

SERIES 35-60
24 VAC Microprocessor-Based
Direct Spark Ignition Control



F-35-60
September 2026

FEATURES

- Safe start with DETECT-A-FLAME® flame sensing technology
Custom pre-purge and inter-purge timings*
Single or three trials for ignition
System diagnostic LED
Flame current test points
Local or remote flame sensing
Automatic reset**
Alarm output (normally closed contact)

APPLICATIONS

- Commercial cooking
Gas furnaces
Boilers
Water heaters
Other gas-fired appliances

DESCRIPTION

The Fenwal Controls 35-60 is a 24 VAC direct spark ignition (DSI) control designed for use in all types of gas-fired appliances. The control uses a microprocessor circuit to provide precise, repeatable timing and operating sequences. On-board diagnostics with LED output makes troubleshooting easy and ensures safe and efficient operation.

Agency Certifications

Recognized under the UL component program, UL 372. Software certified to ANSI/UL 1998. UL File MH8817

Design Certified to ANSI Z21.20, CAN/CSA C22.2 No. 199-M89

CE Approved to EN 298:2022***

Australian Gas Safety certification to EN 298:2022 & AS 4625-2008

GSC 805640

* Pre-purge time cannot exceed inter-purge time on CE Approved models.
** Automatic reset is not allowed for CE Approved models.
*** EMC emission requirements shall be verified after incorporation of the burner control system into the end use appliance.



SPECIFICATIONS

Table with 2 columns: Specification Name and Value. Rows include Input Power, Input Current, Gas Valve, Operating Temperature, Storage Temperature, Flame Sensitivity, Flame Failure Response, Flame Detector Self-check Rate, Gas Types, Spark Rate, Size, Moisture Resistance, Ingress Protection, Tries for Ignition, Trial for Ignition Periods, and Pre-purge and Inter-purge Timings.

SEQUENCE OF OPERATION / FLAME RECOVERY / SAFETY LOCKOUT

Start Up - Heat Mode

When a call for heat is received from the thermostat supplying 24VAC to TH/W, the control will reset, perform a self-check routine, flash the diagnostic LED and begin a pre-purge delay. Following the pre-purge period, the gas valve is energized and sparking commences for the Trial For Ignition (TFI) period.

When flame is detected during the TFI, the sparking process is terminated and the gas valve remains energized. The thermostat and burner flame are constantly monitored to assure proper system operation. When the thermostat is satisfied and the demand for heat ends, the gas valve is immediately de-energized.

Failure to Light - Lockout

SINGLE TRIAL MODEL

Should the burner fail to light, or a flame is not detected during the TFI period, the gas valve will de-energize and the control will go into lockout. The LED will indicate the fault code for ignition lockout.

MULTI TRIAL MODEL

Should the burner fail to light or the flame is not detected during the TFI period, the gas valve will de-energize. The control will then go through an inter-purge delay before an additional ignition attempt. The control attempts two additional ignition trials before de-energizing the gas valve and entering lockout. The LED will indicate the fault code for ignition lockout.

FLAME FAILURE - RE-IGNITION MODE

If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds by immediately energizing the H.V. spark for the TFI period in an attempt to relight the flame. If the burner does not light within the TFI, the gas valve will immediately de-energize and single try models will enter lockout. On multi-try models, a new TFI sequence will begin after an inter-purge delay. Multi-try models perform two additional attempts to light the burner before de-energizing the gas valve and entering lockout. If the burner relights, normal operation resumes.

FLAME FAILURE-RECYCLE MODE

With the "Recycle After Loss of Flame" option, upon loss of flame, the gas valve is de-energized and the control proceeds to inter-purge before attempting to relight the flame. Multi-try models permit three tries for ignition including inter-purges. If the burner relights, normal operation resumes. If the burner does not relight, the control will enter lockout.

Lockout Recovery

Recovery from lockout requires a manual reset by either resetting the thermostat, or removing 24 VAC for a period of 5 seconds. On models with automatic reset, if the thermostat is still calling for heat after one hour, then the control will automatically reset and attempt to ignite the burner.

MOUNTING AND WIRING

The Series 35-60 control is not position sensitive and can be mounted vertically or horizontally. The case may be mounted on any surface with

#6 sheet metal screws. The control also supports direct mounting to a standard NEC 4-in. junction box.



All wiring must be performed in accordance with both local and national electrical codes.



