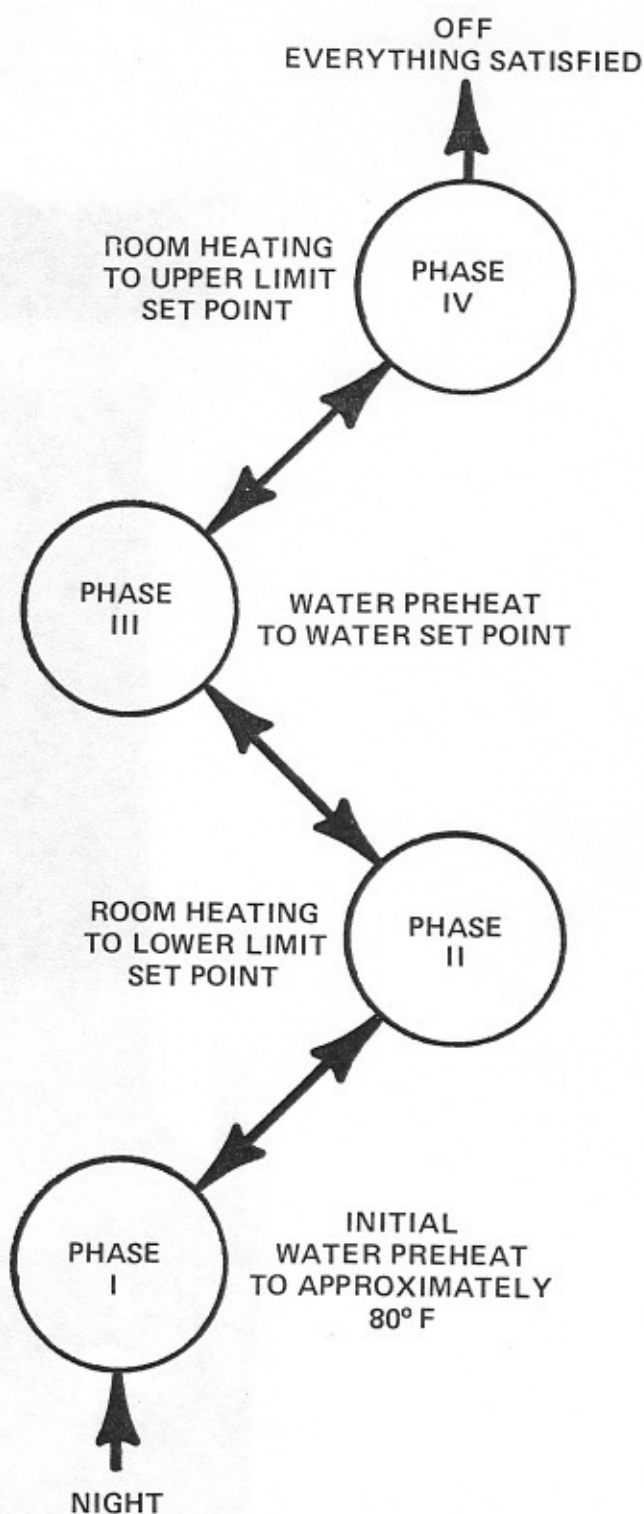


PHASE I: Uses the early morning sun which has limited energy to preheat water only until the collector is hot enough to heat room or on cloudy day it may only heat H₂O because a great enough ΔT doesn't occur to make space heat.

PHASE II: Heats the room to the lower limit set point. This set point should normally be set two to four degrees above the normal furnace thermostat set point, i.e., if the furnace thermostat is set at 68° F the low limit set point should be between 71 and 73° F. This prevents the furnace from turning on when there is sun available to heat the house.

PHASE III: When the house has been heated to the room low limit set point and solar energy is available the system will then go back to heating water to the water set point. Whenever the room temperature drops below the room low limit set point the system will go back to Phase II operation and reheat house and then return to Phase III. The water set point should be in the range of 100 to 110° F. during winter operation.

PHASE IV: When the water has been raised in temperature to the water temperature limit the system will go to heating the house to the room upper limit set point. This mode of operation would normally occur during late afternoon. This mode of operation uses the house and furniture, etc., as a thermal storage mass, thus utilizing energy that would be lost with less advanced control systems. The room temperature high limit should be set as high as comfortable to allow the maximum storage, i.e. 78° F.



