Honeywell

ST9160A-C
Electronic Fan Timers

INSTALLATION INSTRUCTIONS

APPLICATION

The ST9160A-C Electronic Fan Timers integrate control of all circulating fan operations in a gas warm air appliance. This control is the central wiring point for most of the electrical components in the furnace. The ST9160 monitors the thermostat for heat, cool, and fan demands and controls a two-speed circulating fan as required. Communication with the SmartValve™ System Control initiates appliance light off. The ST9160 features a fixed or field-adjustable heat fan on delay and a fixed or field-adjustable heat fan off delay, depending on model. Cooling fan on and off delay is fixed. Specific timings vary. See appliance label or instructions for timings that are available for a specific appliance. Refer to Table 1 for model specifications.

Electronic air cleaner (EAC) and humidifier (HUM) convenience terminal connections can be provided as an option. Continuous low speed indoor air circulation is also available as an option. Thermostat connections are screw terminals or quick-connects.

SPECIFICATIONS

Table 1. ST9160 Model Specifications.

Model Number	Heat Fan		Cool Fan On/Off Delay
	On Delay	Off Delay	
ST9160A	Fixed	Fixed	Fixed
ST9160B	Fixed	Adjustable (4)	Fixed
ST9160C	Adjustable (2)	Adjustable (4)	Fixed

Electrical Ratings:

Power Voltage Requirements: 18 to 30 Vac, 50/60 Hz.
Contact Ratings:
Circulating Fan:
15A Full Load, 30A Locked Rotor at 120 Vac.
7.5A Full Load, 15A Locked Rotor at 240 Vac.
Max. Humidifier: 1A at 120 Vac. (Reduces heat speed circulating fan rating.)
Max. Electronic Air Cleaner (EAC): 1A at 120 Vac. (Reduces heat and cool speed circulating fan rating.)
Thermostat Anticipator Load (nominal): Heat: 0.1A.
Fuse (Optional): 5A, automotive type.

Envrionmental Ratings:

Temperature: -40° to +150° F (-40° to +66° C).
Humidity: 5 to 90% rh, at 95° F noncondensing.

INSTALLATION

When Installing this Product…

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings and specifications given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out the product operation as provided in these instructions.

⚠ CAUTION

Disconnect power supply before wiring to prevent electrical shock or equipment damage.

Location and Mounting

The ST9160 is mounted using four No. 6 screws (obtained locally). Snap-in plastic standoffs also may be used for mounting. The typical mounting location is the appliance compartment. The ST9160 may be mounted in any orientation.

Wiring

All wiring must comply with local codes and ordinances. Disconnect power before making wiring connections. Route the wiring to minimize the strain on the ST9160 connections. Connect the ST9160 to the SmartValve™ System Control. Refer to Fig. 1 and 2 for standard wiring connections.