Label all wires prior to disconnection when servicing controls. Wiring errors may cause improper and dangerous operation. A functional checkout of a replacement control should always be performed.



This product uses voltages of shock hazard potential. Wiring and initial operation must be performed by a qualified service technician.



Operation outside specifications could result in failure of the Fenwal product and other equipment with potential for injury to people and property.

Terminal Designations		
Terminal	Description	Quick Connect (inch)
TH/W	Thermostat Input	1/4"
V1	Valve Power (output)	3/16"
NC	Alarm (normally closed contact)	1/4"
V2	Valve Ground	3/16"
GND	System Ground	1/4"
S1	Remote Flame Sensor	3/16"
H.V.	High Voltage Output	Varies by model
FC+, FC-	Flame Current Test Points	Varies by model

Note: NC terminal is not available on CE Approved models.

Wiring Diagrams - 35-605

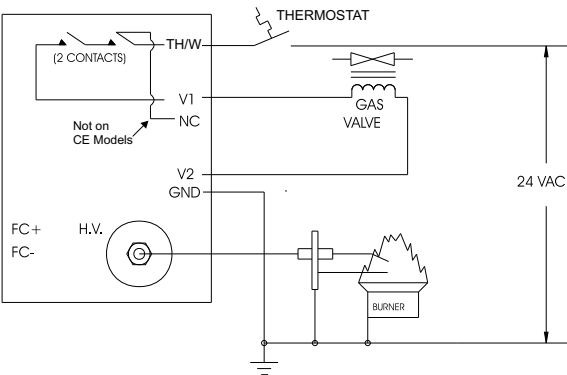


Figure 1. Local Sense

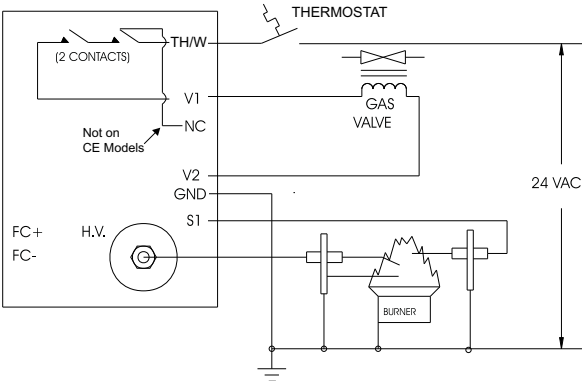


Figure 2. Remote Sense

Wiring Diagrams - 35-602

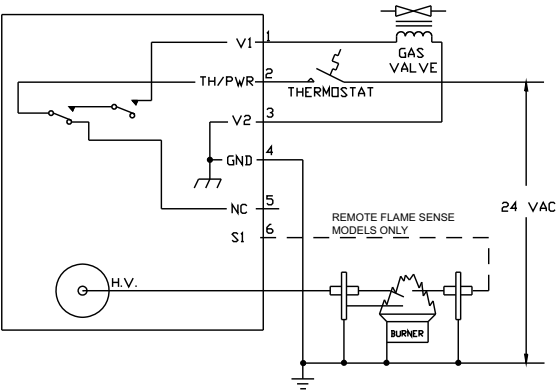


Figure 3. Smaller Footprint Wiring Diagram

High Voltage and Remote Sense Cable Requirements

The HV Ignition Cable must meet a voltage rating of 25 KV and an insulation rating of 200 °C. Recommend length of 3ft (.9m) or less. Consult factory for longer lengths.

Remote flame sense cable must meet a voltage rating of 250V and an insulation rating of 200 °C. Recommended length of 10ft (3m) or less. Consult Factory for longer lengths.

TROUBLESHOOTING

Troubleshooting Guide	
Symptom	Recommended Actions
1. Control does not start	A. Miswired B. 24 VAC transformer fault C. Fuse circuit breaker fault D. Faulty control, check LED for fault codes
2. Thermostat on - no spark	A. Miswired B. Faulty thermostat, no voltage at thermostat terminal TH/W C. Faulty control, check LED for fault codes
3. Valve on - no spark during TFI	A. Shorted electrode - establish 1/8-inch gap B. Check high voltage cable C. Miswired
4. Spark on - valve off	A. Valve coil open B. Valve wire disconnected C. Faulty control, check voltage at gas valve terminal V1
5. Flame okay during TFI - no flame sense after TFI	A. Check electrode position B. Check high voltage wire C. Poor ground at burner D. Poor flame, check flame current