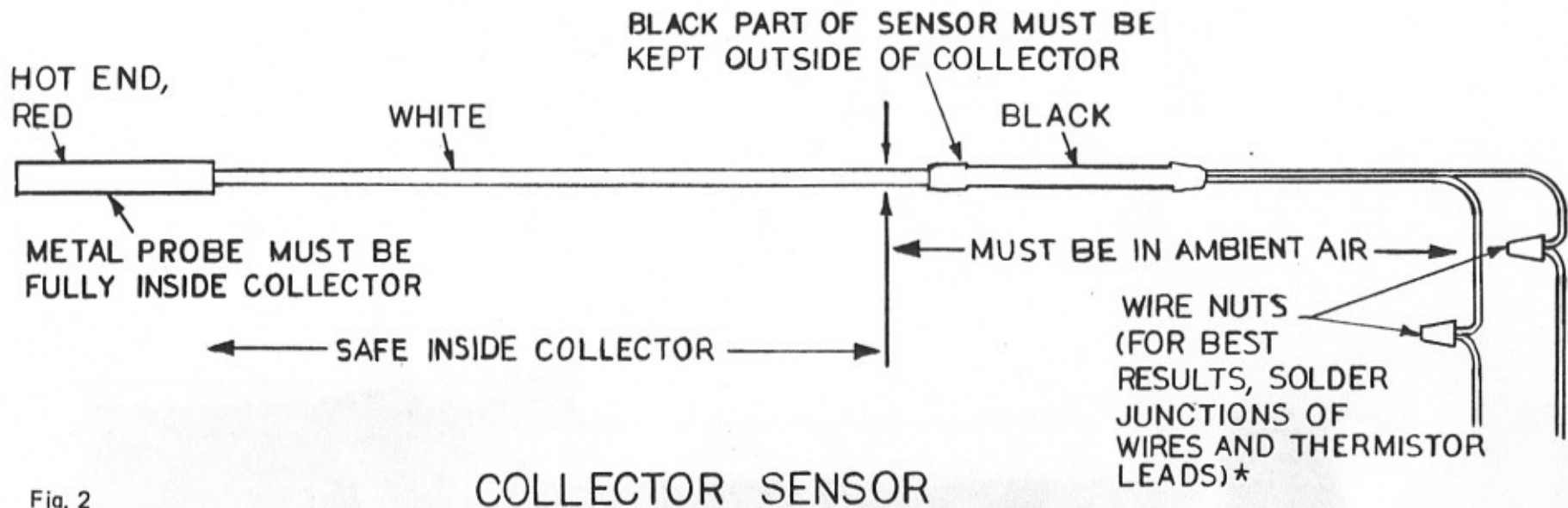


Fig. 2

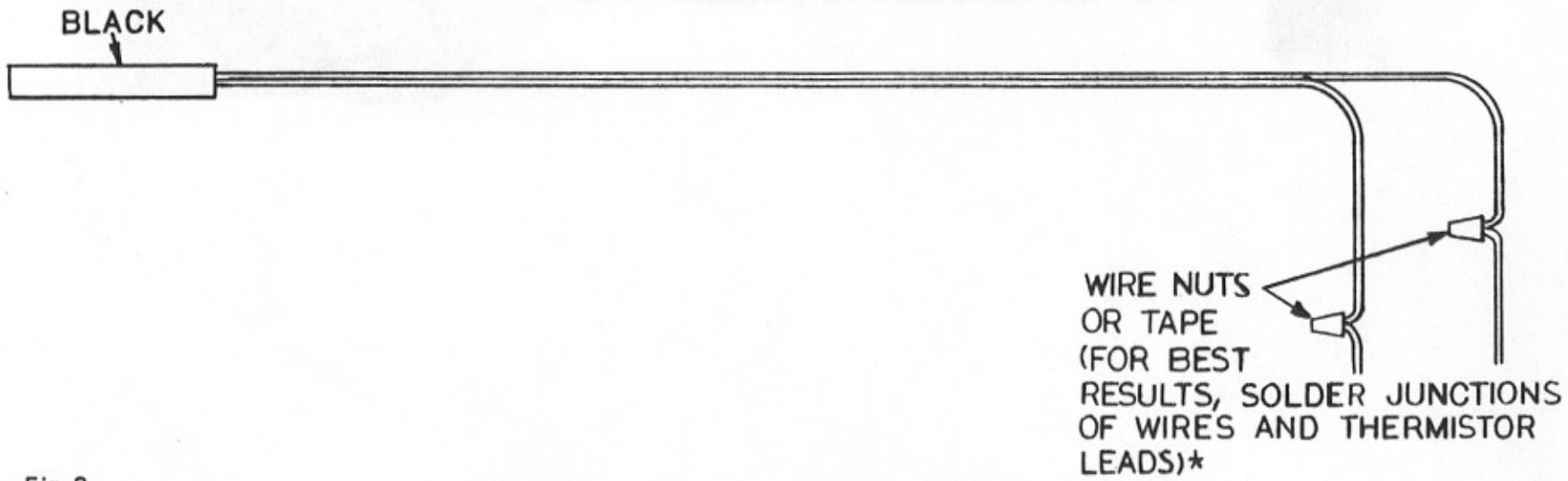
