

## ST9141A1002 Electronic Fan Timer

### Application

The ST9141A1002 Electronic Fan Timer integrates control of all combustion blower and 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 basic purposes of the ST9141A1002 are to monitor the thermostat for heat, cool, and fan demands and run the induced draft blower motor and up to a two-speed circulating fan as required. The ST9141A1002 monitors an spdt pressure switch, burner limit and primary limit. A Honeywell SV9500 Hot Surface Pilot Ignition System Control manages the burner, which is energized through the pressure switch. A light-emitting diode (LED) indicates system status.

In addition, this model includes electronic air cleaner and humidifier convenience terminal connections.

NOTE: Use this control to replace an identical ST9141A1002 Electronic Fan Timer only. This control is not for use in general applications.

### Specifications

#### ELECTRICAL RATINGS:

Power Requirements:

Voltage: 18-30 Vac, 60 Hz.

Contact Ratings:

Combustion Blower:

1.5A Full Load, 10A Locked Rotor at 115 Vac.

.75A Full Load, 5A Locked Rotor at 230 Vac.

Reduce full load rating by humidifier load.

Circulating Fan (Heat-Cool Speed):

15A Full Load, 30A Locked Rotor at 115 Vac.

7.5A Full Load, 15A Locked Rotor at 230 Vac.

Reduce full load rating by electronic air cleaner load.

Thermostat Load: 0.06A plus ignition system current draw.

#### ON/OFF DELAY SETTINGS:

Heat Speed:

Delay On: 30 seconds, fixed.

Delay Off: 60, 100, 140 or 180 seconds, field adjustable.

Cool Speed:

Delay On: 6 seconds, fixed.

Delay Off: 60 seconds, fixed.

Timing Tolerance: Larger of  $\pm 5\%$  or  $\pm 2$  seconds.

POSTPURGE TIMING: 5 seconds.

#### ENVIRONMENTAL RATINGS

Temperature:  $-40^{\circ}$  to  $+175^{\circ}$  F [ $-40^{\circ}$  to  $+79^{\circ}$  C].

Humidity: 5 to 95%, noncondensing.

#### LIGHT-EMITTING DIODE (LED) INDICATIONS:

LED flashing dim-bright indicates normal operation.

LED off when control is powered indicates defective control.

LED on continuously when control is powered indicates defective control.

LED flashing in a cycle with LED on followed by one or more off pulses indicates the following system errors.

Number of Off Flash Pulses	System Condition
1	Burner limit circuit is open.
2	Primary limit circuit is open.
3	Pressure switch circuit is improperly closed.
4	Control is in lockout due to air not circulating (overheating).

### 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 ensure 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 ST9141A1002 is mounted in the appliance wiring compartment using four No. 6 screws (obtained locally) through holes on the corners of the enclosure.

#### Wiring

All wiring must comply with local codes and ordinances. Disconnect power before making wiring connections. Refer to Fig. 1 for standard wiring connections. Refer to Fig. 2 for an internal schematic.

Fig. 1—Typical ST9141A1002 wiring connections.