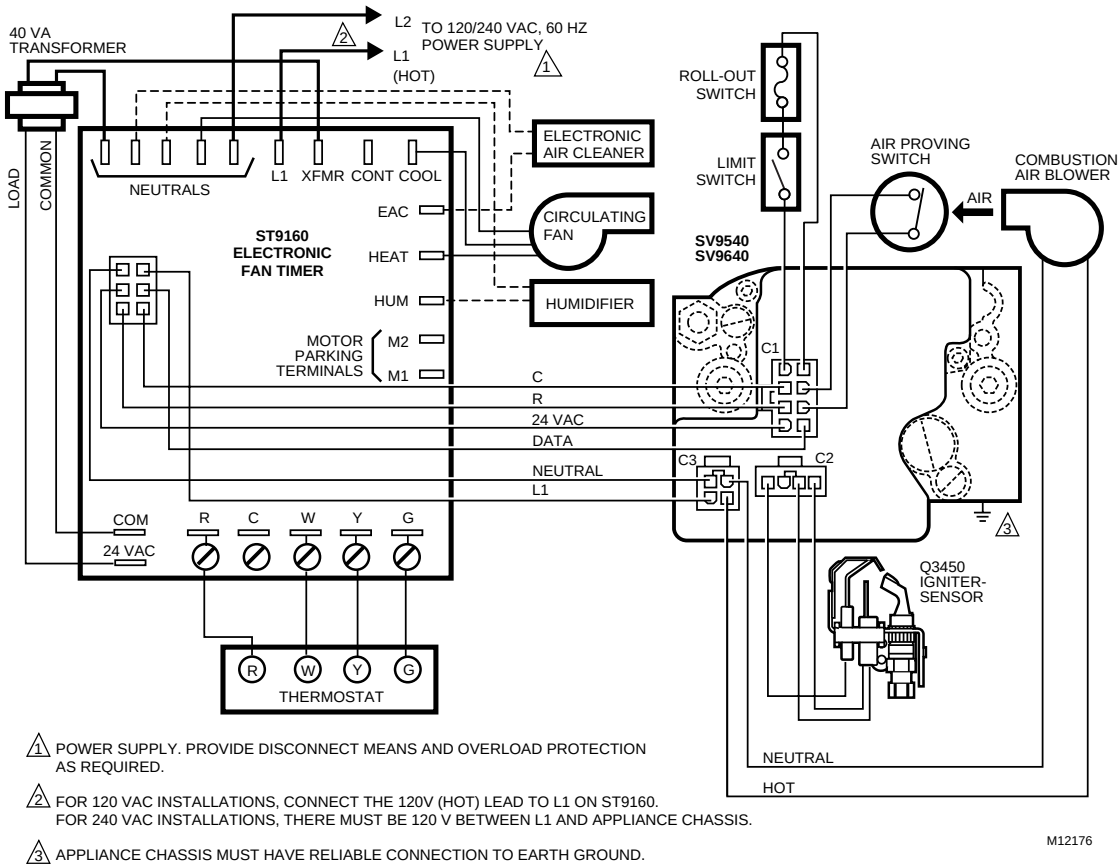


Fig. 1. Typical ST9160 wiring connections with SV9540; SV9640 SmartValve System Control.

