Non-Confidential Business Information (Non-CBI)
Certification Test Report

Sherwood Industries
Freestanding Pellet Stove
Models: Chatham-1, Davenport-1, EF2-1, Kinderhook-1

Prepared for:	Sherwood Industries 6782 Oldfield Road Saanichton, British Columbia V8M 2A3 Canada
Prepared by:	OMNI-Test Laboratories, Inc. 13327 NE Airport Way Portland, OR 97230 (503) 643-3788
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AUTHORIZED SIGNATORIES

This report has been reviewed and approved by the following authorized signatories:

Evaluator:

Bruce Davis, Testing Manager
OMNI-Test Laboratories, Inc.

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Section 1

Sampling Procedures and Test Results

INTRODUCTION

Sherwood Industries retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the Chatham-1 freestanding, pellet-fired room heater.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on June 6, 2016. It was assigned and labeled with *OMNI* ID #2205. *OMNI* representative Bruce Davis conducted the certification testing and completed all testing by July 15, 2016.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this section. The results in this report are limited to the item(s) submitted.

SAMPLING PROCEDURE

The Chatham-1 was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using ASTM E2515 and ASTM E2779. The fuel used for certification testing was Lignetics hardwood pellet fuel; this fuel was graded as Premium by the Pellet Fuels Institute and was produced at registered mill #03434. Particulate emissions were measured using dual sampling trains consisting of two sets of filters (front and back). The results of the integrated test run indicate an average particulate emission rate of 1.44 g/hr. The Chatham-1 results are within the emission limit of 2.0 g/hr.

The model Chatham-1 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10. The heater has a demonstrated an average thermal efficiency of 76.7%. The calculated CO emission rate was 7.41 g/hr.

Efficiency results were calculated using spread sheet Version 2.2 created 12/14/2009 and distributed by CSA. Example calculations for CSA B415.1 were not provided by CSA; spreadsheet is protected from modifications by means of a password.

An ambient filter (Background) was not operated during this series, there were no operations in the area that would have generated additional particulate into the ambient air. Running an ambient filter can only reduce emissions by backing out any particulate not generated by fuel in the appliance, it can never increase emissions. Tests conducted without an ambient filter are considered worse case.

RUN DISCUSSION

Run 1 was an attempt at an integrated test run consisting of burn settings that result in 60 +5/-0 minutes at maximum, 120 +5/-0 minutes at medium (<50% of maximum), and 180 +5/-0 minutes at minimum. Each burn category in this run was achieved, meeting both time and burn rate requirements. Negative filter weights were not found, no sampling anomalies occurred, so this integrated test run is valid and appropriate per ASTM E2779 and no further test runs were needed.

SUMMARY OF RESULTS

The average particulate emission rate over the complete, integrated test run was measured to be 1.44 g/hr.

The average particulate emission factor for the complete, integrated test run was measured to be 1.46 g/dry kg of fuel.

The average thermal efficiency for the complete, integrated test run was measured to be 76.7%.

The particulate emission rate calculated from the one-hour filter was 3.61 g/hr.

CO emissions were calculated to be 0.123 grams per minute over the integrated test run.

The proportionality results and sample train agreement for the test run was acceptable. Quality check results for each test run are presented in Section 3 of this report.

SUMMARY TABLES

Table 1.1 – Particulate Emissions

	One-Hour Filter	Integrated Total
Emission Rate (g/hr)	3.61	1.44
Emission Factor (g/dry kg)	1.63	1.46

Table 1.2 – Efficiency and CO

	Burn Rate Segment			Integrated
	Maximum	Medium	Minimum	Total
Time (minutes)	60	120	180	360
Burn Rate (dry kg/hr)	2.21	0.95	0.61	0.99
Heat Input Rate (BTU/hr, HHV)	40,852	17,622	11,214	18,290
Heat Output Rate (BTU/hr, HHV)	32,134	12,655	8,852	14,033
Efficiency (%, HHV)	78.7%	71.8%	78.9%	76.7%
Efficiency (%, LHV)	84.2%	76.9%	84.5%	82.1%
CO Emission Rate (g/min.)	0.367	0.14	0.038	0.123

Table 1.3 – Test Facility Conditions

	Initial	**Middle**	**Final**
Room Temperature (°F)	75	75	78
Barometric Pressure (in Hg)	30.24	30.23	30.22
Air Velocity (ft/min)	< 50	< 50	< 50
Induced Draft (in H2O)	0	0	0

Table 1.4 – Fuel Measurement Summary

Segment	**Time** (min)	**Burn Rate** (dry kg/hr)	**Consumed Fuel Weight** (lbs)	**Fuel Moisture Content** (dry basis - %)
Pretest	60	2.21	5.1	4.735
Maximum	60	2.21	5.1	4.735
Medium	120	0.95	4.4	4.735
Minimum	180	0.61	4.2	4.735
Integrated Total	360	0.99	13.7	4.735

Table 1.5 – Dilution Tunnel and Flue Gas Measurements

Segment	Average Flue Draft (in H_2O)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	**Flow Rate** (dscf/min)	**Temperature** (°F)
Integrated Total	-0.029	17.51	196.6	88.2

Table 1.6 – Heater Configuration

Segment	Heat Level	Feed Trim	Combustion trim	Manual air Slide
Pretest	5	5	2	Full Closed
Maximum	5	5	2	Full Closed
Medium	2	2	2	Full Closed
Minimum	1	1	2	Full Closed

Section 2

Photographs
Appliance Description
Drawings

Sherwood Industries
Chatham-1

PHOTOGRAPHS

	
Chatham-1 Front	**Chatham-1 Back**

	
Chatham-1 Left	**Chatham-1 Right**

APPLIANCE DESCRIPTION

Appliance Manufacturer: Sherwood Industries

Pellet Stove Model: Chatham-1

Type: Freestanding, air-circulating type, pellet-fired room heater.

The Chatham-1's principle elements include a fuel hopper, mild steel firebox chamber, Stainless Steel burn pot, and electrical fuel feed, combustion air, and convection air supply systems.

Air is forced by the combustion air blower through a rectangular formed firepot with open ends and air passageways in the front, back, and bottom. Combustion products are routed out of the firebox chamber through a 3-inch diameter flue outlet located on the rear of the unit.

Fuel is supplied from the hopper to the burn pot via a semi vertical auger that delivers fuel to a drop tube. Fuel supply rate is varied by cycling the auger motor as needed.

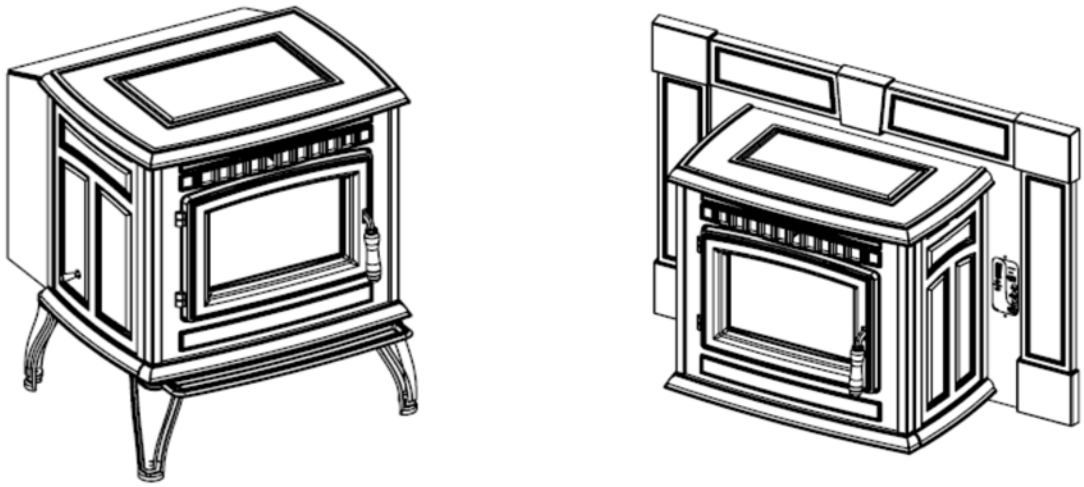
Ashes fall through the burn pot into a removable ash drawer located at the bottom of the unit. The drawer is accessed through the front firebox door, which also features a 390 mm x 229mm viewing window with a 19mm x 3.2mm u-shaped gasket that gives an air tight seal.

The electrical systems are regulated by a user-operated control board. On this board settings such as heat level, feed trim, and combustion trim settings can be adjusted to achieve desired heat output. The unit can also be controlled by an external thermostat system.

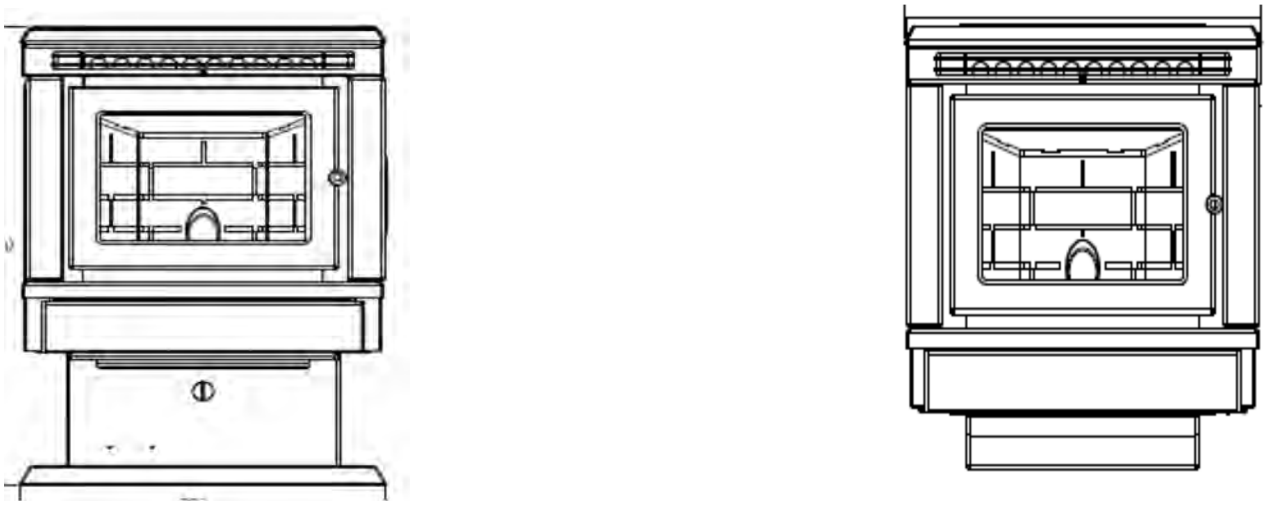
Similar Models: Three additional models share the same firebox, heat exchanger, feed system, air circulation motor, and products of combustion handling system. These models are the Hudson River Davenport-1, Hudson River Kinderhook-1, and the EF2-1. On the freestanding models external shields and legs/pedestal are the only changes. Insert models have shielding around the firebox area, the rear area around the motors is left open but would be within the confines of a fireplace when installed. Feed motors, and air handling motors are the same as used on the freestanding appliance.

See appliance drawings in section 2 for details.

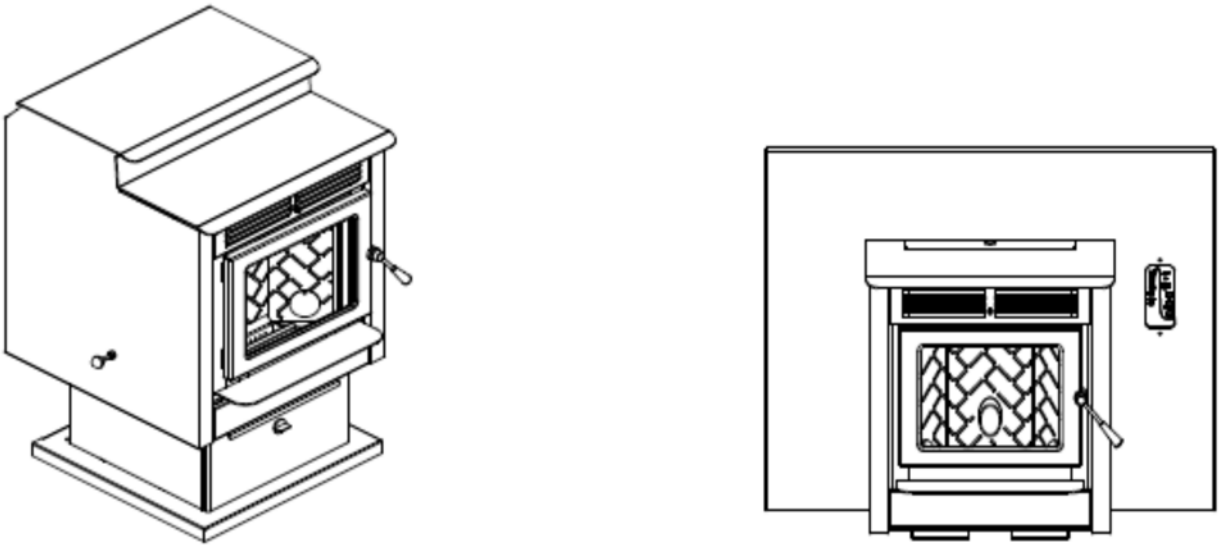
Model Similarity



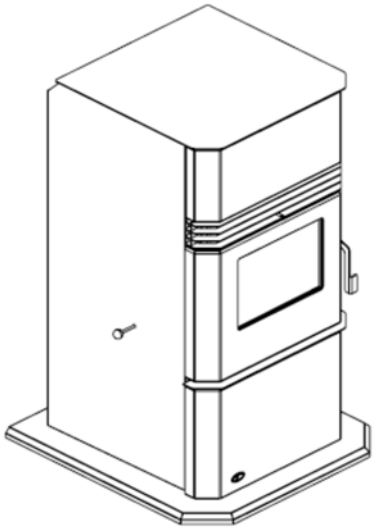
Chatham-1, Freestanding and Insert.



EF2-1, Freestanding and Insert.



Davenport-1, freestanding and insert.



Kinderhook-1, freestanding.

Section 3
Test Data by Run

Appliance operating instructions

Operating instructions for stove operation during testing were not provided, instructions from the appliance operation manual were used. It states the manual air control slide for most efficient operation is to be operated fully closed (pushed in). Combustion trim setting has a factory setting of #2, this setting was found to work during all burn rate settings used for testing. Heat level, and feed trim were set to the highest setting for the high burn segment, and minimum settings for low the low burn segment to produce the highest and lowest possible burn rate. A Heat level setting of 2 was found to generate a burn rate of less than 50% of high for the medium test, and a feed trim of 2 was used.

Pellet Heater Conditioning Data - ASTM E2779

Manufacturer:	Sherwood Industries
Model:	Chathem-1
Tracking No.:	2205
Project No.:	0268PS024E.REV001
Test Date:	6/8/16 - 7/13/16
Operation Category:	II-IV

Operated for 50 hours at a medium burn rate.

Elapsed Time (hours)	Scale Reading (lbs)	Stack (°F)
0	20.3	352
1	15.8	361
2	13.9	256
3	12.0	256
4	10.7	195
5	9.4	193
6	28.3	274
7	26.3	264
8	24.1	292
9	22.0	285
10	20.0	265
11	17.7	305
12	15.3	300
13	5.7	232
14	26.9	295
15	24.7	296
16	22.5	311
17	19.4	304
18	17.2	295
19	15.1	298
20	43.5	285
21	41.3	304
22	39.3	292
23	37.2	303
24	35.1	298
25	33.0	293
26	30.9	303
27	28.8	291
28	26.7	296
29	24.6	291
30	22.4	295
31	20.3	302
32	18.2	308
33	16.0	302
34	14.0	287
35	11.9	291
36	32.2	240
37	30.9	214
38	29.7	202
39	28.3	185
40	23.8	423
41	19.2	445
42	17.1	458
43	31.6	295
44	29.5	293
45	27.5	393
46	25.5	286
47	22.7	303
48	20.6	309
49	18.5	309
50	26.4	396

