



HIRED-HAND®

System 500 Power Curtain Controller

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System 500 Power Curtain Controller

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System 500™ Power Curtain™ Controller

1. Purpose

The System 500™ Power Curtain™ Controller is an eight stage temperature controller intended for use in agricultural enclosures.

2. Ratings/Specifications

- 120 or 240 volts / 6 Amps Maximum / 50/60 hertz (depending on model purchased).
- 8 stages of heating or cooling plus integrated curtain machine operation.
- 8 Amp variable speed fan circuit available.

3. Warnings

Warning!

When this controller is used in a life support heating and ventilation system where failure could result in loss or injury, the user should provide adequate back-up, or accept the risk of such loss or injury!

Warning!

Wiring and connections must comply with all national and local electrical codes. Installation by qualified electrician required!

Warning!

Electrical shock may occur if the enclosure is opened with power connected to the unit. Before opening the enclosure, make sure that all power sources to controller are disconnected!

Warning!

Do not change stage programs with power applied to the controller!

4. Warranty

One Year Limited Warranty

purchase against electrical and mechanical defects in material and workmanship. If this unit fails to operate during this period, contact your dealer for repair or replacement without charge, at the manufacturer's option. Damage by accident or abuse is not covered by this warranty. This warranty gives you specific rights which vary from state to state. For claims on this warranty, contact your dealer.

Warrantor: Hired Hand, 1733 Co Rd 68, Bremen, AL 35033.

5. Installation

5.1. Tools Required

Kit Bag (Included)	Screwdriver
Crimping Pliers	Volt meter

5.2. Instructions

1. Unpack system, and check that all components are present.

1		System 500 Power Curtain Controller
1	6450-2651	Installation Kit
1	6507-0100	PVR-H Relay Box
1	6450-2652	Fuse Kit
2 or 3	6407-2593	Sensors (depending on model)
1	4801-2972	Manual

2. Hang System-500™ with four screws
3. Make sure all power supplies are disconnected before breaking any wires, or reaching into the enclosure.
4. Open System 500™, and find all connections.
5. Run sensors out to locations inside the house. (One sensor outside the house with OSC model.) Be sure that the sensors are in a safe location, free from any temperature influences (direct sunlight, water, etc.) Use care when securing sensor wires so that you do not cut the wire, Any short, or break in the wire will cause improper sensor operation.
6. Connect each sensor to its appropriate terminals inside the enclosure. (See wiring diagrams in the back of this manual.)
7. Connect wires from stage terminals to the contactor panel, or relay box. See wiring diagrams for locations of terminals.
8. Hookup three wire connection from System 500™ board to PVR-H. See wiring diagrams for locations of terminals.

6. Components Description

6.1. General Description

The System 500™ Power Curtain™ controller is an electronic environmental controller which uses knobs for user controls. The controller can operate the following:

- ⇒ One curtain machine intelligently based on time.
- ⇒ Eight stages of heat and cool.
- ⇒ User selected 5 or 10 minute timer.
- ⇒ Any stage can be on either a stir timer, or a negative timer.
- ⇒ Two temperature sensors for inside the building. (One extra for outside temperature with OSC model.)

In addition to the basic operation outlined above, an enhanced model is available which includes the following functions:

- ⇒ Variable speed fan.
- ⇒ Tunnel ventilation control.
- ⇒ Open/Close operation of a tunnel inlet curtain.

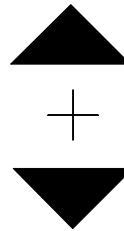
6.2. Controls

6.2.1. Front Panel

The following controls are located on the outside of the panel.

6.2.1.1. Automatic/Manual

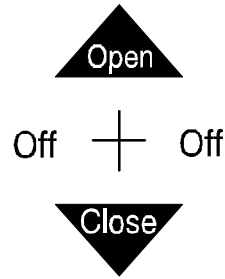
Automatic



Manual

The automatic/manual switch is used as its name implies. The Automatic position allows the controller to move the curtains to control temperature. When the switch is in the manual position, the controller will still automatically operate the stages to control temperature, but the curtain can only be moved using the open/close/off switch.

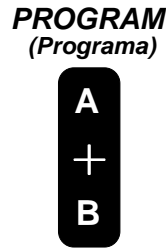
6.2.1.2. Open/ Close/Off



The open\close\off switch is used for manual control of the curtains. This switch is only operable when the automatic/manual switch is in the manual position. At other times, this switch is not operable, thus its position is not significant. However, it is a good practice to always leave the switch in the off position.

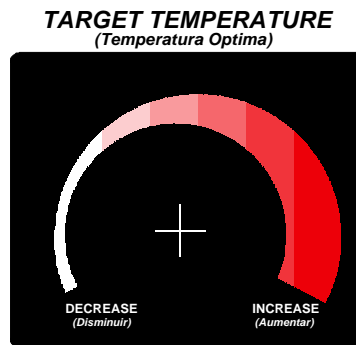
The OPEN position of the switch allows current to flow to the PVR-H, directing power to the open windings of the curtain machine. The CLOSE position of the switch allows current to flow to the PVR-H, directing power to the close windings of the curtain machine. The OFF position does not allow current to the PVR-H, but is not a safe electrical disconnect for the curtain machine.

6.2.1.3. Alternate Program Switch



Each of the 256 stage programs has another shadow program. This separate program is provided to make the change between brooding and full house operation. Position A is a program tailored for brooding, whereas program B is for full house operation.

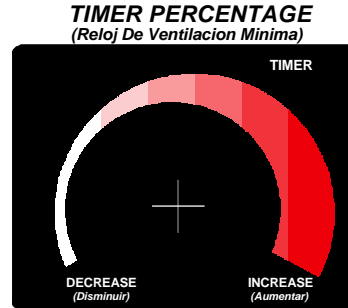
6.2.1.4. Target Temperature



The target temperature knob is used to set the temperature the controller seeks to maintain (Target Temperature). This setting is very important, because all system operations other than the timer are

operated by the distance between target temperature and actual temperature. At all times, the system will try to maintain target temperature.

6.2.1.5. *Timer Percentage*



This control allows the operator to specify the amount of time a stage on the timer stays energized. For example:

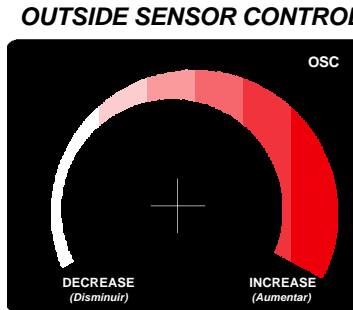
10 Minute timer with Timer Percentage at 40%

The stage will be active for 40% of 10 min.--4 min.

The timer percentage control works in the same manner for a 5 minute timer.

On this display, the word "Timer" will be back-lit red if the stages on the timer are active.

6.2.1.6. *OSC High Limit (Enhanced Version Only)*



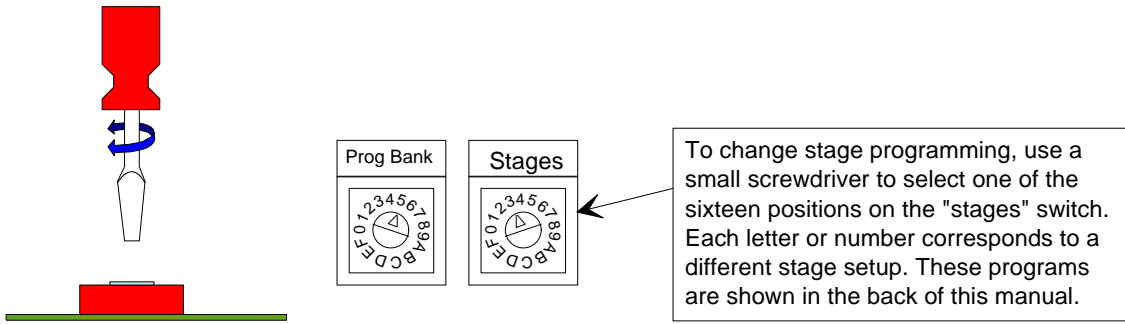
The Outside Sensor Control (OSC) High Limit knob allows the user to set the temperature for the controller to go into tunnel mode. Tunnel mode involves shutting the main curtain, opening the tunnel curtain, and staging in tunnel fans. When temperature on the outside of the house reaches the OSC High Limit, the controller will automatically switch to tunnel control.

On this display, the letters "OSC" will be back-lit red if the controller has switched to tunnel mode.

6.2.2. **Inside**

To see the other controls on the System 500™ Power Curtain™ controller, you will need to open the panel door. These controls will be located on the large green circuit board attached to the door of the panel.

6.2.2.1. Program Bank and Stages

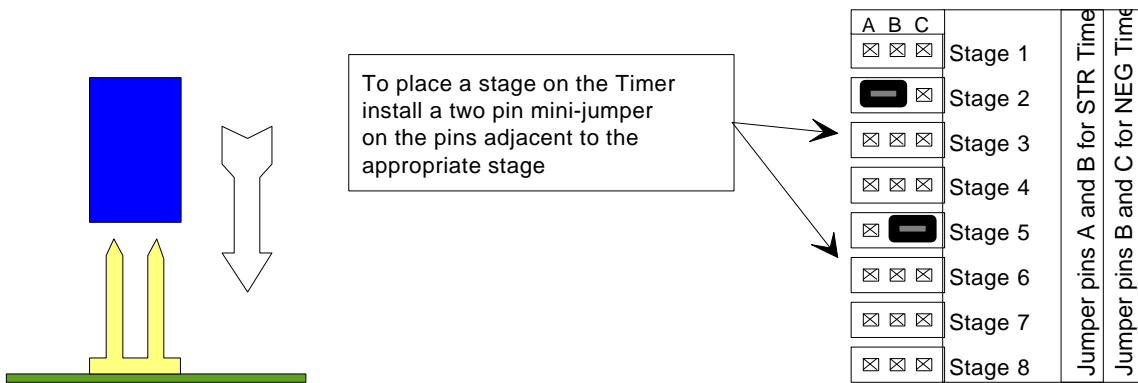


The two switches shown above work together to tell the controller which stage program to use. Each switch has sixteen positions; 0 through 9, and A through F.