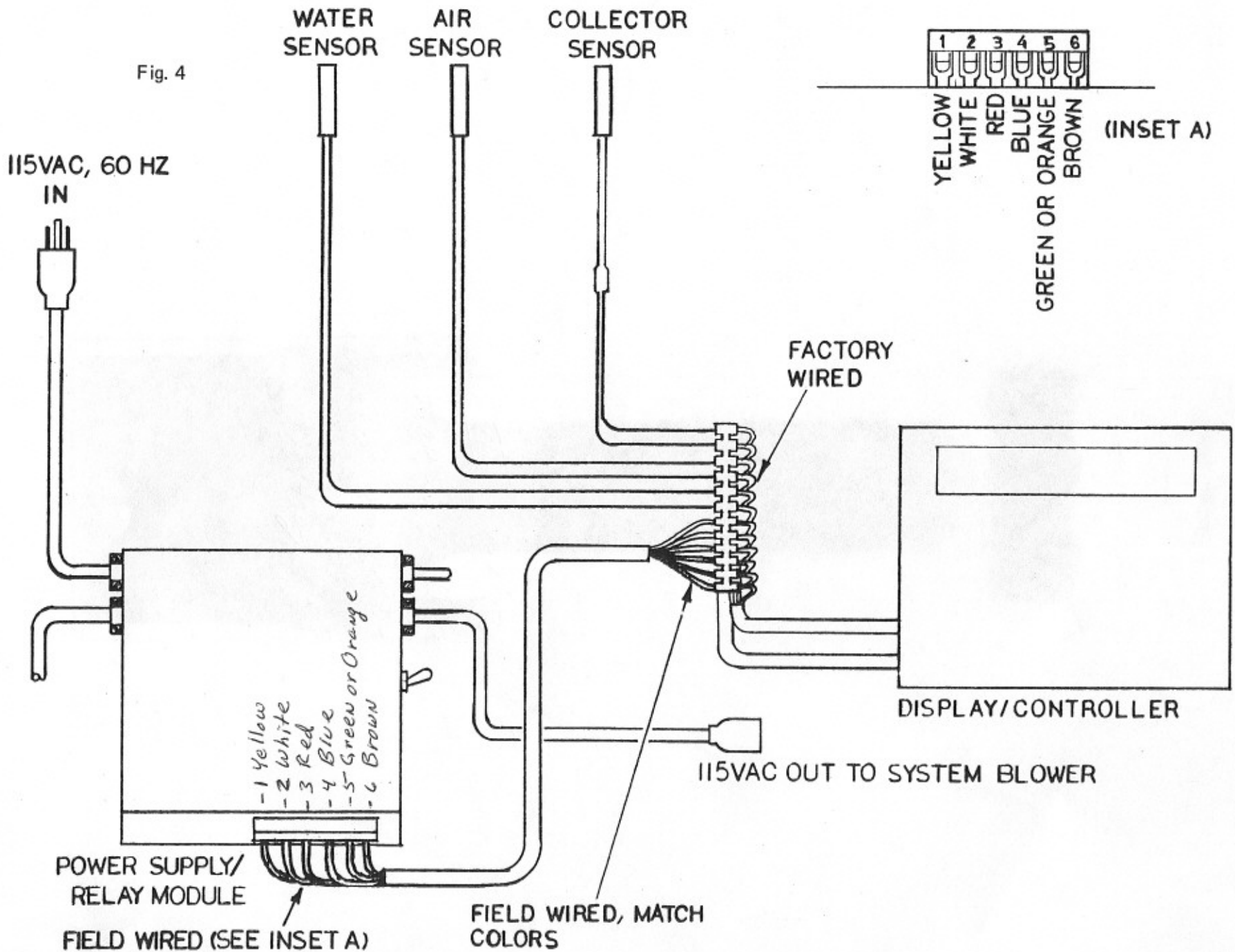


Fig. 3

ROOM AIR AND WATER SENSOR

*Use only Electronic Grade (Rosin Core) Solder.

