHOUSE SYSTEMS, INC. 42065 Zevo Dr., Unit B-1 Temecula, CA 92590 Phone 951.296.3340 Fax 951.296.3350</p> | Project WEATHERMASTER TO PROCOM/GROWCOM | | | |
| | Drawn by SC | Date 7/13/09 | Distributor N/A | Order ID N/A |

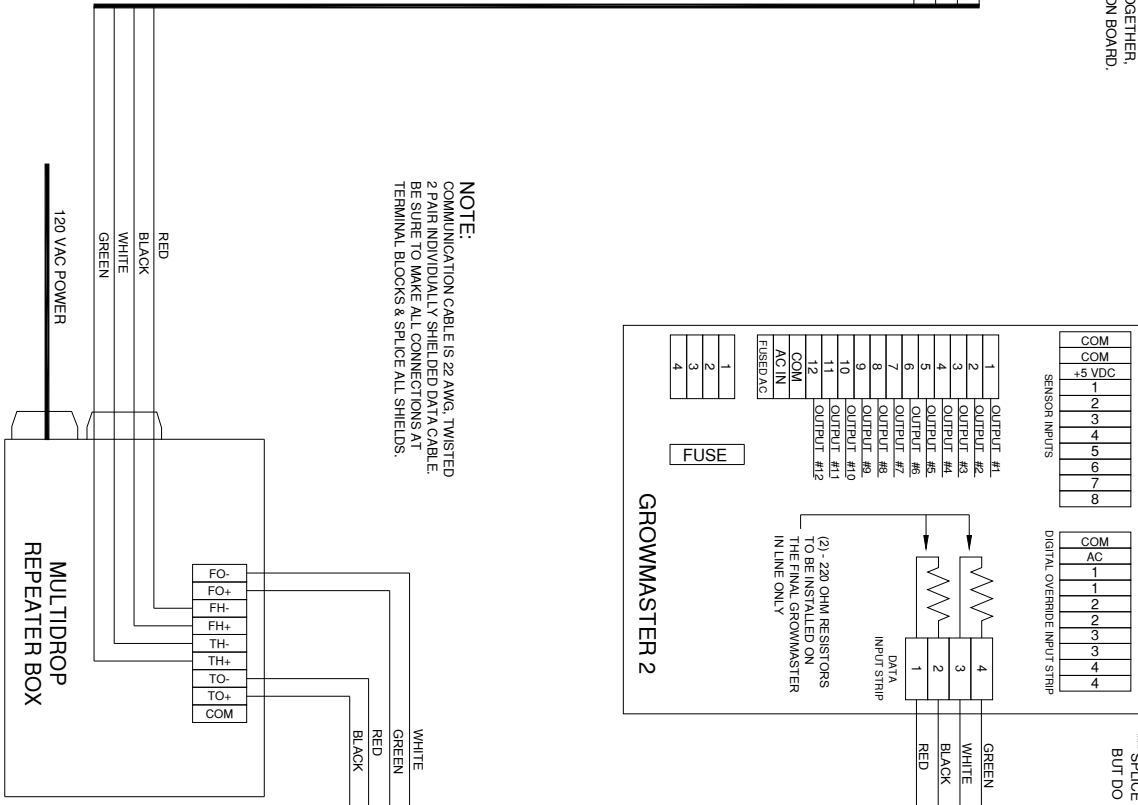
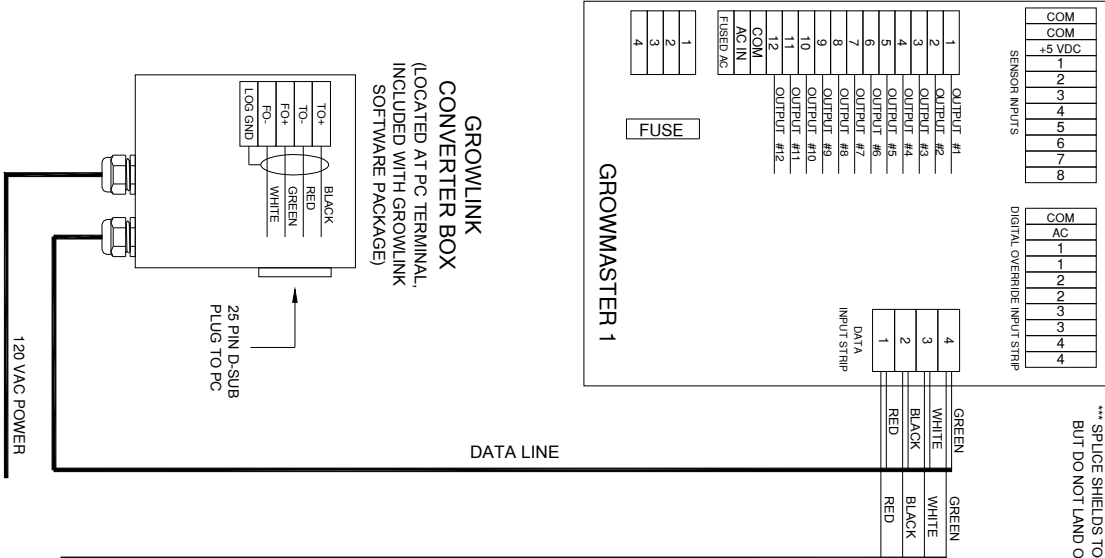


TYPICAL WIRING FOR GROWLINK CONVERTOR BOX TO MULTIPLE GROWMASTERS

GROWLINK CONVERTOR BOX
(LOCATED AT PC TERMINAL, INCLUDED WITH GROWLINK SOFTWARE PACKAGE)

| | | | |
|---|----------|-------------|----------|
| Project | | | |
| GROWLINK TO MULTIPLE GROWMASTERS | | | |
| Drawn by | Date | Distributor | Order ID |
| GH | 11/08/01 | N/A | N/A |

TYPICAL WIRING FOR GROWLINK CONVERTER BOX TO MULTIPLE GROWMASTERS WITH REPEATER BOX



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Project
GROWLINK TO MULTI GM'S W/REPEATER

| | | | |
|----------|---------|-------------|----------|
| Drawn by | Date | Distributor | Order ID |
| SC | 8/25/08 | N/A | 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 materials is limited to the warranty supplied by the original manufacturer or supplier of said products only. This warranty excludes any and all damages cause 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