To change programs, you will need to look at the program list at the back of this manual. Look at the program name (1,0; 2,3; A,5; etc.) The first number or letter is the program bank position; the second is the stages position. To select that particular program, use a screwdriver to align each of the two rotary switches to the corresponding positions.

The system comes programmed with up to 256 stage programs. These programs are listed in the back of this manual. **Remember "Do not change stage programs with power applied to the controller."** Disconnect power before opening controller box for any reason.

6.2.2.2. Stage On Timer Jumpers



This controller allows you to put any or all stages on the timer. Install a jumper on the two pins beside the appropriate stage. This block is found close to the center of the board.

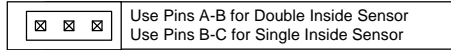
6.2.2.2.1. Negative Timers

A negative timer is a timer which will operate whenever the curtains are closed, and the house is being ventilated using negative ventilation. A stage set on a negative timer will not be timed when the curtains are open. To place a stage on negative timer, push a two-pin jumper on pins B & C next to the stage you wish to use. Stage six above is shown as a negative timer.

6.2.2.2. Stir Timers

A stage on a stir timer may operate at any time, regardless of curtain position. To place a stage on stir timer, push a two-pin jumper on pins A & B next to the stage you wish to use. Stage 3 above is shown as a stir timer.

6.2.2.3. *Single/Double Inside Sensor Jumper*



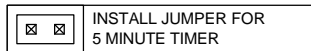
This feature allows you to operate the controller with only one working sensor attached.

This is not highly recommended due to temperature differences which exist throughout any enclosure. These differences can be due to drafts, dead air spots, etc. Use the single inside sensor option only if one sensor has been damaged, and only until you have purchased a new sensor for replacement.

Under normal operating conditions you should use two inside sensors, as the controller will have a better understanding of actual house temperature.

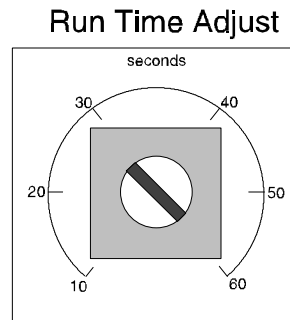
Warning: If you do not have a jumper installed on this set of pins, the controller will not function properly, and your house will have to depend upon the back-up.

6.2.2.4. *Five/Ten Minute Timer*



The controller's internal timer is normally a ten minute timer. However, installing a jumper on this position allows you to set the internal timer to a five minute timer.

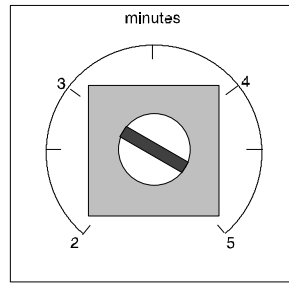
6.2.2.5. *Run Time Adjust*



This setting tells the controller how long to run the curtain machine when a change is needed. If 60 seconds is selected, the controller will run the machine for 60 seconds, or until the curtain is fully open, or closed.

6.2.2.6. Cycle Time Adjust

Cycle Time Adjust

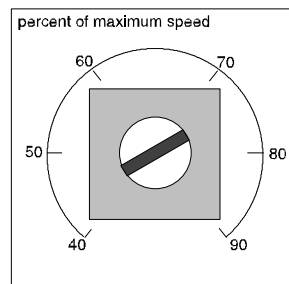


This potentiometer is used to set the time delay between curtain operations. If cycle time is set for 3 minutes, then the curtain will move every 3 minutes if needed. The curtain will not move between cycles, unless it is manually moved.

6.2.2.7. Variable Speed Fan (Enhanced Version Only)

6.2.2.7.1. Variable Minimum Adjust

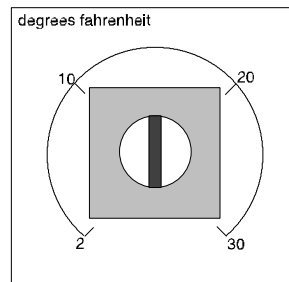
Var. Minimum Adjust



If you have the enhanced version of this controller, this potentiometer controls the minimum speed of the variable speed fan. For example, if the variable minimum is set at 50%, the fan will never run below half speed. If you have the basic version of the controller, these switches are not installed.

6.2.2.7.2. Variable Span Adjust

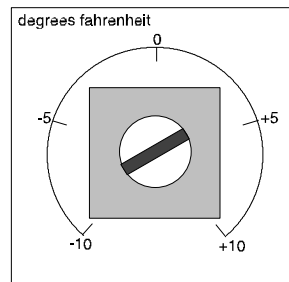
Var. Span Adjust



This setting controls the temperature difference between the minimum speed temperature setpoint and the maximum speed setpoint. In other words, this value represents the range of the variable speed fan.

6.2.2.7.3. Variable Offset Adjust

Var. Offset Adjust

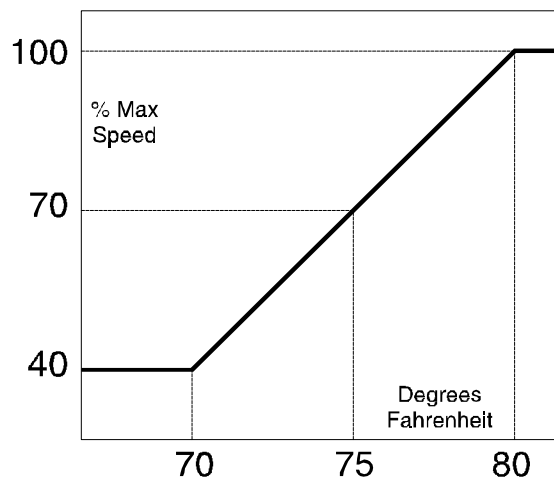


The variable offset is the number of degrees from target temperature at which the variable speed fan will be at minimum speed. For example, if target temperature is 75 degrees, and the variable offset is set at minus 5 degrees, then the fan will be running at minimum speed when temperature equals 70 degrees.

Example:

Minimum	40 percent
Offset	-5 degrees
Span	10 degrees
Target Temp	75 degrees

Variable Speed Operation



The variable speed fan will run at 40% when the inside temp is 70 degrees (target - offset). The controller will increase fan speed if inside temperature is rising up until 80 degrees [(target - offset) + span] at which point the fan would be running at 100 percent.

7. Operation

7.1. Curtain Operation

7.1.1. Standard

If the controller sees that temperature inside the house is above target temperature it will signal the curtains to open. When the cycle time has elapsed the controller will begin opening the curtain. (The curtain will move for the time set by the Runtime Adjust setting after the initial drop.) If temperature cannot be maintained by the curtains alone, the controller will stage in fans as directed by the stage program.

7.1.2. Tunnel (Enhanced Version Only)

When outside temperature has risen above the Outside Sensor Control High Limit setting, the controller will go into tunnel mode. When this event occurs, the controller will begin shutting the primary curtain while opening the tunnel inlet curtain. During the time the curtains are re-aligning, the controller is waiting to see the signal that the tunnel inlet curtain has opened, and that the primary curtain has closed. These signals are taken from the PowerTrak auxiliary switches. The waiting period is counted down in the display. If the controller has waited for 300 seconds (5 minutes) and the inlet curtain has not moved, the controller will abort the attempt to enter tunnel mode. The next paragraph explains this tunnel mode abort.

Tunnel mode abort is designed to prevent having a closed house with no cool stages active. The primary curtain is immediately lowered to completely open, and the inlet curtain is actuated open. All cool stages are activated except for stage 8 (which depending on the program could be a fogger). You will be alerted to this condition by the continual flashing of the TARGET and OSC HIGH LIMIT lights. The machine will not return to normal operation until you reset it by turning the OSC HIGH LIMIT dial all the way to the left, and then all the way back to the right within 1 second. At this point the inlet curtain is closed once again, emergency stages are cut off, and normal operation is resumed.

Once the primary curtain is closed, (the inlet should be fully open) the controller will turn on the appropriate tunnel stages. While in tunnel mode, the controller will always have at least one tunnel stage on.

When outside temperature drops back down to a safe temperature for conventional ventilation (factory set at 7 degrees below the OSC high limit temperature you set) the controller will re-align the curtains for natural ventilation. Since it is safe to believe that this temperature will still be above target temperature, the controller will always open the primary curtain completely upon exiting tunnel mode. If the curtains need to close, they will do so when their cycle time begins again.

If the controller begins to enter tunnel mode because the controls on the facepad were adjusted, (By turning the OSC limit dial) the OSC light will flash repeatedly for several seconds, to alert you to this condition. If this was done by accident, you will be able to stop tunnel mode by re-adjusting the OSC high limit dial.

The inlet curtain will either be completely open or completely closed at all times--no cycling or running.

7.2. Stage Operation

Stages may be operated by the controller automatically, by the controller on the timer, or manually by turning the switches on the contactor panel.

7.2.1. Mode

The mode of each stage tells the controller whether it should act to correct a low or high temperature. There are five modes available for use with this controller. Below is a list with a short description of each:

Heat: Stage used to raise temperature. (Heaters, Brooders, etc.)

Cool Negative: A stage only operable when the curtains are closed.

Cool Negative/Tunnel: This stage may operate when the curtains are closed, or whenever the controller has gone into tunnel mode (via the OSC mechanism).

Cool Tunnel: This stage is only operable when the controller has gone into tunnel mode.