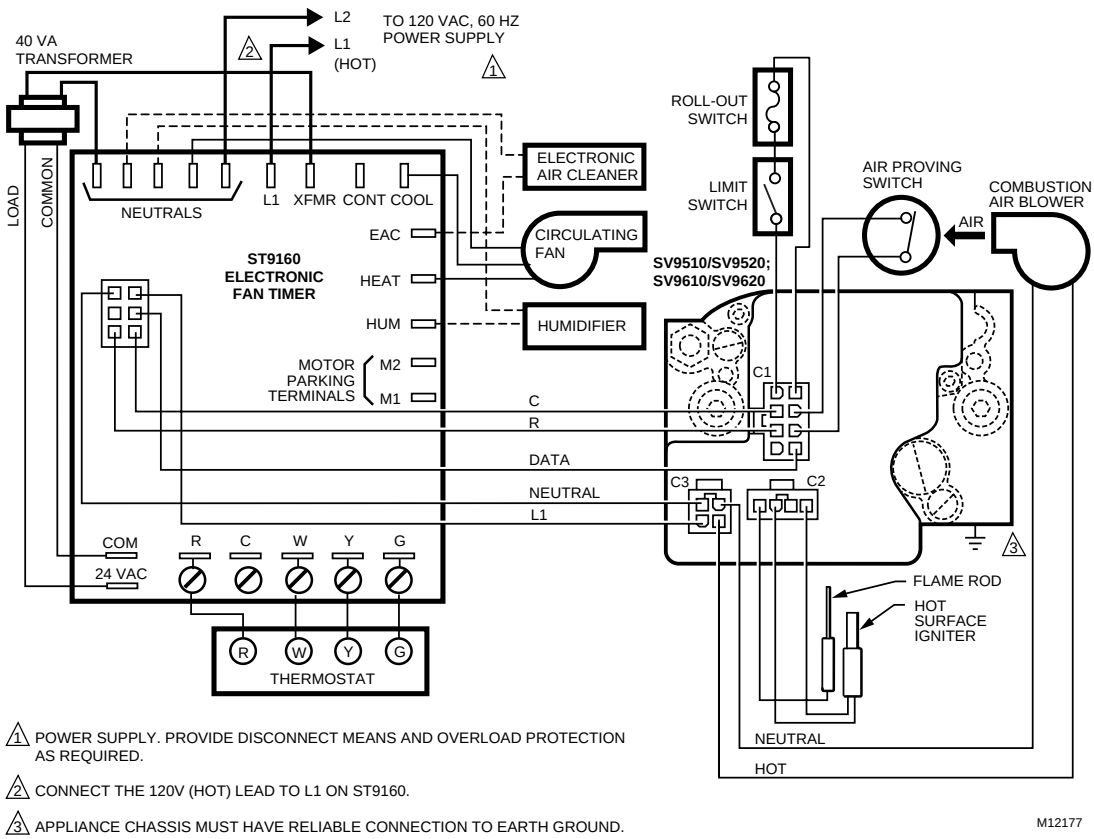


Fig. 2. Typical ST9160 wiring connections with SV9510/SV9520; SV9610/SV9620 SmartValve System Control.

Setting the Adjustable Heat Fan DIP Switches

On models with adjustable heat fan off delay, set the heat fan off delay DIP switches as shown in Fig. 3.

On models with both adjustable heat fan on and off delays, set the heat fan delay DIP switches as shown in Fig. 4. The on delay time starts at the end of the trial for ignition period in direct ignition applications, or after the flame stabilization period in intermittent pilot applications; the off delay time starts when the main burner shuts off at the end of a thermostat call for heat.

NOTE: Times available for selection vary by model. See appliance label or instructions for appropriate settings for a particular application. Timings are for 60 Hz applications. Timings increase by 20% in 50 Hz applications.

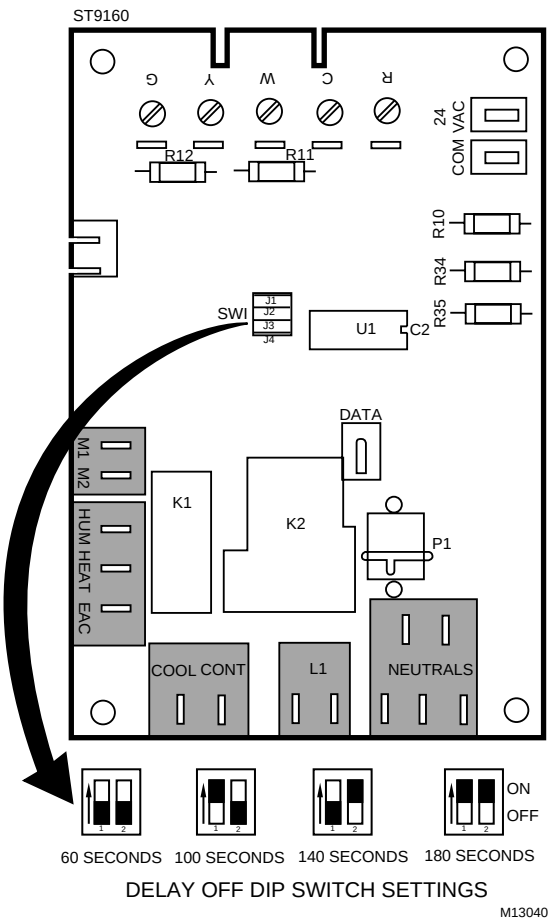


Fig. 3. Setting heat fan off delay DIP switches.

