

Smart Fan Controller™ (SFC™) Model 1413-XX Installation for Smart Thermostats

Fig. 1 Gas Furnace/Hydronic/Electric Installation

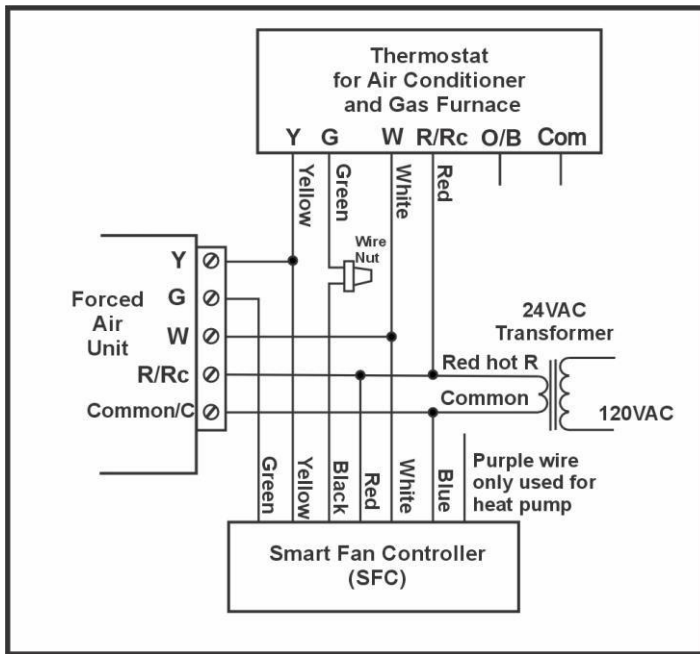


Fig. 2 Orange Reversing Valve Heat Pump Install

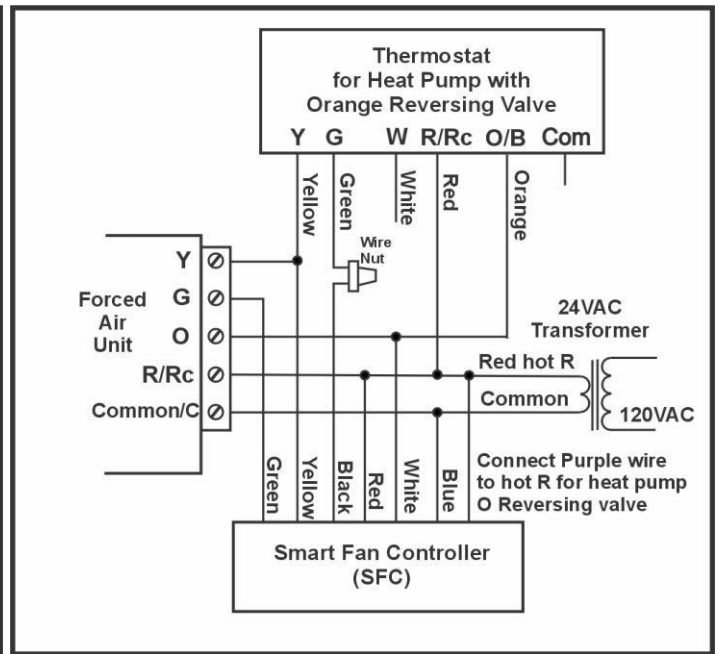


Fig. 3 Brown Reversing Valve Heat Pump Install

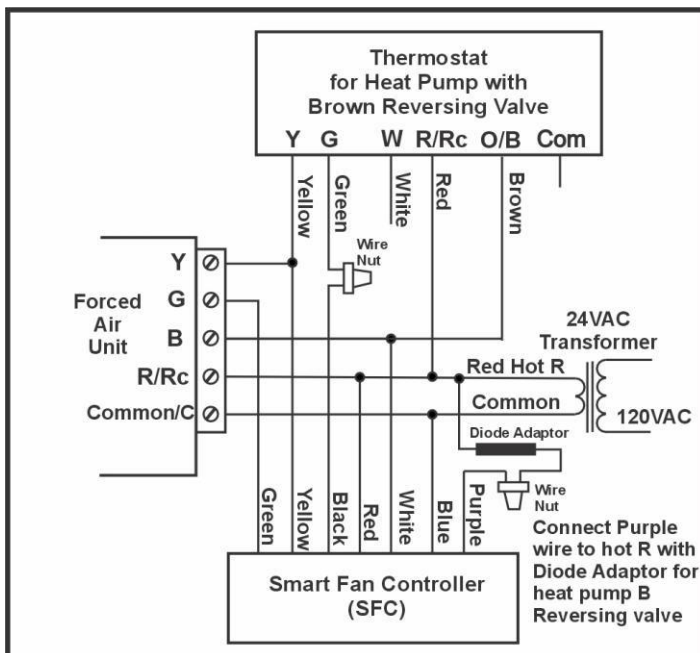


Fig. 4 Warning for Proper Installation of SFC

WARNING

(1) **HOT R and COMMON** wires must be connected to transformer or Forced Air Unit (FAU) terminals for SFC to function properly and avoid damage.

(2) **Fan Control Check** Switch fan control from AUTO to ON to verify fan turns ON. Switch fan control from ON to Auto to verify fan turns OFF without fan-off delay.

(3) **Cool fan-off delay check:** Lower thermostat setpoint, turn ON cooling for less than 10 seconds, and raise thermostat setpoint until cooling turns OFF to verify fan operates for 10 seconds and turns OFF. Fan may operate longer due to built-in delay of 30 to 90 seconds. Wait for fan to turn off to verify proper fan operation.

(4) **Heat fan-off delay check:** Raise thermostat setpoint to turn ON heat for less than 10 seconds, and lower thermostat setpoint until heating turns OFF to verify fan operates for 10 seconds and turns OFF. Fan may operate longer due to built-in fan-off delay of 30 to 150 seconds. Wait for fan to turn off to verify proper fan

1. PRE-INSTALLATION CHECKS

- Customer must agree to install SFC.
- Furnace must be operational with no gas leaks, platform in good condition, all ducts connected, panel doors secure, and air filter clean. Furnace and thermostat controls must be 24VAC with fan switch or G connection at FAU.
- SFC works with smart thermostats on gas, heat pump, hydronic, and electric heating with different wiring for each system. Heat pump reversing valve is energized for cooling (orange wire) or energized for heating (brown wire).