Fault Conditions	
LED Indication	Fault Mode
Steady On	Internal Control Failure
2 Flashes	Flame without call for heat
3 Flashes	Ignition Lockout

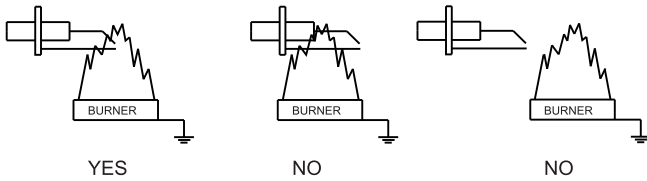
Note: During a fault condition, the LED will flash on for 1/4 second and off for 1/4 second as needed to indicate the fault code. The code will repeat every 3 seconds. Removing power from the control will clear the fault code.

Internal Control Failure

If the control detects a software or hardware error, all outputs are turned off and the LED displays a Steady On condition. If this condition persists after an attempt to restart, then the control must be replaced.

Proper Electrode Location

Proper location of electrode assembly is important for optimum system performance. The electrode assembly should be located so that the tips are inside the flame envelope and about 1/2-inch (1.2 cm) above the base of the flame as shown:



Notes:

- Ceramic insulators must not be in or close to the flame.
- Electrode assemblies must not be adjusted or disassembled. Electrodes are NOT field adjustable.
- Electrodes should have a gap spacing of 0.125 ± 0.031 in (3.12 ± 0.81 mm), unless otherwise specified by the appliance manufacturer. If spacing is not correct, the assembly must be replaced.
- Exceeding temperature limits can cause nuisance lockouts and premature electrode failure.
- Electrodes must be located where they are not exposed during normal operation.

DIMENSIONS

Quick Connect Models

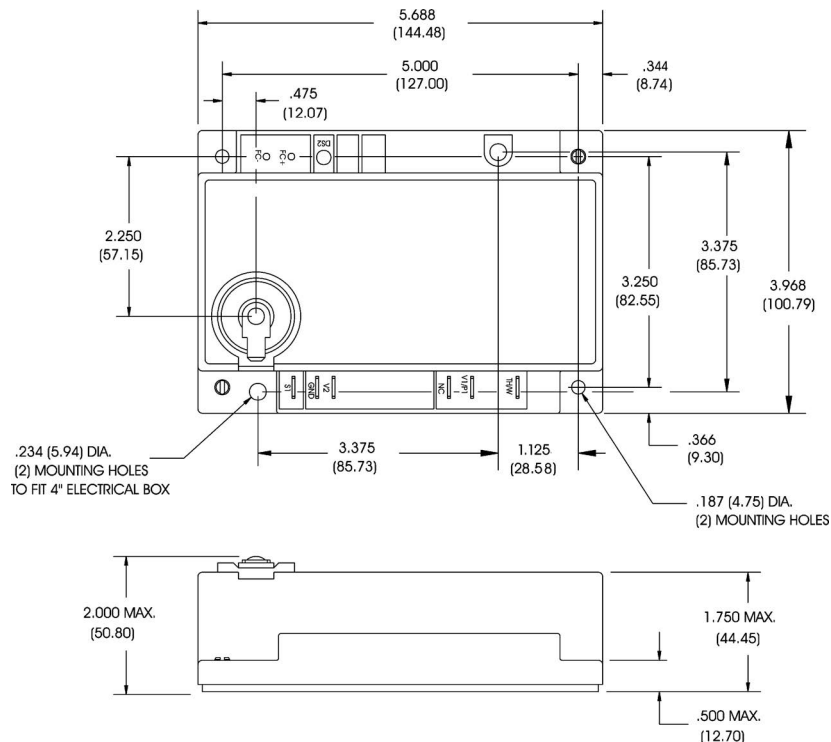


Figure 4. Standard Enclosure

Flame Current Measurement

Flame current is the current that passes through the flame from sensor to ground. To measure flame current, connect a True RMS or analog DC micro-ammeter to the FC+ and FC- terminals. Readings should be 1.0 μ A DC or higher. If the meter reads negative or below "0" on scale, meter leads are reversed. Re-connect leads with proper polarity.

Alternately, a Digital Voltmeter may be used to measure DC voltage between FC+ and FC- terminals. Each micro-amp of flame current produces 1.0 VDC. For example, 2.6 VDC equates to 2.6 μ A.

A good burner ground that matches the control ground is critical for reliable flame sensing.

