

SERIES 35-65
24 VAC Microprocessor-Based
Hot Surface Ignition Control



F-35-65
September 2026

FEATURES

- Safe start with DETECT-A-FLAME® flame sensing technology
- Custom pre-purge and inter-purge timings*
- 120/240 field selectable line voltage for use with 120 VAC igniter option
- 24/120/240 VAC hot surface igniter models available
- Single or three trials for ignition
- System diagnostic LED
- Flame current test points
- Local or remote flame sensing
- Automatic reset**

APPLICATIONS

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

DESCRIPTION

The Model 35-65 is a 24 VAC Microprocessor Based Hot Surface Ignition (HSI) Control designed for use in all types of gas-fired appliance where sparking is not desired. The control continually and safely monitors, analyzes and controls the proper operation of a gas burner. A diagnostic LED and optional UART communications make troubleshooting easy and ensures safe and efficient operation.

AGENCY CERTIFICATIONS



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



Factory Mutual approval on select models

RoHS

RoHS Compliant



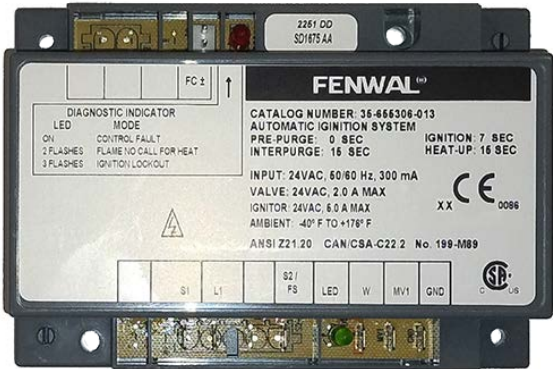
CE Approved to EN 298:2022***
CE682406



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

GSC 805641

* 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

Input Power	Control: 18-30 VAC 50/60 Hz (Class 2 transformer)
HSI Input Voltage	Line: 24, 120 or 240 VAC (L1 and L2 only)
Input Current	350(RMS) mA @ 24 VAC, gas valve relays energized @ 25°C
Gas Valve	2.0A @ 24 VAC 4.0A (Inrush)
Hot Surface Ignitor	5A @ 24/120/240 VAC
Operating Temperature	-40°F to + 176°F (-40°C to +80°C)
Storage Temperature	-40°F to + 185°F (-40°C to +85°C)
Flame Sensitivity	0.7uA minimum
Flame Failure Response Rate	0.8 seconds maximum
Flame Failure Lockout Time	Varies by model, 315 seconds maximum
Flame Detector Self-check Rate	< 1 second
Gas Types	Natural, LP, or manufactured
Size (LxWxH) Board Only	5.5 x 3.75 x 1.5 inches (13.97 x 9.53 x 3.8 cm)
Size (LxWxH) with Cover	5.7 x 4.0 x 1.6 inches (14.45 x 10.15 x 4.1 cm)
Enclosure / Mounting	Noryl Gray Cover or Integral standoffs
Moisture Resistance	Conformal coated to operate to 95% R.H. (Non-Condensing) Always avoid direct exposure to water.
Ingress Protection	Not Rated, Protection provided by appliance in which it is installed.
Tries for Ignition	One or Three
Tries for Ignition Periods	4, 7, 10, or 15 seconds
Pre-purge and Inter-purge Timings	None, 15, or 30 seconds Without pre-purge, there is a 2 second start-up delay.

SEQUENCE OF OPERATION / FLAME RECOVERY / SAFETY LOCKOUT

POWER UP

During power up, the Red LED shall briefly flash ON for about 1 second while the control performs a power on self test. The LED then turns OFF to indicate normal operation.

START UP - HEAT MODE

When a call for heat is received from the thermostat, 24 VAC to TH, the control begins an optional pre-purge delay. Following the pre-purge period, the Igniter is energized for the heat-up period, and then the gas valve is energized for the Trial for Ignition (TFI) period.

When the igniter is de-activated and flame is detected during the TFI, the gas valve remains on. 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 repeatedly flash 3 times indicating 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 and the LED will repeatedly flash 3 times.

