



WHITE-RODGERS

50E47

Hot Surface Ignition Control
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

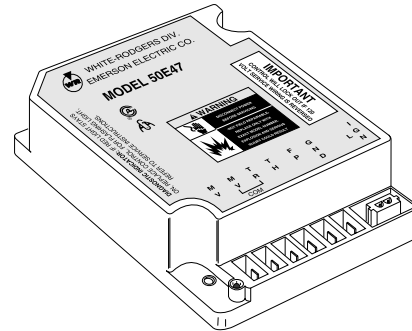
FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

The White Rodgers 50E47 is an automatic gas interrupted ignition control employing a microprocessor to continually monitor, analyze, and control the proper operation of the gas burner.

Signals interpreted during continual surveillance of the thermostat and flame sensing element initiate automatic ignition of the burner, sensing of the flame and system shut-off during normal operation.

System fault analysis, which quickly shuts off the gas flow, coupled with automatic re-ignition upon sensing a fault correction, highlight the control's capabilities.



PRECAUTIONS

GENERAL PRECAUTION

Application of this type of control may cause flame rollout on initial startup and could cause personal injury and/or property damage.

Replace only with exact model number, including dash number. Failure to use exact replacement control could cause personal injury and/or property damage.

If in doubt about whether your wiring is millivolt, line, or low voltage, have it inspected by a qualified heating and air conditioning contractor or licensed electrician.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

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CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

This control is not intended for use in locations where it may come in contact with water. Suitable protection must be provided to shield the control from exposure to water (dripping, spraying, rain, etc.).

WARNING

Do not use on circuits exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

Do not short out terminals on gas valve or primary control to test. Short or incorrect wiring will damage thermostat and could cause personal injury and/or property damage.



WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
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Printed in U.S.A.

PART NO. 37-4836B
Replaces 37-4836A
9541

SPECIFICATIONS

ELECTRICAL RATINGS:

Input Voltage: 25 VAC 50/60 Hz

Current: 0.2 amp

Relay Contact Ratings:

Valve Relay: 1.5 amp @ 25 VAC 50/60 Hz 0.6 pf

Ignitor Relay: 6.0 amp @ 120 VAC 50/60 Hz-resistive

Flame Current Requirements:

Minimum current to insure flame detection: 2 µa DC*

Maximum current for non-detection: 0.2 µa DC*

Maximum allowable leakage resistance: 100 M ohms

* Measured with a DC microammeter in the flame probe lead

OPERATING TEMPERATURE RANGE:

-40° to 175°F (-40° to 80°C)

HUMIDITY RANGE:

To 95% relative humidity (non-condensing)

MOUNTING:

Surface mount or 4" x 4" junction box

Timing Specs (see table below for variable timings): maximum

	60 Hz	50 Hz
Flame Establishing Time		
Standard	4.0 sec	4.8 sec
Optional	7.0 sec	8.4 sec
Flame failure Response time:	0.8 sec	0.96 sec

Recycle Time: Immediate, or equal to prepurge time on models with prepurge option.

Gases Approved: Natural, Manufactured, Mixed, Liquid Petroleum, and LP Gas Air Mixtures are all approved for use.

TIMING SPECIFICATIONS

(all times in seconds unless otherwise noted)