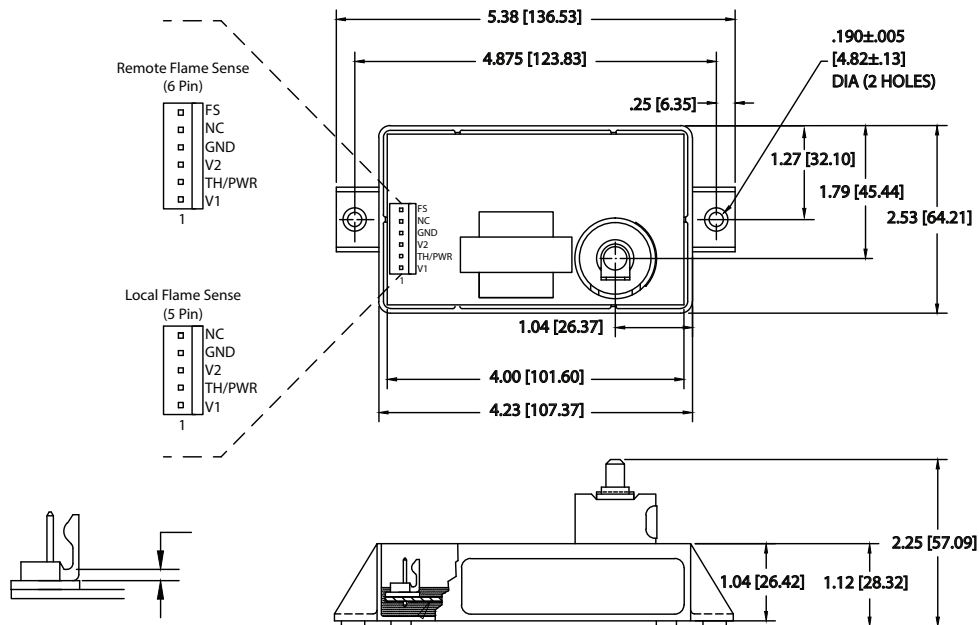


Figure 5. 35-602 Special Small Footprint Configuration

PART NUMBER CONFIGURATION

SERIES 35-605 X X X - X X X

Product Designation

- 2 = Standard CE Approved Model*
- 3 = Special CE Approved Model*
- 5 = Standard
- 6 = Edge Connector
- 8 = Aftermarket Kit
- 9 = Special Configuration

A 3, 8 or 9 in this location (i.e. 35-60 5 901 -113) indicates a special configuration. 9XX is a sequentially assigned part number and does not follow the standard part numbering configuration.

Consult Fenwal for operating characteristics of this control.

*On CE Approved models, pre-purge time cannot exceed inter-purge time and automatic reset is not permitted.

Trial for Ignition

- 1 = 4 Seconds
- 3 = 7 Seconds
- 5 = 10 Seconds
- 7 = 15 Seconds

Inter-Purge

- 0 = None (Single Try Only)
- 1 = 15 Seconds
- 2 = 30 Seconds

Pre-Purge

- 0 = None
- 1 = 15 Seconds
- 2 = 30 Seconds

Tries for Ignition and Methods for Flame Sense

- 0 = Single Try - Local Sense
- 1 = Single Try - Remote Sense
- 5 = Three Tries - Local Sense
- 6 = Three Tries - Remote Sense

Enclosure

- 0 = Noryl Gray Enclosure
- 1 = Integral Standoffs
- 2 = HHVT w/Enclosure
- 3 = HHVT No Enclosure

SERIES 35-602 X X X - X X X

Special small footprint configuration - consult Fenwal
(Not CE Approved)

EXPORT INFORMATION (USA)

Jurisdiction: EAR

Classification: EAR99

This document contains technical data subject to the EAR.

This literature is provided for informational purposes only. Kidde-Fenwal, LLC believes this data to be accurate, but it is published and presented without any guarantee or warranty whatsoever. Kidde-Fenwal, LLC assumes no responsibility for the product's suitability for a particular application. The product must be properly applied to work correctly. If you need more information on this product, or if you have a particular problem or question, contact KIDDE-FENWAL, LLC, Ashland, MA 01721.