FLAME FAILURE - RECYCLE MODE

If the established flame signal is lost from the burner, the gas valve is de-energized and the control proceeds to inter-purge before attempting to relight. 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 and the LED will repeatedly flash 3 times.

LOCKOUT RECOVERY

Recovery from lockout requires a manual reset by either resetting the thermostat, or removing power 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 35-65 is not position sensitive and can be mounted vertically or horizontally. The control may be mounted on any surface and fastened with #6 sheet metal screws. The control also supports direct mounting to a standard 4-in. junction box. Secure the control in an area that will experience a minimum of vibration and remain below 176°F (80°C).

All connections should be made with UL approved, 105°C rated, 18 gauge stranded wire with .054" minimum insulation thick-ness. Refer to the appropriate wiring diagram when connecting the 35-65 to other components in the system.

REMOTE SENSE CABLE REQUIREMENTS

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

Refer to Fenwal Controls datasheet F-05-1000 for details.

 CAUTION	Label all wires prior to disconnection when servicing or replacing controls. Wiring errors can cause improper and dangerous operation. A functional checkout of a replacement control should always be performed.
 CAUTION	The control must be mounted and located in a manner which protects components from exposure to water (dripping, condensate, spraying, rain). Any control that has been exposed to water must be replaced.
 WARNING	All wiring must be done in accordance with both local and national electrical code, and by a trained service technician. Wiring must be at least #18 AWG /AWM rated for 105°C or higher.
 WARNING	The 35-65 uses voltages of shock hazard potential. Wiring and initial operation must be done by qualified service technician.
 WARNING	Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.
 WARNING	Do not disconnect any electrical loads while the automatic gas ignition control is powered. Disconnect power prior to installation, service, or replacement of the control with the end use appliance.

TERMINAL DESIGNATIONS

Name	Description	Terminal Type
R	24 VAC Power	1/4" male Q.C.
S1/240	240 VAC Ignitor	1/4" male Q.C. (optional)
S1/120	120 VAC Ignitor	1/4" male Q.C.
L1	120/240 VAC Input (Hot)	1/4" male Q.C.
L2	Neutral	1/4" male Q.C.
S2 / FS	Ignitor / Remote Flame Sense	1/4" male Q.C.
TH/W	Thermostat Input	1/4" male Q.C.
MV1	Main Valve Power	3/16" x .031" male Q.C.
GND	Ground	3/16" x .031" male Q.C.
G	Comm. GND	.100 pin (3)

