

# SERIES 35-52



## 12 VDC Microprocessor-Based Direct Spark Ignition Control

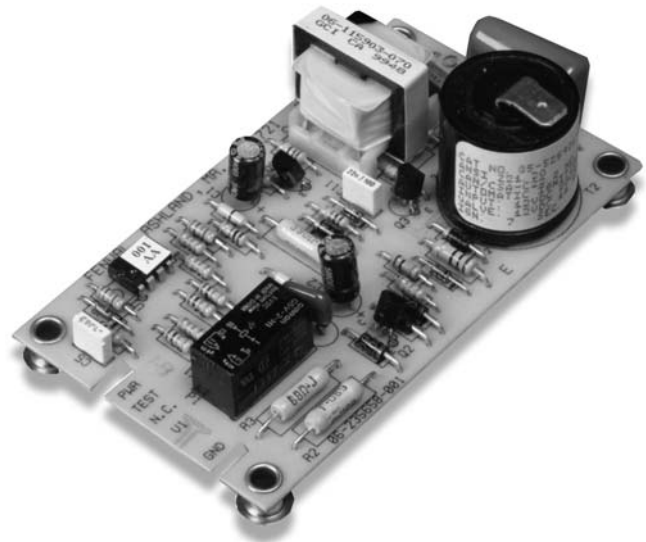
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### FEATURES

- Multiple tries
- Custom TFI, prepurge and interpurge timings
- Potted module available
- Local sensing
- Safe start
- Software conforms to UL 1998 requirements

### APPLICATIONS

- RV gas furnaces
- RV water heaters
- Construction equipment
- Other similar appliances



### DESCRIPTION

The model 35-52 is a 12 VDC Microprocessor Based Direct Spark Ignition Control designed for use in many types of heating applications. The control utilizes a microprocessor to continually and safely monitor, analyze and control the proper operation of the gas burner. Value added features such as safe start and multiple ignition tries highlight the control's benefits.

### Agency Certifications



Design certified to UL372, File MH8817



Design certified to ANSI Z21.20-1997 and CAN/CSA C22.2 No. 199-M89 - Report # C2180012

### SPECIFICATIONS

Input Power	Control: 9.5 to 15 VDC from a storage battery or full wave rectified unfiltered 50/60 Hz AC
Input Current Drain	200 mA @ 12 VDC, gas valve relay energized(control only)
Gas Valve Rating	1.0A @ 12 VDC
Operating Temperature	-40°F to +167°F -40°C to +75°C
Flame Sensitivity	0.7µA minimum
Flame Failure Response Time	0.8 seconds maximum
Types of Gases	Natural, LP, or manufactured
Spark Rate	10 sparks per second
Size (LxWxH)	4.00 x 2.30 x 1.50 inches 10.16 x 5.84 x 3.81 cm
Weight	3.0 ounces nominal (85 grams), uncovered version
Enclosure	Uncovered with integral standoffs or Potted Module
Moisture Resistance (Uncovered)	Conformal coated to operate to 95% R.H. Care must be taken to protect module from direct exposure to water
Tries for Ignition	One or three try versions available
Trial for Ignition Periods	5.0, 7.0, 10.0, or 25.0 seconds available
Prepurge & Interpurge Timings	None, 15 or 25 seconds depending on model. Without prepurge there is a 1 second safe start delay before the first try for ignition

## SEQUENCE OF OPERATION / FLAME RECOVERY/ SAFETY LOCKOUT

### Heat Mode

When a call for heat is received from the thermostat supplying 12 volts to PWR, the control will reset, perform a self check routine, and a prepurge delay begins. Following the pre-purge period the gas valve is energized and sparks commence for the trial for ignition period.

When flame is detected during the trial for ignition, sparks are shut off immediately and the gas valve remains energized. The thermostat and main burner flame are constantly monitored to assure the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the main valve is de-energized immediately.

### Failure to Light - Lockout

#### MULTI TRIAL MODEL

Should the main burner fail to light, or flame is not detected during the first trial for ignition period, the gas valve is de-energized and the control goes through an interpurge delay before another ignition attempt. The control will attempt two additional ignition trials before going into lockout and the valve relay will be de-energized immediately.

Recovery from lockout requires a manual reset by either resetting the thermostat or removing 12 volts for a period of 5 seconds.

#### SINGLE TRIAL MODEL

Should the main burner fail to light, or flame is not detected during the trial for ignition period, the control will go into lockout. The valve will be turned off immediately.