Run 1

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.09	78	2.3	0.75	78	1.2	99	0.078			26.4		345	73	74	75	-0.041	9.4	0.1
1	0.156	0.148	0.16	0.15	1.31	78	2.42	1.00	78	1.2	97	0.078	99	94	26.3	-0.1	361	74	75	75	-0.043	9	0.1
2	0.317	0.303	0.16	0.16	1.31	78	2.42	1.01	78	1.2	97	0.078	102	99	26.2	-0.1	373	74	75	74	-0.044	9.3	0.1
3	0.478	0.463	0.16	0.16	1.30	78	2.42	1.08	78	1.2	98	0.078	102	102	26.2	0	380	75	75	75	-0.045	8	0
4	0.638	0.624	0.16	0.16	1.30	78	2.41	1.07	78	1.2	98	0.078	102	103	26.1	-0.1	385	75	76	75	-0.044	9	0
5	0.799	0.784	0.16	0.16	1.30	78	2.42	1.07	78	1.2	98	0.078	102	102	26.0	-0.1	388	75	76	75	-0.045	9.2	0.1
6	0.959	0.945	0.16	0.16	1.30	78	2.42	1.07	78	1.2	99	0.078	102	103	25.9	-0.1	390	75	76	74	-0.045	9.4	0.1
7	1.120	1.106	0.16	0.16	1.29	78	2.42	1.07	78	1.2	99	0.078	102	103	25.8	-0.1	392	76	76	75	-0.045	9.3	0.1
8	1.280	1.265	0.16	0.16	1.29	78	2.41	1.07	78	1.2	99	0.078	102	102	25.7	-0.1	392	76	76	75	-0.045	9	0
9	1.440	1.425	0.16	0.16	1.29	79	2.42	1.06	78	1.2	99	0.078	102	102	25.6	-0.1	394	76	76	75	-0.046	10	0.1
10	1.600	1.586	0.16	0.16	1.29	79	2.41	1.06	78	1.3	99	0.078	102	103	25.6	0	395	76	76	75	-0.045	9.1	0
11	1.760	1.745	0.16	0.16	1.29	79	2.42	1.06	78	1.3	99	0.078	102	102	25.5	-0.1	394	76	76	75	-0.045	8.7	0
12	1.919	1.905	0.16	0.16	1.28	79	2.41	1.06	78	1.2	99	0.078	101	102	25.4	-0.1	394	76	76	75	-0.045	9.3	0.1
13	2.078	2.065	0.16	0.16	1.28	79	2.42	1.05	78	1.3	99	0.078	101	102	25.3	-0.1	395	77	76	74	-0.045	9.4	0.1
14	2.239	2.224	0.16	0.16	1.28	79	2.42	1.05	78	1.3	99	0.078	102	102	25.2	-0.1	394	77	76	74	-0.045	8.6	0
15	2.398	2.383	0.16	0.16	1.28	79	2.42	1.05	78	1.3	99	0.078	101	102	25.1	-0.1	395	77	77	74	-0.045	9.1	0
16	2.556	2.543	0.16	0.16	1.28	79	2.42	1.05	79	1.3	99	0.078	100	102	25.0	-0.1	395	77	77	75	-0.046	10	0.1
17	2.715	2.702	0.16	0.16	1.28	79	2.42	1.05	79	1.3	99	0.078	101	101	25.0	0	394	77	77	74	-0.045	8.4	0
18	2.875	2.861	0.16	0.16	1.27	79	2.41	1.05	79	1.3	99	0.078	102	101	24.9	-0.1	394	77	77	74	-0.045	8.6	0
19	3.034	3.020	0.16	0.16	1.27	79	2.42	1.05	79	1.3	99	0.078	101	101	24.8	-0.1	394	77	77	75	-0.045	9.6	0.1
20	3.192	3.179	0.16	0.16	1.27	80	2.42	1.05	79	1.3	99	0.078	100	101	24.7	-0.1	394	77	77	74	-0.045	9.2	0.1
21	3.353	3.339	0.16	0.16	1.31	80	2.46	1.04	79	1.3	99	0.078	102	102	24.6	-0.1	394	77	77	75	-0.045	10.5	0.2
22	3.514	3.497	0.16	0.16	1.30	80	2.46	1.04	79	1.3	99	0.078	102	101	24.6	0	392	77	77	74	-0.045	7	0
23	3.674	3.656	0.16	0.16	1.30	80	2.48	1.04	79	1.3	99	0.078	101	101	24.5	-0.1	393	77	77	75	-0.045	10.4	0.2
24	3.835	3.815	0.16	0.16	1.30	80	2.48	1.04	80	1.3	99	0.078	102	101	24.4	-0.1	394	78	77	75	-0.045	10.1	0.2
25	3.996	3.973	0.16	0.16	1.29	80	2.49	1.04	80	1.3	99	0.078	102	101	24.3	-0.1	395	78	77	74	-0.046	9.9	0.1
26	4.156	4.132	0.16	0.16	1.29	80	2.49	1.04	80	1.3	99	0.078	101	101	24.2	-0.1	395	78	77	74	-0.045	8.9	0
27	4.316	4.290	0.16	0.16	1.28	80	2.5	1.03	80	1.3	99	0.078	101	101	24.1	-0.1	394	78	77	74	-0.045	9	0.1
28	4.477	4.448	0.16	0.16	1.29	81	2.5	1.04	80	1.3	99	0.078	102	101	24.0	-0.1	393	78	77	74	-0.045	8.7	0.1
29	4.637	4.608	0.16	0.16	1.29	81	2.49	1.03	80	1.3	99	0.078	101	102	23.9	-0.1	393	78	77	74	-0.045	9.5	0.1
30	4.798	4.765	0.16	0.16	1.28	81	2.51	1.03	80	1.3	99	0.078	102	100	23.8	-0.1	393	78	77	74	-0.045	9.6	0.2
31	4.958	4.923	0.16	0.16	1.29	81	2.51	1.03	80	1.3	99	0.078	101	101	23.8	0	393	78	77	74	-0.045	8.4	0
32	5.118	5.082	0.16	0.16	1.29	81	2.51	1.03	81	1.3	99	0.078	101	101	23.7	-0.1	394	78	77	74	-0.045	9.2	0.1
33	5.278	5.240	0.16	0.16	1.28	81	2.52	1.03	81	1.3	99	0.078	101	100	23.6	-0.1	394	78	77	75	-0.046	8.8	0
34	5.438	5.399	0.16	0.16	1.28	81	2.53	1.03	81	1.3	99	0.078	101	101	23.5	-0.1	395	78	77	75	-0.045	9.8	0.1