Cool Stir: This stage is operable at any time except when in tunnel mode.

7.2.2. Manual

To turn a particular stage on, flip its toggle switch on the contactor panel to the 'ON' position. The red indicator light should turn on. If you wish to prevent a stage from operating, flip the switch to the 'OFF' position. (Note: The back-up board may still turn the stage on if a back-up condition exists.)

To return the stage to operation by the controller, flip the switch to the 'AUTO' position.

7.2.3. Automatic

The controller may turn a stage on for two different reasons. First, if a stage is on the timer, the timer will turn it on from time to time according to its settings. Second, if the temperature inside the building reaches the level required by that particular stage's program.

The controller uses an offset/differential method for determining if a stage should be turned on or off. This method is explained below

- **Offset:**
The point above (cool) or below (heat) target temperature where the stage turns off.
- **Differential:**
The difference in degrees between the temperature a stage comes on and the temperature the stage goes off.

Examples

Heat Mode:

If the Target Temp is set at 80 degrees, Offset set at 4 degrees, and Differential set at 2 degrees, The System will engage Heat Mode when building temperature reaches 74 degrees and the curtains are closed.

Target Temp	-	Offset	-	Differential	=	Heat Mode on
80	-	4	-	2	=	74

If the Target Temp is set at 80 degrees, Offset at 4 degrees and Differential set at 2 degrees, The System will disengage Heat Mode when building temperature reaches 76 degrees.

Target Temp	-	Offset	=	Heat Mode Off
80	-	4	=	76

Cool Mode:

If the Target Temp is set at 80 degrees, Offset set at 5 degrees, and Differential set at 2 degrees, The System will engage the fans when building temperature reaches 87 degrees.

Target Temp	+	Offset	+	Differential	=	Cool Mode On
80	+	5	+	2	=	87

If the Target Temp is set at 80 degrees, Offset set at 5 degrees, and Differential set at 2 degrees, The System will disengage the fans when building temperature reaches 85 degrees.

Target Temp	+	Offset	=	Cool Mode Off
80	+	5	=	85

The stages offset and differential are determined by the program you have selected with the program bank, and stages switches on the inside of the controller. A list of all the stage programs is printed at the back of this manual.

8. Maintenance

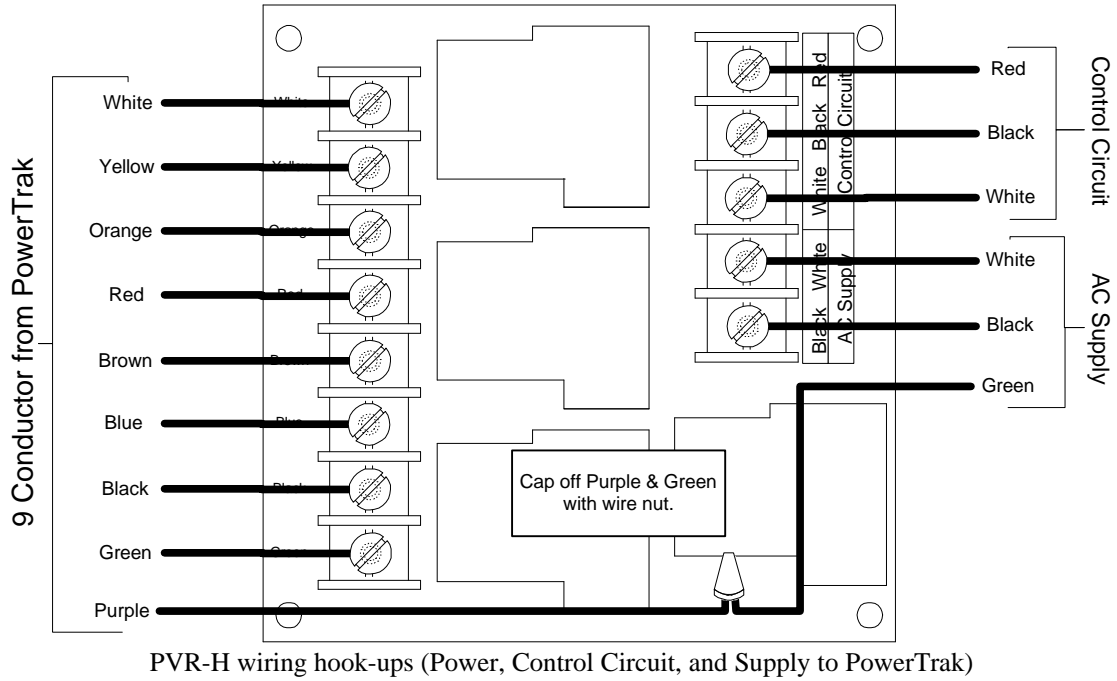
There are few items on the System 500™ which require maintenance. This does not mean that maintenance is not important. Check the calibration of your sensors at least once every two months.

9. Wiring Diagrams

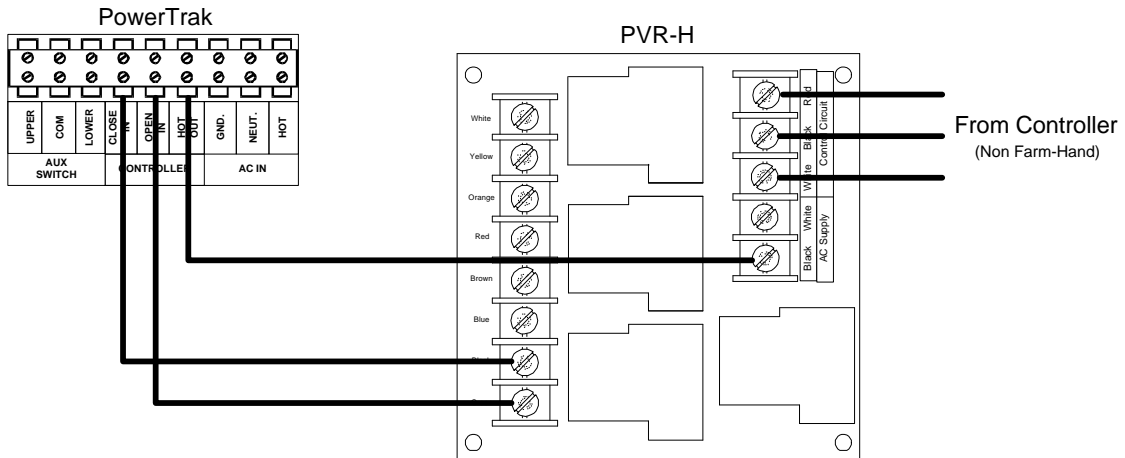
Recommended Wiring for LOW VOLTAGE hookup.

Component	HHI Wiring Part No.	Recommended Wire
Sensor	1502-2427	18/2 Shielded Cable
Hall Effect Devices	1502-2427	18/2 Shielded Cable
PVR-H	1503-1508	18/3 Cable SJT