### Flame Failure - Re-Ignition

If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The HV spark will be energized for a trial for ignition period in an attempt to relight the burner. If the burner does not light, the control will de-energize the gas valve. Multi-try models will make two more attempts to relight the burner. If the burner does not relight, the control will go into lockout as noted above in "Failure to light". If flame is re-established, normal operation resumes.



#### WARNING:

Operation outside specifications could cause failure of the Fenwal product and other equipment resulting in property damage, personal injury or even death from fire, explosion, and/or toxic gases.

## MOUNTING AND WIRING

The control is not position sensitive and can be mounted vertically or horizontally. The control may be mounted on any surface with #6 sheet metal screws.

All wiring must be done in accordance with both local and national electrical code. **WARNING:** The control uses voltages of shock hazard potential. Wiring and initial operation must be done by a qualified service technician.

The control must be secured in an area that will experience a minimum of vibration and remain below the maximum operating temperature of 167°F.

All connections should be made with UL approved 105°C rated 18 gauge, stranded, .054 thick insulated wire. Refer to wiring diagram when connecting the control to other components in the system.

### Terminal Designations

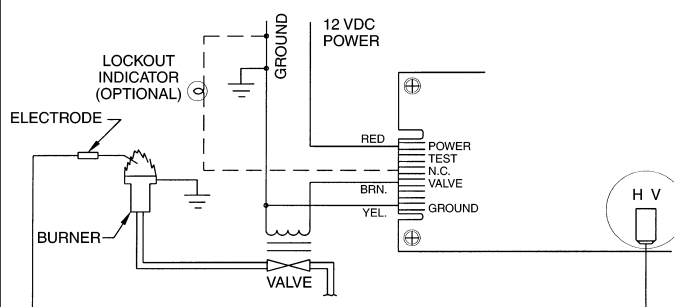
TERMINAL	DESCRIPTION	TERMINAL
PWR	Power	6 Pin Edge Connector
GND	Ground	6 Pin Edge Connector
NC	NC Contact	6 Pin Edge Connector
VI	Gas Valve	6 Pin Edge Connector



#### CAUTION:

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. A functional checkout of a replacement control is recommended.

### System Wiring Diagram



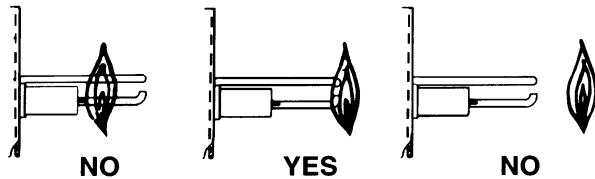
EXTERNAL WIRING DIAGRAM  
WITH LOCAL SENSE

## POWER ELECTRODE LOCATION

Proper location of the electrode assembly is important for optimum system performance. It is recommended that electrode assemblies be mounted temporarily using clamps or other suitable means so that they can be checked before permanently mounting the assembly. The electrode assembly should be located so that the tips are inside the flame envelope and about 1/2 inch above the base of the flame. See Figure 3.

### Ignitor Location

Figure 3



#### CAUTIONS:

1. Ceramic insulators should not be in or close to the flame to avoid overheating.
2. Electrode assemblies should not be adjusted or disassembled. Electrodes should have a gap spacing of  $0.125 \pm 0.031$  in ( $3.12 \pm 0.81$  mm).
3. Exceeding temperature limits can cause nuisance lockouts and premature electrode failure.

## TROUBLESHOOTING GUIDE

SYMPTOM	RECOMMENDED ACTIONS
1. Dead	A. Miswired B. Transformer bad C. Fuse/Circuit breaker bad D. No voltage @ PWR E. Bad control
2. Valve on, no spark	A. Shorted electrode B. Open HV cable C. Miswired D. Bad control
3. Spark on, no valve	A. Valve coil open B. Open valve wire C. Bad control (check voltage between V1 & GND)
4. Flame okay during TFI, no flame sense (after TFI)	A. Bad electrode B. Bad HV wire C. Poor ground at burner D. Bad control (check flame current)

## FLAME CURRENT CHECK

Flame current is the current which passes through the flame from the sensor to ground to complete the primary safety circuit. The minimum flame current necessary to keep the system from lockout is  $0.7\mu\text{A}$  microamps. To measure flame current, DISCONNECT INPUT VOLTAGE, then insert a  $0-50\mu\text{A}$  DC meter and capacitor in series with the sensor electrode and wire per Figure 5. Meter should read  $0.7\mu\text{A}$  or higher while flame is established. If meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

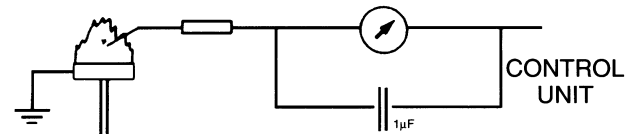


#### CAUTIONS:

When monitoring flame current, use a  $1.5\mu\text{F}$  bypass capacitor to protect the meter from damage. See Figure 5.