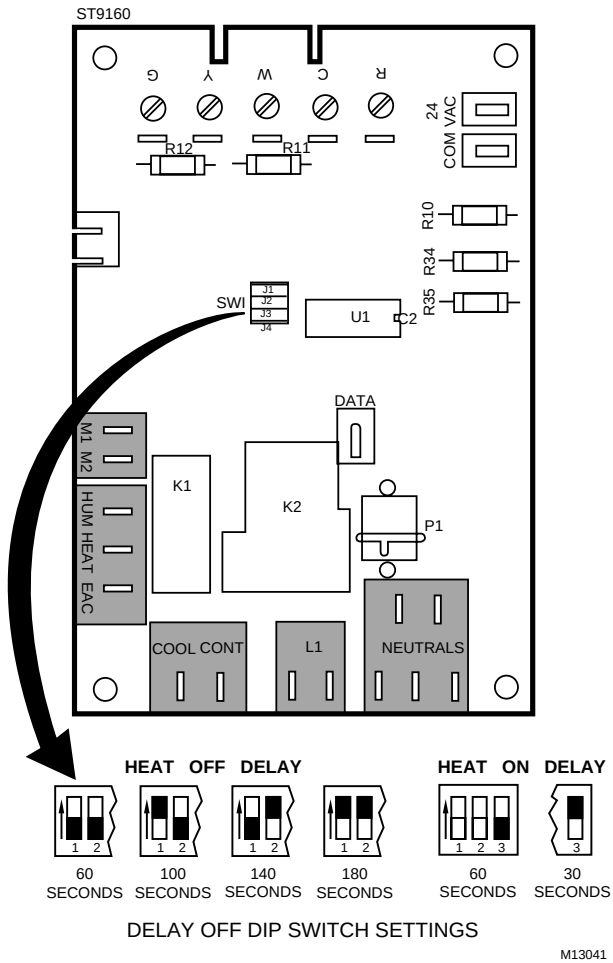


Fig. 4. Setting heat fan on and off delay DIP switches.

CHECKOUT

Make sure the system operates properly by operating the system through at least one complete heating cycle and cooling cycle. Troubleshoot by checking for appropriate voltages at the ST9160 terminals controlling the circulating fan.

Table 2. ST9160 Operating Sequence.