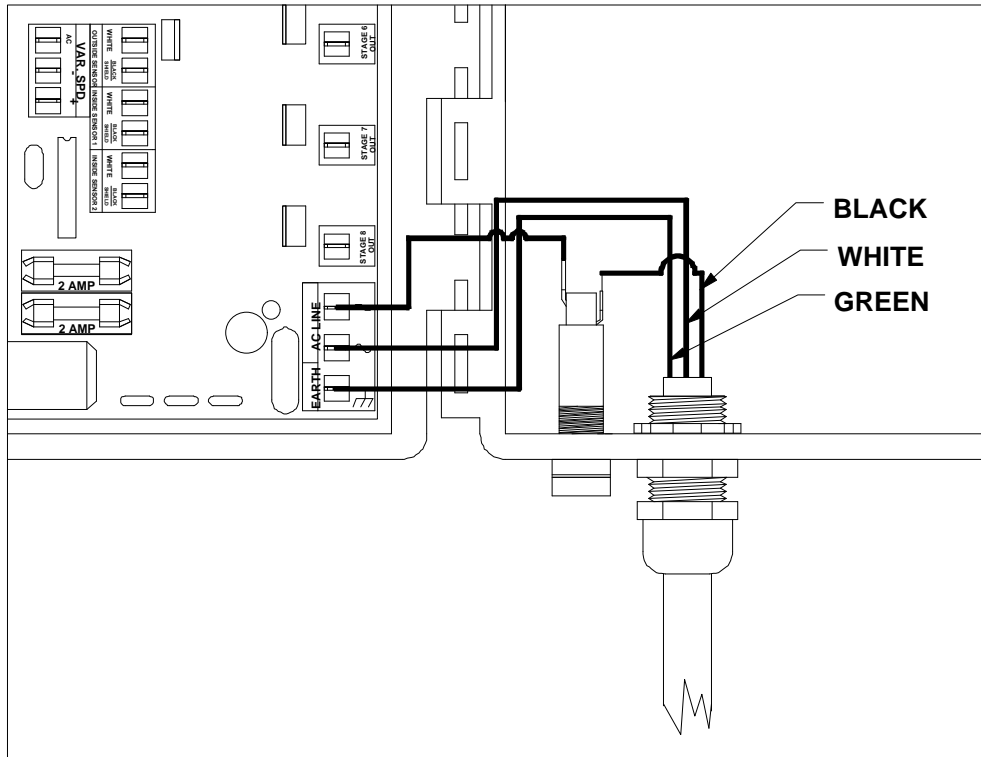
Connecting to 9 wire PowerTrak



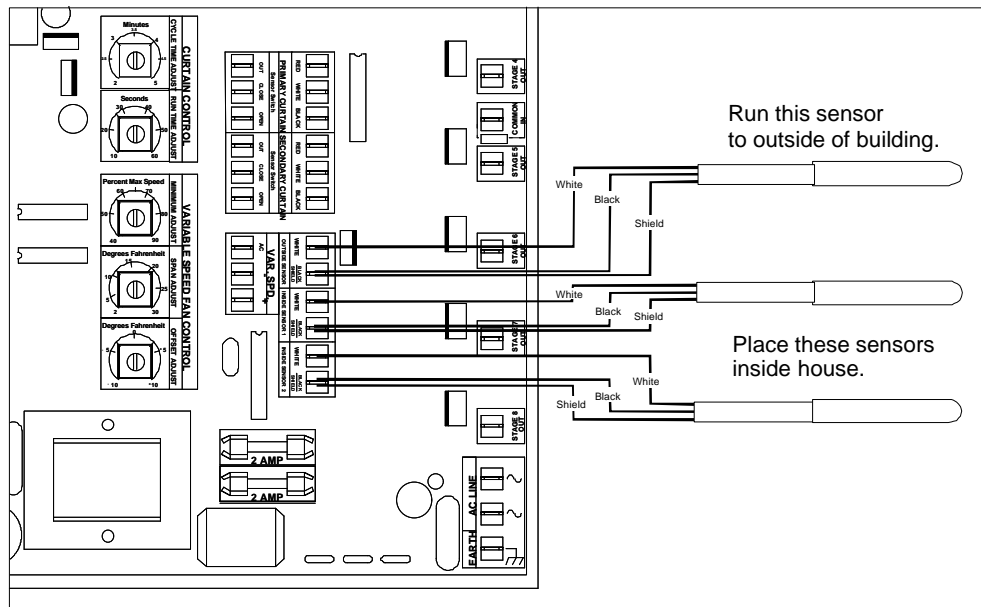
Connecting to 3 wire PowerTrak



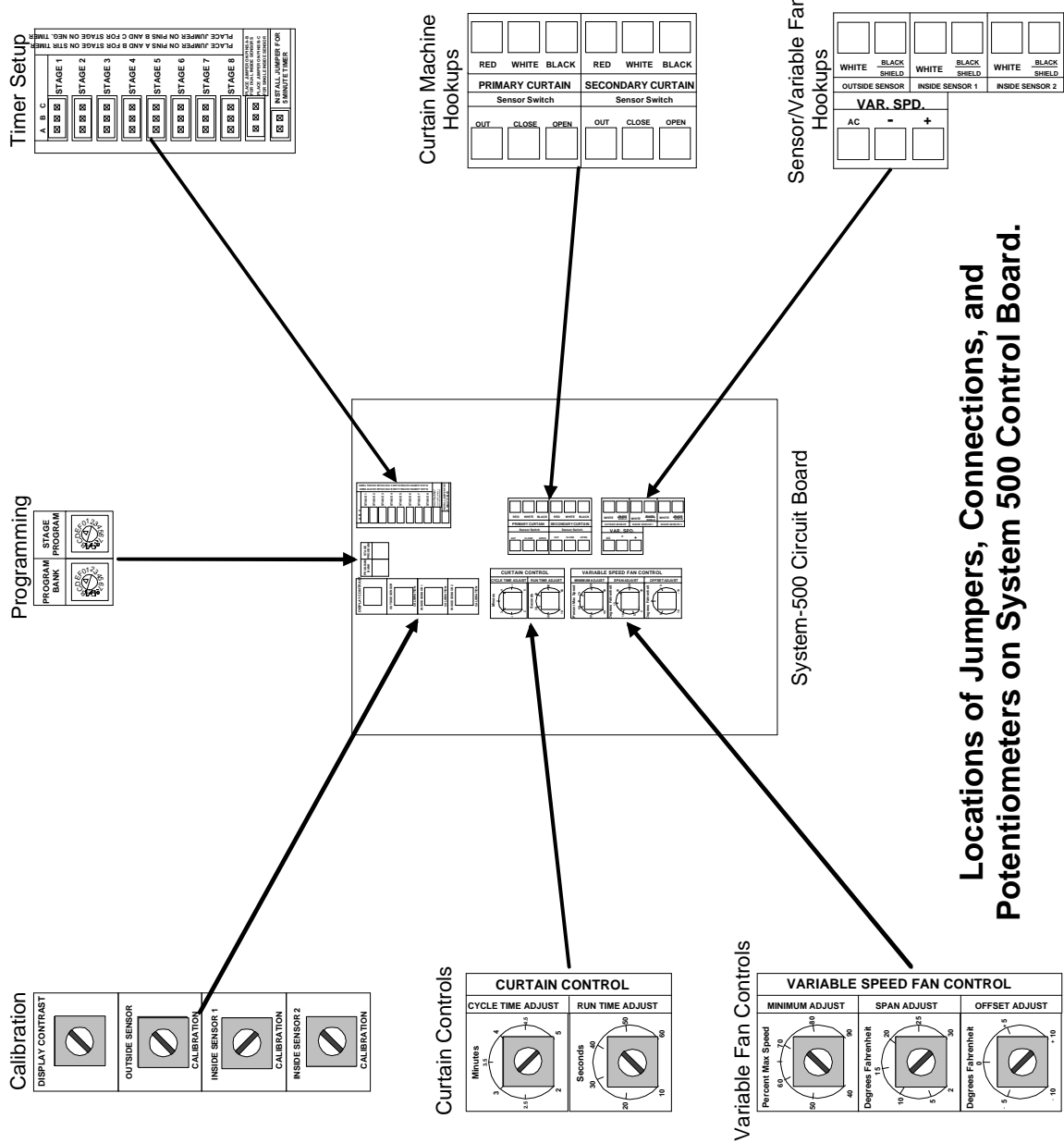
This diagram used for PowerTrak's produced after 4/7/97 (Serial No's 28810 and higher).



