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ST9103A Electronic Fan Timer

INSTALLATION INSTRUCTIONS

APPLICATION

TheST9103A Electronic Fan Timer integrates control of all burner and circulator fan operations in an oil furnace. This control is the central wiring point for most of the electrical components in the furnace. The basic purposes of the ST9103A are to monitor the thermostat for heat, cool, and fan demands and run the oil burner primary control and up to a two-speed circulating fan as required. The ST9103A also monitors a limit switch string, which energizes the circulating fan whenever the limit switch opens.

Electronic air cleaner and humidifier convenience terminal connections may be provided as an option. A means for operating continuous indoor air circulation is also available as an option.

SPECIFICATIONS

Electrical Ratings:

Power Requirements:
Voltage: 18-30 Vac, 50/60 Hz.
Current: 4 VA at 24 Vac.
Contact Ratings:
Circulating Fan: 15A Full Load, 30A Locked Rotor at 115 Vac (includes optional EAC load).

On/Off Delay Settings:

Delay On: 30 seconds, fixed.
Delay Off: 60, 90, 120, 150 seconds, field-adjustable.
Timing Tolerance: larger of ±20% or 5 seconds.

Envrionmental Ratings:

Temperature: -40 to +150° F [-40° to +66° C].
Humidity: 95% maximun, 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 assure 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 ST9103A is mounted in the appliance wiring compartment using four No. 6 screws (obtained locally) through standoffs on the corners of the board.

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.

Setting the Heat Fan Off Delay Switches

Set the heat fan off delay switches to either 60, 90, 120, or 150 seconds, as shown in Fig. 3. The off delay time starts when the burner motor 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, if applicable. Troubleshoot by checking for appropriate voltages at the ST9103A terminals controlling the burner motor and heat and cool speed circulating fan. The ST9103A schematic shows internal switching to clarify operation and assist in troubleshooting. See Fig. 2.