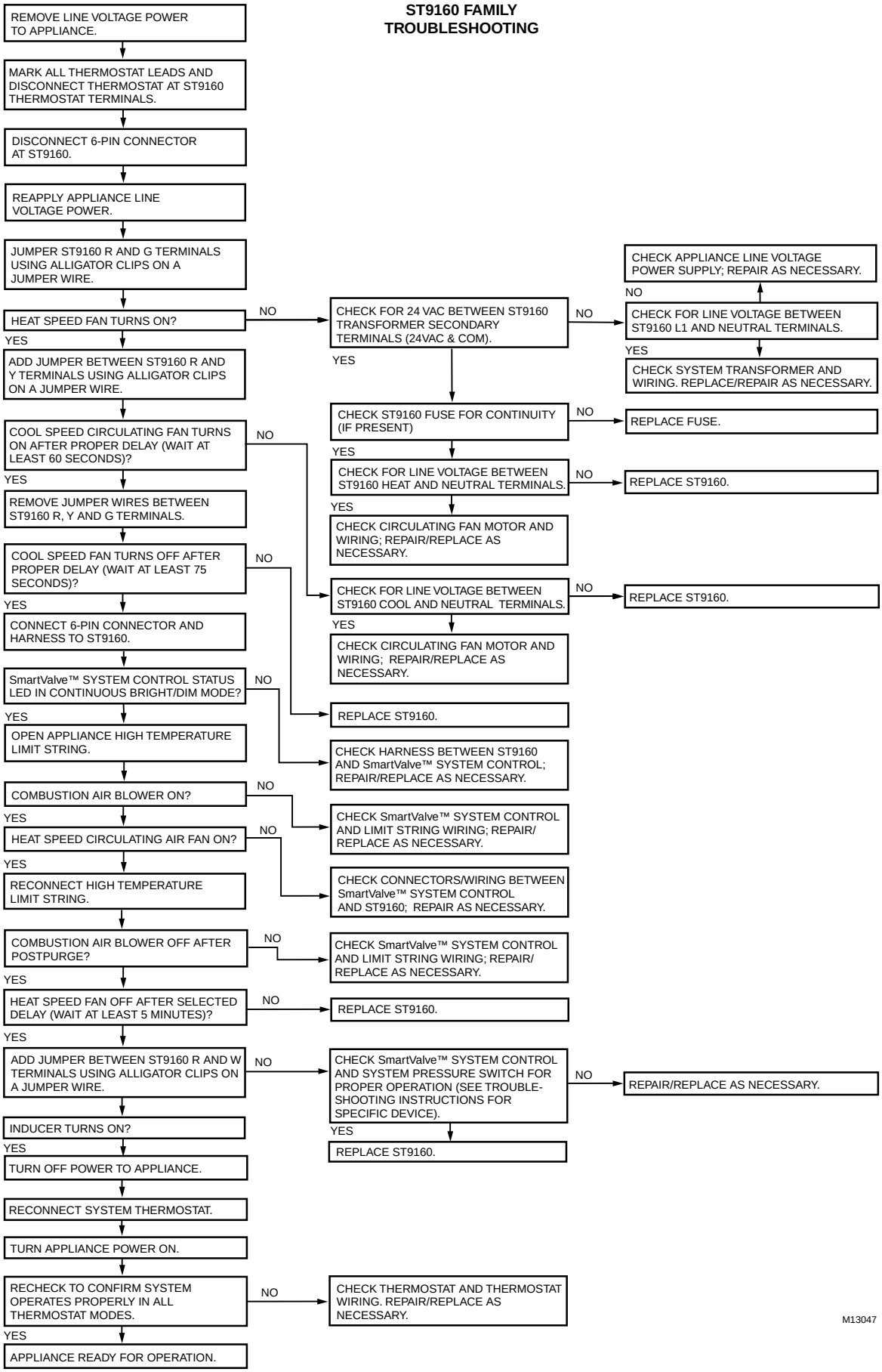
Action	System Response
Thermostat calls for heat.	• Request for heat is sent to the SmartValve System Control. • Main burner lights. • Request for heat speed fan is received from SmartValve System Control. • Heat speed indoor blower motor and humidifier are energized (after heat fan on delay).
Thermostat ends call for heat.	• Request for heat to the SmartValve System Control stops. • Indoor blower motor is de-energized (after heat fan off delay).
Thermostat calls for cool.	• Indoor blower motor is energized at cool speed (after cool fan on delay).
Thermostat ends call for cool.	• Indoor blower motor is de-energized (after the cool fan off delay).
Thermostat calls for manual fan.	• Indoor blower motor is energized at heat speed immediately.
Thermostat ends call for manual fan.	• Indoor blower motor is de-energized immediately.
Thermostat calls for heat with manual fan call already present.	• Normal heating cycle starts. • Indoor blower motor remains energized at heat speed.
Thermostat ends call for heat with manual fan call remaining.	• Normal heating cycle stops. • Indoor blower motor (heat speed) remains energized as long as the request for manual fan remains.
Thermostat calls for cool with manual fan call already present.	• Cooling contactor energized. • Indoor blower motor switches to cool speed (after cool fan on delay).[a]
Thermostat call for cool ends with manual fan call remaining.	• Cooling contactor is de-energized. • Indoor blower motor switches to heat speed (after cool fan off delay).[a]
Electronic air cleaner is connected. (Optional connection to 120 Vac electronic air cleaner.)	• Electronic air cleaner is energized when the heat or cool speed of the circulating fan is energized.
Humidity control is connected. (Optional connection to 120 Vac humidifier.)	• Humidifier is energized when the indoor blower motor is energized at heat speed.

[a] Indoor blower motor power will cycle off, then back on during the transition between the two speeds. This is normal operation for this control.

TROUBLESHOOTING

Disconnect the system thermostat before troubleshooting an appliance that includes the SmartValve™ System Control/ ST9160 Electronic Fan Timer. This allows accurate analysis of the appliance control string for any problems. Once the control system is working properly, the thermostat interface can be analyzed for any impact on system performance.

ST9160 FAMILY TROUBLESHOOTING



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