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
35	5.598	5.556	0.16	0.16	1.28	81	2.53	1.03	81	1.3	99	0.078	101	100	23.4	-0.1	395	78	77	74	-0.045	9.3	0.1
36	5.757	5.714	0.16	0.16	1.28	82	2.53	1.03	81	1.3	99	0.078	100	100	23.4	0	394	78	77	74	-0.045	8.7	0
37	5.918	5.872	0.16	0.16	1.28	82	2.53	1.02	81	1.3	99	0.078	102	100	23.3	-0.1	394	78	77	75	-0.045	8.9	0.1
38	6.078	6.029	0.16	0.16	1.27	82	2.54	1.02	81	1.3	99	0.078	101	100	23.2	-0.1	394	78	77	75	-0.045	9.3	0.1
39	6.236	6.187	0.16	0.16	1.28	82	2.54	1.02	81	1.3	99	0.078	100	100	23.1	-0.1	394	78	77	74	-0.045	9.7	0.1
40	6.396	6.344	0.16	0.16	1.27	82	2.55	1.02	81	1.3	99	0.078	101	100	23.0	-0.1	394	78	77	74	-0.045	9	0.1
41	6.556	6.505	0.16	0.16	1.27	82	2.55	1.08	82	1.4	99	0.078	101	102	22.9	-0.1	393	78	77	74	-0.045	8.1	0
42	6.715	6.668	0.16	0.16	1.27	82	2.56	1.08	82	1.4	99	0.078	100	103	22.9	0	392	78	77	74	-0.045	8.4	0
43	6.874	6.829	0.16	0.16	1.27	82	2.56	1.08	82	1.4	99	0.078	100	102	22.8	-0.1	393	78	77	74	-0.045	9.9	0.1
44	7.034	6.990	0.16	0.16	1.27	82	2.57	1.08	82	1.4	99	0.078	101	102	22.7	-0.1	394	78	77	74	-0.045	9.4	0.1
45	7.193	7.152	0.16	0.16	1.26	82	2.57	1.07	82	1.4	99	0.078	100	103	22.6	-0.1	394	78	77	74	-0.045	9.8	0.1
46	7.351	7.314	0.16	0.16	1.26	82	2.57	1.07	82	1.4	99	0.078	100	103	22.5	-0.1	395	78	77	75	-0.045	10.6	0.2
47	7.510	7.474	0.16	0.16	1.26	83	2.57	1.07	82	1.4	99	0.078	100	101	22.4	-0.1	394	78	77	74	-0.045	8.1	0
48	7.669	7.636	0.16	0.16	1.25	83	2.58	1.07	82	1.4	99	0.078	100	103	22.3	-0.1	395	78	77	74	-0.046	9.9	0.1
49	7.827	7.797	0.16	0.16	1.25	83	2.59	1.07	82	1.4	99	0.078	99	102	22.2	-0.1	395	78	77	74	-0.046	9.4	0.1
50	7.986	7.958	0.16	0.16	1.25	83	2.59	1.06	82	1.4	99	0.078	100	102	22.2	0	395	78	77	74	-0.045	9.3	0.1
51	8.145	8.118	0.16	0.16	1.25	83	2.59	1.07	82	1.4	99	0.078	100	101	22.0	-0.2	396	78	77	74	-0.045	9.8	0.1
52	8.303	8.279	0.16	0.16	1.24	83	2.6	1.07	83	1.4	99	0.078	99	102	22.0	0	395	78	77	74	-0.045	8.8	0
53	8.461	8.440	0.16	0.16	1.25	83	2.6	1.06	83	1.4	99	0.078	99	102	21.9	-0.1	394	78	77	74	-0.045	7.7	0
54	8.623	8.601	0.16	0.16	1.33	83	2.72	1.06	83	1.4	99	0.078	102	102	21.8	-0.1	394	78	77	75	-0.045	9.6	0.1
55	8.786	8.761	0.16	0.16	1.33	83	2.73	1.06	83	1.5	100	0.078	103	101	21.7	-0.1	397	78	77	74	-0.045	11.1	0.3
56	8.949	8.922	0.16	0.16	1.32	83	2.73	1.06	83	1.5	100	0.078	103	102	21.6	-0.1	396	78	77	74	-0.046	9.4	0.1
57	9.112	9.081	0.16	0.16	1.32	83	2.73	1.06	83	1.4	99	0.078	103	101	21.5	-0.1	395	78	77	74	-0.045	7.7	0
58	9.275	9.242	0.16	0.16	1.32	83	2.74	1.05	83	1.5	99	0.078	103	102	21.5	0	395	78	77	75	-0.045	9.7	0.1
59	9.437	9.402	0.16	0.16	1.32	83	2.74	1.05	83	1.5	99	0.078	102	101	21.4	-0.1	394	78	77	74	-0.046	9.5	0.1
60	9.600	9.562	0.16	0.16	1.32	83	2.74	1.05	83	1.5	99	0.078	103	101	21.3	-0.1	395	78	77	75	-0.045	9.9	0.2
61	9.764	9.721	0.16	0.16	1.49	84	2.33	1.05	83	1.5	97	0.078	103	100	21.2	-0.1	388	78	77	74	-0.045	9	0
62	9.930	9.882	0.17	0.16	1.33	84	2.46	1.05	83	1.5	96	0.078	104	102	21.2	0	377	79	77	74	-0.044	5	0.1
63	10.094	10.041	0.16	0.16	1.33	84	2.45	1.05	83	1.5	96	0.078	103	100	21.2	0	369	79	77	74	-0.043	6.1	0
64	10.257	10.201	0.16	0.16	1.32	84	2.45	1.05	83	1.5	96	0.078	102	101	21.1	-0.1	361	79	77	74	-0.042	5	0
65	10.420	10.362	0.16	0.16	1.32	84	2.45	1.05	83	1.5	95	0.078	102	102	21.1	0	354	79	77	74	-0.040	4.3	0
66	10.583	10.521	0.16	0.16	1.32	84	2.46	1.05	83	1.5	95	0.078	102	100	21.1	0	348	79	77	74	-0.041	4.3	0
67	10.746	10.681	0.16	0.16	1.32	84	2.46	1.05	83	1.5	94	0.078	102	101	21.0	-0.1	344	79	77	74	-0.039	5.5	0
68	10.909	10.842	0.16	0.16	1.33	84	2.45	1.05	83	1.5	94	0.078	102	101	21.0	0	338	79	77	74	-0.038	4.2	0
69	11.072	11.001	0.16	0.16	1.33	84	2.46	1.05	83	1.5	94	0.078	102	100	20.9	-0.1	334	78	77	74	-0.039	5	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
70	11.236	11.161	0.16	0.16	1.33	84	2.46	1.05	83	1.5	94	0.078	103	101	20.9	0	329	78	77	75	-0.037	3.4	0
71	11.400	11.321	0.16	0.16	1.32	84	2.46	1.05	83	1.5	93	0.078	103	101	20.9	0	323	78	77	74	-0.037	3.7	0
72	11.563	11.481	0.16	0.16	1.33	84	2.46	1.05	83	1.5	93	0.078	102	101	20.8	-0.1	320	78	77	74	-0.036	4.8	0
73	11.726	11.641	0.16	0.16	1.32	84	2.47	1.05	83	1.5	93	0.078	102	101	20.8	0	317	78	77	75	-0.036	4.5	0
74	11.889	11.801	0.16	0.16	1.32	84	2.46	1.05	84	1.5	93	0.078	102	101	20.8	0	314	78	77	74	-0.036	4.2	0
75	12.052	11.960	0.16	0.16	1.32	84	2.46	1.05	84	1.5	92	0.078	102	100	20.7	-0.1	311	78	77	74	-0.036	4	0
76	12.215	12.120	0.16	0.16	1.33	84	2.46	1.05	84	1.5	92	0.078	102	100	20.7	0	308	78	77	74	-0.034	4.6	0
77	12.378	12.281	0.16	0.16	1.32	84	2.45	1.05	84	1.5	92	0.078	102	101	20.7	0	304	78	77	75	-0.034	3.3	0
78	12.542	12.440	0.16	0.16	1.33	84	2.46	1.05	84	1.5	91	0.078	102	100	20.6	-0.1	300	78	77	74	-0.033	3.4	0
79	12.706	12.600	0.16	0.16	1.33	84	2.46	1.05	84	1.5	91	0.078	102	100	20.6	0	296	78	77	74	-0.033	3	0
80	12.869	12.761	0.16	0.16	1.33	84	2.46	1.05	84	1.5	91	0.078	102	101	20.6	0	295	78	77	75	-0.033	4.1	0
81	13.032	12.920	0.16	0.16	1.33	84	2.46	1.05	84	1.5	91	0.078	102	100	20.5	-0.1	296	78	77	74	-0.033	5.3	0
82	13.195	13.080	0.16	0.16	1.32	84	2.46	1.05	84	1.5	91	0.078	102	100	20.5	0	293	78	77	75	-0.032	3.3	0.1
83	13.359	13.241	0.16	0.16	1.32	84	2.46	1.04	84	1.5	91	0.078	102	101	20.4	-0.1	292	77	77	74	-0.032	4	0
84	13.521	13.400	0.16	0.16	1.33	84	2.46	1.04	84	1.5	90	0.078	101	100	20.4	0	286	78	77	74	-0.031	2.5	0.1
85	13.685	13.560	0.16	0.16	1.33	84	2.46	1.05	84	1.5	91	0.078	102	100	20.4	0	285	77	77	74	-0.031	4.7	0
86	13.848	13.720	0.16	0.16	1.32	84	2.47	1.04	84	1.5	90	0.078	102	100	20.3	-0.1	284	77	77	74	-0.032	3.9	0
87	14.012	13.879	0.16	0.16	1.33	84	2.46	1.05	84	1.5	90	0.078	102	100	20.3	0	286	77	77	74	-0.032	5.1	0
88	14.175	14.039	0.16	0.16	1.32	85	2.46	1.05	84	1.5	90	0.078	101	100	20.2	-0.1	285	77	77	74	-0.031	3.8	0.1
89	14.339	14.200	0.16	0.16	1.32	84	2.47	1.05	84	1.5	90	0.078	102	101	20.2	0	285	77	77	74	-0.032	4.4	0
90	14.502	14.359	0.16	0.16	1.32	85	2.46	1.05	84	1.5	90	0.078	101	100	20.2	0	287	77	77	74	-0.031	4.4	0
91	14.665	14.519	0.16	0.16	1.33	85	2.47	1.05	84	1.5	90	0.078	101	100	20.1	-0.1	285	77	77	74	-0.031	3.1	0.1
92	14.828	14.679	0.16	0.16	1.32	85	2.47	1.05	84	1.5	90	0.078	101	100	20.1	0	286	77	77	74	-0.032	4.2	0
93	14.991	14.838	0.16	0.16	1.33	85	2.46	1.04	84	1.5	90	0.078	101	100	20.1	0	288	77	76	74	-0.031	5	0
94	15.155	14.998	0.16	0.16	1.32	85	2.46	1.05	84	1.5	90	0.078	102	100	20.0	-0.1	287	77	76	74	-0.032	3	0.1
95	15.318	15.159	0.16	0.16	1.33	85	2.47	1.05	84	1.5	90	0.078	101	101	20.0	0	288	77	76	74	-0.031	5.2	0
96	15.482	15.318	0.16	0.16	1.32	85	2.47	1.05	84	1.5	90	0.078	102	100	20.0	0	288	77	76	74	-0.032	3.9	0
97	15.646	15.477	0.16	0.16	1.33	85	2.46	1.05	84	1.5	90	0.078	102	100	19.9	-0.1	286	77	76	74	-0.031	3.5	0
98	15.809	15.638	0.16	0.16	1.32	85	2.46	1.05	84	1.5	90	0.078	101	101	19.9	0	285	77	76	74	-0.031	4.3	0
99	15.972	15.797	0.16	0.16	1.32	85	2.46	1.05	84	1.5	90	0.078	101	100	19.8	-0.1	284	77	76	74	-0.032	3.3	0
100	16.135	15.957	0.16	0.16	1.32	85	2.46	1.04	84	1.5	90	0.078	101	100	19.8	0	286	77	76	74	-0.032	4.4	0
101	16.298	16.117	0.16	0.16	1.33	85	2.47	1.04	84	1.5	90	0.078	101	100	19.8	0	283	77	76	74	-0.030	2.8	0.1
102	16.462	16.276	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	102	100	19.7	-0.1	280	77	76	74	-0.031	2.8	0
103	16.625	16.436	0.16	0.16	1.32	85	2.46	1.04	84	1.5	90	0.078	101	100	19.7	0	280	77	76	74	-0.030	3.9	0
104	16.789	16.596	0.16	0.16	1.33	85	2.47	1.04	84	1.5	90	0.078	102	100	19.6	-0.1	283	77	76	74	-0.032	4.7	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
105	16.953	16.755	0.16	0.16	1.31	85	2.47	1.04	84	1.5	90	0.078	102	100	19.6	0	285	77	76	74	-0.031	4.9	0
106	17.116	16.914	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.6	0	283	77	76	74	-0.030	3.7	0.1
107	17.279	17.075	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	101	19.6	0	283	77	76	74	-0.031	4	0
108	17.442	17.234	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.5	-0.1	285	77	76	74	-0.031	4.9	0
109	17.605	17.393	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.5	0	285	77	76	74	-0.031	4.9	0
110	17.768	17.554	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	101	19.5	0	282	77	76	74	-0.030	3.2	0.1
111	17.932	17.713	0.16	0.16	1.32	85	2.46	1.04	84	1.5	90	0.078	102	100	19.4	-0.1	281	77	76	74	-0.031	3	0
112	18.095	17.872	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.4	0	281	77	76	74	-0.031	3.9	0
113	18.259	18.032	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	102	100	19.3	-0.1	285	77	76	75	-0.032	6	0
114	18.422	18.191	0.16	0.16	1.32	85	2.47	1.05	84	1.5	90	0.078	101	100	19.3	0	286	77	76	74	-0.032	4.7	0
115	18.586	18.351	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	102	100	19.2	-0.1	287	77	76	74	-0.031	4.9	0
116	18.749	18.511	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.2	0	279	77	76	74	-0.030	1.6	0.2
117	18.912	18.670	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.2	0	278	77	76	74	-0.031	3.4	0
118	19.075	18.830	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.1	-0.1	282	77	76	74	-0.031	5.3	0
119	19.238	18.989	0.16	0.16	1.32	85	2.46	1.04	84	1.5	90	0.078	101	100	19.1	0	281	77	76	74	-0.030	3.1	0.1
120	19.402	19.148	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	102	100	19.1	0	281	77	76	74	-0.030	4	0
121	19.566	19.308	0.16	0.16	1.33	85	2.47	1.04	84	1.5	90	0.078	102	100	19.0	-0.1	281	77	76	74	-0.030	4.8	0
122	19.729	19.467	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.0	0	280	77	76	74	-0.030	3.3	0
123	19.892	19.626	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	19.0	0	281	77	76	74	-0.031	4.4	0
124	20.055	19.787	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	101	18.9	-0.1	284	77	76	74	-0.031	5.3	0
125	20.218	19.945	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	99	18.9	0	284	77	76	75	-0.031	3.9	0
126	20.381	20.104	0.16	0.16	1.32	85	2.47	1.04	84	1.5	90	0.078	101	100	18.8	-0.1	283	77	76	74	-0.030	3	0.1
127	20.545	20.264	0.16	0.16	1.33	85	2.47	1.04	84	1.5	90	0.078	102	100	18.9	0.1	280	77	76	74	-0.029	3.8	0
128	20.708	20.423	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	101	99	18.8	-0.1	273	77	76	75	-0.029	1.5	0.1
129	20.872	20.583	0.16	0.16	1.33	85	2.48	1.04	85	1.5	90	0.078	102	100	18.8	0	275	77	76	74	-0.030	4.1	0
130	21.035	20.742	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	101	99	18.7	-0.1	277	77	76	74	-0.030	4.1	0
131	21.198	20.901	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	101	99	18.7	0	278	77	77	74	-0.030	4.8	0
132	21.362	21.061	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	102	100	18.7	0	276	77	76	74	-0.030	3.2	0.1
133	21.524	21.220	0.16	0.16	1.32	85	2.47	1.03	85	1.5	90	0.078	101	99	18.6	-0.1	277	77	76	74	-0.030	4.6	0
134	21.688	21.379	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	102	99	18.6	0	276	77	77	75	-0.030	3.3	0.1
135	21.851	21.539	0.16	0.16	1.33	85	2.47	1.04	85	1.5	90	0.078	101	100	18.6	0	277	77	77	75	-0.029	4.5	0
136	22.014	21.697	0.16	0.16	1.32	85	2.47	1.03	85	1.5	90	0.078	101	99	18.5	-0.1	276	77	77	75	-0.030	3.1	0.1
137	22.178	21.857	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	102	100	18.5	0	279	77	77	75	-0.030	5	0
138	22.341	22.017	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	101	100	18.4	-0.1	279	77	77	75	-0.030	3.4	0
139	22.504	22.175	0.16	0.16	1.32	85	2.47	1.03	85	1.5	90	0.078	101	99	18.4	0	282	77	77	75	-0.031	4.9	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.24	30.23	30.22	30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
140	22.668	22.334	0.16	0.16	1.31	85	2.47	1.04	85	1.5	90	0.078	102	99	18.3	-0.1	283	77	77	75	-0.031	4.4	0
141	22.830	22.494	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	101	100	18.3	0	284	77	77	75	-0.031	4.8	0
142	22.994	22.652	0.16	0.16	1.33	85	2.48	1.04	85	1.5	90	0.078	102	99	18.3	0	282	77	77	75	-0.031	3.9	0
143	23.157	22.812	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	101	100	18.2	-0.1	282	77	77	75	-0.031	3.8	0
144	23.320	22.971	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	18.2	0	281	77	77	75	-0.031	3.4	0.1
145	23.483	23.130	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	101	99	18.2	0	281	77	77	75	-0.030	3.8	0
146	23.647	23.290	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	102	100	18.1	-0.1	281	77	77	75	-0.031	4.2	0
147	23.810	23.448	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	18.1	0	283	77	77	75	-0.031	4.2	0
148	23.974	23.607	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	102	99	18.0	-0.1	283	77	77	75	-0.031	3.7	0
149	24.136	23.767	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	100	18.1	0.1	279	77	77	75	-0.029	2.3	0.1
150	24.300	23.925	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	102	99	18.0	-0.1	280	77	77	75	-0.030	4.8	0
151	24.463	24.084	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	101	99	18.0	0	280	77	77	75	-0.030	4.2	0
152	24.626	24.244	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	100	17.9	-0.1	278	77	77	75	-0.030	2.8	0.1
153	24.789	24.403	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.9	0	280	77	77	75	-0.031	4.4	0
154	24.953	24.562	0.16	0.16	1.32	85	2.48	1.04	85	1.5	90	0.078	102	99	17.8	-0.1	281	77	77	75	-0.030	4.6	0
155	25.116	24.721	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.8	0	282	77	77	75	-0.030	4.3	0
156	25.280	24.880	0.16	0.16	1.31	85	2.48	1.04	85	1.5	90	0.078	102	99	17.8	0	278	77	77	74	-0.030	2.8	0.1
157	25.443	25.039	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.7	-0.1	278	77	77	75	-0.031	3.5	0
158	25.606	25.198	0.16	0.16	1.32	85	2.49	1.03	85	1.5	90	0.078	101	99	17.7	0	282	77	77	75	-0.030	4.9	0
159	25.769	25.357	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.7	0	277	77	77	75	-0.029	2.6	0.1
160	25.932	25.516	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.6	-0.1	279	77	77	75	-0.030	4.4	0
161	26.095	25.674	0.16	0.16	1.32	85	2.48	1.03	85	1.5	90	0.078	101	99	17.6	0	281	77	77	75	-0.030	4.7	0
162	26.259	25.833	0.16	0.16	1.32	85	2.47	1.04	85	1.5	90	0.078	102	99	17.5	-0.1	279	77	77	75	-0.030	2.9	0.1
163	26.422	25.993	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	101	100	17.5	0	277	77	77	75	-0.029	3.4	0
164	26.585	26.151	0.16	0.16	1.32	86	2.49	1.03	85	1.5	90	0.078	101	99	17.5	0	279	77	77	75	-0.031	4.3	0
165	26.748	26.311	0.16	0.16	1.31	86	2.49	1.03	85	1.5	90	0.078	101	100	17.4	-0.1	279	77	77	75	-0.031	3.6	0
166	26.911	26.469	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	101	99	17.4	0	283	77	77	75	-0.031	5.8	0
167	27.074	26.628	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	101	99	17.4	0	282	77	77	75	-0.030	3.3	0.1
168	27.237	26.787	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	101	99	17.3	-0.1	277	77	77	75	-0.029	2.2	0.1
169	27.401	26.946	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	102	99	17.3	0	276	77	77	75	-0.030	3.4	0
170	27.564	27.104	0.16	0.16	1.32	86	2.49	1.03	85	1.5	90	0.078	101	99	17.3	0	278	77	77	75	-0.029	4.5	0
171	27.728	27.264	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	102	100	17.2	-0.1	278	77	77	75	-0.030	4	0
172	27.891	27.422	0.16	0.16	1.31	86	2.48	1.03	85	1.5	90	0.078	101	99	17.2	0	278	77	77	75	-0.031	2.9	0.1
173	28.054	27.582	0.16	0.16	1.32	86	2.49	1.03	85	1.5	90	0.078	101	100	17.2	0	281	77	77	75	-0.030	5.4	0
174	28.217	27.739	0.16	0.16	1.31	86	2.48	1.03	85	1.5	90	0.078	101	98	17.1	-0.1	281	78	77	75	-0.030	4	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
175	28.380	27.898	0.16	0.16	1.32	86	2.48	1.03	85	1.5	91	0.078	101	100	17.1	0	281	78	77	75	-0.031	3.3	0.1
176	28.543	28.058	0.16	0.16	1.32	86	2.48	1.03	85	1.5	90	0.078	101	100	17.1	0	279	77	77	75	-0.030	2.7	0.1
177	28.706	28.216	0.16	0.16	1.32	86	2.49	1.03	85	1.5	90	0.078	101	99	17.0	-0.1	276	77	77	75	-0.030	2.6	0.1
178	28.870	28.375	0.16	0.16	1.31	86	2.49	1.03	85	1.5	90	0.078	102	99	17.0	0	279	78	77	75	-0.031	4.8	0
179	29.033	28.534	0.16	0.16	1.32	86	2.48	1.02	85	1.5	90	0.078	101	99	17.0	0	278	78	77	75	-0.030	3	0.1
180	29.195	28.692	0.16	0.16	1.28	86	2.44	1.05	85	1.5	91	0.078	101	99	16.9	-0.1	278	78	77	75	-0.030	4.3	0
181	29.356	28.853	0.16	0.16	1.28	86	2.44	1.05	85	1.5	87	0.078	100	100	16.9	0	267	77	77	75	-0.031	3.9	0
182	29.517	29.014	0.16	0.16	1.28	86	2.45	1.04	85	1.5	86	0.078	100	100	16.9	0	254	77	77	75	-0.029	4.5	0
183	29.678	29.173	0.16	0.16	1.28	86	2.45	1.05	85	1.5	85	0.078	100	99	16.8	-0.1	244	77	77	75	-0.028	3.3	0
184	29.840	29.334	0.16	0.16	1.28	86	2.45	1.05	85	1.5	84	0.078	100	100	16.8	0	236	77	77	75	-0.027	2.9	0
185	30.000	29.495	0.16	0.16	1.27	86	2.45	1.04	85	1.5	84	0.078	99	100	16.8	0	233	77	77	75	-0.026	5	0
186	30.161	29.654	0.16	0.16	1.28	86	2.45	1.05	85	1.5	84	0.078	99	99	16.8	0	229	77	77	75	-0.026	3.8	0
187	30.322	29.815	0.16	0.16	1.28	86	2.45	1.05	85	1.5	84	0.078	99	100	16.7	-0.1	225	77	77	75	-0.025	2.8	0
188	30.483	29.975	0.16	0.16	1.28	86	2.45	1.05	85	1.5	83	0.078	99	99	16.7	0	223	77	77	75	-0.025	4.5	0
189	30.644	30.135	0.16	0.16	1.27	86	2.46	1.05	85	1.5	83	0.078	99	99	16.7	0	222	77	77	75	-0.025	4.8	0