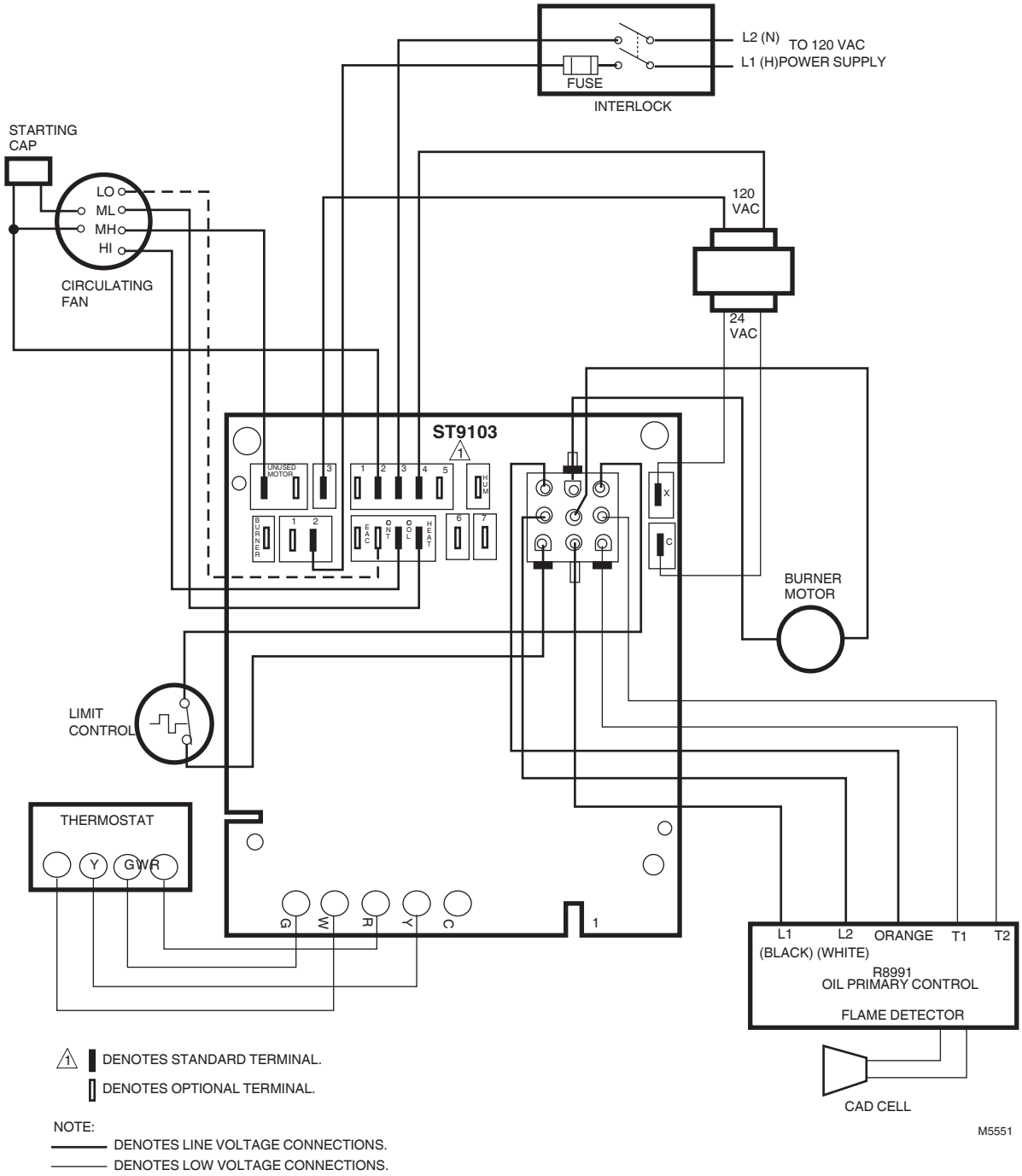
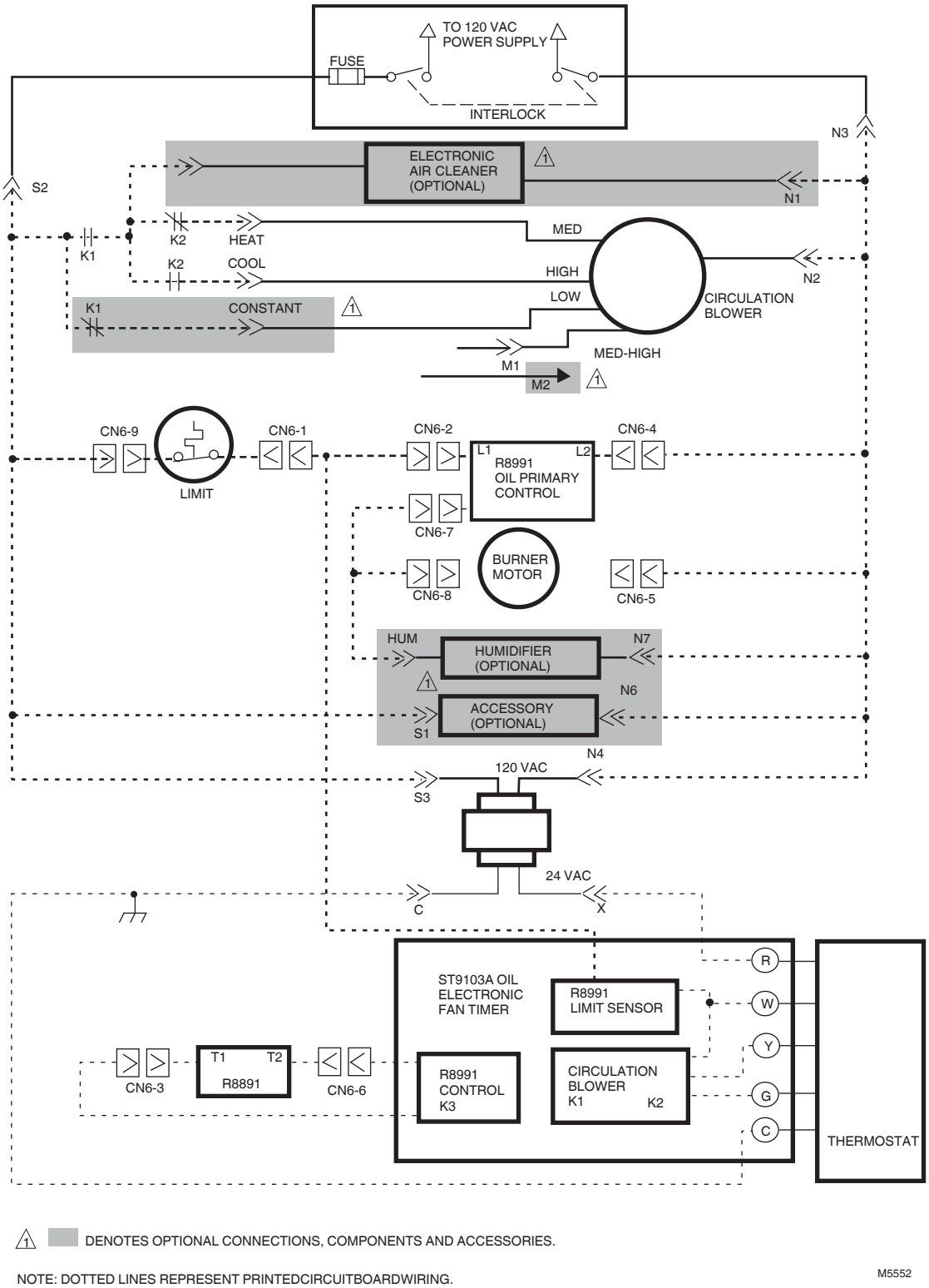


Fig. 1. Typical ST9103A wiring connections.