Dash Number	Pre-purge	Ignitor Warmup Period	Trial for Ignition Period	Ignition Activation Period	Retries	Valve Sequence Period	Interpurge	Lockout Time
-1 thru -9	0	17	4	1	0	4	0	21
-10 thru -19	0	45	4	1	0	4	0	49
-20 thru -29	30	17	4	1	0	4	0	51
-30 thru -39	30	45	4	1	0	4	0	79
-40 thru -49	30	17	4	1	2	12	90	293
-50 thru -59	30	45	4	1	2	12	90	377
-60 thru -69	0	17	4	1	2	12	60	203
-70 thru -79	0	45	4	1	2	12	60	287
-101 thru -109	0	17	7	4	0	7	0	24
-110 thru -119	0	45	7	4	0	7	0	52
-120 thru -129	30	17	7	4	0	7	0	54
-130 thru -139	30	45	7	4	0	7	0	82
-140 thru -149	30	17	7	4	2	21	90	302
-150 thru -159	30	45	7	4	2	21	90	386
-160 thru -169	0	17	7	4	2	21	60	212
-170 thru -179	0	45	7	4	2	21	60	296
-201 thru -209	0	17	4	1	0	4	0	21
-210 thru -219	0	45	4	1	0	4	0	49
-220 thru -229	30	17	4	1	0	4	0	51
-230 thru -239	30	45	4	1	0	4	0	79
-240 thru -249	30	17	4	1	2	12	90	293
-250 thru -259	30	45	4	1	2	12	90	377
-260 thru -269	0	17	4	1	2	12	60	203
-270 thru -279	0	45	4	1	2	12	60	287
-301 thru -309	0	17	7	4	0	7	0	24
-310 thru -319	0	45	7	4	0	7	0	52
-320 thru -329	30	17	7	4	0	7	0	54
-330 thru -339	30	45	7	4	0	7	0	82
-340 thru -349	30	17	7	4	2	21	90	302
-350 thru -359	30	45	7	4	2	21	90	386
-360 thru -369	0	17	7	4	2	21	60	212
-370 thru -379	0	45	7	4	2	21	60	296

NOTE: All times are in nominal seconds at 60 Hz. Multiply all timings by 120% at 50 Hz.

Reset time is 2.3 seconds max. at power-up.

On controls with retry option, ignitor warm-up time is increased by 10 seconds on retry

MOUNTING AND WIRING

⚠ WARNING

Do not use on circuits exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete. Failure to earth ground the appliance or reversing the neutral and hot wire connection to the line can cause shock hazard.

Shut off main gas to heating system until installation is complete.

Route and secure all wiring as far from flame as practical to prevent fire and/or equipment damage.

NOTE

Replace 50E47 control as a unit - no user serviceable parts.

All wiring should be installed according to local and national electrical codes and ordinances.

The 50E47 control may be mounted on any convenient surface using two #6 x 5/8 sheet metal screws. If desired, it is designed to be mounted on a 4" x 4" junction box using two #8-32 x 5/8" machine screws.

The control must be secured to an area that will experience a minimum of vibration and remain below the maximum ambient temperature rating of 175°F. The control is approved for minimum ambient temperatures of -40°F.

Any orientation is acceptable.

Refer to the wiring diagram and wiring table when connecting the 50E47 control to other components of the system.

UL approved, 105°C rated 18 gauge min., stranded, 2/64" thick insulation wire is recommended for all low voltage safety circuit connections. Refer to 50E47 specification sheet for recommended terminals to mate with those on the control.

UL approved 105°C rated 16 gauge min., stranded, 4/64" thick insulation wire is recommended for all line voltage connections. Refer to 50E47 specification sheet for recommended terminals to mate with those on the control.

Following installation or replacement, follow appliance manufacturer's recommended installation/service instructions to insure proper operation.

WIRING

The two terminals identified as **MV** connect to the 36E model gas valve. Both solenoids in the valve will be in parallel across these two terminals.

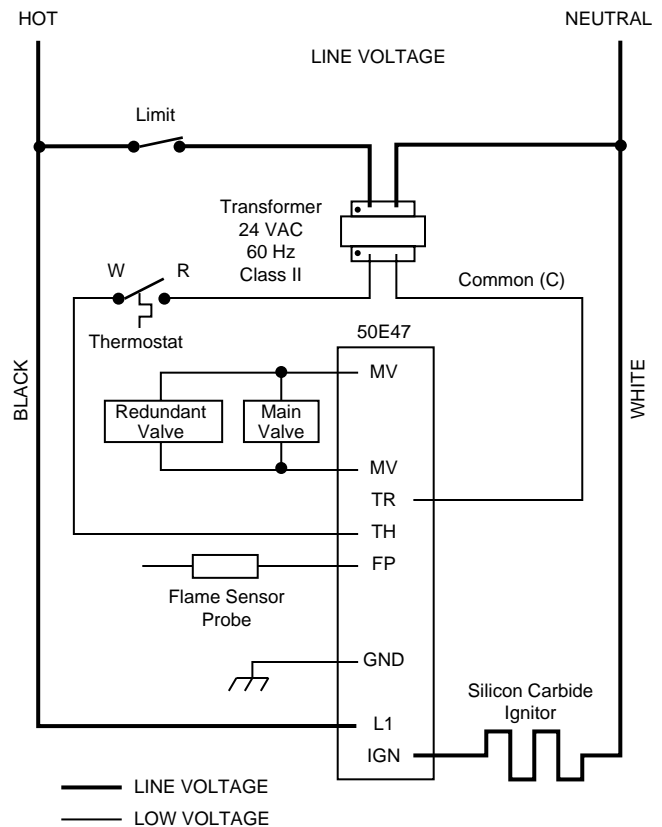
The **TH** terminal must be connected to the switched 24 volt wire from the thermostat (**TH** is the same as the **W** terminal on most low voltage thermostat systems).