190	30.804	30.295	0.16	0.16	1.27	86	2.46	1.05	85	1.5	83	0.078	99	99	16.7	0	219	77	77	75	-0.024	2.2	0.1
191	30.965	30.457	0.16	0.16	1.26	86	2.44	1.09	85	1.6	83	0.078	99	101	16.6	-0.1	216	77	77	75	-0.024	3.1	0
192	31.125	30.620	0.16	0.16	1.26	86	2.44	1.08	85	1.6	83	0.078	99	101	16.6	0	216	77	77	75	-0.024	3.9	0
193	31.285	30.783	0.16	0.16	1.25	86	2.44	1.09	85	1.6	83	0.078	99	101	16.6	0	213	77	77	75	-0.023	2.9	0.1
194	31.444	30.946	0.16	0.16	1.26	86	2.44	1.09	85	1.6	83	0.078	98	101	16.6	0	213	77	77	75	-0.024	5	0
195	31.603	31.110	0.16	0.16	1.26	86	2.44	1.09	85	1.6	82	0.078	98	102	16.6	0	212	77	77	75	-0.023	4.2	0
196	31.764	31.274	0.16	0.16	1.26	86	2.44	1.09	85	1.6	82	0.078	99	102	16.5	-0.1	210	77	77	75	-0.023	3.2	0
197	31.923	31.437	0.16	0.16	1.26	86	2.44	1.08	85	1.6	82	0.078	98	101	16.5	0	211	77	77	75	-0.023	5	0
198	32.082	31.600	0.16	0.16	1.26	86	2.44	1.09	85	1.6	83	0.078	98	101	16.5	0	211	77	77	75	-0.023	5.1	0
199	32.241	31.763	0.16	0.16	1.26	86	2.45	1.09	85	1.6	83	0.078	98	101	16.5	0	210	76	77	75	-0.023	3.4	0
200	32.401	31.926	0.16	0.16	1.26	86	2.45	1.09	85	1.6	83	0.078	99	101	16.4	-0.1	210	76	77	75	-0.023	2.8	0
201	32.560	32.090	0.16	0.16	1.26	86	2.45	1.09	85	1.6	82	0.078	98	102	16.4	0	210	76	77	75	-0.023	4.3	0
202	32.720	32.253	0.16	0.16	1.25	86	2.45	1.09	85	1.6	82	0.078	99	101	16.4	0	210	76	77	75	-0.023	4.4	0
203	32.880	32.415	0.16	0.16	1.25	86	2.46	1.08	85	1.6	82	0.078	99	101	16.4	0	211	76	77	75	-0.023	5.4	0
204	33.038	32.578	0.16	0.16	1.25	86	2.45	1.09	86	1.6	82	0.078	97	101	16.3	-0.1	209	76	77	75	-0.023	3.2	0
205	33.197	32.741	0.16	0.16	1.25	86	2.45	1.09	86	1.6	82	0.078	98	101	16.3	0	209	76	77	75	-0.023	3.9	0
206	33.357	32.905	0.16	0.16	1.26	86	2.45	1.08	86	1.6	82	0.078	99	102	16.3	0	209	76	77	75	-0.023	5.3	0
207	33.516	33.067	0.16	0.16	1.25	86	2.45	1.08	86	1.6	82	0.078	98	100	16.3	0	209	76	77	75	-0.023	3.5	0
208	33.675	33.230	0.16	0.16	1.25	86	2.46	1.08	86	1.6	82	0.078	98	101	16.2	-0.1	208	76	77	76	-0.022	2.8	0
209	33.834	33.392	0.16	0.16	1.25	86	2.47	1.09	86	1.6	82	0.078	98	100	16.2	0	208	76	77	75	-0.023	3.3	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.24	30.23	30.22	30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
210	33.994	33.555	0.16	0.16	1.25	86	2.46	1.08	86	1.6	82	0.078	99	101	16.2	0	208	76	77	75	-0.022	4.8	0
211	34.152	33.719	0.16	0.16	1.25	86	2.47	1.08	86	1.6	82	0.078	97	102	16.2	0	209	76	77	75	-0.022	3.4	0
212	34.311	33.881	0.16	0.16	1.25	86	2.47	1.08	86	1.6	82	0.078	98	100	16.2	0	210	76	76	75	-0.023	5.2	0
213	34.471	34.044	0.16	0.16	1.25	86	2.46	1.08	86	1.6	82	0.078	99	101	16.1	-0.1	208	76	77	76	-0.022	2.4	0.1
214	34.630	34.206	0.16	0.16	1.24	86	2.46	1.08	86	1.6	82	0.078	98	100	16.1	0	208	76	77	75	-0.022	3.2	0
215	34.788	34.369	0.16	0.16	1.24	86	2.47	1.08	86	1.6	82	0.078	97	101	16.1	0	208	76	77	76	-0.023	4.7	0
216	34.947	34.532	0.16	0.16	1.24	86	2.48	1.08	86	1.6	82	0.078	98	101	16.1	0	209	76	77	76	-0.022	4.1	0
217	35.106	34.694	0.16	0.16	1.24	86	2.47	1.08	86	1.6	82	0.078	98	100	16.0	-0.1	209	76	77	76	-0.023	3.7	0
218	35.264	34.856	0.16	0.16	1.24	86	2.48	1.08	86	1.6	82	0.078	97	100	16.0	0	209	76	77	76	-0.022	4.4	0
219	35.423	35.019	0.16	0.16	1.24	86	2.48	1.08	86	1.6	83	0.078	98	101	16.0	0	210	76	77	76	-0.023	4.4	0
220	35.582	35.182	0.16	0.16	1.24	86	2.48	1.07	86	1.6	83	0.078	98	101	15.9	-0.1	211	76	77	76	-0.023	4.1	0
221	35.740	35.344	0.16	0.16	1.24	86	2.48	1.07	86	1.6	83	0.078	98	100	15.9	0	210	76	77	76	-0.022	2.4	0
222	35.899	35.506	0.16	0.16	1.24	86	2.48	1.08	86	1.6	83	0.078	98	100	15.9	0	209	76	77	76	-0.023	2.7	0
223	36.058	35.668	0.16	0.16	1.24	86	2.47	1.08	86	1.6	83	0.078	98	100	15.9	0	208	76	77	76	-0.022	3.4	0
224	36.216	35.831	0.16	0.16	1.24	86	2.48	1.07	86	1.6	82	0.078	97	101	15.9	0	207	76	77	76	-0.022	2.7	0
225	36.374	35.993	0.16	0.16	1.24	86	2.48	1.07	86	1.6	82	0.078	97	100	15.9	0	207	76	77	76	-0.022	4.4	0
226	36.533	36.155	0.16	0.16	1.23	86	2.48	1.07	86	1.6	83	0.078	98	100	15.8	-0.1	207	77	77	76	-0.023	4.1	0
227	36.691	36.317	0.16	0.16	1.24	86	2.48	1.08	86	1.6	83	0.078	98	100	15.8	0	207	77	77	76	-0.022	5.2	0
228	36.850	36.480	0.16	0.16	1.24	86	2.48	1.08	86	1.6	82	0.078	98	101	15.8	0	206	77	77	76	-0.022	2.4	0.1
229	37.009	36.642	0.16	0.16	1.23	86	2.49	1.07	86	1.6	82	0.078	98	100	15.7	-0.1	207	77	77	76	-0.022	6.2	0
230	37.166	36.804	0.16	0.16	1.23	86	2.49	1.07	86	1.6	83	0.078	97	100	15.7	0	207	77	77	76	-0.022	4.1	0
231	37.324	36.966	0.16	0.16	1.23	87	2.49	1.07	86	1.6	82	0.078	97	100	15.7	0	205	77	77	76	-0.022	3	0
232	37.483	37.128	0.16	0.16	1.23	87	2.49	1.07	86	1.6	82	0.078	98	100	15.7	0	206	77	77	76	-0.022	5.5	0
233	37.641	37.290	0.16	0.16	1.23	87	2.49	1.07	86	1.6	82	0.078	97	100	15.6	-0.1	206	77	77	76	-0.022	2.9	0
234	37.798	37.451	0.16	0.16	1.23	87	2.5	1.07	86	1.6	82	0.078	97	100	15.6	0	206	77	77	76	-0.022	5.1	0
235	37.957	37.613	0.16	0.16	1.23	87	2.49	1.07	86	1.6	82	0.078	98	100	15.6	0	205	77	77	76	-0.022	2.7	0
236	38.115	37.775	0.16	0.16	1.23	87	2.5	1.07	86	1.6	82	0.078	97	100	15.6	0	204	77	77	76	-0.021	3	0
237	38.272	37.937	0.16	0.16	1.23	87	2.5	1.07	86	1.6	83	0.078	97	100	15.5	-0.1	205	77	77	76	-0.022	5.2	0
238	38.431	38.099	0.16	0.16	1.22	87	2.51	1.07	86	1.6	83	0.078	98	100	15.5	0	205	77	77	76	-0.022	3.6	0
239	38.589	38.261	0.16	0.16	1.23	87	2.5	1.07	86	1.7	82	0.078	97	100	15.5	0	204	77	77	76	-0.022	3.4	0
240	38.746	38.423	0.16	0.16	1.23	87	2.5	1.07	86	1.7	83	0.078	97	100	15.5	0	204	77	77	76	-0.022	4.3	0
241	38.905	38.585	0.16	0.16	1.23	87	2.5	1.07	86	1.6	83	0.078	98	100	15.4	-0.1	205	77	77	76	-0.022	5	0
242	39.062	38.746	0.16	0.16	1.22	87	2.51	1.07	86	1.7	83	0.078	97	100	15.4	0	205	77	77	76	-0.022	3.9	0
243	39.220	38.908	0.16	0.16	1.23	87	2.5	1.07	86	1.6	83	0.078	97	100	15.4	0	205	77	77	76	-0.021	2.9	0
244	39.378	39.070	0.16	0.16	1.22	87	2.5	1.07	86	1.7	83	0.078	97	100	15.4	0	204	77	77	76	-0.022	2.9	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
245	39.535	39.231	0.16	0.16	1.23	87	2.51	1.06	86	1.7	83	0.078	97	100	15.4	0	204	77	77	76	-0.021	3.8	0
246	39.693	39.393	0.16	0.16	1.23	87	2.51	1.07	86	1.7	83	0.078	97	100	15.3	-0.1	204	77	77	76	-0.022	4	0
247	39.851	39.554	0.16	0.16	1.22	87	2.51	1.07	86	1.7	83	0.078	97	100	15.3	0	204	77	77	76	-0.021	3.6	0
248	40.008	39.716	0.16	0.16	1.27	87	2.57	1.07	86	1.7	83	0.078	97	100	15.3	0	204	77	77	76	-0.021	3	0
249	40.169	39.878	0.16	0.16	1.27	87	2.57	1.06	86	1.7	83	0.078	99	100	15.3	0	204	77	77	76	-0.021	3.3	0
250	40.330	40.038	0.16	0.16	1.27	87	2.57	1.07	86	1.7	83	0.078	99	99	15.3	0	205	77	77	76	-0.022	3.9	0
251	40.490	40.200	0.16	0.16	1.26	87	2.57	1.06	86	1.7	83	0.078	99	100	15.2	-0.1	204	77	77	76	-0.021	4	0
252	40.650	40.362	0.16	0.16	1.27	87	2.58	1.06	86	1.7	83	0.078	99	100	15.2	0	204	77	77	76	-0.022	3.4	0
253	40.810	40.523	0.16	0.16	1.27	87	2.57	1.06	86	1.7	83	0.078	99	100	15.2	0	205	77	77	76	-0.022	5.4	0
254	40.972	40.684	0.16	0.16	1.27	87	2.58	1.06	86	1.7	83	0.078	100	100	15.2	0	206	77	77	76	-0.022	3.6	0
255	41.131	40.845	0.16	0.16	1.26	87	2.58	1.06	86	1.7	83	0.078	98	100	15.1	-0.1	206	77	77	76	-0.022	4	0
256	41.291	41.007	0.16	0.16	1.26	87	2.59	1.06	86	1.7	83	0.078	99	100	15.1	0	207	77	77	77	-0.021	4.1	0
257	41.451	41.168	0.16	0.16	1.27	87	2.58	1.05	86	1.7	83	0.078	99	100	15.1	0	207	77	77	76	-0.022	3.9	0
258	41.612	41.329	0.16	0.16	1.27	87	2.59	1.06	86	1.7	83	0.078	99	100	15.0	-0.1	206	77	77	77	-0.022	2.7	0
259	41.772	41.491	0.16	0.16	1.26	87	2.59	1.05	86	1.7	83	0.078	99	100	15.0	0	207	77	77	76	-0.022	4.3	0
260	41.932	41.652	0.16	0.16	1.26	87	2.58	1.05	86	1.7	83	0.078	99	100	15.0	0	205	77	77	76	-0.021	2.3	0.1
261	42.092	41.812	0.16	0.16	1.26	87	2.59	1.06	87	1.7	83	0.078	99	99	15.0	0	205	77	77	77	-0.021	3	0
262	42.253	41.973	0.16	0.16	1.26	87	2.59	1.06	87	1.7	83	0.078	99	100	15.0	0	206	77	77	77	-0.022	4.8	0
263	42.412	42.135	0.16	0.16	1.26	87	2.6	1.06	87	1.7	83	0.078	98	100	14.9	-0.1	208	77	78	77	-0.022	5.9	0
264	42.572	42.295	0.16	0.16	1.27	87	2.59	1.05	87	1.7	83	0.078	99	99	14.9	0	208	77	78	77	-0.022	4.9	0
265	42.732	42.456	0.16	0.16	1.26	87	2.59	1.06	87	1.7	83	0.078	99	100	14.9	0	207	77	78	77	-0.022	2.4	0.1
266	42.892	42.618	0.16	0.16	1.26	87	2.59	1.06	87	1.7	83	0.078	99	100	14.9	0	207	77	78	77	-0.022	3.7	0
267	43.052	42.779	0.16	0.16	1.25	87	2.6	1.05	87	1.7	83	0.078	99	100	14.8	-0.1	206	77	78	77	-0.022	3.3	0
268	43.211	42.939	0.16	0.16	1.26	87	2.59	1.06	87	1.7	83	0.078	98	99	14.8	0	206	77	78	77	-0.022	3.4	0
269	43.372	43.100	0.16	0.16	1.26	87	2.6	1.06	87	1.7	83	0.078	99	100	14.8	0	207	77	78	77	-0.022	4.8	0
270	43.532	43.262	0.16	0.16	1.25	87	2.6	1.06	87	1.7	83	0.078	99	100	14.8	0	207	77	78	77	-0.022	3.2	0
271	43.691	43.422	0.16	0.16	1.26	87	2.6	1.06	87	1.7	83	0.078	98	99	14.7	-0.1	207	77	78	77	-0.022	4.3	0
272	43.850	43.583	0.16	0.16	1.25	87	2.6	1.06	87	1.7	83	0.078	98	100	14.7	0	207	77	78	77	-0.022	4.2	0
273	44.011	43.745	0.16	0.16	1.25	87	2.6	1.06	87	1.7	83	0.078	99	100	14.7	0	207	77	78	77	-0.022	3.4	0
274	44.171	43.905	0.16	0.16	1.25	87	2.6	1.05	87	1.7	83	0.078	99	99	14.7	0	206	77	78	77	-0.021	2.6	0
275	44.330	44.065	0.16	0.16	1.26	87	2.6	1.06	87	1.7	83	0.078	98	99	14.6	-0.1	205	77	78	77	-0.021	2.7	0
276	44.489	44.226	0.16	0.16	1.26	88	2.6	1.06	87	1.7	83	0.078	98	100	14.6	0	205	77	78	76	-0.021	3.9	0
277	44.650	44.388	0.16	0.16	1.26	88	2.6	1.05	87	1.7	83	0.078	99	100	14.6	0	205	77	78	77	-0.021	3.3	0
278	44.809	44.548	0.16	0.16	1.25	88	2.61	1.05	87	1.7	83	0.078	98	99	14.6	0	204	77	78	77	-0.021	3.8	0
279	44.969	44.709	0.16	0.16	1.26	87	2.61	1.05	87	1.7	83	0.078	99	100	14.6	0	204	77	78	77	-0.021	3.2	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.24	30.23	30.22	30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
280	45.129	44.870	0.16	0.16	1.26	88	2.61	1.05	87	1.7	83	0.078	98	100	14.6	0	204	77	78	77	-0.021	3	0
281	45.289	45.030	0.16	0.16	1.25	88	2.61	1.05	87	1.7	83	0.078	98	99	14.5	-0.1	204	77	78	77	-0.021	3.9	0
282	45.448	45.191	0.16	0.16	1.25	88	2.6	1.06	87	1.7	83	0.078	98	100	14.5	0	204	77	78	77	-0.021	4.1	0
283	45.609	45.352	0.16	0.16	1.29	88	2.66	1.06	87	1.7	83	0.078	99	100	14.5	0	203	77	78	77	-0.021	2.9	0
284	45.771	45.513	0.16	0.16	1.30	88	2.66	1.05	87	1.7	83	0.078	100	100	14.5	0	203	77	78	77	-0.021	4.1	0
285	45.934	45.673	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	100	99	14.4	-0.1	204	77	78	77	-0.021	5.1	0
286	46.095	45.833	0.16	0.16	1.28	88	2.67	1.05	87	1.7	83	0.078	99	99	14.4	0	205	77	78	77	-0.022	4.1	0
287	46.257	45.994	0.16	0.16	1.28	88	2.66	1.05	87	1.7	83	0.078	100	100	14.4	0	205	77	78	77	-0.022	4	0
288	46.418	46.154	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	99	99	14.4	0	206	77	78	77	-0.021	4.7	0
289	46.580	46.315	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	100	100	14.3	-0.1	204	78	78	77	-0.021	3	0
290	46.742	46.476	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	100	100	14.3	0	204	77	78	77	-0.021	3.1	0
291	46.904	46.636	0.16	0.16	1.29	88	2.66	1.05	87	1.7	83	0.078	100	99	14.3	0	203	78	78	77	-0.021	3.6	0
292	47.066	46.797	0.16	0.16	1.28	88	2.68	1.05	87	1.7	83	0.078	100	100	14.3	0	202	78	78	77	-0.021	2.5	0
293	47.227	46.958	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	99	100	14.2	-0.1	203	78	78	77	-0.021	3.8	0
294	47.389	47.118	0.16	0.16	1.28	88	2.68	1.05	87	1.7	83	0.078	100	99	14.2	0	203	78	78	77	-0.021	4.3	0
295	47.550	47.278	0.16	0.16	1.29	88	2.67	1.05	87	1.7	83	0.078	99	99	14.2	0	202	78	78	77	-0.021	2.8	0
296	47.713	47.439	0.16	0.16	1.28	88	2.68	1.05	87	1.7	83	0.078	100	100	14.2	0	202	78	78	77	-0.021	3.8	0
297	47.874	47.600	0.16	0.16	1.28	88	2.68	1.04	87	1.7	83	0.078	99	100	14.2	0	204	78	78	77	-0.022	4.7	0
298	48.035	47.759	0.16	0.16	1.28	88	2.68	1.05	87	1.7	83	0.078	99	98	14.1	-0.1	206	78	78	77	-0.022	5.6	0
299	48.196	47.920	0.16	0.16	1.28	88	2.69	1.04	87	1.7	83	0.078	99	100	14.1	0	205	78	78	77	-0.022	2.8	0.1
300	48.358	48.080	0.16	0.16	1.28	88	2.69	1.05	87	1.7	83	0.078	100	99	14.1	0	204	78	78	77	-0.021	3.2	0
301	48.520	48.240	0.16	0.16	1.28	88	2.69	1.05	87	1.7	83	0.078	100	99	14.1	0	205	78	78	77	-0.022	4.1	0
302	48.681	48.400	0.16	0.16	1.27	88	2.7	1.05	87	1.7	83	0.078	99	99	14.0	-0.1	206	78	78	77	-0.022	4.5	0
303	48.842	48.561	0.16	0.16	1.27	88	2.69	1.04	87	1.7	83	0.078	99	100	14.0	0	206	78	78	77	-0.022	4.4	0
304	49.003	48.721	0.16	0.16	1.28	88	2.69	1.04	87	1.7	83	0.078	99	99	14.0	0	206	78	78	77	-0.021	3.6	0
305	49.164	48.880	0.16	0.16	1.28	88	2.7	1.04	87	1.7	83	0.078	99	98	14.0	0	206	78	78	77	-0.022	3.7	0
306	49.326	49.041	0.16	0.16	1.27	88	2.7	1.04	87	1.7	83	0.078	100	100	13.9	-0.1	206	78	78	77	-0.022	3.6	0
307	49.487	49.201	0.16	0.16	1.28	88	2.7	1.04	87	1.7	83	0.078	99	99	13.9	0	206	78	78	77	-0.022	4.3	0
308	49.648	49.361	0.16	0.16	1.28	88	2.7	1.04	87	1.7	83	0.078	99	99	13.9	0	205	78	78	77	-0.022	3.2	0
309	49.809	49.521	0.16	0.16	1.27	88	2.7	1.04	87	1.7	83	0.078	99	99	13.9	0	205	78	78	77	-0.021	3.6	0
310	49.970	49.681	0.16	0.16	1.28	88	2.7	1.04	87	1.7	83	0.078	99	99	13.9	0	204	78	78	77	-0.022	2.5	0
311	50.131	49.841	0.16	0.16	1.28	88	2.7	1.05	87	1.7	83	0.078	99	99	13.8	-0.1	204	78	78	77	-0.021	4.4	0
312	50.292	50.001	0.16	0.16	1.27	88	2.71	1.04	87	1.7	83	0.078	99	99	13.8	0	204	78	78	77	-0.021	3.9	0
313	50.453	50.160	0.16	0.16	1.27	88	2.71	1.04	87	1.7	83	0.078	99	98	13.8	0	203	78	78	77	-0.021	2.8	0.1
314	50.614	50.320	0.16	0.16	1.28	88	2.7	1.04	87	1.7	83	0.078	99	99	13.7	-0.1	204	78	78	77	-0.021	5.3	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
315	50.775	50.481	0.16	0.16	1.27	88	2.71	1.04	87	1.7	83	0.078	99	100	13.7	0	204	78	78	77	-0.021	3.5	0
316	50.936	50.640	0.16	0.16	1.27	88	2.71	1.04	88	1.7	83	0.078	99	98	13.7	0	203	78	78	77	-0.021	3.3	0
317	51.097	50.800	0.16	0.16	1.27	88	2.71	1.04	87	1.7	83	0.078	99	99	13.7	0	202	78	78	77	-0.021	3.2	0
318	51.257	50.960	0.16	0.16	1.27	88	2.71	1.04	87	1.7	83	0.078	98	99	13.7	0	202	78	78	77	-0.022	3.6	0
319	51.418	51.119	0.16	0.16	1.27	88	2.72	1.04	88	1.7	83	0.078	99	98	13.6	-0.1	204	78	78	77	-0.021	5.5	0
320	51.579	51.279	0.16	0.16	1.26	88	2.71	1.04	88	1.7	83	0.078	99	99	13.6	0	204	78	78	77	-0.022	3.4	0
321	51.740	51.439	0.16	0.16	1.27	88	2.72	1.04	88	1.7	83	0.078	99	99	13.6	0	204	78	78	77	-0.021	4.2	0
322	51.900	51.598	0.16	0.16	1.27	88	2.71	1.04	88	1.7	83	0.078	98	98	13.6	0	202	78	78	77	-0.021	2.3	0.1
323	52.061	51.758	0.16	0.16	1.27	88	2.72	1.04	88	1.7	83	0.078	99	99	13.5	-0.1	202	78	78	77	-0.021	3	0.1
324	52.222	51.918	0.16	0.16	1.27	88	2.72	1.04	88	1.7	83	0.078	99	99	13.5	0	203	78	78	77	-0.021	4.9	0
325	52.383	52.077	0.16	0.16	1.26	88	2.72	1.03	88	1.7	83	0.078	99	98	13.5	0	203	78	78	77	-0.021	3.8	0
326	52.543	52.237	0.16	0.16	1.27	88	2.72	1.04	88	1.7	83	0.078	98	99	13.5	0	203	78	78	77	-0.021	3.2	0
327	52.703	52.397	0.16	0.16	1.27	88	2.73	1.03	88	1.7	83	0.078	98	99	13.5	0	203	78	78	77	-0.021	3.9	0
328	52.865	52.556	0.16	0.16	1.26	88	2.73	1.04	88	1.7	83	0.078	100	98	13.4	-0.1	203	78	78	77	-0.021	3.8	0
329	53.025	52.716	0.16	0.16	1.26	88	2.72	1.04	88	1.7	83	0.078	98	99	13.4	0	202	78	78	78	-0.021	3.8	0
330	53.185	52.876	0.16	0.16	1.26	88	2.72	1.03	88	1.7	83	0.078	98	99	13.4	0	202	78	78	77	-0.021	3.8	0
331	53.345	53.034	0.16	0.16	1.27	88	2.73	1.04	88	1.7	83	0.078	98	98	13.3	-0.1	203	78	78	77	-0.022	4.6	0
332	53.506	53.194	0.16	0.16	1.27	88	2.72	1.03	88	1.7	83	0.078	99	99	13.3	0	203	78	78	78	-0.021	4.6	0
333	53.667	53.354	0.16	0.16	1.26	88	2.73	1.03	88	1.7	83	0.078	99	99	13.3	0	203	78	78	78	-0.021	3.3	0
334	53.827	53.513	0.16	0.16	1.25	88	2.73	1.04	88	1.7	83	0.078	98	98	13.3	0	203	78	78	77	-0.022	4.1	0
335	53.987	53.673	0.16	0.16	1.26	88	2.73	1.03	88	1.7	83	0.078	98	99	13.3	0	204	78	78	78	-0.021	3.7	0
336	54.148	53.832	0.16	0.16	1.26	88	2.73	1.03	88	1.7	83	0.078	99	98	13.2	-0.1	203	78	78	77	-0.021	2.4	0.1
337	54.308	53.991	0.16	0.16	1.26	88	2.73	1.03	88	1.7	83	0.078	98	98	13.2	0	202	78	78	77	-0.022	3.4	0
338	54.468	54.151	0.16	0.16	1.26	88	2.74	1.03	88	1.7	83	0.078	98	99	13.2	0	203	78	78	78	-0.022	4.1	0
339	54.628	54.309	0.16	0.16	1.26	88	2.74	1.03	88	1.7	83	0.078	98	98	13.2	0	203	78	78	77	-0.022	4.2	0
340	54.788	54.468	0.16	0.16	1.26	88	2.74	1.03	88	1.7	83	0.078	98	98	13.1	-0.1	204	78	78	78	-0.022	4.5	0
341	54.949	54.628	0.16	0.16	1.25	88	2.74	1.03	88	1.8	83	0.078	99	99	13.1	0	204	78	78	78	-0.022	4.6	0
342	55.108	54.786	0.16	0.16	1.25	88	2.74	1.03	88	1.8	83	0.078	98	98	13.1	0	203	78	78	78	-0.021	3.9	0
343	55.268	54.946	0.16	0.16	1.26	88	2.74	1.03	88	1.8	83	0.078	98	99	13.1	0	202	78	78	78	-0.021	3	0
344	55.429	55.105	0.16	0.16	1.25	89	2.75	1.02	88	1.8	83	0.078	99	98	13.0	-0.1	203	78	78	77	-0.022	3.7	0
345	55.588	55.263	0.16	0.16	1.25	89	2.75	1.03	88	1.8	83	0.078	98	98	13.0	0	202	78	78	78	-0.021	3.7	0
346	55.748	55.423	0.16	0.16	1.25	88	2.74	1.03	88	1.7	83	0.078	98	99	13.0	0	202	78	78	78	-0.021	2.5	0.1
347	55.907	55.581	0.16	0.16	1.26	88	2.75	1.02	88	1.8	83	0.078	98	98	13.0	0	202	78	78	78	-0.022	4.4	0
348	56.068	55.741	0.16	0.16	1.25	89	2.74	1.03	88	1.8	83	0.078	99	99	13.0	0	203	78	78	78	-0.022	4.2	0
349	56.228	55.900	0.16	0.16	1.24	89	2.75	1.03	88	1.8	84	0.078	98	98	13.0	0	203	78	78	77	-0.022	3.8	0