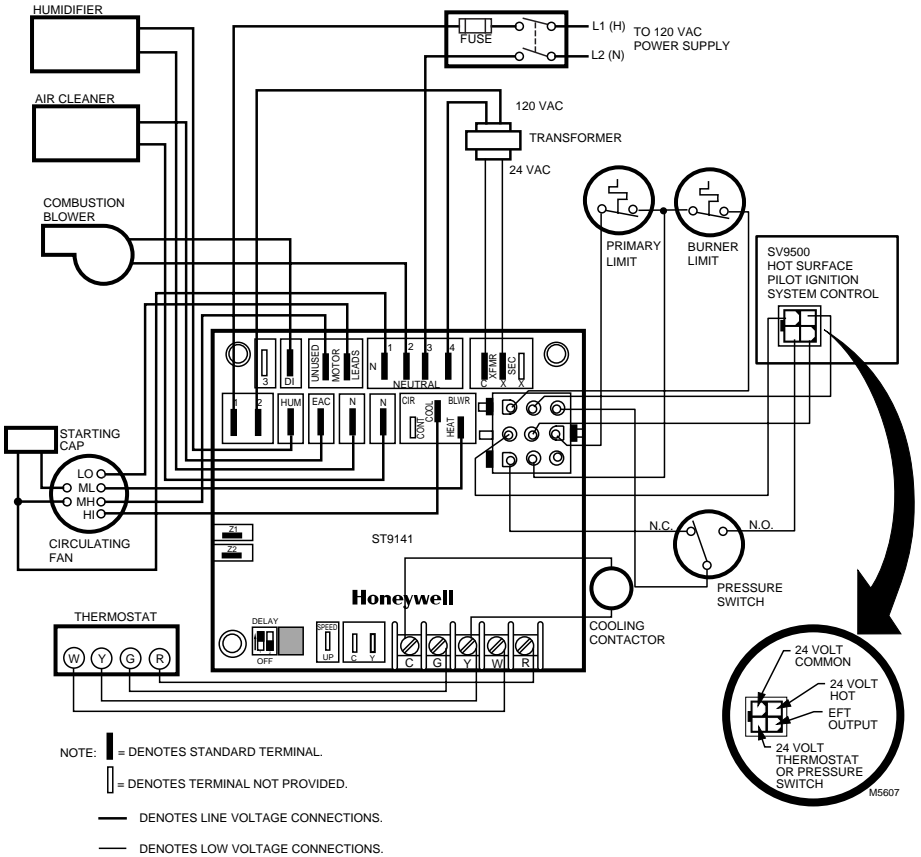
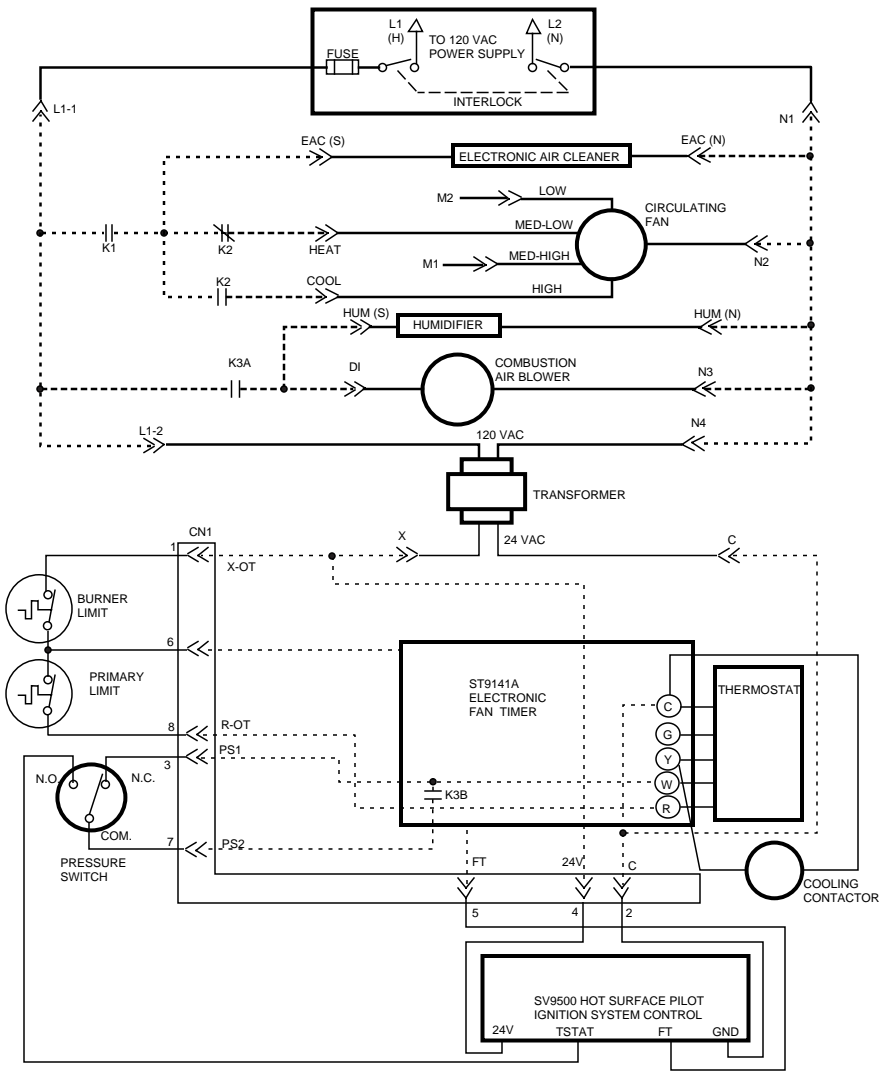


Fig. 2—ST9141A1002 internal schematic.



NOTE: DOTTED LINES REPRESENT PRINTED CIRCUIT BOARD WIRING.

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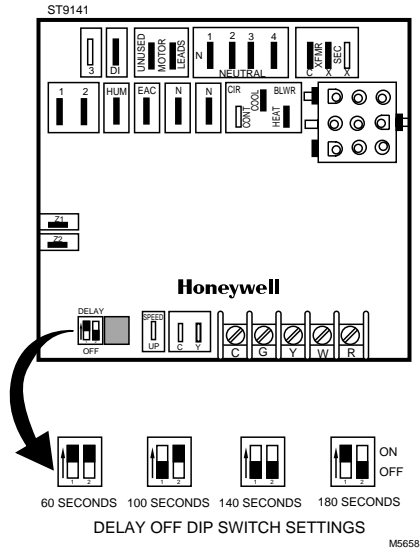
### Setting the Heat Fan Off Delay DIP Switches

Set the heat fan off delay DIP switches to 60, 100, 140 or 180 seconds as shown in Fig. 3. The off delay is factory-set at 140 seconds. This delay time starts when the main gas valve is de-energized at the end of a thermostat call for heat.