The **TR** terminal is connected to the 24 volt transformer return. **TR may be grounded either at the transformer or by a ground wire extended from the terminal TR** (**TR** is the same as the **C** terminal on most low voltage thermostat systems).

The **L1 terminal** and **IGN** terminal are connected with a two-terminal connector on the ignitor leads.

The **FP** terminal is connected to the flame probe. Maximum recommended wire length to the flame probe is 36 inches.

The **GND** terminal is a ground and return path for the flame sensor probe. **GND must be reliably connected to the burner chassis ground.**



OPERATION

TYPICAL FURNACE INSTALLATION

In a typical system, a call for heat is initiated by closing the thermostat contacts. This will energize the 50E47 control. If the system is equipped with prepurge, the prepurge fan or interfacing relay is also energized through the thermostat contacts. In the prepurge mode, the 50E47 control will delay 30 seconds before applying power to the 767A silicon carbide ignitor. If prepurge is not an option, the ignitor is powered within one second.

The ignitor is then allowed to warm up for 17 or 45 seconds depending on the 50E47 control dash number being used (see **Timing Specifications** table). Various ignitors on the market must use the 45-second option to allow them to fully attain ignition temperatures at low voltage conditions. The W-R 15-second ignitor is especially designed to heat up quickly at a low voltage condition without overheating at a high voltage condition. Thus, the W-R 15-second ignitor may also be used with a 45-second warm-up time without detrimental effects.

At the end of the ignitor warm-up time, both valves in the 36E manifold gas valve are opened. The ignitor will remain on for an additional one second (ignition activation period). A four-second ignition activation period is also available. Flame must be detected within four seconds (a seven-second trial for ignition period is available as a separate type). If flame is not detected, both valves are de-energized, the ignitor is turned off, and the 50E47 control goes into lockout.

If the control is locked out, it may be reset by momentary power interruption of $\frac{1}{20}$ second or longer. Either the 24 volt thermostat or line voltage may be interrupted.

The 50E47 control may also be equipped with a retry option, depending on the dash number (see **Timing Specifications** table). This provides a 60-second wait following an unsuccessful ignition attempt (flame not detected). If the prepurge option is used, the waiting time becomes 90 seconds (30-second prepurge plus 60-second wait).

After this wait, the ignition sequence is restarted. An additional 10 seconds is added to the ignitor warm-up time, so a module with a 17-second warm-up time will have 27 seconds of ignitor warm-up or a module with a 45-second warm-up time will have 55 seconds of ignitor warm-up. If this ignition attempt is unsuccessful, one more retry will be made before lockout.

All 50E47 controls will repeat the ignition sequence for a total of five recycles if flame is lost within the first 10 seconds of establishment.

If flame is established for more than 10 seconds after ignition, the 50E47 controller will clear the ignition attempt (retry) counter. If flame is lost after 10 seconds, it will restart the ignition sequence. This can occur a maximum of five times.

During burner operation, a momentary loss of power of 50 milliseconds or longer will de-energize the main gas valve. When power is restored, the gas valve will remain de-energized and a restart of the ignition sequence will begin immediately.

A momentary loss of gas supply, flame blowout, or a shorted or open condition in the flame probe circuit will be sensed within 0.8 seconds. The gas valve will de-energize and the control will restart the ignition sequence after waiting 60 seconds. Recycles will begin and the burner will operate normally if the gas supply returns, or the fault condition is corrected, before the last ignition attempt. Otherwise, the control will go into system lockout.

If you need further information about this product, please write to

White-Rodgers Division, Emerson Electric Co.
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St. Louis, MO 63123-5398
Attention: Technical Service Department

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