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 15-Jul-16
Beginning Clock Time: 09:30

High Burn End Time: 60
Medium Burn End Time: 180
Total Sampling Time: 360 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.999 (1) 1.005 (2) 0 (Amb)

Barometric Pressure: Begin 30.24, Middle 30.23, End 30.22, Average 30.23 "Hg

OMNI Equipment Numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 17.51 ft/sec.
Intial Tunnel Flow: 193.1 scfm
Average Tunnel Flow: 196.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -4 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -4 in. Hg
Fuel Moisture: 4.74 Dry Basis %

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.050	0.078	0.080	0.064	0.052	0.074	0.080	0.060	0.078	"H2O
Temp:	99	99	99	99	98	98	98	98	99	°F

V_{strav} 17.68 ft/sec V_{scent} 18.95 ft/sec F_p 0.933

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
350	56.387	56.058	0.16	0.16	1.25	89	2.75	1.03	88	1.8	83	0.078	98	98	12.9	-0.1	204	78	78	78	-0.022	4.2	0
351	56.547	56.217	0.16	0.16	1.25	89	2.75	1.03	88	1.8	83	0.078	98	98	12.9	0	203	78	78	78	-0.021	3.4	0
352	56.707	56.376	0.16	0.16	1.25	89	2.75	1.02	88	1.8	83	0.078	98	98	12.9	0	203	78	78	78	-0.021	3.9	0
353	56.866	56.534	0.16	0.16	1.25	89	2.76	1.03	88	1.8	84	0.078	98	98	12.8	-0.1	203	78	78	78	-0.021	3.5	0
354	57.026	56.694	0.16	0.16	1.25	89	2.76	1.02	88	1.8	83	0.078	98	99	12.8	0	204	78	78	78	-0.022	4.7	0
355	57.186	56.852	0.16	0.16	1.25	89	2.76	1.02	88	1.8	83	0.078	98	98	12.8	0	204	78	78	78	-0.022	3.9	0
356	57.345	57.011	0.16	0.16	1.25	89	2.76	1.02	88	1.8	83	0.078	98	98	12.8	0	203	78	78	78	-0.021	3.6	0
357	57.505	57.170	0.16	0.16	1.25	89	2.76	1.02	88	1.8	83	0.078	98	98	12.8	0	204	78	78	78	-0.022	4.4	0
358	57.664	57.328	0.16	0.16	1.25	89	2.76	1.02	88	1.8	84	0.078	98	98	12.7	-0.1	205	78	78	78	-0.022	4.3	0
359	57.824	57.487	0.16	0.16	1.25	89	2.76	1.02	88	1.8	84	0.078	98	98	12.7	0	207	78	78	78	-0.022	4.3	0
360	57.983	57.646	0.16	0.16	1.24	89	2.77	1.02	88	1.8	84	0.078	98	98	12.7	0	207	78	78	78	-0.022	4.3	0
Avg/Tot	57.983	57.646	0.16	0.16	1.28	85	2.54	1.05	85	1.56	88	0.08	100	100			266	77	77	75	-0.029	4.80	0.03

Pellet Heater Lab Data - ASTM E2779 / ASTM E2515

Manufacturer:	Sherwood Industries	Equipment Numbers:	23, 283A, 592
Model:	Chathem-1		
Tracking No.:	2205		
Project No.:	0268PS024E.REV001		
Run #:	1		
Date:	7/15/16		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C400	123.6	120.7	2.9
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. Filter seals catch*	Seals				0.0

Sub-Total	Total Particulate, mg:	2.9

TRAIN 1 (Remainder of Test)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C410	122.9	119.4	3.5
B. Rear filter catch	Filter	C401	120.9	120.7	0.2
C. Probe catch*	Probe	8	115595.1	115595	0.1
D. Filter seals catch*	Seals	R388	3550.1	3549.6	0.5

Sub-Total	Total Particulate, mg:	4.3
Train 1 Aggregate	Total Particulate, mg:	**7.2**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C408	127.1	120.9	6.2
B. Rear filter catch	Filter	C409	122.1	121.8	0.3
C. Probe catch*	Probe	28	114755.6	114755.4	0.2
D. Filter seals catch*	Seals	R393	3415.0	3415	0.0

	Total Particulate, mg:	6.7

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

	Total Particulate, mg:	0.0

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Pellet Heater Test Results - ASTM E2779 / ASTM E2515

Manufacturer: Sherwood Industries
Model: Chathem-1
Project No.: 0268PS024E.REV001
Tracking No.: 2205
Run: 1
Test Date: 07/15/16

Burn Rate (Composite)	**0.99 kg/hr dry**
Average Tunnel Temperature	88 degrees F
Average Gas Velocity in Dilution Tunnel - vs	17.51 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	11795.9 dscf/hour
Average Delta p	0.078 inches H20
Average Delta H	1.28 inches H20
Total Time of Test	360 minutes

Burn Rate (High)	**2.21**	kg/hr dry
Burn Rate (Med)	**0.95**	kg/hr dry
	43.1%	of High
Burn Rate (Low)	**0.61**	kg/hr dry
	27.5%	of High

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	1st HR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	57.983 cubic feet	57.646 cubic feet	9.600 cubic feet
Average Gas Meter Temperature	75 degrees F	85 degrees F	85 degrees F	81 degrees F
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	56.814 dscf	56.850 dscf	9.488 dscf
Total Particulates - m_n	0 mg	7.2 mg	6.7 mg	2.9 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00013 grams/dscf	0.00012 grams/dscf	0.00031 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	8.97 grams	8.34 grams	3.61 grams
Particulate Emission Rate	0.00 grams/hour	1.49 grams/hour	1.39 grams/hour	3.61 grams/hour
Emissisons Factor		1.51 g/kg	1.41 g/kg	1.63 g/kg
Difference from Average Total Particulate Emissions		0.31 grams	0.31 grams	

Dual Train Comparison Results Are Acceptable

FINAL AVERAGE RESULTS

Integrated Test Run	
Total Particulate Emissions - E_T	8.66 grams
Particulate Emission Rate	**1.44 grams/hour**
Emissisons Factor	1.46 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	3.61 grams
Particulate Emission Rate	3.61 grams/hour
Emissisons Factor	1.63 grams/kg

QUALITY CHECKS	
Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK
Train Precesion 7.5%	3.63
Train Precision 0.5g/kg	0.11
Medium Burn Rate < 50%	OK

Pellet Heater Preburn Data - ASTM E2779

Manufacturer: Sherwood Industries
Model: Chathem-1
Tracking No.: 2205
Project No.: 0268PS024E.REV001
Test Date: 7/15/2016

PB Length: 60 min
Recording Interval: 10 min

			Averages:	377	74	0	7	0
	Elapsed Time (min)	Scale Reading	Weight Change	Stack (F)	Ambient (F)	Draft ("H2O)	CO2 (%)	CO (%)
	0	31.5	-	349	75	-0.03	1.52	0.03
1	10	30.6	-0.9	361	75	-0.04	7.18	0.04
2	20	29.8	-0.8	369	74	-0.04	10.02	0.17
3	30	29.0	-0.8	381	74	-0.05	8.20	0.03
4	40	28.1	-0.9	389	74	-0.05	9.54	0.07
5	50	27.3	-0.8	394	74	-0.05	8.96	0.03
6	60	26.4	-0.9	396	75	-0.05	6.81	0.03
7								
8								
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OMNI-Test Laboratories

Manufacturer: Sherwood Industries
Model: Chathem-1
Date: 07/15/16
Run: 1
Control #: 0268PS024E.REV001
Test Duration: 60
Output Category: Maximum

Technicians: Bruce Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	78.7%	84.2%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	79%	84.6%

Output Rate (kJ/h)	33,875	32,134	**(Btu/h)**
Burn Rate (kg/h)	2.21	4.87	**(lb/h)**
Input (kJ/h)	43,065	40,852	**(Btu/h)**

Test Load Weight (dry kg)	2.21	4.87	**dry lb**
MC wet (%)	4.520933785		
MC dry (%)	4.74		
Particulate (g)	0		
CO (g)	22		
Test Duration (h)	1.00		

Emissions	**Particulate**	**CO**
g/MJ Output	0.00	0.65
g/kg Dry Fuel	0.00	9.96
g/h	0.00	22.01
lb/MM Btu Output	0.00	1.51

Air/Fuel Ratio (A/F)	13.17

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer: Sherwood Industries
Model: Chathem-1
Date: 7/15/2016
Run: 1
Control #: 0268PS024E.REV001
Test Duration: 60
Output Category: Maximum

Appliance Type: Pellet (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Default Fuel Values

	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Wood Moisture (% wet): 4.52
Load Weight (lb wet): 5.10
Burn Rate (dry kg/h): 2.21
Total Particulate Emissions: g

Fuel Data

	D. Fir	
HHV	19,492	kj/kg
%C	49.23	
%H	5.95	
%O	43.99	
%ASH	0.83	

Averages	0.08	9.22	#DIV/0!	391.90	74.39

Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Temp. (ºF) Flue Gas	Room Temp
0	5.10	0.10	9.40		345.0	75.0
1	5.00	0.10	9.00		361.0	75.0
2	4.90	0.10	9.30		373.0	74.0
3	4.90	0.00	8.00		380.0	75.0
4	4.80	0.00	9.00		385.0	75.0
5	4.70	0.10	9.20		388.0	75.0
6	4.60	0.10	9.40		390.0	74.0
7	4.50	0.10	9.30		392.0	75.0
8	4.40	0.00	9.00		392.0	75.0
9	4.30	0.10	10.00		394.0	75.0
10	4.30	0.00	9.10		395.0	75.0
11	4.20	0.00	8.70		394.0	75.0
12	4.10	0.10	9.30		394.0	75.0
13	4.00	0.10	9.40		395.0	74.0
14	3.90	0.00	8.60		394.0	74.0
15	3.80	0.00	9.10		395.0	74.0
16	3.70	0.10	10.00		395.0	75.0
17	3.70	0.00	8.40		394.0	74.0
18	3.60	0.00	8.60		394.0	74.0
19	3.50	0.10	9.60		394.0	75.0
20	3.40	0.10	9.20		394.0	74.0
21	3.30	0.20	10.50		394.0	75.0
22	3.30	0.00	7.00		392.0	74.0
23	3.20	0.20	10.40		393.0	75.0
24	3.10	0.20	10.10		394.0	75.0
25	3.00	0.10	9.90		395.0	74.0
26	2.90	0.00	8.90		395.0	74.0
27	2.80	0.10	9.00		394.0	74.0
28	2.70	0.10	8.70		393.0	74.0
29	2.60	0.10	9.50		393.0	74.0
30	2.50	0.20	9.60		393.0	74.0
31	2.50	0.00	8.40		393.0	74.0
32	2.40	0.10	9.20		394.0	74.0
33	2.30	0.00	8.80		394.0	75.0
34	2.20	0.10	9.80		395.0	75.0
35	2.10	0.10	9.30		395.0	74.0
36	2.10	0.00	8.70		394.0	74.0
37	2.00	0.10	8.90		394.0	75.0
38	1.90	0.10	9.30		394.0	75.0
39	1.80	0.10	9.70		394.0	74.0
40	1.70	0.10	9.00		394.0	74.0
41	1.60	0.00	8.10		393.0	74.0
42	1.60	0.00	8.40		392.0	74.0
43	1.50	0.10	9.90		393.0	74.0
44	1.40	0.10	9.40		394.0	74.0
45	1.30	0.10	9.80		394.0	74.0
46	1.20	0.20	10.60		395.0	75.0
47	1.10	0.00	8.10		394.0	74.0
48	1.00	0.10	9.90		395.0	74.0
49	0.90	0.10	9.40		395.0	74.0
50	0.90	0.10	9.30		395.0	74.0
51	0.70	0.10	9.80		396.0	74.0
52	0.70	0.00	8.80		395.0	74.0
53	0.60	0.00	7.70		394.0	74.0
54	0.50	0.10	9.60		394.0	75.0
55	0.40	0.30	11.10		397.0	74.0
56	0.30	0.10	9.40		396.0	74.0
57	0.20	0.00	7.70		395.0	74.0
58	0.20	0.10	9.70		395.0	75.0
59	0.10	0.10	9.50		394.0	74.0
60	0.00	0.20	9.90		395.0	75.0

OMNI-Test Laboratories

Manufacturer:	Sherwood Industries	**Technicians:**	Bruce Davis
Model:	Chathem-1		
Date:	07/15/16		
Run:	1		
Control #:	0268PS024E.REV001		
Test Duration:	120		
Output Category:	Medium		

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	71.8%	76.9%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	72%	77.3%

Output Rate (kJ/h)	13,340	12,655	**(Btu/h)**
Burn Rate (kg/h)	0.95	2.10	**(lb/h)**
Input (kJ/h)	18,577	17,622	**(Btu/h)**

Test Load Weight (dry kg)	1.91	4.20	**dry lb**
MC wet (%)	4.520933785		
MC dry (%)	4.74		
Particulate (g)	0		
CO (g)	17		
Test Duration (h)	2.00		

Emissions	**Particulate**	**CO**
g/MJ Output	0.00	0.63
g/kg Dry Fuel	0.00	8.85
g/h	0.00	8.44
lb/MM Btu Output	0.00	1.47

Air/Fuel Ratio (A/F)	29.81

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer: Sherwood Industries
Model: Chathem-1
Date: 7/15/2016
Run: 1
Control #: 0268PS024E.REV001
Test Duration: 120
Output Category: Medium

Appliance Type: Pellet (Cat, Non
Temp. Units F (F or C)
Weight Units lb (kg or lb)

Wood Moisture (% wet): 4.52
Load Weight (lb wet): 4.40
Burn Rate (dry kg/h): 0.95
Total Particulate Emissions: g