Power supply wiring for System 500

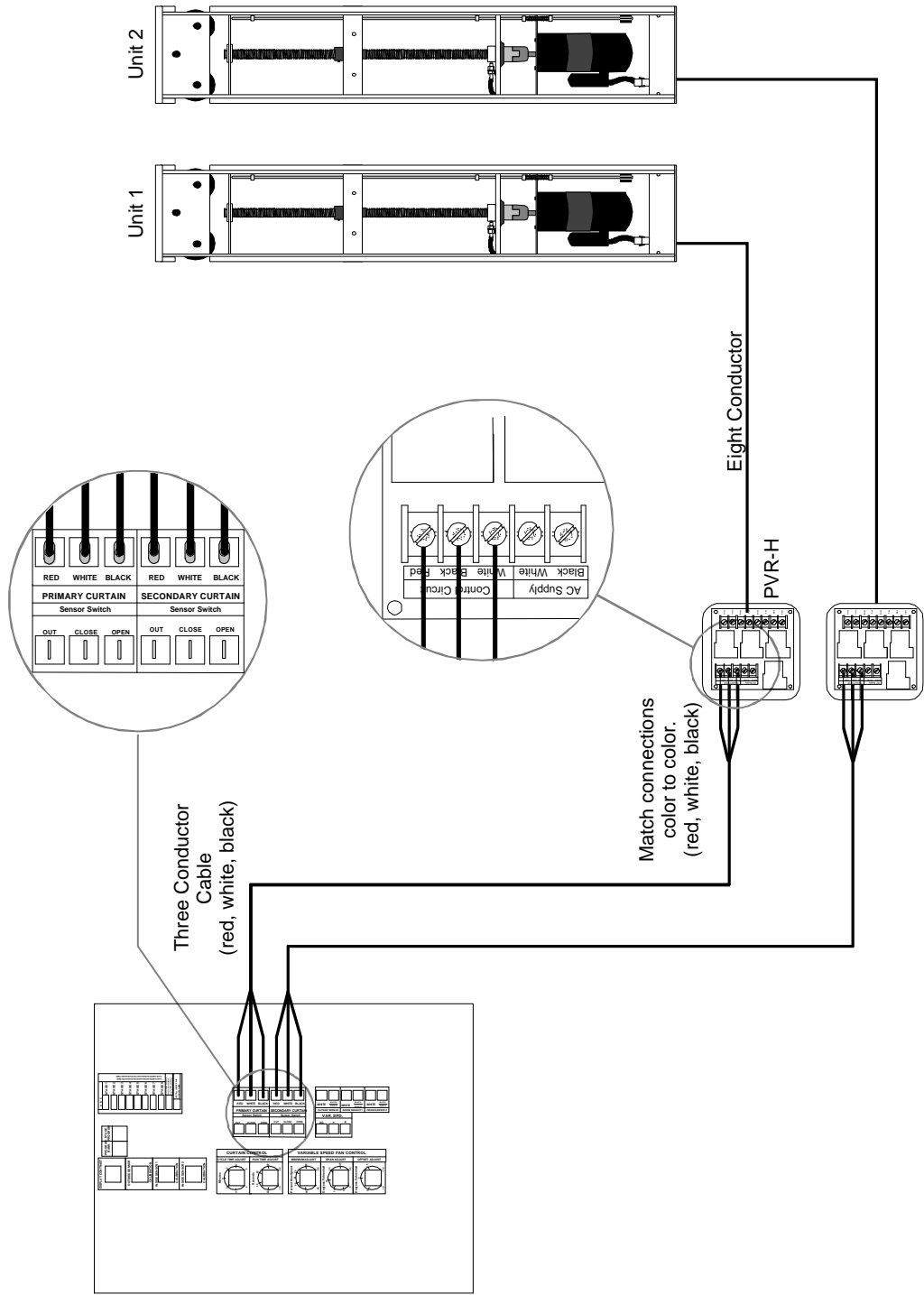


Sensor wiring for System 500

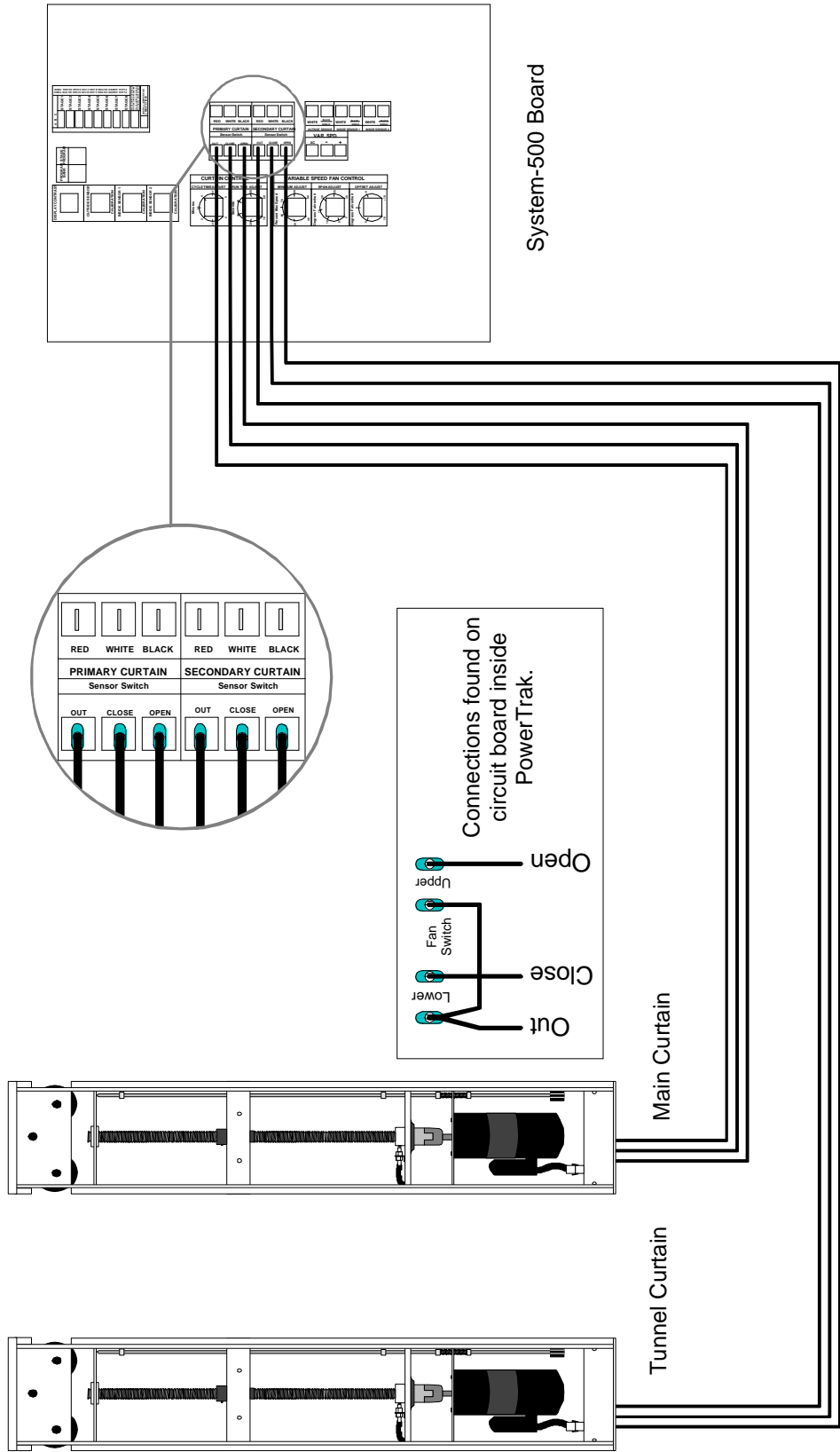


Locations of Jumpers, Connections, and Potentiometers on System 500 Control Board.

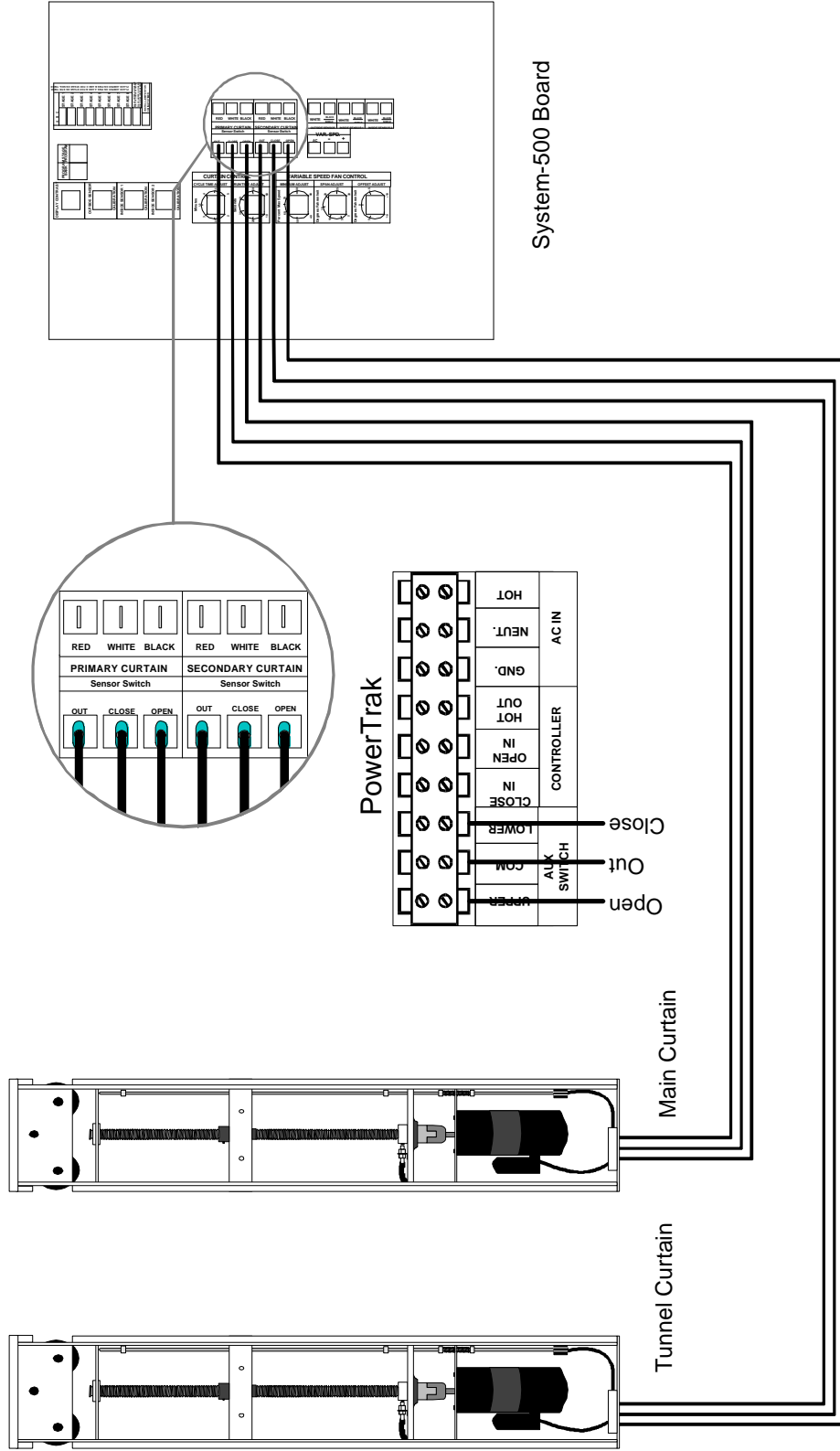
Connection of PowerTrak to System 500



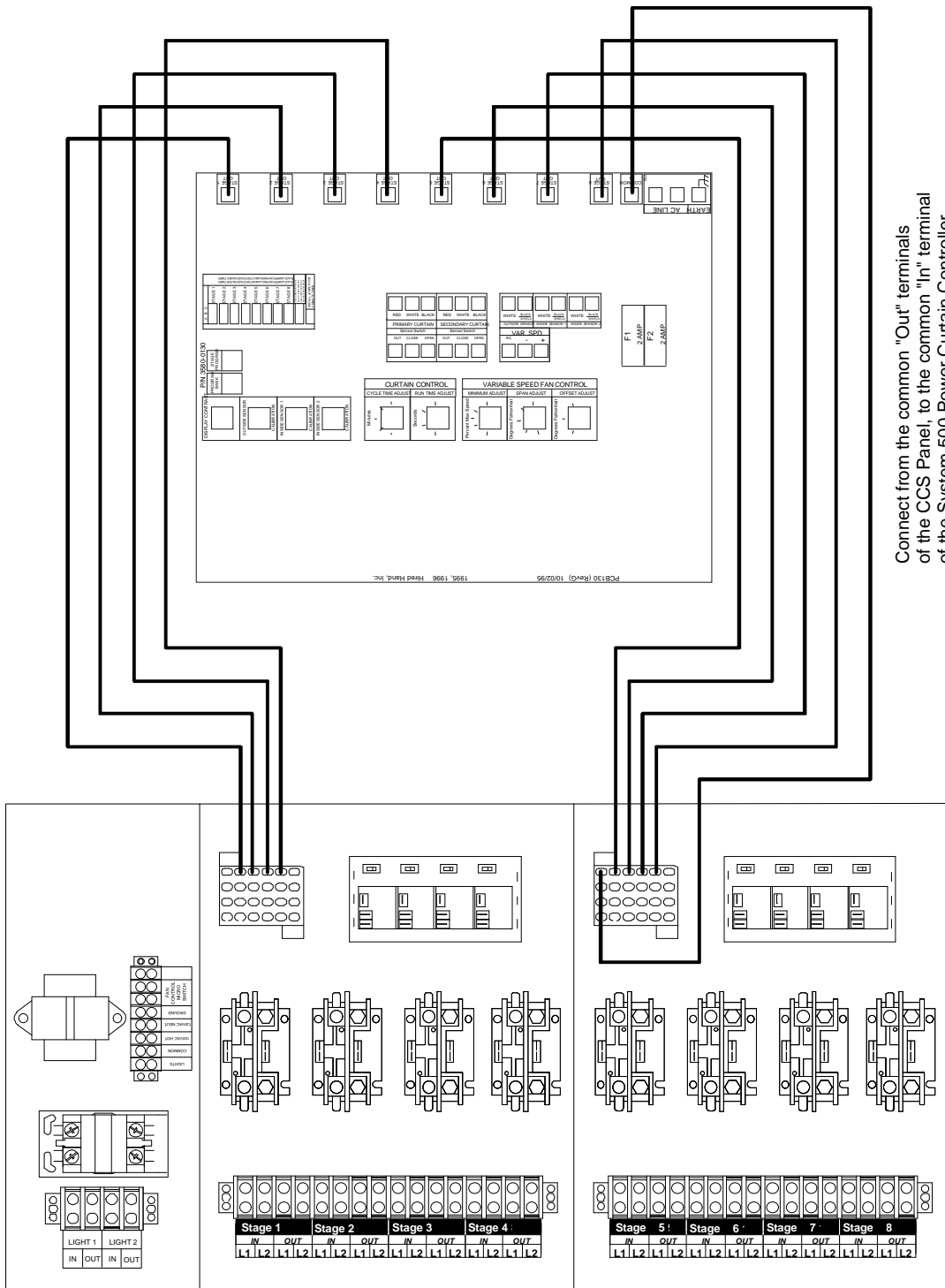
Connection of PowerTrak Fan Switch to System 500



