October 2013

FENWAL 35-535811-113*

12 VDC GAS IGNITION REPLACEMENT KIT FOR ATWOOD® HYDRO FLAME™ FURNACES *REF. ATWOOD 31501

INSTALLATION INSTRUCTIONS

DESCRIPTION

The Fenwal 35-535911-113 is a 12 VDC Direct Spark Ignition Control designed for use in Atwood RV gas furnaces. The control utilizes a microprocessor to continually and safely monitor, analyze and control the proper operation of the gas burner. Integrated combustion blower control provides automatic backward compatibility with older models.

- Certified to ANSI Z21.20-1998 and CAN/CSA C22.2 No. 199-M89
- Recognized to UL372 – Software conforms to UL1998

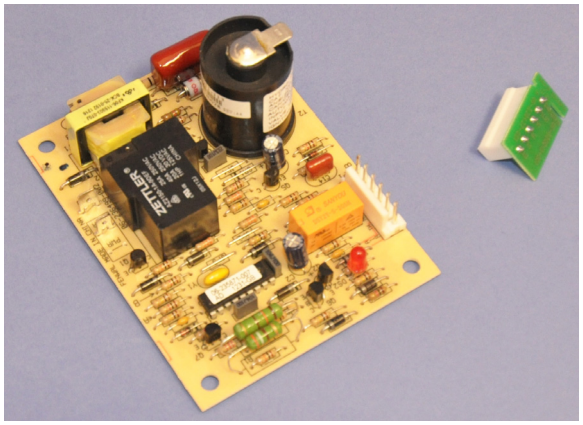
SPECIFICATIONS	
Input Power	Control: 9.0 to 15 VDC from a storage battery or RV power converter
Input Current Drain	300 mA @ 12 VDC, combustion blower and gas valve relays energized (control only)
Gas Valve Rating	1.0A @ 12 VDC
Combustion Blower Rating	20.0A @ 12 VDC
Operating Temperature	-40°F to + 176°F (-40°C to +80°C)
Flame Sensitivity	0.7 µA minimum
Flame Failure Response Time	0.8 seconds maximum
Types of Gases	Natural, LP, or manufactured
Spark Rate	16 sparks per second
Size (LxWxH)	4.25 x 3.25 x 1.80 inches 10.80 x 8.25 x 4.57 cm
Moisture Resistance	Conformal coated to operate to 95% R.H. (Non-Condensing) Always avoid direct exposure to water.
Tries for Ignition	Three
Trial for Ignition Periods	7 seconds
Pre-purge and Inter-purge Timings	15 seconds
Postpurge Timings	90 seconds

ITEMS INCLUDED

This kit includes the genuine Fenwal OEM control and is a direct substitute for Atwood furnace board kit **31501**. The control board carries UL and CSA certification listings, unlike other aftermarket replacement controls that have limited or no safety agency certifications.

Item Description	Part Number	Atwood #
Control, Gas Ignition	35-535911-113	33488
Board, Adapter	06-220041-001	33727
Installation Instructions and Warranty	06-237326-001	N/A

Adapter board 33727 makes this kit compatible with pre-2004 furnaces using Atwood Edge Connector style board 37875.



INSTALLATION GUIDELINES

Important: Use **ONLY** in Atwood hydro flame furnaces that specify part number 31501 or 33488, which is Fenwal Part Number 35-535911-113. Any deviations or other use voids the product warranty and the agency listings, and can be hazardous.

Fenwal Gas Ignition boards must be installed by a certified technician only. Follow installation instructions exactly.

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.
WARNING	Propane is an explosive gas! Improper installation or operation can cause an explosion leading to serious injury or death.
WARNING	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	The Fenwal 35-535911-113 uses voltages of shock hazard potential. Wiring and initial operation must be done by qualified service technician. All wiring must be done in accordance with both local and national electrical code. Wiring must be at least #18 AWG rated for 105°C or higher. Do not disconnect battery or any electrical loads while the automatic gas ignition control is powered. Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.

MOUNTING AND WIRING

The Fenwal 35-535911-113 is not position sensitive and should be mounted in the same location as the controller being replaced.

WIRING CONNECTIONS

All connections should be made with UL approved, 105°C rated, 18 gauge stranded wire with .054” minimum insulation thickness. Refer to the RV furnace wiring diagram when connecting the Fenwal 35-535911-113 to other components in the system.

Attach the wiring harness to the 6-pin connector on the 35-535911-113 control. Connect the 12VDC Power lead to the .187” QC PWR terminal and the Blower lead to the .250” QC BLO terminal.

USE IN OLDER ATWOOD FURNACES WITHOUT INTEGRATED BLOWER CONTROL

Older furnace models did not include blower control on the ignition board. The 35-535911-113 control is fully backward compatible with these older models. These furnaces only have the 6 pin wiring harness and no quick-connect style terminals for the blower and the 12VDC power inputs. In this case, simply leave the PWR and BLO terminals un-connected and the new control will automatically operate as a non-blower version.