Fig. 4



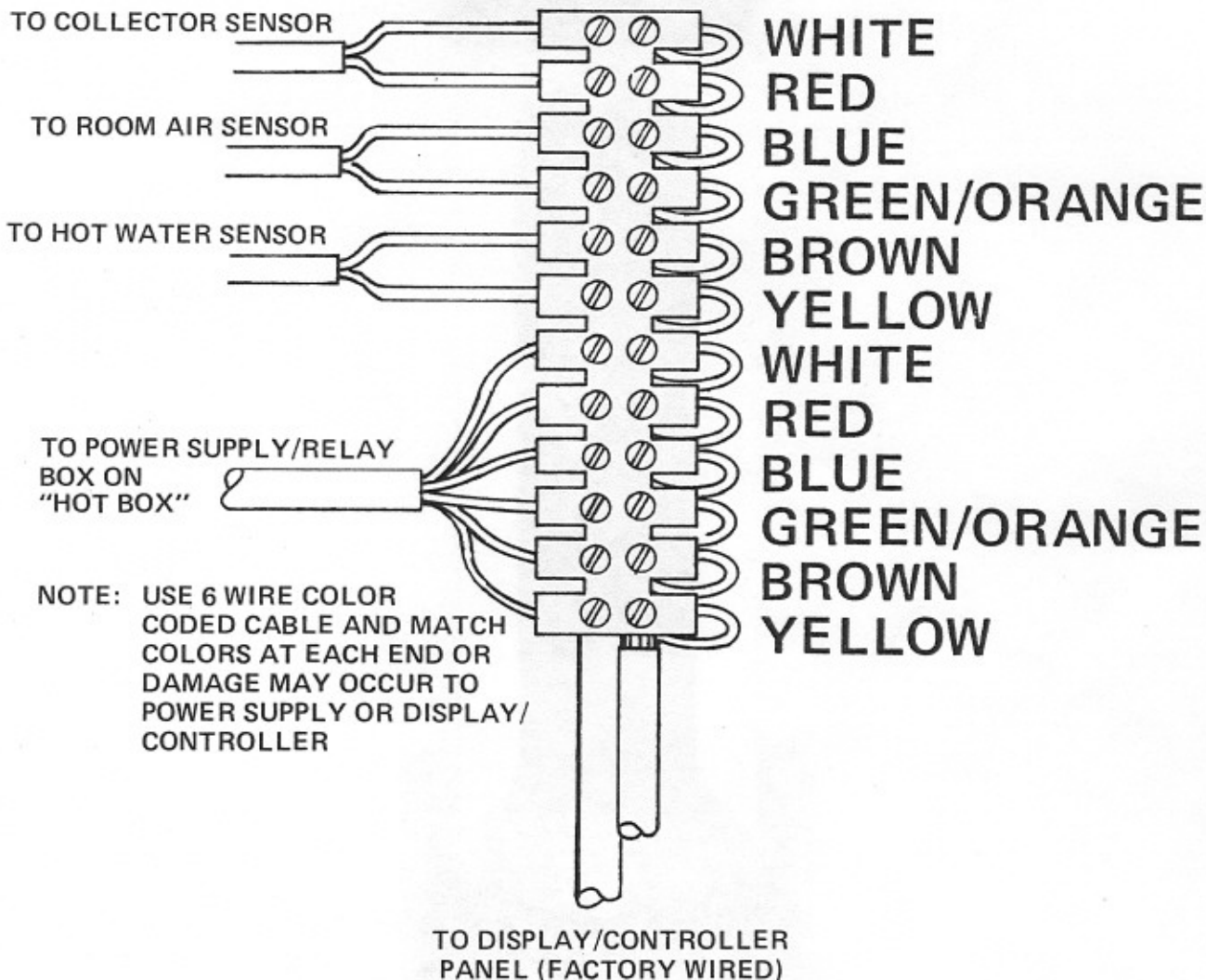
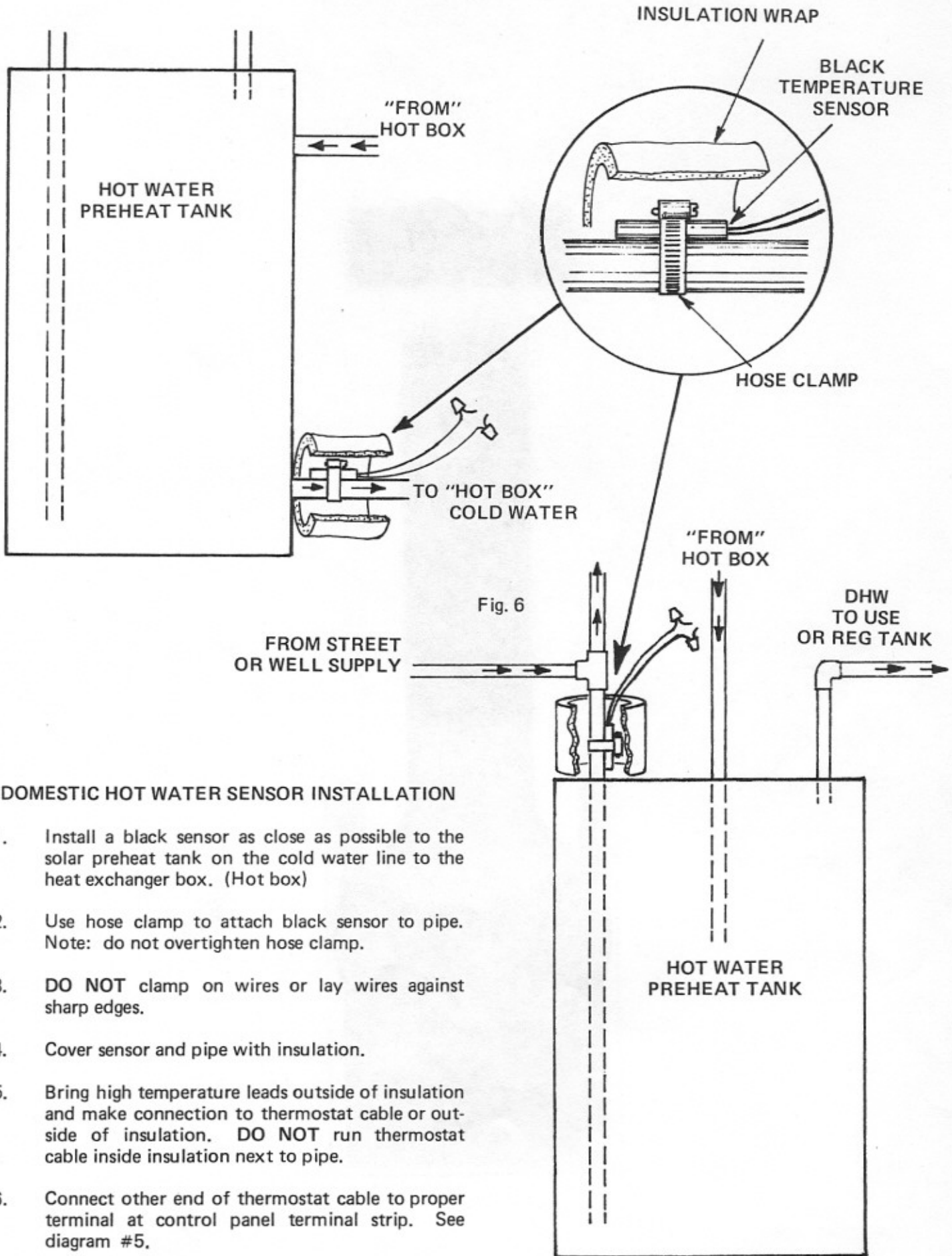