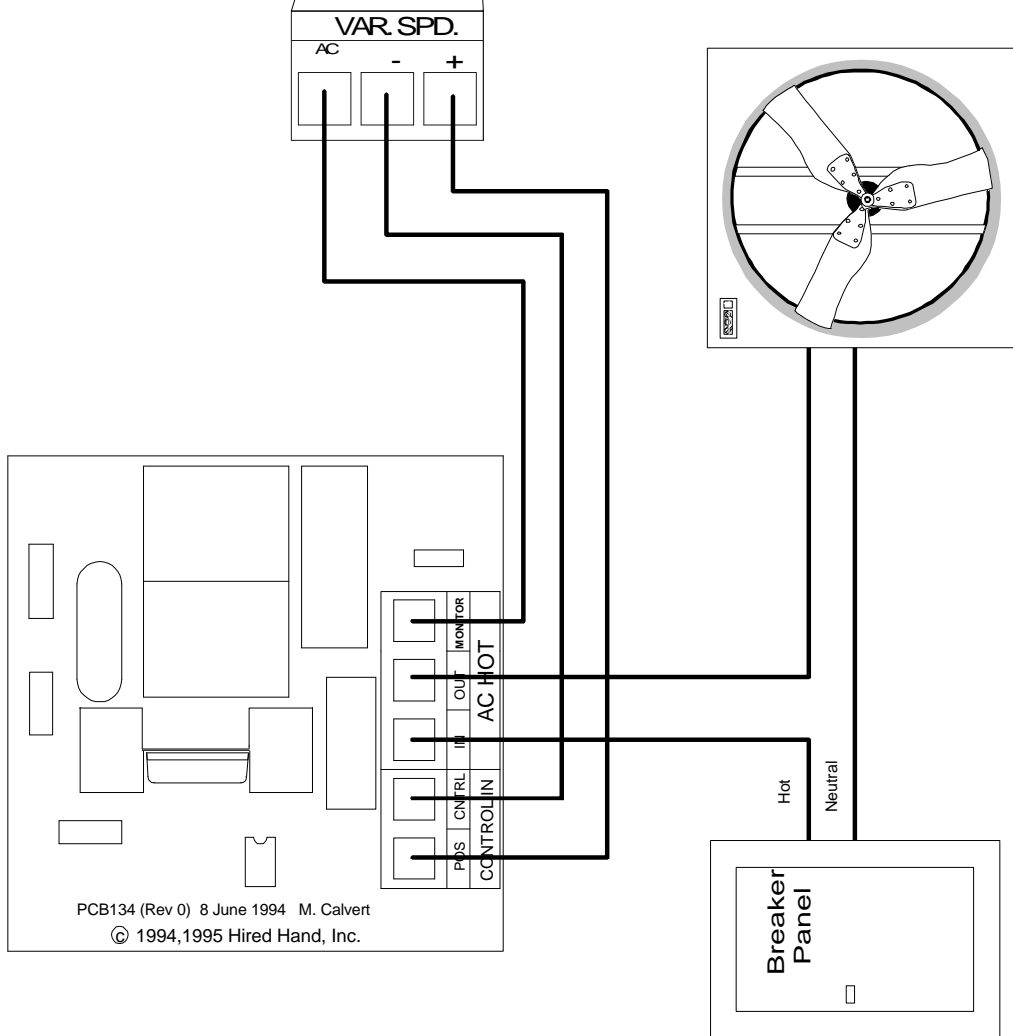
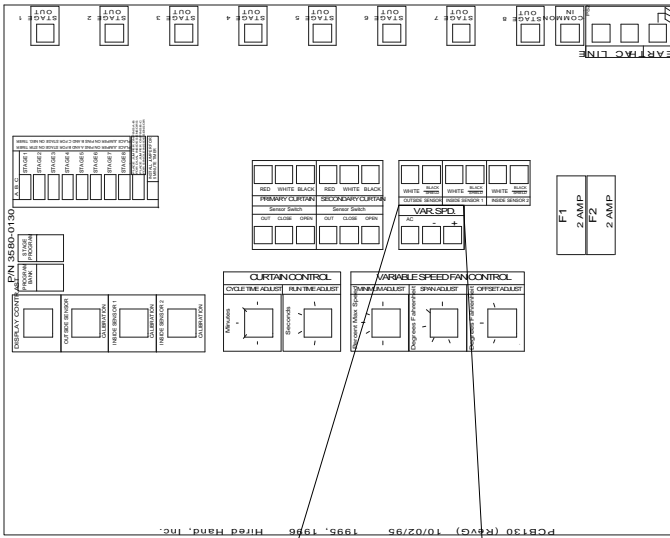
Connection of PowerTrak Fan Switch to System 500



This diagram for PowerTrak's produced after 4/7/97 Serial No's 28810 and higher.



Connect from the common "Out" terminals of the CCS Panel, to the common "In" terminal of the System 500 Power Curtain Controller. Connect from the stage "out" connections of controller back to the appropriate terminals in the contactor panel.



PCB134 (Rev 0) 8 June 1994 M. Calvert
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Variable Speed Wiring with External Variable S

10. Troubleshooting

Warning!

WARNING! Electric Shock Hazard. These tests must only be run by a Qualified Technician.

10.1. Curtain machine does not operate Manually.

1. Make sure that the PVR-H is getting voltage. Put meter leads across the AC input labeled BLACK and WHITE. This should read 110vac or 240VAC depending on model.
2. Check fuse at PVR-H. Fuse should be a 10 Amp.
3. Check curtain machine and make sure that the cam block is not on the limit switches.
4. Check fuse on the circuit board inside the controller (F1) and make sure that you are reading 12VDC on both sides of this fuse. Fuse should be a 2 amp mini fuse. Note the black lead of your volt meter should be on the terminal labeled SENSOR, BLACK\SHEILD whenever measuring DC voltages.
5. Checking at the System 500™ board on the Primary Unit the RED should always have 12 volts DC. If you read 12VDC at this terminal, check the terminal labeled WHITE. When the manual switch is off you should have 12VDC. When the manual switch is in the 'open' or 'close' position, you should read less then 2.5VDC. Now check the terminal labeled BLACK. When the manual switch is in open you should have 12VDC on the terminal labeled BLACK. When the switch is in the closed position you should have less then 2.5VDC. The secondary unit will not operate in the manual position.
6. If voltages are not correct you need to check and make sure that the 3 conductor cable that connects from controller to PVR-H does not have a short. Disconnect power from the System-500™ and PVR-H. Then disconnect 3 conductor cable from the PVR-H and System 500™ making sure that the ends of the wires are not touching each other and then measure for a short.
7. Disconnect power from PVR-H and remove 9-conductor cable and check the PowerTrak unit. Refer to the PowerTrak manual for trouble shooting.

10.2. Curtain machine does not operate Automatically

8. Check to see if the unit will operate manually, if not repeat steps 1-7.
9. Check your program settings to make sure they are correct.
10. Check to make sure that your sensor readings are correct.

10.3. Temperature Sensors not reading correctly

11. If the temperature sensor reads -19.9 degrees, the cable is broken or disconnected from controller.
12. If temperature sensor is reading 130 degrees then the cable or sensor is shorted.
13. Check the sensor with an ohm meter. Remove sensor from controller and measure resistance across the sensor. Refer to the resistance chart.
14. If sensor is only off 1 to 5 degrees then it probably needs calibrating.
15. If sensor is erratic you need to disconnect sensor cable and replace it with a sensor with short leads at the controller. If the sensor is still erratic the problem is in the System-500™ board.

10.4. A Stage not working correctly

16. Check and make sure that the controller is calling for stages to be on by observing the display.
17. Make sure that the switch on the contactor panel is not in the off position.
18. Make sure that the stages power is on in the breaker panel.
19. Check to see if you can turn the stages on and off with the toggle switches on the front of the contactor panel.
20. Check the voltage on the IN terminal of the System 500™ board.

10.5. If Stages are not working at all

21. Check fuse on the System 500™ board labeled F1. Make sure you are reading 12VDC on both sides of fuse. Fuse should be a 2amp mini fuse.
22. Check to make sure that the WHITE wire that connects all contactors is not disconnected.
23. Repeat steps 16-20.