USE OF ADAPTER CARD 06-220041-001

This adapter must be used when replacing an older-style Atwood furnace control with a circuit-board edge connector. Install the adapter card onto the 6-pin connector of the new 35-535911-113 control making sure it is properly aligned. Attach the original edge-connector wiring harness directly to the adapter card. Ensure that all connectors are firmly seated.

TERMINAL DESIGNATIONS

Name	Description	Terminal Type	Location
PWR	+12 VDC Power	3/16” Q.C.	
BLO	Blower	1/4” Q.C.	
AIR	Airflow Switch	6 Pin Connector	1
TH	Thermostat	6 Pin Connector	2
NC	NC Contact	6 Pin Connector	3
V1	Gas Valve	6 Pin Connector	4
TEST/	Unused	6 Pin Connector	5
GND	Ground	6 Pin Connector	6

SEQUENCE OF OPERATION / FLAME RECOVERY / SAFETY LOCKOUT

START UP - HEAT MODE

When a call for heat is received from the thermostat supplying 12 volts to TH, the control will reset, perform a self check routine and verify no flame exists (safe start). After verifying the airflow switch input is open, the Blower is energized and the airflow switch contacts close, starting the pre-purge delay. After the pre-purge delay the gas valve is energized and sparks commence for the trial for ignition period.

When flame is detected during the trial for ignition, sparking stops and the gas valve remains energized. The thermostat, airflow switch and main burner flame are constantly monitored to assure that the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the main valve is de-energized immediately, and after the post-purge period the blower is turned off.

FAILURE TO LIGHT - LOCKOUT

Should the main burner fail to light, or if the 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 after which the valve relay will remain de-energized and the blower will turn off after a five minute delay.

FLAME FAILURE

If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The gas valve is de-energized and a new interpurge and TFI sequence will begin. The control 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.

COMBUSTION AIRFLOW PROBLEMS

If the airflow signal is lost, or the hi-limit opens during heat mode, the gas valve is immediately de-energized and the blower stays on. If the switch closes again, a normal ignition sequence will resume. If not and this condition persists for more than five minutes, the control will enter lockout with the blower off.

LOCKOUT RESET

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

CHECKOUT

WARNING	**Risk of Explosion or Fire** Verify there are no gas leaks by using a rich soap and water solution on all joints and pipe connections. Never use a match or lighter to test for the presence of gas. Failure to test properly before operation can lead to explosion or fire and may result in severe injury or death.

Test the gas control system after any service or component changes to the appliance using the following method:

1. Perform a visual check of all piping, burners, and venting. Check all wiring for integrity and proper electrical and ground connections. Verify the burner is properly grounded.
2. With the gas supply and thermostat off, turn on power to the appliance.
3. Turn the thermostat to a setting high enough to initiate a call for heat. Verify the ignition control proceeds through the operating sequence to a safety shutoff (lockout) condition. (The burner will not light because the gas is shut off)
4. Turn off the thermostat.
5. Turn on the gas supply, and purge the gas lines of air. Check for gas leaks on all joints upstream of the gas valve with a soap solution.
6. Turn the thermostat to a setting high enough to initiate a call for heat. Verify the ignition control proceeds through the operating sequence to a normal run (burner lit) condition. Confirm there are no gas leaks downstream of the gas valve using a soap solution.
7. Turn the thermostat setting down below the room temperature. Verify the burner flame goes out.

TROUBLESHOOTING

WARNING	**Risk of Explosion or Fire** The Fenwal 35-535911-113 control cannot be serviced by the user. If any control faults are detected, the Fenwal 35-535911-113 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.

Before troubleshooting the system, check the following items:

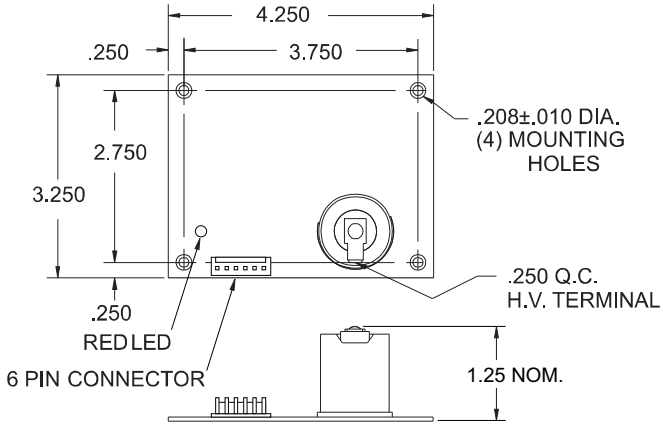
- Verify all mechanical and electrical connections are secure and tight.
- Verify all system wiring is correct.
- Verify there is a proper system ground. The igniter, flame sensor, and ignition module must share a common ground with the burner. *Nuisance shutdowns are often caused by a poor or erratic ground.*
- Perform the instructions in “Checkout” on page 3, as the first step in any troubleshooting.
- Verify that the system is powered and that the thermostat is calling for heat.
- If the control proceeds to an error code on the red diagnostic LED, troubleshoot per the Fault Conditions table below:

Fault Conditions	
LED Indication	**Fault Mode**
Off	Normal Operation
1 Flash	Blower or Airflow Fault
2 Flashes	Flame without Call for Heat
3 Flashes	Ignition Lockout
Steady On	Internal Control Failure

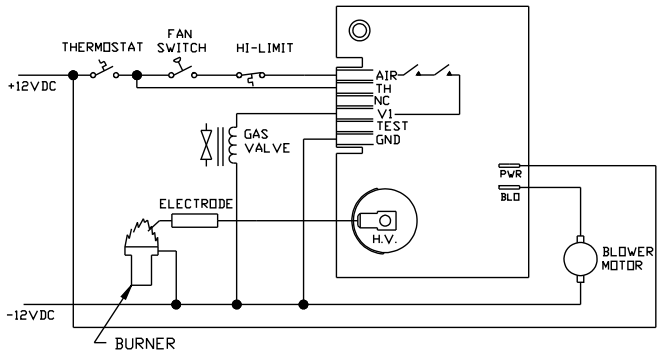
The LED will flash on for 1/4 second, then off for 1/4 second during a fault condition. The pause between fault codes is 3 seconds.

Symptom	Recommended Actions
1. Dead	A. Miswired B. Transformer/battery bad C. Fuse/circuit breaker bad D. No voltage at PWR or AIR E. Bad control
2. Thermostat on - No blower output	A. Miswired or failed air flow switch B. Bad thermostat no voltage at TH C. Bad control
3. Airflow Switch input okay, but no trial for ignition after purge delay	A. Miswired B. Bad control
4. Valve on, no spark	A. Shorted electrode B. Open HV cable C. Miswired D. Bad control
5. Spark on, no valve	A. Valve coil open B. Open valve wire C. Bad control (check voltage between V1 and GND)
6. Flame okay during TFI, no flame sense (after TFI)	A. Bad electrode B. Bad HV wire C. Poor ground at burner D. Bad control

DIMENSIONS



WIRING DIAGRAMS



ATWOOD FURNACE MODELS SUPPORTED

The Fenwal 35-535811-113 kit allows for direct replacement of the furnace control in the following Atwood furnaces:

- 7912-II, 7916-II, 7920-II
- 8012-II
- 8516-I, 8520-I, 8525-I
- 8516-II, 8520-II, 8525-II
- 8516-III, 8520-III, 8525-IIII
- 8516-IV, 8520-IV, 8525-IV
- 8531-I, 8535-I
- 8531-II, 8535-II
- 8531-III, 8535-III
- 8531-IV, 8535-IV
- DC8225, DC8232, DC8235, DC8241
- DC89-I, DC89-II, DC89-III
- FA-72D, FA-76D, FA-79D
- FA-7825, FA-7832, FA-7835, FA-7841
- HF-80D

LIMITED WARRANTY

Product: Fenwal® 35-535911-113 12VDC Gas Ignition control

Service: Applicable Atwood® *Hydro Flame*™ RV furnaces ONLY

Kidde-Fenwal, Inc., d/b/a Fenwal Controls (hereinafter "Fenwal") warrants to the original purchaser that the enclosed Product will be free from defects in materials and workmanship and that it shall conform to specifications published by Fenwal for a period of four years. The warranty period begins on the date of purchase and is valid only for Products purchased from an authorized Fenwal dealer.

Fenwal's sole liability and obligation under this warranty shall be to replace the Product through the original Fenwal dealer. All claims must be pre-approved by the dealer, use the dealers returned goods process and include dated proof of original purchase listing the Product (receipt or invoice). For a claim to be validated, the Product:

- Must be within the warranty period
- Must show no evidence of physical damage, overstress, repairs or modifications

This warranty applies solely to Products used in Atwood *hydroflame* furnaces specifying Atwood part number 31501 or 33488 and installed and operated in strict compliance with the Fenwal installation instructions. This warranty does not extend to the furnace or the furnace components.

This warranty shall not apply if the Product has been damaged, modified, abused or altered after the date of purchase.

ANY DEVIATIONS OR OTHER USE VOIDS THE PRODUCT WARRANTY, VOIDS THE AGENCY LISTINGS OF THE PRODUCT, VOIDS THE AGENCY LISTINGS OF THE FURNACE, AND CAN BE HAZARDOUS.

DISCLAIMER OF WARRANTIES

FENWAL MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS DELIVERED HEREUNDER, NOR IS THERE ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, EXCEPT FOR THE WARRANTY DETAILED ABOVE. IN NO EVENT SHALL FENWAL BE LIABLE TO PURCHASER OR ANY OTHER PERSON (A) FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES OR (B) FOR DIRECT DAMAGE, OTHER THAN AS EXPRESSLY SPECIFIED ABOVE. FENWAL'S AGGREGATE LIABILITY ARISING FROM THE SALE OF THIS PRODCUCT OR UNDER THIS LIMITED WARRANTY , WHETHER IN TORT, CONTRACT OR OTHERWISE, SHALL NOT EXCEED THE PRICE PAID BY PURCHASER FOR THE GOODS SOLD HEREUNDER.

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