Fig. 5



DOMESTIC HOT WATER SENSOR INSTALLATION

1. Install a black sensor as close as possible to the solar preheat tank on the cold water line to the heat exchanger box. (Hot box)
2. Use hose clamp to attach black sensor to pipe. Note: do not overtighten hose clamp.
3. **DO NOT** clamp on wires or lay wires against sharp edges.
4. Cover sensor and pipe with insulation.
5. Bring high temperature leads outside of insulation and make connection to thermostat cable or outside of insulation. **DO NOT** run thermostat cable inside insulation next to pipe.
6. Connect other end of thermostat cable to proper terminal at control panel terminal strip. See diagram #5.

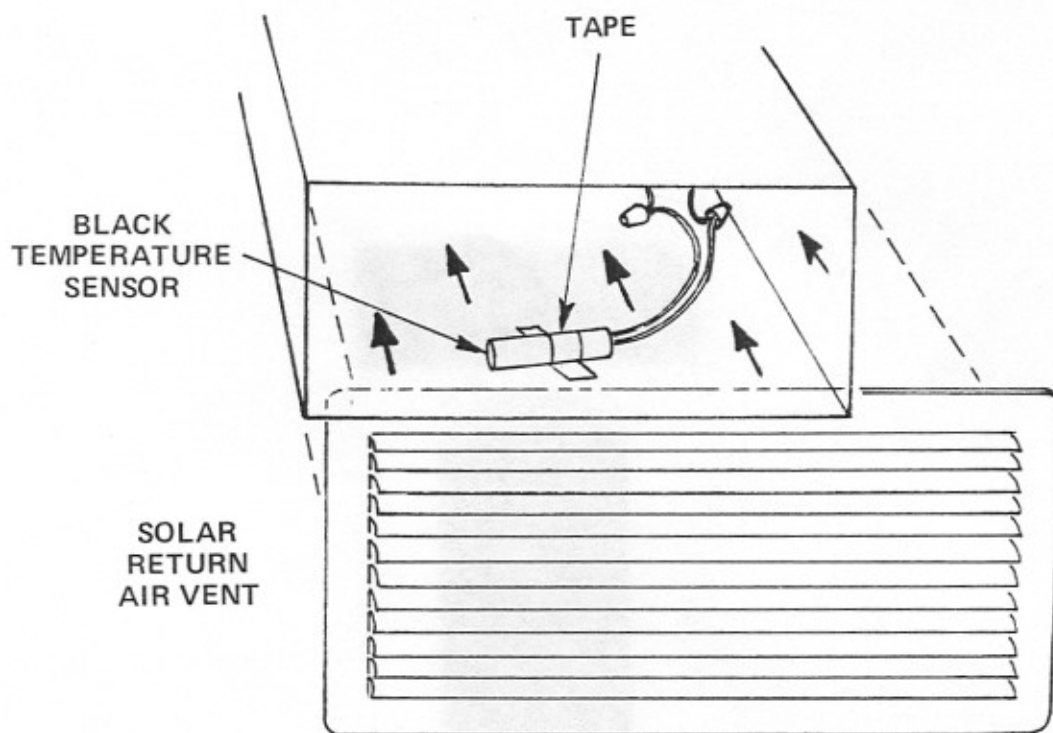


Fig. 7

INSTALLATION: ROOM AIR SENSOR

1. Install A. black sensor just behind the solar return air grill.
2. Use double sided foam tape, $\frac{1}{2}$ " copper pipe clamp, or other method to attach sensor to convenient attachment point.
3. Make thermostat wire connections to sensor inside duct or at other convenient location and solder the connection for better reliability.;
4. Use rubber grommet or similar padding where wire goes through duct metal to prevent damage to wires.
5. DO NOT clamp on wires or run over any sharp edges.
6. Connect other end of thermostat or cable to proper terminal at control panel terminal strip.