10.6. If Variable Speed unit is not working at all

24. Check fuse in the External Variable Speed Unit F1. Fuse should be a 15amp mini fuse.
25. Make sure breaker is not tripped.
26. Make sure that the External Variable Speed Unit is getting voltage on the IN terminal.

Temperature Vs. Resistance for Hired-Hand Temperature Sensors.

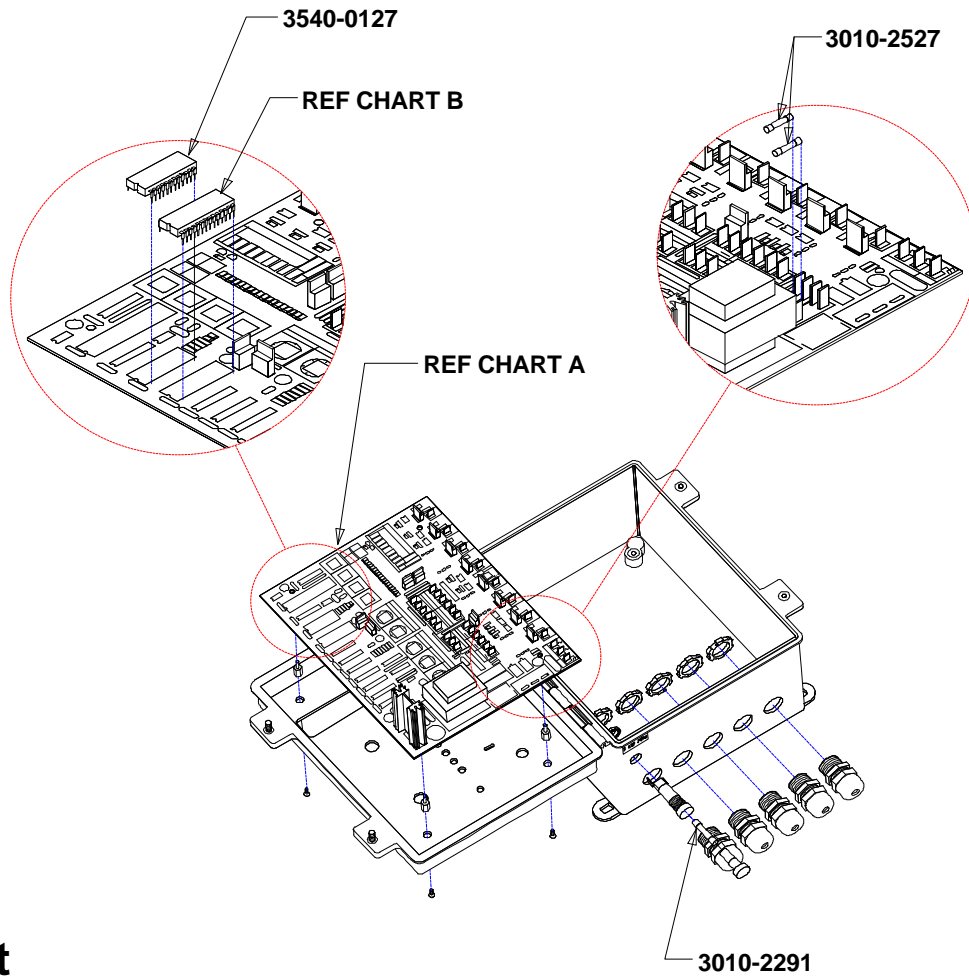
Resistance (KOhms)	Temp (F)	Temp (C)	Resistance (Kohms)	Temp (F)	Temp (C)
165.030	-20	-28.9	39.946	25.0	-3.9
157.128	-18.6	-28.1	39.120	25.7	-3.5
149.644	-17.1	-27.3	38.513	26.2	-3.2
142.552	-15.7	-26.5	37.916	26.8	-2.9
136.652	-14.4	-25.8	37.137	27.5	-2.5
130.238	-13.0	-25.0	36.564	28.0	-2.2
124.900	-11.7	-24.3	36.001	28.6	-1.9
120.517	-10.7	-23.7	35.448	29.1	-1.6
115.618	-9.4	-23.0	34.904	29.7	-1.3
111.594	-8.3	-22.4	34.370	30.2	-1.0
107.095	-7.1	-21.7	33.672	30.9	-0.6
103.399	-6.0	-21.1	33.158	31.5	-0.3
99.845	-4.9	-20.5	32.654	32.0	0.0
96.896	-4.0	-20.0	32.158	32.5	0.3
93.675	-2.9	-19.4	31.671	33.1	0.6
91.012	-2.0	-18.9	31.191	33.6	0.9
87.927	-.9	-18.3	30.720	34.2	1.2
85.445	0	-17.8	30.257	34.7	1.5
83.040	.9	-17.3	29.802	35.2	1.8
80.711	1.8	-16.8	29.355	35.8	2.1
78.454	2.7	-16.3	28.915	36.3	2.4
76.268	3.6	-15.8	28.482	36.9	2.7
74.149	4.5	-15.3	28.057	37.4	3.0
72.095	5.4	-14.8	27.777	37.8	3.2
70.105	6.3	-14.3	27.363	38.3	3.5
68.557	7.0	-13.9	26.957	38.8	3.8
66.675	7.9	-13.4	26.557	39.4	4.1
65.211	8.6	-13.0	26.164	39.9	4.4
63.782	9.3	-12.6	25.777	40.5	4.7
62.046	10.2	-12.1	25.523	40.8	4.9
60.695	10.9	-11.7	25.147	41.4	5.2
59376	11.7	-11.3	24.777	41.9	5.5
58.090	12.4	-10.9	24.413	42.4	5.8
56.864	13.1	-10.5	24.055	43.0	6.1
55.609	13.8	-10.1	23.820	43.3	6.3
54.413	14.5	-9.7	23.472	43.9	6.6
53.246	15.3	-9.3	23.130	44.4	6.9
52.107	16.0	-8.9	22.793	45.0	7.2
50.995	16.7	-8.5	22.572	45.3	7.4
49.909	17.4	-8.1	22.244	45.9	7.7
48.849	18.1	-7.7	21.922	46.4	8.0
48.350	18.7	-7.4	21.710	46.8	8.2
47.053	19.5	-6.9	21.397	47.3	8.5
46.062	20.1	-6.6	21.088	47.8	8.8
45.334	20.7	-6.3	20.886	48.2	9.0
44.382	21.4	-5.9	20.586	48.7	9.3
43.683	21.9	-5.6	20.290	49.3	9.6
42.769	22.6	-5.2	20.096	49.6	9.8
42.096	23.2	-4.9	19.809	50.2	10.1
41.222	23.9	-4.5	19.526	50.7	10.4
40.579	24.4	-4.2	19.340	51.1	10.6

Resistance (Kohms)	Temp (F)	Temp (C)	Resistance (Kohms)	Temp (F)	Temp (C)
19.065	51.6	10.9	9.956	77.2	25.1
18.884	52.0	11.1	9.869	77.5	25.3
18.616	52.5	11.4	9.741	78.1	25.6
18.352	53.1	11.7	9.614	78.6	25.9
18.179	53.4	11.9	9.530	79.0	26.1
17.503	54.9	12.7	9.407	79.5	26.4
17.339	55.2	12.9	9.325	79.9	26.6
17.095	55.8	13.2	9.205	80.4	26.9
16.856	56.3	13.5	9.086	81.0	27.2
16.698	56.7	13.7	9.007	81.3	27.4
16.465	57.2	14.0	8.891	81.9	27.7
16.312	57.6	14.2	8.815	82.2	27.9
16.085	58.1	14.5	8.702	82.8	28.2
15.935	58.5	14.7	8.590	83.3	28.5
15.714	59.0	15.0	8.517	83.7	28.7
15.568	59.4	15.2	8.408	84.0	28.9
15.353	59.9	15.5	8.336	84.6	29.2
15.211	60.3	15.7	8.230	85.1	29.5
15.001	60.8	16.0	8.125	85.6	29.8
14.863	61.2	16.2	8.056	86.0	30.0
14.658	61.7	16.5	7.954	86.5	30.3
14.457	62.2	16.8	7.853	87.1	30.6
14.325	62.6	17.0	7.787	87.4	30.8
14.128	63.1	17.3	7.689	88.0	31.1
13.999	63.5	17.5	7.592	88.5	31.4
13.808	64.0	17.8	7.496	89.1	31.7
13.682	64.4	18.0	7.433	89.4	31.9
13.496	64.9	18.3	7.340	90.0	32.2
13.373	65.3	18.5	7.248	90.5	32.5
13.192	65.8	18.8	7.157	91.0	32.8
13.073	66.2	19.0	7.098	91.4	33.0
12.896	66.7	19.3	7.009	91.9	33.3
12.779	67.1	19.5	6.922	92.5	33.6
12.607	67.6	19.8	6.836	93.0	33.9
12.493	68.0	20.0	6.779	93.4	34.1
12.325	68.5	20.3	6.695	93.9	34.4
12.215	68.9	20.5	6.612	94.5	34.7
12.051	69.4	20.8	6.531	95.0	35.0
11.943	69.8	21.0	6.450	95.5	35.3
11.783	70.3	21.3	6.371	96.1	35.6
11.678	70.7	21.5	6.319	96.4	35.8
11.522	71.2	21.8	6.241	97.0	36.1
11.420	71.6	22.0	6.165	97.5	36.4
11.268	72.1	22.3	6.089	98.1	36.7
11.168	72.5	22.5	6.015	98.6	37.0
11.020	73.0	22.8	5.941	99.1	37.3
10.874	73.6	23.1	5.869	99.7	37.6
10.778	73.9	23.3	5.798	100.2	37.9
10.636	74.5	23.6	5.728	100.8	38.2
10.542	74.8	23.8	5.658	101.3	38.5
10.404	75.4	24.1	5.590	101.8	38.8
10.312	75.7	24.3	5.522	102.4	39.1
10.177	76.3	24.6	5.456	102.9	39.4
10.088	76.6	24.8	5.390	103.4	39.7