1 DENOTES OPTIONAL CONNECTIONS, COMPONENTS AND ACCESSORIES.

NOTE: DOTTED LINES REPRESENT PRINTEDCIRCUITBOARDWIRING.

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Fig. 2. ST9103A internal schematic.

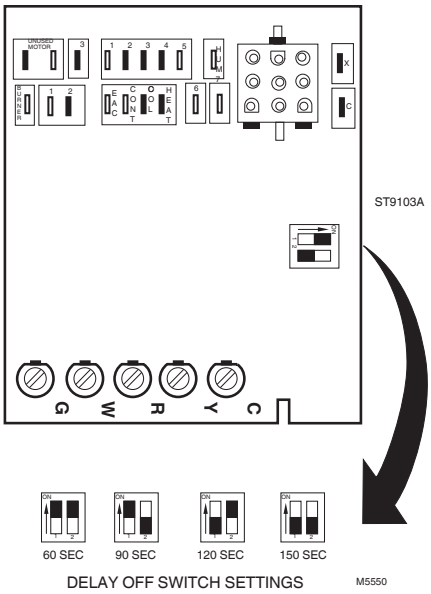

Fig. 3. Setting delay off switches.

ST9103 Operating Sequence.

Action	System Response
Thermostat calls for heat. (W terminal is energized.)	• ST9103A closes oil primary control T-T connections. Ignition system and oil primary control start the furnace. Oil flows as long as oil primary control senses flame. • Burner motor is energized and heat fan on delay timing begins. When timing is complete, the circulating fan is energized at heat speed and warm air is delivered to the controlled space. Oil primary control is de-energized,
Thermostat ends call for heat. (W terminal is de-energized.)	• terminating the burner cycle. • Heat fan off delay timing begins. When timing is complete, the circulating fan is de-energized. • ST9103A returns to standby mode (oil primary control and circulating fan are off).
Burner fails to light.	• Oil primary control locks out within lockout timing (timing depends on oil primary control). • Burner motor is de-energized. • If heat fan has started, it continues through the selected delay off period.
Established flame fails.	• Burner motor is de-energized and oil primary control goes into recycle mode. • If selected heat fan off delay is longer than the recycle delay timing, the heat fan continues to run through the next trial for ignition. Circulating fan is
Thermostat begins call for cool. (G and Y terminals are energized.)	• energized at cool speed. • Cooling compressor turns on immediately.
Thermostat ends call for cool. (G and Y terminals are de-energized.)	• Circulating fan and cooling compressor turn off immediately.
Thermostat begins call for fan. (G terminal is energized.)	• Circulating fan is energized immediately at cool speed. • ST9103A maybe factory-configured to operate heat speed in this mode.

ST9103 Operating Sequence (Continued).

Action	System Response
Thermostat ends call for fan. (G terminal is de-energized.)	• Circulating fan is de-energized.
Limit switch string opens.	• Oil primary control shuts off burner. • Circulating fan is energized immediately at heat speed. • ST9103A opens oil primary control T-T connections. • Circulating fan runs as long as limit string stays open. • If there is a call for cooling or fan, the circulating fan switches from heat speed to cool speed.
Limit switch string closes.	• ST9103A begins heat fan off delay sequence. • Circulating fan turns off after the selected heat fan off delay timing. • ST9103A recloses oil primary control T-T connections. • Oil primary control is energized, initiating burner light off.
Continuous circulating fan is connected. (Optional connectors are available for separate circulating fan speed tap.)	• Circulating fan is energized at low speed when there is no call for heat, cool or fan. • If fan operation is required by a call for heat, cool or fan, the ST9103A switches off the continuous fan speed tap before energizing the other fan speed.
Electronic air cleaner is connected. (Optional connectors are available for 120 Vac electronic air cleaner.)	• Electronic air cleaner (EAC) connections are energized when the heat or cool speed of the circulating fan is energized. EAC connections are not energized when the optional continuous fan terminal is energized.
Humidity control is connected. (Optional connectors are available for 120 Vac humidifier.)	• Humidifier connections are energized when burner motor is energized.

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