Fuel Data

	D. Fir	
HHV	19,492	kj/kg
%C	49.23	
%H	5.95	
%O	43.99	
%ASH	0.83	

Averages	**0.03**	**4.08**	**#DIV/0!**	**290.82**	**74.45**
				Temp. (ºF)	
Elapsed Time (min)	**Fuel Weight Remaining (lb)**	**Flue Gas Composition (%) CO**	**CO_2**	**O_2**	**Flue Gas**	**Room Temp**
0	4.40	0.20	9.90		395.0	75.0
1	4.30	0.00	9.00		388.0	74.0
2	4.30	0.10	5.00		377.0	74.0
3	4.30	0.00	6.10		369.0	74.0
4	4.20	0.00	5.00		361.0	74.0
5	4.20	0.00	4.30		354.0	74.0
6	4.20	0.00	4.30		348.0	74.0
7	4.10	0.00	5.50		344.0	74.0
8	4.10	0.00	4.20		338.0	74.0
9	4.00	0.00	5.00		334.0	74.0
10	4.00	0.00	3.40		329.0	75.0
11	4.00	0.00	3.70		323.0	74.0
12	3.90	0.00	4.80		320.0	74.0
13	3.90	0.00	4.50		317.0	75.0
14	3.90	0.00	4.20		314.0	74.0
15	3.80	0.00	4.00		311.0	74.0
16	3.80	0.00	4.60		308.0	74.0
17	3.80	0.00	3.30		304.0	75.0
18	3.70	0.00	3.40		300.0	74.0
19	3.70	0.00	3.00		296.0	74.0
20	3.70	0.00	4.10		295.0	75.0
21	3.60	0.00	5.30		296.0	74.0

22	3.60	0.10	3.30		293.0	75.0
23	3.50	0.00	4.00		292.0	74.0
24	3.50	0.10	2.50		286.0	74.0
25	3.50	0.00	4.70		285.0	74.0
26	3.40	0.00	3.90		284.0	74.0
27	3.40	0.00	5.10		286.0	74.0
28	3.30	0.10	3.80		285.0	74.0
29	3.30	0.00	4.40		285.0	74.0
30	3.30	0.00	4.40		287.0	74.0
31	3.20	0.10	3.10		285.0	74.0
32	3.20	0.00	4.20		286.0	74.0
33	3.20	0.00	5.00		288.0	74.0
34	3.10	0.10	3.00		287.0	74.0
35	3.10	0.00	5.20		288.0	74.0
36	3.10	0.00	3.90		288.0	74.0
37	3.00	0.00	3.50		286.0	74.0
38	3.00	0.00	4.30		285.0	74.0
39	2.90	0.00	3.30		284.0	74.0
40	2.90	0.00	4.40		286.0	74.0
41	2.90	0.10	2.80		283.0	74.0
42	2.80	0.00	2.80		280.0	74.0
43	2.80	0.00	3.90		280.0	74.0
44	2.70	0.00	4.70		283.0	74.0
45	2.70	0.00	4.90		285.0	74.0
46	2.70	0.10	3.70		283.0	74.0
47	2.70	0.00	4.00		283.0	74.0
48	2.60	0.00	4.90		285.0	74.0
49	2.60	0.00	4.90		285.0	74.0
50	2.60	0.10	3.20		282.0	74.0
51	2.50	0.00	3.00		281.0	74.0
52	2.50	0.00	3.90		281.0	74.0
53	2.40	0.00	6.00		285.0	75.0
54	2.40	0.00	4.70		286.0	74.0
55	2.30	0.00	4.90		287.0	74.0
56	2.30	0.20	1.60		279.0	74.0
57	2.30	0.00	3.40		278.0	74.0
58	2.20	0.00	5.30		282.0	74.0
59	2.20	0.10	3.10		281.0	74.0
60	2.20	0.00	4.00		281.0	74.0
61	2.10	0.00	4.80		281.0	74.0
62	2.10	0.00	3.30		280.0	74.0
63	2.10	0.00	4.40		281.0	74.0

64	2.00	0.00	5.30		284.0	74.0
65	2.00	0.00	3.90		284.0	75.0
66	1.90	0.10	3.00		283.0	74.0
67	2.00	0.00	3.80		280.0	74.0
68	1.90	0.10	1.50		273.0	75.0
69	1.90	0.00	4.10		275.0	74.0
70	1.80	0.00	4.10		277.0	74.0
71	1.80	0.00	4.80		278.0	74.0
72	1.80	0.10	3.20		276.0	74.0
73	1.70	0.00	4.60		277.0	74.0
74	1.70	0.10	3.30		276.0	75.0
75	1.70	0.00	4.50		277.0	75.0
76	1.60	0.10	3.10		276.0	75.0
77	1.60	0.00	5.00		279.0	75.0
78	1.50	0.00	3.40		279.0	75.0
79	1.50	0.00	4.90		282.0	75.0
80	1.40	0.00	4.40		283.0	75.0
81	1.40	0.00	4.80		284.0	75.0
82	1.40	0.00	3.90		282.0	75.0
83	1.30	0.00	3.80		282.0	75.0
84	1.30	0.10	3.40		281.0	75.0
85	1.30	0.00	3.80		281.0	75.0
86	1.20	0.00	4.20		281.0	75.0
87	1.20	0.00	4.20		283.0	75.0
88	1.10	0.00	3.70		283.0	75.0
89	1.20	0.10	2.30		279.0	75.0
90	1.10	0.00	4.80		280.0	75.0
91	1.10	0.00	4.20		280.0	75.0
92	1.00	0.10	2.80		278.0	75.0
93	1.00	0.00	4.40		280.0	75.0
94	0.90	0.00	4.60		281.0	75.0
95	0.90	0.00	4.30		282.0	75.0
96	0.90	0.10	2.80		278.0	74.0
97	0.80	0.00	3.50		278.0	75.0
98	0.80	0.00	4.90		282.0	75.0
99	0.80	0.10	2.60		277.0	75.0
100	0.70	0.00	4.40		279.0	75.0
101	0.70	0.00	4.70		281.0	75.0
102	0.60	0.10	2.90		279.0	75.0
103	0.60	0.00	3.40		277.0	75.0
104	0.60	0.00	4.30		279.0	75.0
105	0.50	0.00	3.60		279.0	75.0

106	0.50	0.00	5.80		283.0	75.0
107	0.50	0.10	3.30		282.0	75.0
108	0.40	0.10	2.20		277.0	75.0
109	0.40	0.00	3.40		276.0	75.0
110	0.40	0.00	4.50		278.0	75.0
111	0.30	0.00	4.00		278.0	75.0
112	0.30	0.10	2.90		278.0	75.0
113	0.30	0.00	5.40		281.0	75.0
114	0.20	0.00	4.00		281.0	75.0
115	0.20	0.10	3.30		281.0	75.0
116	0.20	0.10	2.70		279.0	75.0
117	0.10	0.10	2.60		276.0	75.0
118	0.10	0.00	4.80		279.0	75.0
119	0.10	0.10	3.00		278.0	75.0
120	0.00	0.00	4.30		278.0	75.0

OMNI-Test Laboratories

Manufacturer: Sherwood Industries
Model: Chathem-1
Date: 07/15/16
Run: 1
Control #: 0268PS024E.REV001
Test Duration: 180
Output Category: Minimum

Technicians: Bruce Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	78.9%	84.5%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	79%	84.9%

Output Rate (kJ/h)	9,332	8,852	**(Btu/h)**
Burn Rate (kg/h)	0.61	1.34	**(lb/h)**
Input (kJ/h)	11,822	11,214	**(Btu/h)**

Test Load Weight (dry kg)	1.82	4.01	**dry lb**
MC wet (%)	4.520933785		
MC dry (%)	4.74		
Particulate (g)	0		
CO (g)	7		
Test Duration (h)	3.00		

Emissions	**Particulate**	**CO**
g/MJ Output	0.00	0.25
g/kg Dry Fuel	0.00	3.81
g/h	0.00	2.31
lb/MM Btu Output	0.00	0.58

Air/Fuel Ratio (A/F)	32.02

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer: Sherwood Industries
Model: Chathem-1
Date: 7/15/2016
Run: 1
Control #: 0268PS024E.REV001
Test Duration: 180
Output Category: Minimum

Appliance Type: Pellet (Cat, Non
Temp. Units F (F or C)
Weight Units lb (kg or lb)

Wood Moisture (% wet): 4.52
Load Weight (lb wet): 4.20
Burn Rate (dry kg/h): 0.61
Total Particulate Emissions: g

Fuel Data

	D. Fir	
HHV	19,492	kj/kg
%C	49.23	
%H	5.95	
%O	43.99	
%ASH	0.83	

Averages	**0.01**	**3.82**	**#DIV/0!**	**207.60**	**76.51**	
				Temp. (ºF)		
Elapsed Time (min)	**Fuel Weight Remaining (lb)**	**Flue Gas Composition (%) CO**	**CO_2**	**O_2**	**Flue Gas**	**Room Temp**
0	4.20	0.00	4.30		278.0	75.0
1	4.20	0.00	3.90		267.0	75.0
2	4.20	0.00	4.50		254.0	75.0
3	4.10	0.00	3.30		244.0	75.0
4	4.10	0.00	2.90		236.0	75.0
5	4.10	0.00	5.00		233.0	75.0
6	4.10	0.00	3.80		229.0	75.0
7	4.00	0.00	2.80		225.0	75.0
8	4.00	0.00	4.50		223.0	75.0
9	4.00	0.00	4.80		222.0	75.0
10	4.00	0.10	2.20		219.0	75.0
11	3.90	0.00	3.10		216.0	75.0
12	3.90	0.00	3.90		216.0	75.0
13	3.90	0.10	2.90		213.0	75.0
14	3.90	0.00	5.00		213.0	75.0
15	3.90	0.00	4.20		212.0	75.0
16	3.80	0.00	3.20		210.0	75.0
17	3.80	0.00	5.00		211.0	75.0
18	3.80	0.00	5.10		211.0	75.0
19	3.80	0.00	3.40		210.0	75.0
20	3.70	0.00	2.80		210.0	75.0
21	3.70	0.00	4.30		210.0	75.0

22	3.70	0.00	4.40		210.0	75.0
23	3.70	0.00	5.40		211.0	75.0
24	3.60	0.00	3.20		209.0	75.0
25	3.60	0.00	3.90		209.0	75.0
26	3.60	0.00	5.30		209.0	75.0
27	3.60	0.00	3.50		209.0	75.0
28	3.50	0.00	2.80		208.0	76.0
29	3.50	0.00	3.30		208.0	75.0
30	3.50	0.00	4.80		208.0	75.0
31	3.50	0.00	3.40		209.0	75.0
32	3.50	0.00	5.20		210.0	75.0
33	3.40	0.10	2.40		208.0	76.0
34	3.40	0.00	3.20		208.0	75.0
35	3.40	0.00	4.70		208.0	76.0
36	3.40	0.00	4.10		209.0	76.0
37	3.30	0.00	3.70		209.0	76.0
38	3.30	0.00	4.40		209.0	76.0
39	3.30	0.00	4.40		210.0	76.0
40	3.20	0.00	4.10		211.0	76.0
41	3.20	0.00	2.40		210.0	76.0
42	3.20	0.00	2.70		209.0	76.0
43	3.20	0.00	3.40		208.0	76.0
44	3.20	0.00	2.70		207.0	76.0
45	3.20	0.00	4.40		207.0	76.0
46	3.10	0.00	4.10		207.0	76.0
47	3.10	0.00	5.20		207.0	76.0
48	3.10	0.10	2.40		206.0	76.0
49	3.00	0.00	6.20		207.0	76.0
50	3.00	0.00	4.10		207.0	76.0
51	3.00	0.00	3.00		205.0	76.0
52	3.00	0.00	5.50		206.0	76.0
53	2.90	0.00	2.90		206.0	76.0
54	2.90	0.00	5.10		206.0	76.0
55	2.90	0.00	2.70		205.0	76.0
56	2.90	0.00	3.00		204.0	76.0
57	2.80	0.00	5.20		205.0	76.0
58	2.80	0.00	3.60		205.0	76.0
59	2.80	0.00	3.40		204.0	76.0
60	2.80	0.00	4.30		204.0	76.0
61	2.70	0.00	5.00		205.0	76.0
62	2.70	0.00	3.90		205.0	76.0
63	2.70	0.00	2.90		205.0	76.0

64	2.70	0.00	2.90		204.0	76.0
65	2.70	0.00	3.80		204.0	76.0
66	2.60	0.00	4.00		204.0	76.0
67	2.60	0.00	3.60		204.0	76.0
68	2.60	0.00	3.00		204.0	76.0
69	2.60	0.00	3.30		204.0	76.0
70	2.60	0.00	3.90		205.0	76.0
71	2.50	0.00	4.00		204.0	76.0
72	2.50	0.00	3.40		204.0	76.0
73	2.50	0.00	5.40		205.0	76.0
74	2.50	0.00	3.60		206.0	76.0
75	2.40	0.00	4.00		206.0	76.0
76	2.40	0.00	4.10		207.0	77.0
77	2.40	0.00	3.90		207.0	76.0
78	2.30	0.00	2.70		206.0	77.0
79	2.30	0.00	4.30		207.0	76.0
80	2.30	0.10	2.30		205.0	76.0
81	2.30	0.00	3.00		205.0	77.0
82	2.30	0.00	4.80		206.0	77.0
83	2.20	0.00	5.90		208.0	77.0
84	2.20	0.00	4.90		208.0	77.0
85	2.20	0.10	2.40		207.0	77.0
86	2.20	0.00	3.70		207.0	77.0
87	2.10	0.00	3.30		206.0	77.0
88	2.10	0.00	3.40		206.0	77.0
89	2.10	0.00	4.80		207.0	77.0
90	2.10	0.00	3.20		207.0	77.0
91	2.00	0.00	4.30		207.0	77.0
92	2.00	0.00	4.20		207.0	77.0
93	2.00	0.00	3.40		207.0	77.0
94	2.00	0.00	2.60		206.0	77.0
95	1.90	0.00	2.70		205.0	77.0
96	1.90	0.00	3.90		205.0	76.0
97	1.90	0.00	3.30		205.0	77.0
98	1.90	0.00	3.80		204.0	77.0
99	1.90	0.00	3.20		204.0	77.0
100	1.90	0.00	3.00		204.0	77.0
101	1.80	0.00	3.90		204.0	77.0
102	1.80	0.00	4.10		204.0	77.0
103	1.80	0.00	2.90		203.0	77.0
104	1.80	0.00	4.10		203.0	77.0
105	1.70	0.00	5.10		204.0	77.0

106	1.70	0.00	4.10		205.0	77.0
107	1.70	0.00	4.00		205.0	77.0
108	1.70	0.00	4.70		206.0	77.0
109	1.60	0.00	3.00		204.0	77.0
110	1.60	0.00	3.10		204.0	77.0
111	1.60	0.00	3.60		203.0	77.0
112	1.60	0.00	2.50		202.0	77.0
113	1.50	0.00	3.80		203.0	77.0
114	1.50	0.00	4.30		203.0	77.0
115	1.50	0.00	2.80		202.0	77.0
116	1.50	0.00	3.80		202.0	77.0
117	1.50	0.00	4.70		204.0	77.0
118	1.40	0.00	5.60		206.0	77.0
119	1.40	0.10	2.80		205.0	77.0
120	1.40	0.00	3.20		204.0	77.0
121	1.40	0.00	4.10		205.0	77.0
122	1.30	0.00	4.50		206.0	77.0
123	1.30	0.00	4.40		206.0	77.0
124	1.30	0.00	3.60		206.0	77.0
125	1.30	0.00	3.70		206.0	77.0
126	1.20	0.00	3.60		206.0	77.0
127	1.20	0.00	4.30		206.0	77.0
128	1.20	0.00	3.20		205.0	77.0
129	1.20	0.00	3.60		205.0	77.0
130	1.20	0.00	2.50		204.0	77.0
131	1.10	0.00	4.40		204.0	77.0
132	1.10	0.00	3.90		204.0	77.0
133	1.10	0.10	2.80		203.0	77.0
134	1.00	0.00	5.30		204.0	77.0
135	1.00	0.00	3.50		204.0	77.0
136	1.00	0.00	3.30		203.0	77.0
137	1.00	0.00	3.20		202.0	77.0
138	1.00	0.00	3.60		202.0	77.0
139	0.90	0.00	5.50		204.0	77.0
140	0.90	0.00	3.40		204.0	77.0
141	0.90	0.00	4.20		204.0	77.0
142	0.90	0.10	2.30		202.0	77.0
143	0.80	0.10	3.00		202.0	77.0
144	0.80	0.00	4.90		203.0	77.0
145	0.80	0.00	3.80		203.0	77.0
146	0.80	0.00	3.20		203.0	77.0
147	0.80	0.00	3.90		203.0	77.0

148	0.70	0.00	3.80		203.0	77.0
149	0.70	0.00	3.80		202.0	78.0
150	0.70	0.00	3.80		202.0	77.0
151	0.60	0.00	4.60		203.0	77.0
152	0.60	0.00	4.60		203.0	78.0
153	0.60	0.00	3.30		203.0	78.0
154	0.60	0.00	4.10		203.0	77.0
155	0.60	0.00	3.70		204.0	78.0
156	0.50	0.10	2.40		203.0	77.0
157	0.50	0.00	3.40		202.0	77.0
158	0.50	0.00	4.10		203.0	78.0
159	0.50	0.00	4.20		203.0	77.0
160	0.40	0.00	4.50		204.0	78.0
161	0.40	0.00	4.60		204.0	78.0
162	0.40	0.00	3.90		203.0	78.0
163	0.40	0.00	3.00		202.0	78.0
164	0.30	0.00	3.70		203.0	77.0
165	0.30	0.00	3.70		202.0	78.0
166	0.30	0.10	2.50		202.0	78.0
167	0.30	0.00	4.40		202.0	78.0
168	0.30	0.00	4.20		203.0	78.0
169	0.30	0.00	3.80		203.0	77.0
170	0.20	0.00	4.20		204.0	78.0
171	0.20	0.00	3.40		203.0	78.0
172	0.20	0.00	3.90		203.0	78.0
173	0.10	0.00	3.50		203.0	78.0
174	0.10	0.00	4.70		204.0	78.0
175	0.10	0.00	3.90		204.0	78.0
176	0.10	0.00	3.60		203.0	78.0
177	0.10	0.00	4.40		204.0	78.0
178	0.00	0.00	4.30		205.0	78.0
179	0.00	0.00	4.30		207.0	78.0
180	0.00	0.00	4.30		207.0	78.0

OMNI-Test Laboratories, Inc. **ASTM E2779 Pellet Heater Run Sheets**

Client: Sherwood Ind. Project Number: 0268PS024E Rev 1 Run Number: 1

Model: Chathem Tracking Number: 2205 Date: ~~7/14/16~~ 7/15/16

Test Crew: B. Davis

OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

Pellet Heater Run Notes

Air Control Settings

High Burn Rate Target: 100%

Settings: Heat Level 5, Feed trim 5, combustion trim 2, Air slide fully closed (Pushed in)

Medium Burn Rate Target: <50%

Settings: Heat Level 2, Feed trim 2, combustion trim 2, Air slide fully closed (Pushed in)

Low Burn Rate Target: Minimum Setting

Settings: Heat Level 1, Feed trim 1, combustion trim 2, Air slide fully closed.