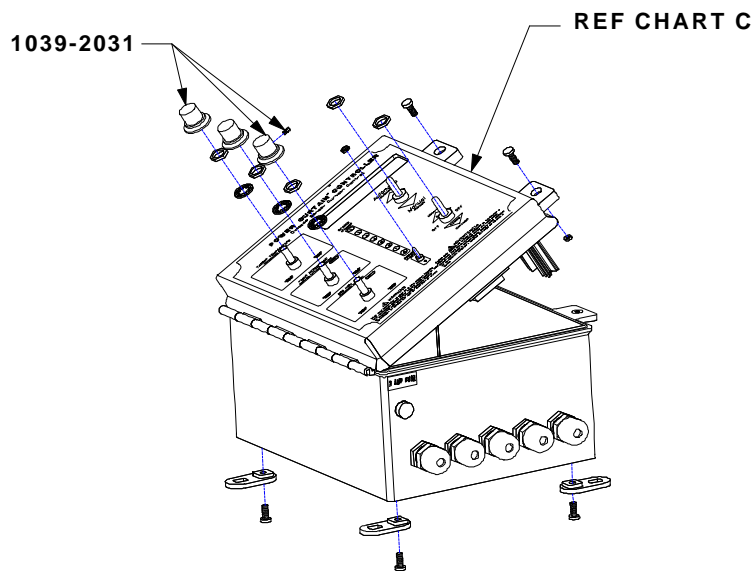
Resistance (K ohms)	Temp (F)	Temp (C)	Resistance (Kohms)	Temp (F)	Temp (C)
5.326	104.0	40.0	4.454	112.1	44.5
5.262	104.5	40.3	4.402	112.6	44.8
5.199	105.1	40.6	4.334	113.4	45.2
5.137	105.6	40.9	4.284	113.9	45.5
5.076	106.2	41.2	4.217	114.6	45.9
4.995	106.9	41.6	4.168	115.2	46.2
4.936	107.4	41.9	4.120	115.7	46.5
4.877	108.0	42.2	4.057	116.4	46.9
4.820	108.5	42.5	3.995	117.1	47.3
4.763	109.0	42.8	3.949	117.7	47.6
4.688	109.8	43.2	3.888	118.4	48.0
4.633	110.3	43.5	3.844	118.9	48.3
4.579	110.8	43.8	3.785	119.7	48.7
4.507	111.6	44.2			

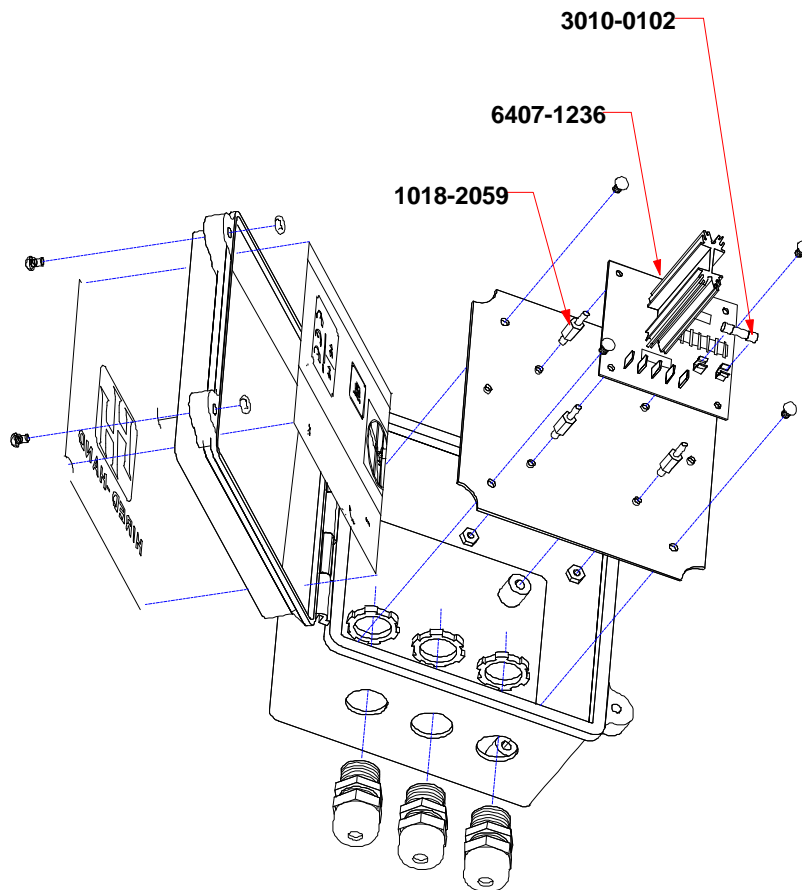
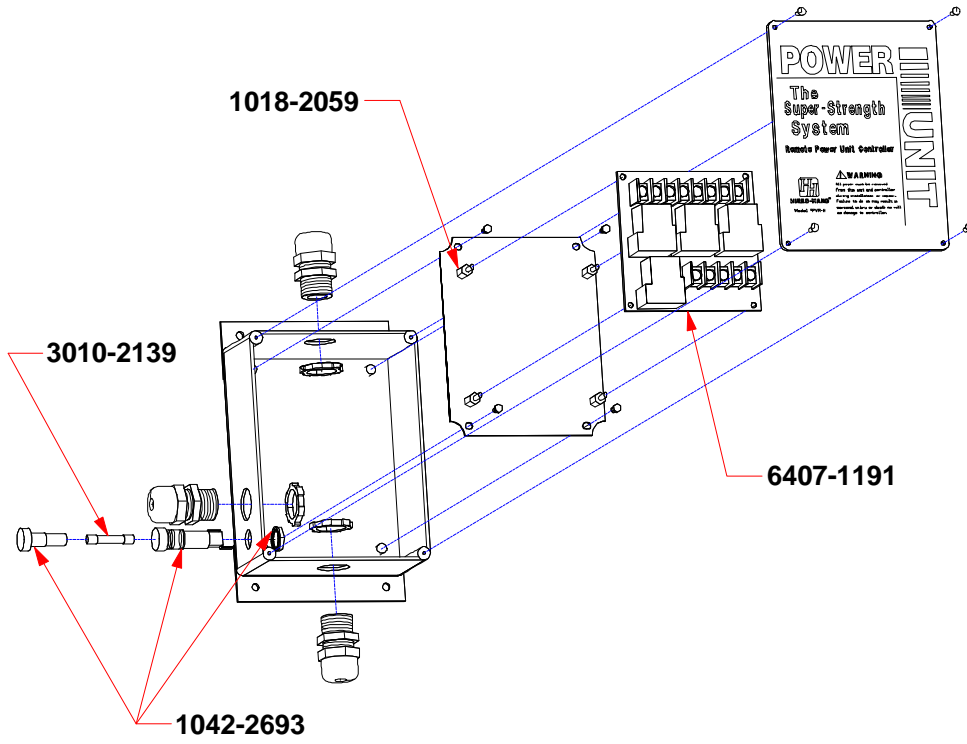
All resistance values given in Kohms.

11. Exploded View/Parts



List





Part No.	Description
1018-2059	STND_OFF SCBS-8N
1039-2031	KNOB 1" dia 1/4 shft indctr
1042-2693	FUSE HLDR Shock safe Lit fuse
3010-2139	Fuse 10 AMP 1/4X1-1/4 fst act
3010-2291	Fuse 2 AMP 1/4X1-1/4 fst act
3010-2527	Fuse 2 AMP 5mmX20mm fsc act
3010-0102	Fuse 15 AMP 5mmX20mm fsc act
3540-0127	DIGITAL_IC SRAM 2Kx8
6407-1191	/PCB119 PVR-H w QA
6407-1236	/PCB134 external var/spd w QA
6407-2593	/Temperature sensor assy

Chart A	
Part No.	Description
6407-1203	/PCB130 S05-CON-8-0 w QA 120V
6407-1211	/PCB130 S05-CON-8-0 w QA 240V
6407-1214	/PCB130 S05-CON-8-V w QA
6407-1216	/PCB130 S05-TUN-8-0 w QA
6407-1218	/PCB130 S05-OSC-8-V w QA
6407-1219	/PCB130 S05-CON-8-V w QA 240V
6407-1220	/PCB130 S05-TUN-8-0 w QA 240V
6407-1221	/PCB130 S05-CON-8-V w QA 240V

Chart B	
Part No.	Description
3701-0111	EPROM S05-OSC-8-0 V. ENG
3701-0112	EPROM S05-OSC-8-0 V. MET
3701-0113	EPROM S05-OSC-8-V V. ENG
3701-0114	EPROM S05-OSC-8-V V. MET
3701-0115	EPROM S05-CON-8-0 V. ENG
3701-0116	EPROM S05-CON-8-0 V. MET
3701-0117	EPROM S05-CON-8-V V. ENG
3701-0118	EPROM S05-CON-8-V V. MET

Chart C	
Part No.	Description
6407-0510	DOOR Assembly S05-OSC-8-0 ENG
6407-0511	DOOR Assembly S05-OSC-8-0 MET
6407-0512	DOOR Assembly S05-OSC-8-V ENG
6407-0513	DOOR Assembly S05-OSC-8-V MET
6407-0514	DOOR Assembly S05-CON-8-0 ENG
6407-0515	DOOR Assembly S05-CON-8-0 MET
6407-0516	DOOR Assembly S05-CON-8-V ENG
6407-0517	DOOR Assembly S05-CON-8-V MET

12. Programs