- For installations without labels on controller boards check wiring colors. Follow wires to thermostat or verify function by connecting a jumper wire from transformer hot R (usually red) to green (fan), yellow (AC), white (heat), etc..

2. INSTALLATION

- Verify system works in heating and cooling. Smart thermostats have default delays of 150 seconds or more between compressor cycles for cooling or heating. Make sure TXV bulb is strapped to suction line and properly insulated.
- Turn off power to FAU either at disconnect (packaged units) or wall plug/switch (split systems). Locate mounting location for SFC adjacent to thermostat wires or terminal block on FAU that is connection point for thermostat wiring.

Smart Efficient Fan Controller (EFC) Model 1413-XX Installation for Smart Thermostats

- Step 1:** Connect SFC red wire to FAU “R/Rc” terminal (red) loosen screw (or wire nut) hold existing red wire, insert SFC red wire with existing wire, and tighten screw (or wire nut).
- Step 2:** Connect SFC white wire to FAU “W” terminal. If unit is heat pump, leave white wire disconnected and see section 3. If FAU has separate “Rh” (red heat) do not connect white wire.
- Step 3:** Connect SFC yellow wire to FAU “Y” terminal.
- Step 4:** Disconnect green wire from FAU “G” terminal and connect SFC black to thermostat green wire.
- Step 5:** Connect SFC green wire to FAU “G” terminal (or wire nut).
- Step 6:** Connect SFC blue wire to C terminal (common). This is return from 24VAC transformer and colors vary.
- If system is not a heat pump, purple wire can be capped with a wire nut or cut off. Secure body of SFC using cable or zip ties to reduce vibration from FAU. Double-check wire connections are tight. Turn power back on to system.
- For hydronic or electric forced-air heating set smart thermostat to electric heating to energize fan G with heat W.