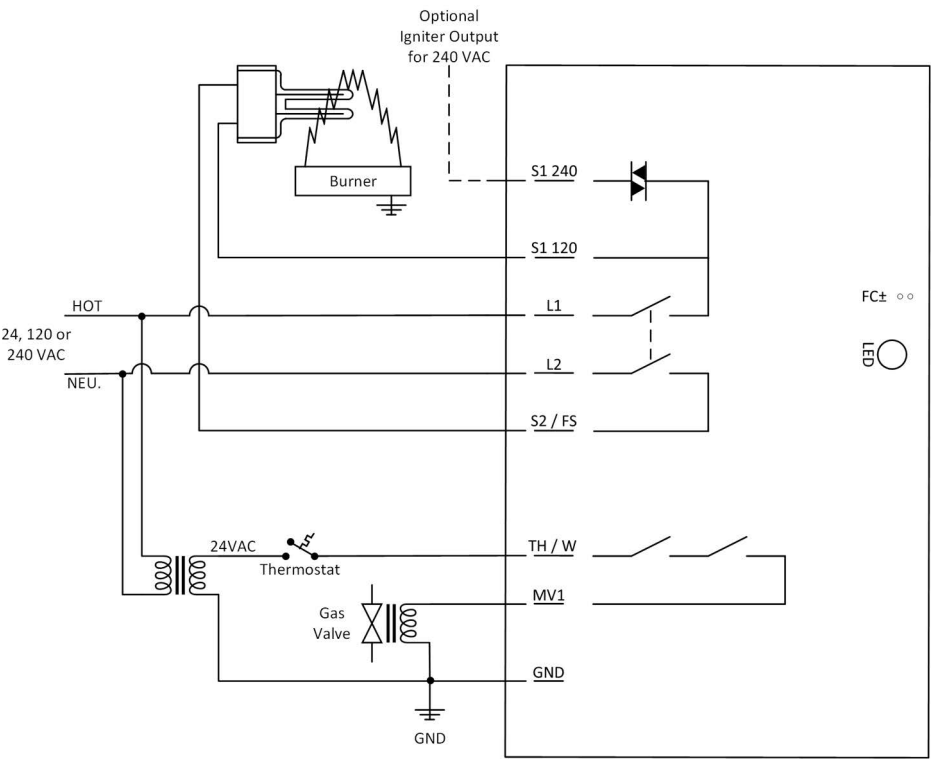


Figure 1. Local Sense

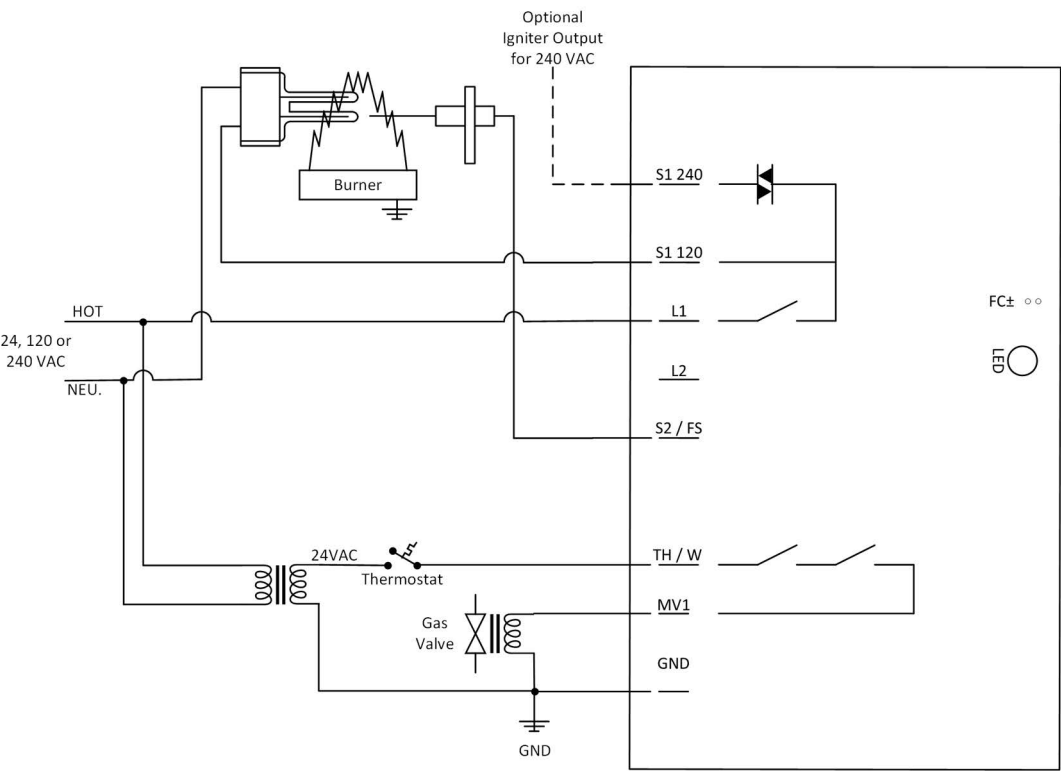


Figure 2. Remote Sense

DIMENSIONS - INTEGRAL STANDOFF

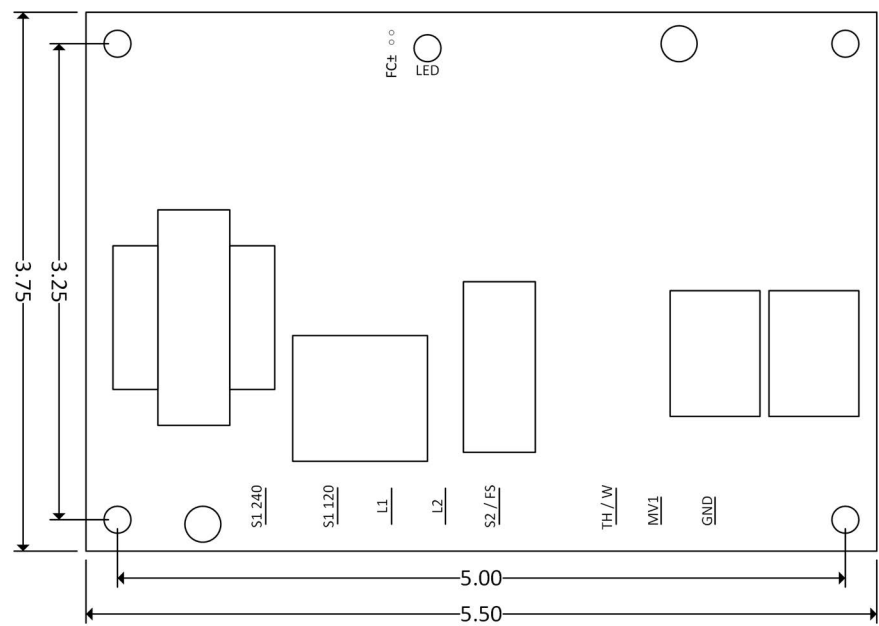


Figure 3. Board Only

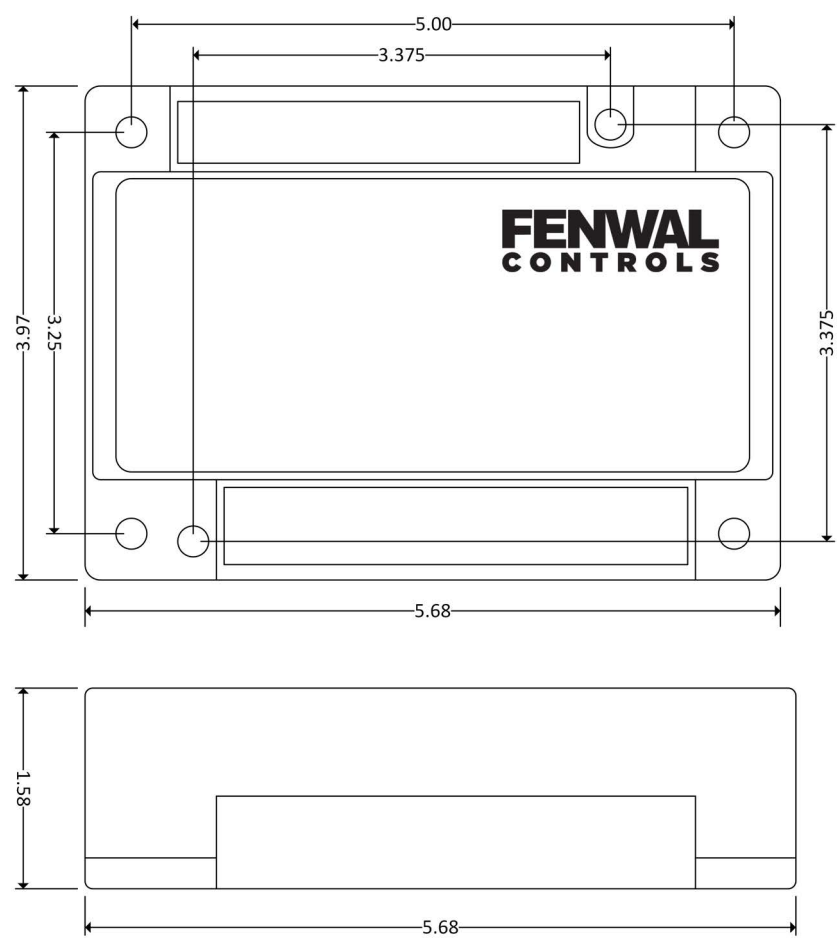


Figure 4. Control with Cover

TROUBLESHOOTING



WARNING

Risk of Explosion or Fire

The 35-65 control cannot be serviced by the user. If any control faults are detected, the 35-65 control must be replaced by qualified service personnel. Risk of explosion or fire can result if the control module has been opened or with any attempts to repair it, and the warranty is void. Do not use aluminum wire, this can also lead to risk of fire.