Kidde-Fenwal, LLC
400 Main Street
Ashland, MA 01721, USA

KFI U.K. Limited
Station Road,
Bentham, Lancaster, LA2 7NA, UK

Kidde Technologies
Survey No. 28/2, 44/2 and 45
Rasyani, Dandapta Road
Raigad Maharashtra-410207, India

kiddefenwal.com | 508.881.2000

 **KiddeFenwal**

Kidde Fire Systems, Kidde Fire Protection and Fenwal Controls branded products are created exclusively by Kidde-Fenwal, LLC.

Unistrut is a registered trademark of Atkore International Group. Argonite is a registered trademark of Kidde-Fenwal, LLC.

All other trademarks are the property of their respective owners.

2026© Kidde-Fenwal, LLC | All Rights Reserved

P/N: F-35-60 Rev. AG

EU DECLARATION OF CONFORMITY

We

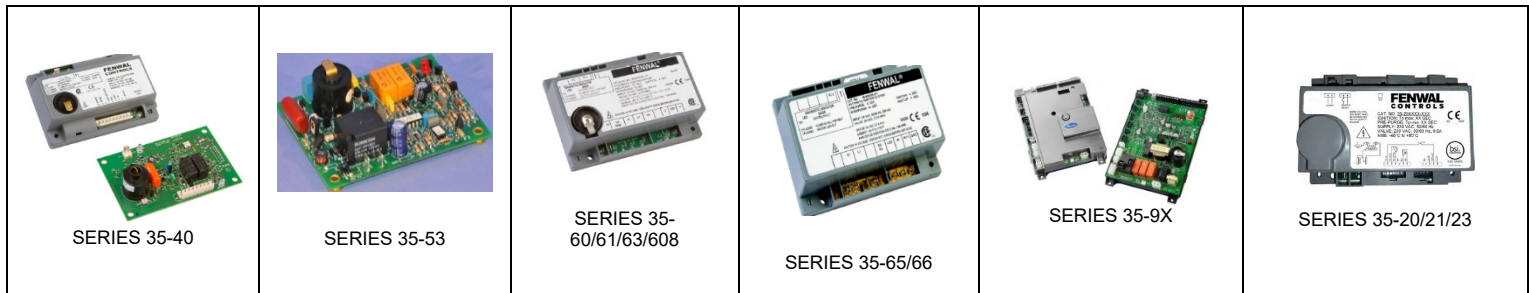
Company Name: Kidde-Fenwal, LLC
Postal Address: 400 Main Street
City and Post Code: Ashland, MA 01721
Tel: 508-881-2000

Declare that the DoC is issued under sole responsibility and belongs to the following product:

Apparatus Model(s) Series 35-40, 35-53, 35-60, 35-61, 35-63, 35-608, 35-65, 35-66, 35-9X
Type: Fitting
Batch Number Date code and Revision Level Assigned per production lot, (YYWW RR)

Object of the Declaration:

Series 35-20, 35-21, 35-23 230Vac Direct Spark Automatic Gas Ignition Controllers
Series 35-40, 12/24Vdc Direct Spark Automatic Gas Ignition Controllers
Series 35-53, 12Vdc Direct Spark Automatic Gas Ignition Controllers
Series 35-60, 35-61, 35-63, 35-608 24Vac Direct Spark Automatic Gas Ignition
Series 35-65 & 35-66 24Vac Hot Surface Automatic Gas Ignition Controllers
Series 35-9X Platform Ignition Module



The object of the declaration described above is in conformity within the relevant union harmonization legislation:

Gas Appliance Regulation:	(EU) 2016/426	Low Voltage Directive:	2014/35/EC
EMC Directive:	2014/30/EC	Rohs	2011/65/EU

The following harmonized standards and technical specifications have been applied:

<u>EN298:2022:</u>	Automatic Burner Control systems for Burners and appliances burning gaseous or liquid fuels.
<u>EN13611:2019:</u>	Safety and control devices for Gas Burners and Gas burning appliances – General Requirements.

Name of Notified Body & Number: BSI Group, 2797, EU Type Examination Certification

Notified Body Certificate No.:	Series 35-20/21/23	CE828701
	Series 35-40:	CE682407
	Series 35-53	CE682404
	Series 35-60/61/63/608	CE682405
	Series 35-65/66	CE682406
	Series 35-9x	CE690652

Surveillance Audit Notified Body: BSI Group

For copies of the Installation Instructions and the EU DoC, got to www.fenwalcontrols.com, - Document Library - Data sheets.

Paul Finn

Kidde-Fenwal, LLC. Ashland, MA USA
Place of Issue:

9 Sept 2025
Date of Issue

Paul Finn, Certification Engineer
Name