Additional Settings Notes:

Preburn Notes

Time	Notes
Ø	Heat Level 5, Feed trim 5, combustion trim 2. Air slide fully closed. (Pushed in)

Test Notes

Time	Notes
0930	Started test operating the stove on High, test duration 60 min.
10:30-12:30	operated @ Heat setting 2, Feed trim 2.
10:31	changed Fuel Filter for 1st hour catch.
12:30-15:30	operated @ Heat setting 1, Feed trim 1.

Pellet Moisture Content: 4.735

Technician Signature: [signature] Date: 7/15/16

OMNI-Test Laboratories, Inc. **ASTM E2779 Pellet Heater Run Sheets**

Client: Sherwood Ind. Project Number: 0268PS024E Rev 1 Run Number: 1

Model: Chathem Tracking Number: 2205 Date: ~~7/14/16~~ 7/15/16

Test Crew: B. Davis

OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

Pellet Heater Supplemental Data

Start Time: 0930 Booth #: E1

Stop Time: 1530

Stack Gas Leak Check:

Initial: good Final: good

Sample Train Leak Check:

A: 0.00 @ 4 "Hg

B: 0.00 @ "Hg 4"

Calibrations: Span Gas CO_2: 9.97 CO: 2.50

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	0928	0928	1534	1534
CO_2	0.00	10.06	-0.01	9.96
CO	0.000	2.547	0.003	2.523

Air Velocity (ft/min): Initial: 250 Final: 250

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 3"

Induced Draft: 0.0

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/13/16 Initials: DR

	Initial	Middle	Ending
P_b (in/Hg)	30.24	30.23	30.22
Ambient (°F)	75	75	78

Background Filter Volume: NA

Tunnel Traverse		
Microtector Reading	dP (in H_2O)	T(°F)
1	.050	99
2	.078	99
3	.080	99
4	.064	99
5	.052	98
6	.074	98
7	.080	98
8	.060	98
Center:		
	.078	99
Static:		
	-0.27	

Technician Signature: Date: 7/15/16

Section 4

Quality Assurance/Quality Control

QUALITY ASSURANCE/QUALITY CONTROL

OMNI follows the guidelines of ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," and the quality assurance/quality control (QA/QC) procedures found in *OMNI*'s Quality Assurance Manual.

OMNI's scope of accreditation includes, but is not limited to, the following:

- ANSI (American National Standards Institute) for certification of product to safety standards.
- To perform product safety testing by the International Accreditation Service, Inc. (formerly ICBO ES) under accreditation as a testing laboratory designated TL-130.
- To perform product safety testing as a "Certification Organization" by the Standards Council of Canada (SCC).
- Serving as a testing laboratory for the certification of wood heaters by the U.S. Environmental Protection Agency.

This report is issued within the scope of OMNI's accreditation. Accreditation certificates are available upon request.

The manufacturing facilities and quality control system for the production of the Chatham-1 at Sherwood Industries were evaluated to determine if sufficient to maintain conformance with OMNI's requirements for product certification. OMNI has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

Sample Analysis

Analysis Worksheets
Moisture Content Worksheet
Fuel Certification Label
Tared Filter, Probe, and O-Ring Data

OMNI-Test Laboratories, Inc. **ASTM E2779 Pellet Heater Run Sheets**

Client: Sherwood Ind. Project Number: 0268PS024E Rev 1 Run Number: 1

Model: Chathem Tracking Number: 2205 Date: ~~7/14/16~~ 7/15/16

Test Crew: B. Davis

OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 594, 679, 592

ASTM E2515 Lab Sheet

Assembled By:

B. Davis

Date/Time in Dessicator:

7/15/16

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
	Date: 7/18/16	Date: 7/19/16	Date:	Date:	Date:
	Time: 0830	Time: 0930	Time:	Time:	Time:
	R/H %: 9.2	R/H %: 13.6	R/H %:	R/H %:	R/H %:
	Temp: 76.8	Temp: 76.2	Temp:	Temp:	Temp:
	Audit: 500.2 100000.6	Audit: 500.1 100000.6	Audit:	Audit:	Audit:
	Initials: AM	Initials: A	Initials:	Initials:	Initials:

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A	Front Filter (60 min)	C400	120.7	123.7	123.6			
A	Rear Filter (60 Min)	NA						
A	Probe (60 Min)	NA						
A	O-Ring (60 Min)	NA						
A	Front Filter (Remainder)	C410	119.4	123.0	122.9			
A	Rear Filter	C401	120.7	121.0	120.9			
A	Probe	8	115595.0	115595.1	115595.1			
A	O-Ring Set	R388	3549.6	3550.1	3550.1			
B	Front Filter	C408	120.9	127.0	127.1			
B	Rear Filter	C409	121.8	122.7	122.1			
B	Probe	28	114755.4	114755.5	114755.6			
B	O-Ring Set	R393	3415.0	3415.0	3415.0			
BG	Filter	N/A						

Technician Signature: Date: 7/19/16

Moisture Content Worksheet

Client: Sherwood Industries
Model: Chatham
Project #: 0268PS024E Rev 1 Tracking #: 2205
Sample description: Lignetics wood pellets, PFI mill registration number 03434

Weight record:

Prior to Oven-Drying

Balance ID #: OMNI – 00023. Audit ID #: 283A 100g

Date/Time in: 7/14/16, 1500 Audit weight: 99.9980

Container: ID#: 1041 / 2021 Tare weight: 110.7963 / 102.2174

Total weight: 200.3320 / 204.3685

Material weight (total weight - container tare weight): 89.5357 / 102.1511

Post Oven-Drying

Balance ID #: OMNI - 00023

Date/Time out: 7/15/16 1500 Audit ID #: 283A 100g

Total weight: 196.3117/199.7159 Audit weight (if necessary): 99.9980

Material weight (total weight - container tare weight): 85.5154 / 97.4985

Calculations:

Sample 1

Dry basis (%) = $\frac{\text{Initial - Final}}{\text{Final}} \times 100$ $\frac{89.5357-85.5154}{85.5154} = 4.70$

Sample 2

Dry basis (%) = $\frac{\text{Initial - Final}}{\text{Final}} \times 100$ 4.77

Avg. Dry = 4.735

Method: ASTM D4442-92 Method A—Oven-Drying Method

Technician signature: Date: 7/27/2016

Reviewed by: Date: 8/01/2016


PFI GRADED FUEL
PFI Densified Fuel Grade: Premium
Mill Registration # 03434
Grade Requirements:
Density:
40–46 lbs
meter:
230– 285 in/5.84–7.25
ability:
Content (as received)
Manufacturers Guaranteed Analysis:
Hardwood/Softwood Ble
Higher Heating Value (as received)
Manufacturers Guarantees:

TARE SHEET - FILTERS

Date Placed in Dessicator: 3/4/16

Thermohygrometer ID #: 592

Cleaned By: A. Krawitz

Balance ID #: 23

Audit Weight ID #: 13

Filter ID #	Date: 3/14/16 Time: 1500 RH %: 10.1 T (°F): 70.7 Audit: 500.1	Date: 3/15/16 Time: 1276 RH %: 12.3 T (°F): 69.9 Audit: 500.2	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
C398	121.2	121.1			7/14/16	0268 PS02YE R1	1a
C399	121.1	121.2			↓	↓	↓
C400	120.7	120.7			7/15/16	0268 PS02YE R1	1b
C401	120.7	120.7			↓	↓	↓
C402	121.1	121.1			7/14/16	0268 PS 02YE R1	1a
C403	120.3	120.3			↓	↓	↓
C404	119.8	119.9			↓	↓	↓
C405	120.3	120.2			↓	↓	↓
C406	121.4	121.3			↓	↓	↓
C407	120.1	120.1			↓	↓	↓
C408	120.9	120.9			7/15/16	0268 PS02YE R1	1b
C409	~~127~~. 121.7	121.8			↓	↓	↓
C410	119.5	119.4			↓	↓	↓
C411	120.7	120.5					
C412	120.7	120.6					
	Initials: A	Initials: A	Initials:	Initials:			

Final Technician Signature: [signature]

Date: 3/15/16

O-RING TARES

Date Placed in Desiccator: 7/8/16 Technician: B Davis Balance ID # OMNI-00023

Thermo/Hygro meter ID #: OMNI-00592 Audit Weight ID # 283A (Balance audit mfr. Std.: 500 ± 0.72)

Audit Sg = 5.0000 Sg = 5.0000

O-Ring Size/ID# 47	Date: 7/11/16 Time: 1000 RH%: 16.6 T (F): 77.7 Initials: B.R	Date: 7/12/16 Time: 0935 RH%: 18.3 T (F): 76.5 Initials: BR	Date: Time: RH%: T (F): Initials:	Date: Time: RH%: T (F): Initials:	Manufacturer	Appliance	Project No.	Run No.
R363	3563.0	3563.0						
R388	3549.8	3549.6			Sherwood	Chatham	0268PS024E	16
R389	3532.7	3532.8						
R398	3415.0	3415.0			Sherwood	Chatham	0268PS024E	16
R394	3376.3	3376.2						
R397	3349.3	3349.2						

Final Technician signature: B Davis Date: 7/22/16

TARE SHEET - PROBES

Date Placed in Dessicator: 7/8/16

Thermohygrometer ID #: OMNI-00592

Cleaned By: B Davis

Balance ID #: OMNI-00023

Audit Weight ID #: 2834 100g

Probe ID #	Date: 7/11/16 Time: 1005 RH %: 16.5 T (°F): 77.7 Audit: 99.9980	Date: 7/12/16 Time: 0935 RH %: 18.3 T (°F): 76.5 Audit: 99.9980	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
6	115352.7	115352.9	✓		7/14/16	0268PS024E R1	1a
8	115595.0	115595.0	✓		7/15/16	0268PS024E R1	1b
11	114190.2	114190.0	✓		7/14/16	0268PS024E R1	1a
14	114551.8	114551.7	✓		↓	↓	↓
24	114128.6	114128.6	✓				
28	114755.5	114755.4	✓		7/15/16	0268PS024E	1b
	Initials:	Initials:	Initials:	Initials:			

Final Technician Signature: [signature]

Date: 7/27/16

Calibrations

EPA Method 28R, ASTM E2515, ASTM E2779

ID #	Lab Name/Purpose	Log Name	Attachment Type
0001	Calibration Dry Gas Meter	Gas Meter Reference Standard	Calibration Certificate
23	Scale-Analytical Balance	Mettler Analytical Balance	Calibration Certificate
131	500 mg Weight	Ohaus Weight Standard, 500 mg	Calibration Certificate
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Log
185	Platform Scale	Weigh-Tronix Platform Scale	Calibration Certificate
209	Barometer	Barometer – Princo	Equipment Record
283A	Calibration Weights	Troemner Metric Weight Standards	Calibration Certificate
335	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
336	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
410	Microtector	Dwyer Microtector	Equipment Record
594	Combustion Gas Analyzer	CAI Gas Analyzer	Equipment Record
579	Anemometer	Extech Thermal Anemometer	Calibration Certificate
592	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log

CERTIFICATE OF CALIBRATION

CUSTOMER:	**OMNI TEST LABS INC.** PORTLAND OR	**CALIBRATION DATE:**	11/05/15
PO NUMBER:	OTL-15-051	**CALIBRATION DUE:**	11/05/16
INST. MANUFACTURER:	ROCKWELL	**PROCEDURE:**	NAVAIR 17-20MG-02
INST. DESCRIPTION:	P.D. METER	**CALIBRATION FLUID:**	AIR @ 14.7 PSIA 70 F
MODEL NUMBER:	S-275	**STANDARD(S) USED:**	A4, A24, A321 DUE 06-2016
SERIAL NUMBER:	684390L	**NIST TRACE #' S:**	1329407628, 1361269184, 1390386562
RATED UNCERTAINTY:	+/- .5 % RD.	**AMBIENT CONDITIONS:**	764 mm HGA 53 % RH 70 F
UNCERTAINTY GIVEN:	TOTAL measurement uncertainty: +/- .190 % RD. K=2	**CERTIFICATE FILE #:**	426663.15

NOTES: AS RECEIVED/AS LEFT WITHIN SPECS. REFERENCE CONDITIONS ARE: 760 mm HGA 70 F **OMNI-00001**

TEST POINT NUMBER	UUT INDICATED SCFH	DM.STD. ACTUAL SCFH	CORRECTION FACTOR	K FACTOR
1	0.5514	0.55	0.99748	60.151
2	8.7683	8.75	0.99792	60.125
3	54.3679	54.27	0.99820	60.108
4	101.1836	101.02	0.99838	60.097
5	137.5749	137.38	0.99858	60.085
6	177.1385	176.92	0.99877	60.074
7	212.5234	212.24	0.99867	60.080
8	250.2787	249.92	0.99857	60.086
		AVERAGE (Y)=	0.99832083	

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NCSL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

Dick Munns Company • 10572 Calle Lee #130 • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823

Date: 11/5/2015

Approved By:

Calibration Technician:

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 03/07/2016 Rev # 15

Inspector

Certificate of Calibration

Certificate Number: **547339**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

ACCREDITED
0723.01
Calibration

PO: OTL-13-035
Order Date: 11/19/2013
Authorized By: N/A

Property #: OMNI-00131
User: N/A
Department: N/A
Make: Ohaus
Model: 500mg
Serial #: 27503
Description: Mass
Procedure: DCN 500901
Accuracy: CLASS F (±0.72mg)

Calibrated on: 12/02/2013
*Recommended Due: 12/02/2018
Environment: 20 °C 34 % RH
As Received: Within Tolerance
As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 34

Remarks: * Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired

Refer to attachment for measurement results.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
723A	Rice Lake	1mg-200g (Class O)	Mass Set	09/05/2014	540048

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 12/06/2013 Rev # 14

Inspector

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 lb

ID Number: 132

Standard Calibration Weight: 10 lb

ID Number: 256

Scale Used: MTW-150K

ID Number: 353

Date: 2/19/13 By: A. Kravitz

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	Ø

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature: Date: 2/19/13

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

OMNI-Test Laboratories, Inc.
13327 NE Airport Way
Portland, OR 97230

Report Number: OMNE0321676151027

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Weigh-Tronix	WI-127	21676	185	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.2	QC033	10/27/15	N/A	10/2016

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 300 Tol: 0.4	Test Wt: HB44 Tol: HB44	Test Wt: 500 Tol: 0.2	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 18.8°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.0	1000.0	0.16
700	700.0	700.0	0.16
500	500.0	500.0	0.13
200	200.0	200.0	0.13
100	100.0	100.0	0.11
50	50.0	50.0	0.11

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	10/28/13	10/2015	34XX

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

Report prepared/reviewed by: J. Colacchio **Date:** 10/27/15

Technician: J. Colacchio
Signature:

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy.

8 AM

Quality Control Services
Report of Services and Calibration

2340 S.E. 11TH AVENUE
PORTLAND, OR 97214
PHONE 503-236-2712

48196

Sold To: OMNI-Test Laboratories, Inc. PT ID: OMNE03
Address: PO Box 301367
City: Portland, OR 97294
Ship To: 13327 NE Airport Way Portland, OR 97230

P.O. No: OTL-15-042
Contact: Ken Morgan
Phone: 503-643-3788
Email: kmorgan@omni-test.com

No	Item	Make	Model	Serial Number	Location	Contact	Rate	Date Svc'd	Tech	Cust ID
1	Scale	Weigh-Tronix	WI127	53719	Lab	Ken Morgan	$140.00	10.27	JAC	356
2	Scale	Weigh-Tronix	WI-127	21676	Lab	Ken Morgan	$140.00	10.27	JAC	185
3	Scale	Weigh-Tronix	WI-127	42527	Lab	Ken Morgan	$140.00	10.27	JAC	288
4										
5										
6										
7										
8										
9										
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22										
23										
24										
25										

Service / Calibration Documentation Requirements

- ☐ Certificate of Calibration
- ☐ Calibration with Data
- ☒ A2LA Certificate

Received By: K. A. Morgan Date: 10-27-15

Comments: TRUCK CHARGE $80.00

1000 LBS.

PARTS

No.	Description	Part #	Qty.	@	Amt.	No.	Description	Part #	Qty.	@	Amt.

453
National
Weather
Service
Type

OMNI 00209

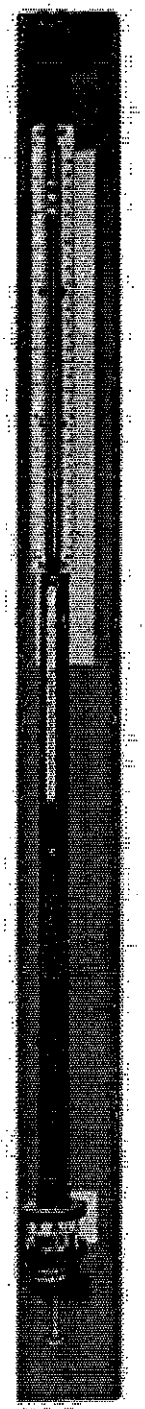
Instruction Booklet

for use with

PRINCO

Fortin type mercurial

Barometers



469
NOVA™
Economy
Model

Manufactured by

PRINCO INSTRUMENTS, INC.
1020 Industrial Blvd.
Southampton, Pa. 18966-4095
U.S.A.