Troubleshooting Guide	
Symptom	Recommended Actions
1. Control does not start	A. Miswired B. Transformer bad/battery fault C. Fuse/circuit breaker fault D. No voltage at PWR E. Faulty control
2. Thermostat on - no ignition	A. Miswired B. Faulty thermostat, no voltage at thermostat terminal W C. Failed igniter
3. Valve on - no igniter	A. Miswired B. Defective igniter C. Open S1 cable D. Faulty control
4. Igniter on - no valve	A. Valve coil open B. Open valve wire C. Faulty control (check voltage between MV1 and GND)
5. Flame okay during TFI - no flame sense after TFI	A. Faulty igniter B. Faulty S1 wire C. Poor ground at burner D. Faulty control (check flame current)

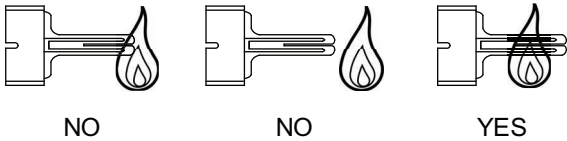
Fault Conditions	
LED Indication	Fault Mode
Off	Standby & Normal Condition
Steady On	Internal Control Failure
2 Flashes	False Flame
3 Flashes	Ignition Lockout

Note: Removing the 24 VAC power from the control will clear the fault code.

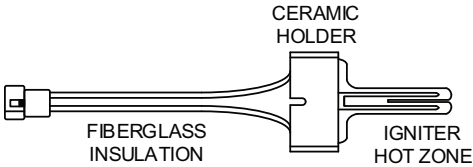
HOT SURFACE IGNITER

Proper location of the silicon hot surface igniter is important to achieve optimum system performance for both ignition and flame sensing. See figure below.

Note: The temperature of the ceramic holder should not exceed the manufacturer's specifications.



TYPICAL HOT SURFACE IGNITER



FLAME CURRENT

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.