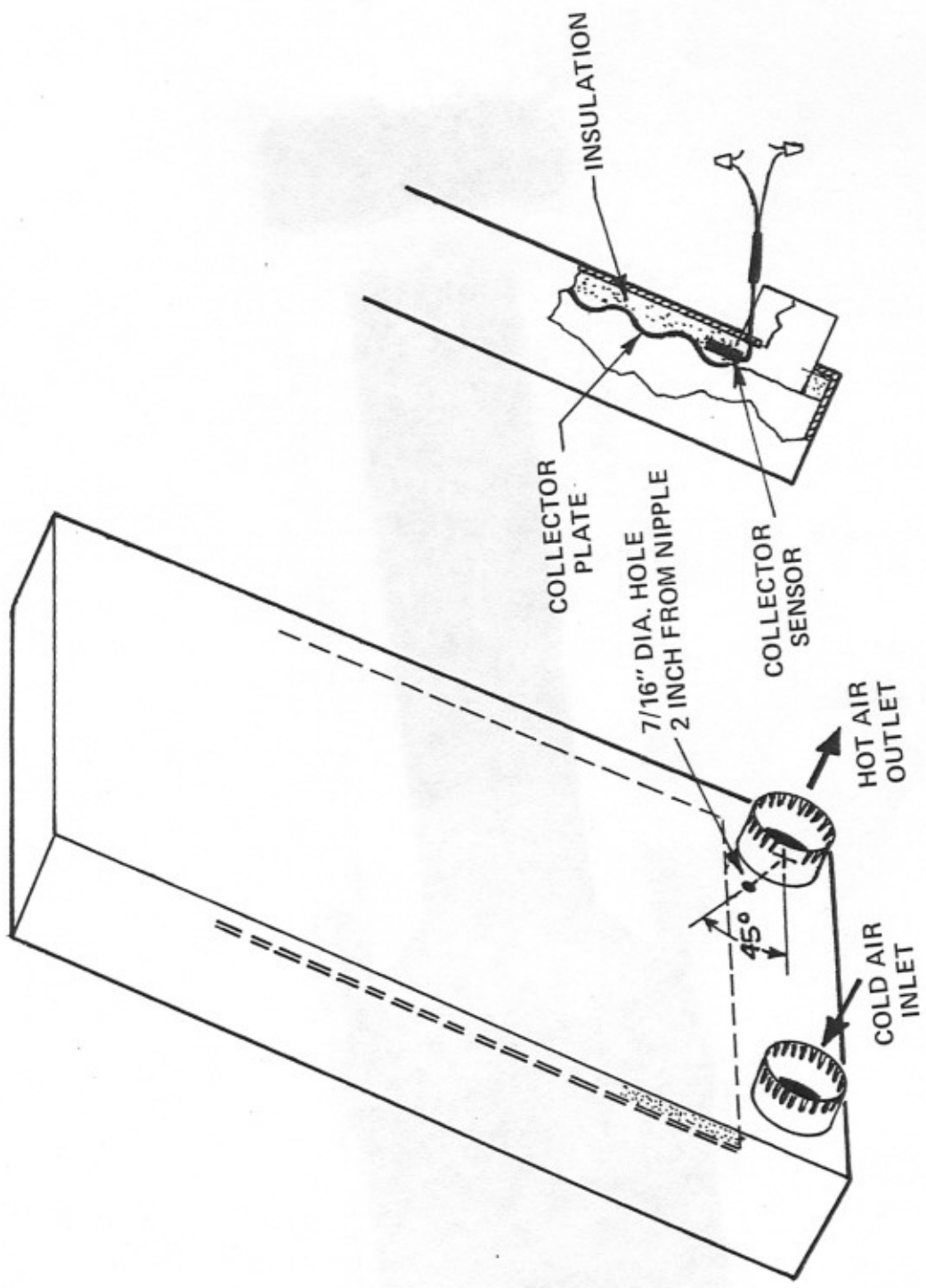


Fig. 8

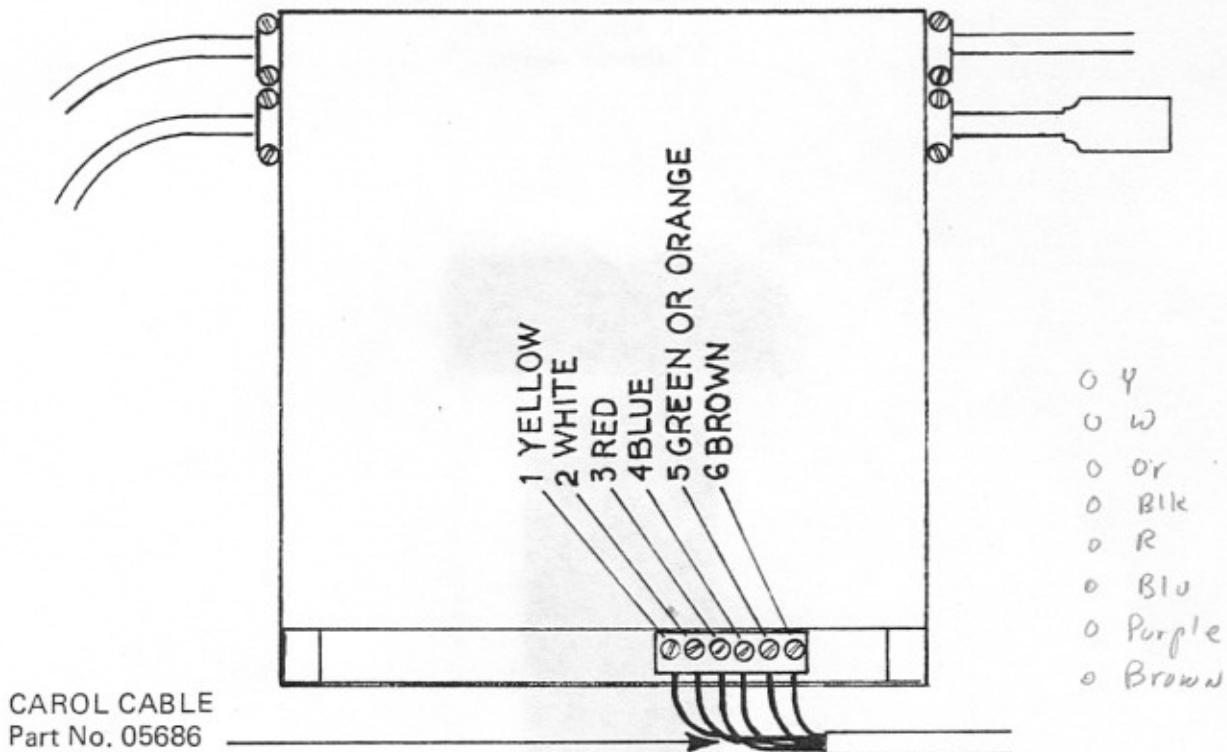


Fig. 9

POWER SUPPLY TO CONTROL PANEL WIRING

WARNINGS:

1. Danger high voltage: Do not remove cover from relay/power supply box without first disconnecting power.
2. Do not run water pump dry for more than 5 seconds or it may be destroyed.
3. You must use 6 wire color coded cable for connection between power supply and control panel. Failure to do so will void warranty. Interchanging of wires which will occur if three two's are pulled can cause distinctive failures. The charge to fix these distinctive failures is a costly one, and the panel must be returned to the factory for repair with the associated installation delay.

The following cable is suggested:

6 wire color coded thermostat cable
18 AWG solid copper conductors with PVC insulation
PVC insulation outer jacket

EXAMPLE:

CAROL CABLE CO. Part No. 05686 thermostat wire
6 conductor plastic jacketed low voltage
intercom and bell wire.

COLLECTOR SENSOR INSTALLATION

WARNINGS

1. Black part of collector sensor must be outside of collector in ambient air temperatures or damage may occur to sensor.
2. Do not bend black part of sensor or damage may occur to sensor.
3. Do not run thermostat cable inside or in contact with bare hot air ducts.
Temperature rating of thermostat cable is as low as 60°C (140°F) and insulation can be damaged by hot air from the collector.

INSTALLATION

1. Sensor goes in hottest (last) collector in series connected string.
2. Drill hole through back of collector approximately 2 inches outside of hot air outlet nipple on a 45° angle from the centerline of nipple. Use a 7/16 inch drill.