## Checkout

Assure 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 ST9141A1002 terminals controlling the combustion air blower and heat and cool speed circulating fan. The ST9141A1002 schematic shows internal switching to clarify operation and assist in troubleshooting. See Fig. 2.

Fig. 3—Setting delay off DIP switches.



### ST9141A1002 Operating Sequence

Action	System Response
Thermostat calls for heat. (W terminal is energized.)	<ul style="list-style-type: none"> <li>Pressure switch confirmed in no airflow position. (If pressure switch shows airflow, LED flashes three times.)</li> <li>Combustion air blower is energized.</li> <li>Air proving switch makes (air flow is established).</li> <li>Ignition system is energized.</li> <li>Gas valve opens and main burner lights.</li> <li>Heat fan on delay timing begins. When timing is complete, circulating blower is energized at heat speed.</li> </ul>
Thermostat ends call for heat. (W terminal is de-energized.)	<ul style="list-style-type: none"> <li>Ignition system is de-energized and gas valve closes.</li> <li>Combustion air blower is de-energized after postpurge timing.</li> <li>Heat fan off delay timing begins. When timing is complete, the circulating fan is de-energized.</li> </ul>
Thermostat begins call for cool. (G and Y terminals are energized.)	<ul style="list-style-type: none"> <li>Cooling contactor is energized.</li> <li>Circulating fan is energized at cool speed after cool fan on delay timing.</li> </ul>
Thermostat ends call for cool. (G and Y terminals are de-energized.)	<ul style="list-style-type: none"> <li>Cooling contactor is de-energized.</li> <li>Circulating fan turns off after cool fan off delay timing.</li> </ul>
Thermostat begins call for fan. (G terminal is energized.)	<ul style="list-style-type: none"> <li>Circulating fan is energized at heat speed two seconds after G terminal is energized.</li> <li>If a call for heat occurs, circulating fan continues to run at heat speed.</li> <li>If a call for cool occurs, circulating fan switches to cool speed after four-second delay.</li> </ul>
Thermostat ends call for fan. (G terminal is de-energized.)	<ul style="list-style-type: none"> <li>Circulating fan is de-energized.</li> </ul>
Primary limit switch string opens.	<ul style="list-style-type: none"> <li>Thermostat and ignition system are de-energized and gas valve closes.</li> <li>Combustion air blower is de-energized.</li> <li>Circulating fan is energized at heat speed.</li> <li>LED flashes twice.</li> <li>If there is a call for cooling or for heat, the circulating fan switches from heat speed to cool speed.</li> </ul>

(continued)

**ST9141A1002 Operating Sequence (Continued)**

<b>Action</b>	<b>System Response</b>
Primary limit switch string closes.	<ul style="list-style-type: none"><li>• Circulating fan turns off after the selected heat fan off delay timing.</li><li>• LED stops flashing.</li><li>• Normal operation resumes.</li></ul>
Primary limit switch string is open for more than 150 seconds (on each of three consecutive cycles).	<ul style="list-style-type: none"><li>• Combustion air blower, circulating fan and ignition system are de-energized.</li><li>• Control goes into lockout mode.</li><li>• LED flashes four times.</li><li>• Control remains in lockout until 24V power is removed and reapplied (control is reset).</li><li>• LED stops flashing.</li><li>• Normal operation resumes.</li></ul>
Burner limit opens.	<ul style="list-style-type: none"><li>• Thermostat and ignition system are de-energized and gas valve closes.</li><li>• Combustion air blower and circulating fan heat speed are energized.</li><li>• LED flashes once.</li></ul>
Burner limit closes.	<ul style="list-style-type: none"><li>• Combustion air blower remains energized for postpurge timing.</li><li>• The circulating fan remains energized for the selected delay off timing.</li><li>• LED stops flashing.</li><li>• Normal operation resumes.</li></ul>
Electronic air cleaner is connected. (Connector to 120 Vac electronic air cleaner.)	<ul style="list-style-type: none"><li>• Electronic air cleaner is energized when the circulating fan heat or cool speed is energized.</li></ul>
Humidity control is connected. (Connector to 120 Vac humidifier.)	<ul style="list-style-type: none"><li>• Humidifier is energized when combustion air blower is energized.</li></ul>

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