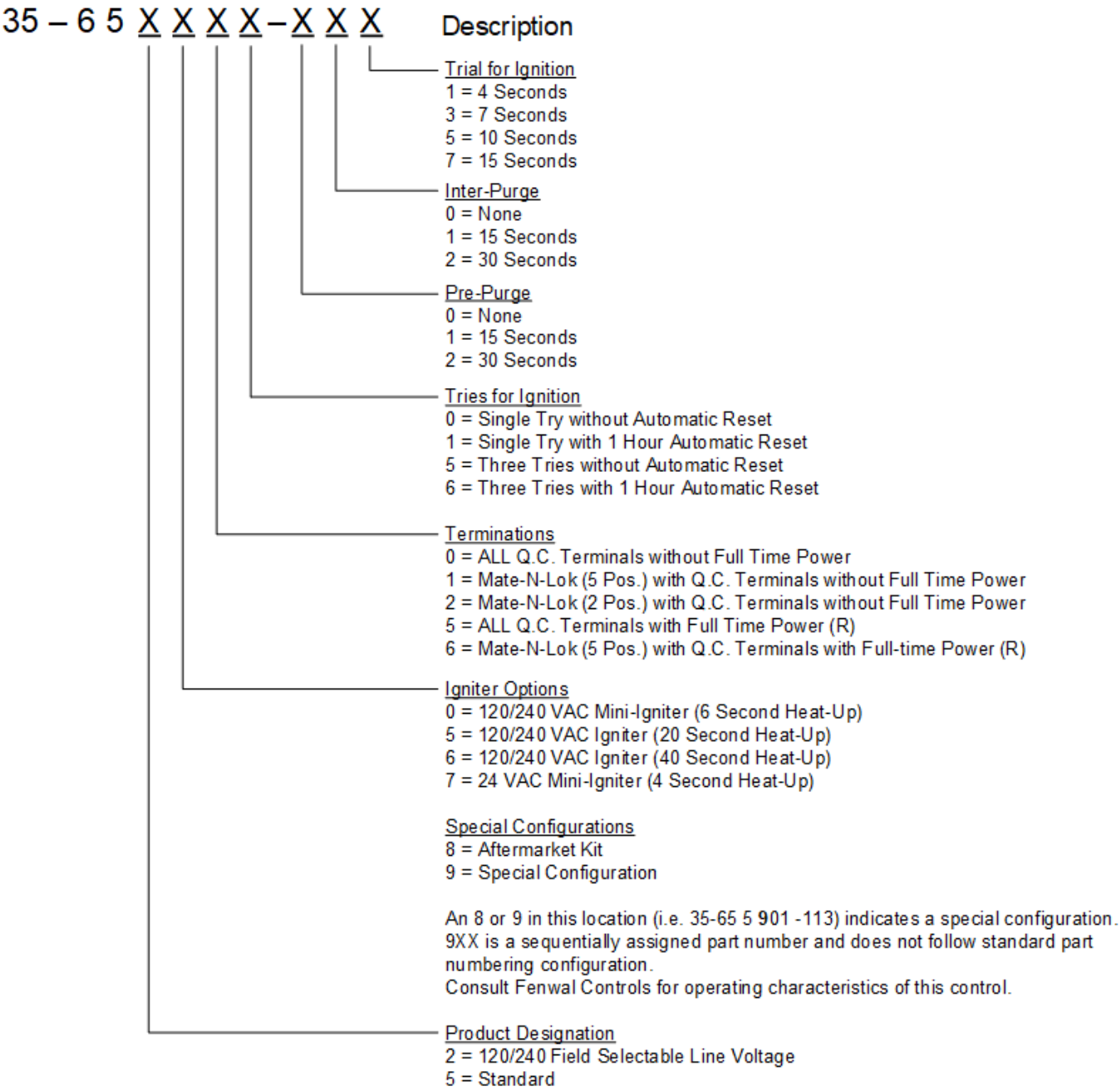
A good burner ground that matches the control ground is critical for reliable flame sensing.

INTERNAL CONTROL FAILURE

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

Note: The control can only be replaced with the same model type control.

STANDARD PART NUMBER CONFIGURATION



35-6559XX-XXX Special configuration, consult Fenwal Controls for operating characteristics. (Requires re-submitting to Agency)
Consult Fenwal Controls for operating characteristics of this control.

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.

EU DECLARATION OF CONFORMITY

We

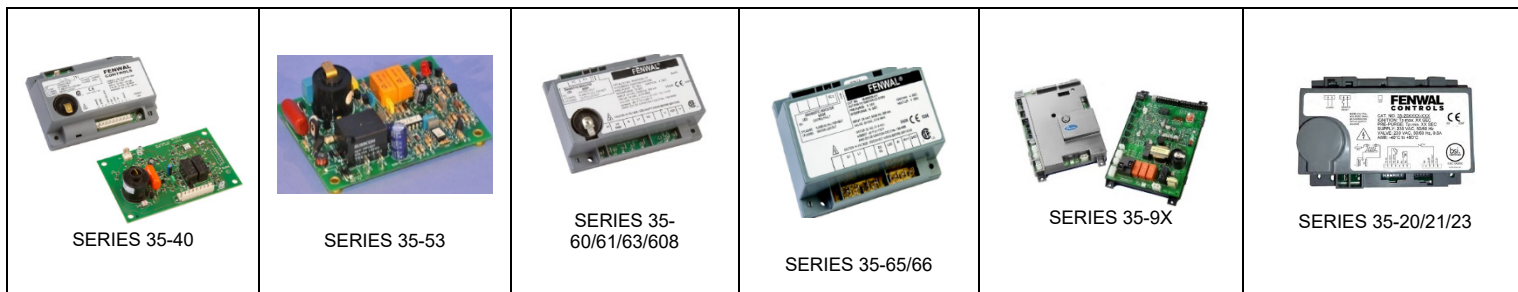
Company Name: Kidde-Fenwal, LLC
Postal Address: 400 Main Street
City and Post Code: Ashland, MA 01721
Tel: 508-881-2000

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