3. Push red part of sensor through hole into collector and attach to collector plate or wedge under edge of collector plate. Leave black part of sensor outside of collector.
4. Fill 7/16 inch hole in back of collector with silicone rubber (RTV) caulking compound or equivalent.
5. Tape black part of collector sensor to outside of duct insulation.
6. Make connections to cable going to control panel and solder connections for best reliability. Use electronic grade (rosin core) solder only.
7. Tape or wire nut over soldered connections and tape to outside of duct insulation for support.
8. Run cable going to control panel outside of duct insulation.

WARNINGS CONTINUED

4. Do not run thermostat cable inside or in contact with bare hot air ducts or in contact with bare hot water pipes. Temperature rating of this type of cable is only 60°C (140°F).

INSTALLATION

1. **NOTE:** Two low voltage fuses are inside power supply. Replace only with identical fuses if blown during checkout.
2. **Before** connecting the 6 wire cable between the power supply and the control panel, make the following tests on the power supply at the low voltage terminal strip at the front.

TEST NO.	NEGATIVE LEAD BLACK	POSITIVE LEAD RED	VOLTAGE READING DC VOLTS
1	Brown 6	Yellow 1	+20 to +32 volts
2	Brown 6	White 2	+20 to +32 volts
3	Brown 6	Red 3	+20 to +32 volts
4	Blue 4	Brown 6	+20 to +32 volts

WARNING: Do not short any terminals other than those listed below or damage could result to the unit.

TEST NO.	CONNECT THIS TERMINAL	THIS TERMINAL WITH WIRE	RESULT
1	Yellow 1	Green 5	Water pump and hot box blower should run.
2	White 2	Brown 6	Room heating blower should run.