### System Flame Current Measurement Circuit

Figure 5



### Fenwal Accessory Items

PART NUMBER	DESCRIPTION
22-100001-021	Spark Electrode
05-127694-448	Edge Connect Wire Harness
05125948-1XX	Ignition Cable - Quick Connects on both ends *XX is length of cable in inches
05-125608-6XX*	Suppression Cable - Quick Connects on both ends *XX is length of cable in inches
05-080224-004	12 VDC Gas Ignition Field Tester

# CONTROL CONFIGURATION

**35 - 52 5**

**X X X**

**- X X X**

## Description

### Special Options

- Potted module
- Recycle after flame loss

### \* Non-Standard Configurations

A 9 in this location of the part number (i.e. 35-52 5 901 -113) identifies this configuration as a non-standard design. The part number does not follow the part numbering system. The 9XX is a sequential part number assigned by Fenwal.

Consult factory for operating characteristics of this control.

### Trial for Ignition Time (TFI)

- 1 = 5 seconds
- 3 = 7 seconds
- 5 = 10 seconds
- 7 = 25 seconds

### Inter-Purge

- 0 = None
- 1 = 15 seconds
- 3 = 25 seconds

### Pre-Purge Time

- 0 = None
- 1 = 15 seconds
- 3 = 25 seconds

### Number of Ignition Trials and Flame Sense Method

- 0 = 1 try, Local Sense
- 5 = 3 try, Local Sense

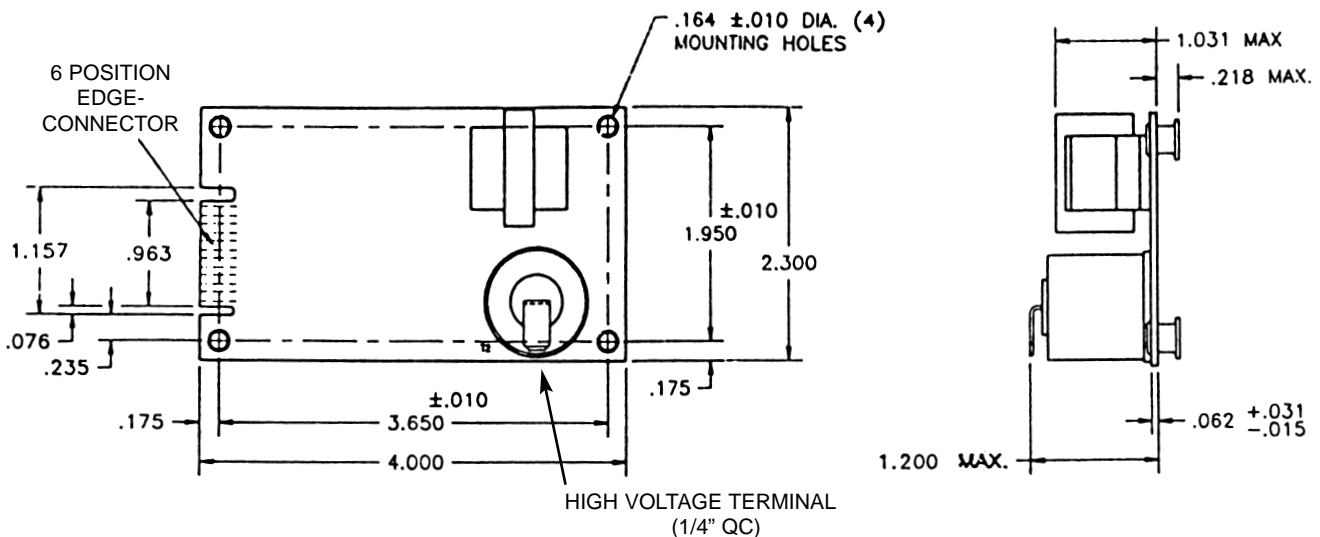
### Enclosure

- 5 = Integral Standoffs

### Configurations

- 5 = Standard Model, Recycle on Flame Loss
- 8 = Aftermarket Kit (may consist of control, high voltage ignition wire, electrode and harness)
- 9 = Non Standard Configuration\*

## DIMENSIONS



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 www.fenwalcontrols.com

These instructions do not purport to cover all the details or variations in the equipment described, nor do they provide for every possible contingency to be met in connection with installation, operation and maintenance. All specifications are subject to change without notice. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to KIDDE-FENWAL, Inc., Ashland, Massachusetts.