3. INSTALLATION FOR HEAT PUMP ORANGE REVERSING VALVE (ENERGIZED FOR COOLING)

- Connect SFC white wire to orange wire (FIG. 2). Connect SFC purple and red wires to FAU “R/Rc” terminal (red).

INSTALLATION FOR HEAT PUMP BROWN REVERSING VALVE (ENERGIZED FOR HEATING)

- Connect SFC white wire to brown reversing valve wire (FIG. 3). Connect SFC purple wire to one end of brown HP diode adapter (FIG. 3). Connect other end of brown HP adapter to FAU “R/Rc” terminal (red) and SFC red wire.
- For smart thermostats go to equipment settings > heat pump and select B or O.

INSTALLATION FOR WATER SOURCE HEAT PUMP (REVERSING VALVE ENERGIZED FOR COOLING)

- Please refer to FIG. 2 for orange wire (energized for cooling) or FIG. 3 for brown wire (energized for heating).

4. FAN CONTROL CHECK

- Switch fan control from AUTO to ON and verify fan turns ON.
- Switch fan control from ON to Auto and verify fan turns OFF without a fan-off delay.

5. FAN-OFF DELAY CHECKS

- Cool fan-off delay check:** Lower thermostat setpoint to turn ON cooling for less than 10 seconds and raise thermostat setpoint until cooling turns OFF to verify fan operates for 10 seconds and turns OFF. Fan may operate longer due to built-in fan-off delay of 30 to 90 seconds. Wait for fan to turn off to verify proper fan operation.
- Heat fan-off delay check:** Raise thermostat setpoint to turn ON heating for less than 10 seconds and lower thermostat setpoint until heating turns OFF to verify fan operates for 10 seconds and turns OFF. Fan may operate longer due to built-in fan-off delay of 30 to 150 seconds. Wait for fan to turn off to verify proper fan operation.

6. TROUBLESHOOTING

- If two transformer wires “Rc” (red cool) and “Rh” (red heat), install SFC red wire to “Rc.” Do not install SFC red wire to “Rh”, do not connect SFC white wire to thermostat “W”, insulate SFC white wire with wire nut.
- Double-check wiring connection from thermostat to furnace, condenser, reversing valve, and water valve for hydronic systems. **Ensure all wire connections are tight and secure.**
- If SFC does not produce fan delay at end of cooling cycle, ensure SFC yellow wire is connected to FAU Y terminal.
- If unit is a heat pump do not connect SFC white wire to “W”. Connect white wire as outlined in section 3.
- Installation is not complete until system operates properly.
- If system does not function, then continue to Troubleshooting sections 7 and 8.

7. TROUBLESHOOTING FOR FAN OPERATION ISSUES

- If blower runs continuously with SFC installed, remove thermostat face plate.
- If blower continues to run with face of thermostat removed, disconnect SFC green and black wires from fan relay connection to temporarily remove SFC fan control. Leave all other wires in place, reconnect thermostat fan wire (usually green) to fan relay terminal, or wire nut connection. If blower continues to run with thermostat faceplate removed and thermostat fan wire connected to fan relay, fan relay is faulty, or there is a short in thermostat fan wire.
- Make sure all connections are tight** and thermostat has new batteries and terminals on thermostat are good.
- If fan does not operate and system is hydronic make sure water valve is not stuck closed.

8. TROUBLESHOOTING FOR COOLING OR HEATING ISSUES

- If insufficient cooling install new thermostat batteries, replace air filter, clean condenser, check compressor contactor, and/or check and correct refrigerant charge.
- If insufficient heating, install new thermostat batteries, replace air filter, check igniter, inducer fan, and gas valve. If heat pump is not providing sufficient heating replace air filter and clean condenser, check compressor contactor, reversing valve, and/or check and correct refrigerant charge. If hydronic system is not providing sufficient heating, then check pump, air filter, and check water heater to ensure minimum 130°F hot water supply temperature.