3. Turn power off before continuing with installation.
4. Connect 6 wire cable to power supply and run to control panel but do not connect to control panel. Run tests of step 2 on control panel end of cable before connecting to panel and after turning power on.
5. Turn power off. Connect 6 wire cable to control panel.
6. Connect sensor wires to control panel.
7. Turn power on when system is complete and ready to run.

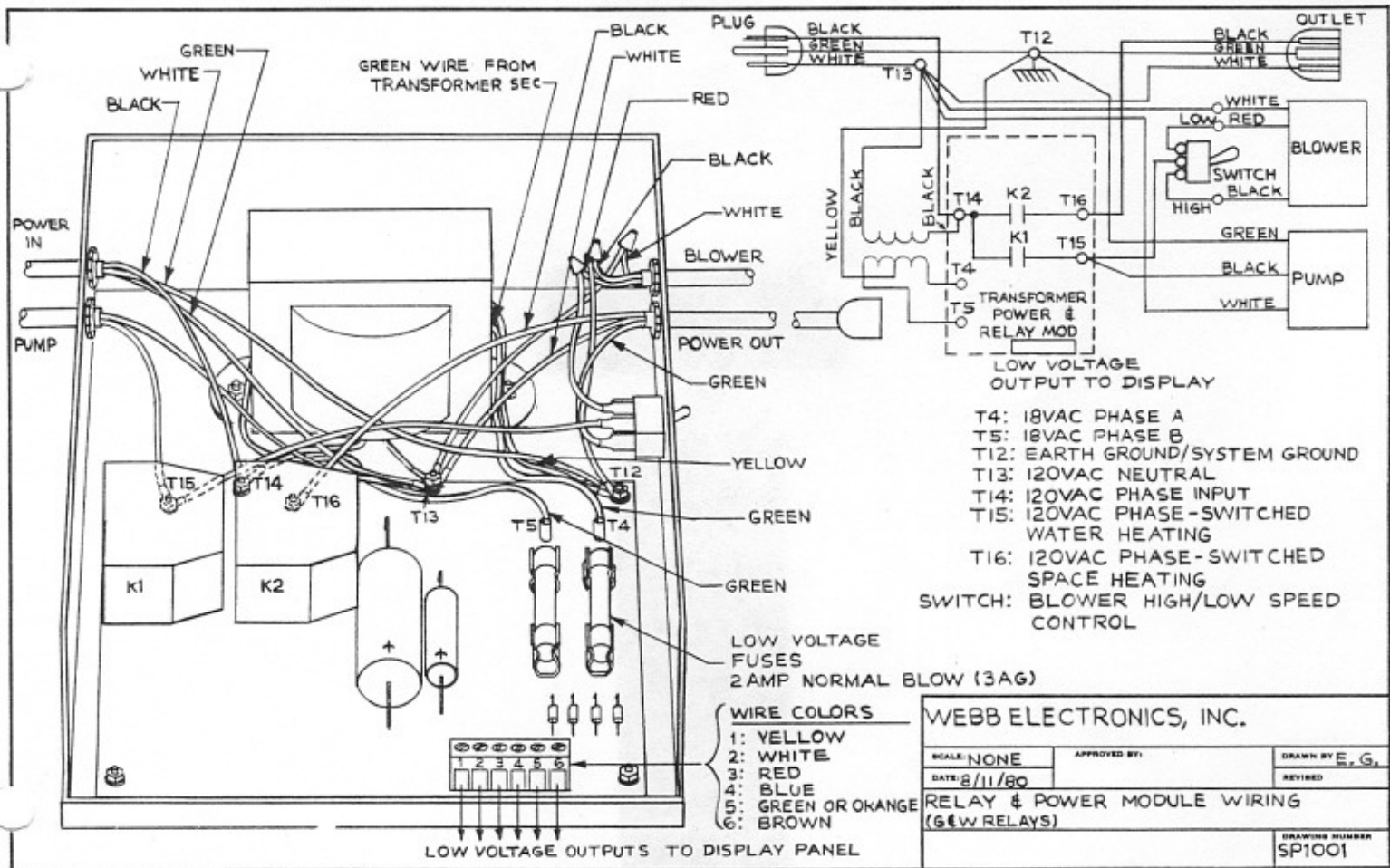


Fig. 10

Codes in some areas of the U.S. require Romex or conduit for the power in and power out cables.

1. Remove power from system. Remove cover by loosening 2 side screws.
2. Cut off power in and power out cables approximately 3 inches outside box. Loosen Romex clamps. Slide orange insulation off wires. Pull wires back inside box and strip for wire nuts.
3. Strip outer covering back about 5 inches on the power in and power out Romex replacement cables.
4. Feed Romex cables in through clamps until outer covering is in clamp and tighten clamps. Strip wires for wire nuts.
5. Wire nut black to black, white to white and green to ground on the power in cable and on the power output cable.
6. Push wires down inside box keeping them to the back away from the fuses and relays. Replace cover and tighten side screws.