Phone: 215 355-1500
Fax: 215 355-7766

Certificate of Calibration

Certificate Number: **543402**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

ACCREDITED
0723.01
Calibration

PO: **OTL-13-031**
Order Date: **09/27/2013**
Authorized By: **N/A**

Property #: **OMNI-00283A**
User: **N/A**
Department: **N/A**
Make: **Troemner Inc**
Model: **1mg-100g (Class F)**
Serial #: **47883**
Description: **Mass Set, 21 Pc.**
Procedure: **DCN 500901**
Accuracy: **Class F**

Calibrated on: **10/09/2013**
*Recommended Due: **10/09/2018**
Environment: **20** °C **41** % RH
As Received: **Other - See Remarks**
As Returned: **Within Tolerance**
Action Taken: **Calibrated**
Technician: **34**

Remarks: * Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired

Changed set from a Class 4 to a Class F per Jeremy Clark.
Received missing 1g weight.
Refer to attachment for measurement results.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
479A	Sartorius	MC210S	Scale, 210g	02/22/2014	517755
503A	Rice Lake	1mg-200g (Class O)	Mass Set	12/07/2013	517746
723A	Rice Lake	1mg-200g (Class O)	Mass Set	09/05/2014	540048

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 10/11/2013 Rev # 14

Inspector

OMNI Track #	OMNI-00335
Equipment Name/Description	Sample Box, Automated Emissions - APEX XC-60
Equipment S/N:	606001
Comments	This unit consists of 1 Dry Gas Meter, two 0-1" pressure differential gauges, and 1 thermocouple readout.
Status	Active
Part #	XC-60-EP

Reference Standard:		YES	X	NO	(Check 'X' for answer)

Location of Equipment:	E1
Calibration Vendor	OMNI in house
Type of Calibration	Six Month
Calibration Period (Months)	6
Date of Last Calibration	7/7/2016
Date of Next Calibration	1/7/2017

Do the following:

1) Complete Calibration documentation
2) Complete top half of this form
3) Attach appropriate calibration forms and save in following location
   \\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
4) Repopulate database with updated information
5) Print, laminate and adhere calibration tag to equipment

Six Month
OMNI-00335
APEX Sample Box
Y= 0.999
Last Cal Date: 7**/7/2016**
Due Date of Cal: **1/7/2017**

Six Month
OMNI-00335
APEX Sample Box
Y= 0.999
Last Cal Date: **7/7/2016**
Due Date of Cal: 1**/7/2017**

Thermal Metering System Calibration
Y Factor

Manufacturer:	APEX
Model:	XC-60-EP
Serial Number:	606001
OMNI Tracking No.:	OMNI-00335
Calibrated Orifice:	☐ Yes

Previous Calibration Comparision

Date	1/7/2016	Acceptable Deviation (5%)	Deviation
y Factor	1.001	0.05005	0.002
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.006
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	Orifice Meter dH@
0.999	N/A

Calibration Date:	07/07/16	
Calibrated by:	B. Davis	
Calibration Frequency:	Six months	
Next Calibration Due:	1/7/2017	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.04	"Hg
Signature/Date:		

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	05-Nov-15	
	Calib. Value	0.9983	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	2.25	1.30	0.75
Initial Reference Meter	900.5	906.1	913.7
Final Reference Meter	906.016	913.572	919.228
Initial DGM	0	0	0
Final DGM	5.519	7.575	5.642
Temp. Ref. Meter (°F), Tr	76.3	77.8	77.7
Temperature DGM (°F), Td	83.0	86.0	88.0
Time (min)	26.0		46.0
Net Volume Ref. Meter, Vr	5.516	7.472	5.528
Net Volume DGM, Vd	5.519	7.575	5.642
Gas Meter y Factor =	**1.005**	**0.997**	**0.995**
Gas Meter y Factor Deviation (from avg.)	0.006	0.002	0.004
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 1" W.C. ID Number: OMNI-00335 B

Calibration Instrument: Digital Manometer ID Number: OMNI-00396

Date: July 11, 2016 By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.2	0.175	0.181	0.006	0.6
20-40% Max. Range 0.2 – 0.4	0.237	0.240	0.003	0.3
40-60% Max. Range 0.4 – 0.6	0.456	0.461	0.005	0.5
60-80% Max. Range 0.6 – 0.8	0.712	0.717	0.005	0.5
80-100% Max. Range 0.8 – 1.0	0.849	0.851	0.002	0.2

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: Date: 7/11/16

Reviewed by: Date: 7/12/16

Temperature Calibration
EPA Method 28R, ASTM 2515

BOOTH:	TEMPERATURE MONITOR TYPE:	EQUIPMENT NUMBER:
E1	National Instruments Logger	00335, 00336

REFERENCE METER EQUIPMENT NUMBER:	Calibration Due Date: 7/24/16

CALIBRATION PERFORMED BY:	DATE:	AMBIENT TEMPERATURE:	BAROMETRIC PRESSURE:
B. Davis	7/7/2016	76	30.04

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	0	0	1	0	1	0	0
100	101	101	100	101	101	100	100
300	301	301	301	301	301	300	300
500	501	501	501	501	501	5000	500
700	701	701	701	701	701	700	700
1000	1001	1001	1001	1001	1001	1001	1001

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	0	0	0	0	0	1	1	1	0
100	100	100	100	100	100	101	101	101	100
300	300	300	300	300	300	301	301	301	300
500	500	500	500	500	500	501	501	501	500
700	700	700	700	700	700	701	701	701	700
1000	1001	1001	1001	1001	1001	1001	1001	1001	1001

Technician signature: _____ Date: 7/7/2016

Reviewed By: _____ Date: 7/12/16

OMNI Track #	OMNI-00336
Equipment Name/Description	Sample Box, Automated Emissions - APEX XC-60
Equipment S/N:	606002
Comments	This unit consists of 1 Dry Gas Meter, two 0-1" pressure differential gauges, and 1 thermocouple readout.
Status	Active
Part #	XC-60-EP

Reference Standard:		YES	X	NO	(Check 'X' for answer)

Location of Equipment:	E1
Calibration Vendor	OMNI in house
Type of Calibration	Six Month
Calibration Period (Months)	6
Date of Last Calibration	7/7/2016
Date of Next Calibration	1/7/2017

Do the following:

1) Complete Calibration documentation
2) Complete top half of this form
3) Attach appropriate calibration forms and save in following location
   \\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
4) Repopulate database with updated information
5) Print, laminate and adhere calibration tag to equipment

Six Month
OMNI-00336
APEX Sample Box
Y=1.005
Last Cal Date: **7/7/2016**
Due Date of Cal: **1/7/2017**

Six Month
OMNI-00336
APEX Sample Box
Y=1.005
Last Cal Date: **7/7/2016**
Due Date of Cal: **1/7/2017**

Thermal Metering System Calibration
Y Factor

Manufacturer:	APEX
Model:	XC-60-EP
Serial Number:	606002
OMNI Tracking No.:	OMNI-00336
Calibrated Orifice:	☐ Yes

Previous Calibration Comparision

Date	1/7/2016	Acceptable Deviation (5%)	Deviation
y Factor	1.001	0.05005	0.004
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.001
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	Orifice Meter dH@
1.005	N/A

Calibration Date:	07/07/16	
Calibrated by:	B. Davis	
Calibration Frequency:	Six months	
Next Calibration Due:	1/7/2017	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.04	"Hg
Signature/Date:		

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	05-Nov-15	
	Calib. Value	0.9983	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	1.95	1.00	0.06
Initial Reference Meter	919.8	925	930.3
Final Reference Meter	924.948	930.208	935.955
Initial DGM	0	0	0
Final DGM	5.145	5.243	5.721
Temp. Ref. Meter (°F), Tr	77.7	78.7	78.9
Temperature DGM (°F), Td	84.0	87.0	89.0
Time (min)	24.0	33.0	47.0
Net Volume Ref. Meter, Vr	5.148	5.208	5.655
Net Volume DGM, Vd	5.145	5.243	5.721
Gas Meter y Factor =	**1.006**	**1.004**	**1.005**
Gas Meter y Factor Deviation (from avg.)	0.001	0.001	0.000
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 1" W.C. ID Number: OMNI-00336 B

Calibration Instrument: Digital Manometer ID Number: OMNI-00396

Date: July 11, 2016 By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.2	0.155	0.151	0.004	0.4
20-40% Max. Range 0.2 – 0.4	0.338	0.332	0.006	0.6
40-60% Max. Range 0.4 – 0.6	0.487	0.480	0.007	0.7
60-80% Max. Range 0.6 – 0.8	0.635	0.628	0.007	0.7
80-100% Max. Range 0.8 – 1.0	0.837	0.831	0.006	0.6

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: Date: 7/11/16

Reviewed by: Date: 7/12/16

Temperature Calibration
EPA Method 28R, ASTM 2515

BOOTH:	TEMPERATURE MONITOR TYPE:	EQUIPMENT NUMBER:
E1	National Instruments Logger	00335, 00336

REFERENCE METER EQUIPMENT NUMBER:	Calibration Due Date: 7/24/16

CALIBRATION PERFORMED BY:	DATE:	AMBIENT TEMPERATURE:	BAROMETRIC PRESSURE:
B. Davis	7/7/2016	76	30.04

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	0	0	1	0	1	0	0
100	101	101	100	101	101	100	100
300	301	301	301	301	301	300	300
500	501	501	501	501	501	5000	500
700	701	701	701	701	701	700	700
1000	1001	1001	1001	1001	1001	1001	1001

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	0	0	0	0	0	1	1	1	0
100	100	100	100	100	100	101	101	101	100
300	300	300	300	300	300	301	301	301	300
500	500	500	500	500	500	501	501	501	500
700	700	700	700	700	700	701	701	701	700
1000	1001	1001	1001	1001	1001	1001	1001	1001	1001

Technician signature:  Date: 7/7/2016

Reviewed By:  Date: 7/12/16

JJ Calibrations, Inc.

Manufacturer: Troemner Inc.
Model: 1mg-100g (Class F)
Nomenclature: Mass Set, 21 Pc.
Serial: 47883

Certificate #: 543402
Date: 09Oct2013
Technician: 34
Calibration Interval: 60 Months

Parameter		Nominal	JJ Standard	UUT	UUT ± Limit	Uncertainty ±
Mass Verification						
Data in mg		1	0.996	1.048	0.100	0.0115
	dot	2	2.002	1.973	0.120	0.0115
		2	2.002	2.048	0.120	0.0115
		5	4.996	5.033	0.170	0.0115
		10	10.000	10.053	0.210	0.0115
	dot	20	19.999	19.966	0.260	0.0115
		20	19.999	20.069	0.260	0.0115
		50	49.998	50.018	0.350	0.0115
		100	99.998	100.144	0.430	0.0115
	dot	200	199.999	200.045	0.540	0.0115
		200	199.999	199.967	0.540	0.0115
		500	499.996	500.334	0.720	0.0115
Data in grams		1		Missing		
	dot	2	2.000000	1.999888	0.0011	0.0000394
		2	2.000000	2.000335	0.0011	0.0000394
		5	5.000002	4.999996	0.0015	0.0000395
		10	9.99998	9.99984	0.0020	0.0000580
	dot	20	19.99999	20.00100	0.0040	0.0000855
		20	19.99999	20.00079	0.0040	0.0000855
		50	49.99997	49.99949	0.0100	0.0001390
		100	99.99999	99.99802	0.0200	0.0002900

Supplement Data Sheet
Bold Italics indicates Out of Tolerance Value.

Equipment Record

Name: Microtector

Type of Equipment: Hook Gage Liquid Manometer with Micrometer Gage in Inches

Model: 1430

S/N: 115004-00 **OMNI ID #:** OMNI-00410

Manufacturer: Dwyer Instruments

Vendor/Retailer: Dwyer Instruments

Is Manufacturer's manual available in the equipment file? ☒ **Yes, if not why?**

Date Received: December 2007 **Date Placed in Service:** December 2007

Condition When Received: ☒ New ☐ Used ☐ Reconditioned

Location: shop

Location of Calibration Procedures: Calibrate prior to use using NIST Traceable standard OMNI-00033. "Zeroing" instructions in attached manual.

Location of Dates/Results of Calibrations: N/A

Location of Maintenance Procedures: Maintenance is performed on an "as needed" basis as determined by calibrations.

Dates / Results of Maintenance: Regularly scheduled maintenance is not required. Pre- and post-service maintenance is conducted per QA Manual Section 5.3.5. To date, maintenance has not been required beyond the in-service maintenance prescribed in QA Manual Section 5.3.5.

Any Planned Maintenance? ☒ **No, if yes what:**

Equipment History of any damage, malfunction, modification and/or repair (including a statement on the suitability of the equipment for testing): To date, this instrument has not been damaged, modified or repaired, nor has it malfunctioned.

OMNI Track #	OMNI-00594
Equipment Name/Description	CAI ZRE-4 Gas Analyzer
Equipment S/N:	N5F0112
Comments	CO2, O2, and dual range CO gas analyzer.
Status	Active, calibrate prior to use.
Part #	ZRE-4

Reference Standard:		YES	X	NO	(Check 'X' for answer)

Location of Equipment:	Portable gas cart.
Calibration Vendor	OMNI in house
Type of Calibration	Calibrate Prior to use.
Calibration Period (Months)	N/A
Date of Last Calibration	N/A
Date of Next Calibration	N/A

Do the following:

1) Complete Calibration documentation
2) Complete top half of this form
3) Attach appropriate calibration forms and save in following location
   \\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
4) Repopulate database with updated information
5) Print, laminate and adhere calibration tag to equipment

Verify before use
OMNI-00594
Gas Analyzer

Verify before use
OMNI-00594
Gas Analyzer

Certificate of Calibration

Certificate Number: **607778**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

PO: **150056**
Order Date: **11/20/2015**
Authorized By: **N/A**

Property #: **OMNI-00579**
User: **N/A**
Department: **N/A**
Make: **Extech**
Model: **407113**
Serial #: **A012691**
Description: **Anemometer**
Procedure: **400331 / 403614**
Accuracy: **Refer to Mfg. Specs.**

Calibrated on: **11/24/2015**
*Recommended Due: **11/24/2016**
Environment: **21 °C 37 % RH**
As Received: **Within Tolerance**
As Returned: **Within Tolerance**
Action Taken: **Calibrated**
Technician: **128**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit.

Received and returned with probes, cover, and case.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
799	TSI	5815 DP-Calc	Micromanometer	10/15/2016	604458
644A	Thunder Scientific	1200	Two Pressure Humidity Generator	02/13/2016	579240

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT
Before/After						
Air Velocity						
	ft/min	656.0	624	688	20	636 ft/min
	ft/min	1017.0	976	1058	3	1014 ft/min
	ft/min	1834.0	1774	1894	7	1841 ft/min
Temperature						
		22.80	22.0	23.6	0.3	23.1
		15.50	14.7	16.3	0.4	15.9
		29.90	29.1	30.7	0.7	30.6

Reviewer

Issued 11/25/2015 Rev # 15

Inspector

VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI- 00592 , inside OMNI desiccate box on the same shelf with the NIST traceable standard.

Step 3: After a period of not less than four hours record the temperature and humidity of both units in the spaces provide below.

Step 4: If the unit to be calibrated matches the NIST standard within ± 4%, it is acceptable. If not, the unit needs to be sent to a repair company or replaced.

Verification Data:

Date: 1/13/16 Technician: B Davis

Time in desiccate: 10:30 Recording time: 14:30

NIST Standard Temperature: 74.5 °F NIST Standard Humidity: ~~21.7~~ 19.2 (30)

Test Unit Temperature Reading: 74.4 °F Test Unit Humidity Reading: 16.8

Test unit OMNI- 00592 is X or was not ___ within acceptable limits.

Technician Signature: B Davis

Comments: Hygrometer OMNI-00291 was used to verify new unit. A difference of 2.4% RH was found, this result is within ± 4%, with a full scale of 100% for OMNI-00291, and 95% for OMNI-00592

Example Calculations

Equations and Sample Calculations – ASTM E2779 & E2515

Manufacturer:	Sherwood Industries
Model:	Chathem-1
Run:	1
Category:	[Integrated]

Equations used to calculate the parameters listed below are described in this appendix. Sample calculations are provided for each equation. The raw data and printout results from a sample run are also provided for comparison to the sample calculations.

M_{Bdb} – Weight of test fuel burned during test run, dry basis, kg

M_{BSidb} – Weight of test fuel burned during test run segment *i* , dry basis, kg

BR – Average dry burn rate over full integrated test run, kg/hr

BR_{Si} – Average dry burn rate over test run segment *i* , kg/hr

V_s – Average gas velocity Dry burn rate, kg/hr

Q_{sd} – Average gas flow ra Total particulate matter collected, mg

$V_{m(std)}$ – Volume of Gas S Volume of gas sampled corrected to standard conditions, dscf

m_n – Total Particulate Ma Average dilution tunnel gas velocity, ft/sec

C_s - Concentration of part Particulate concentration, g/dscf

E_T – Total Particulate Em Dilution tunnel gas flow rate, dscf/min

PR - Proportional Rate Va Particulate emission rate, lbs/hr

PM_R – Average particulat Total particulate emissions, grams

PM_F – Average particulat Average fuel load moisture content, %

M_{Bdb} – Weight of test fuel burned during test run, dry basis, kg
ASTM E2779 equation (1)

$$M_{Bdb} = (M_{Swb} - M_{Ewb})(100/(100 + FM))$$

Where,

FM = average fuel moisture of test fuel, % dry basis
M_{Swb} = weight of test fuel in hopper at start of test run, wet basis, kg
M_{Ewb} = weight of test fuel in hopper at end of test run, wet basis, kg

Sample Calculation:

4.7 %
M_{Swb} = 26.4 lbs
M_{Ewb} = 12.7 lbs
0.4536 = Converstion factor from lbs to kg

M_{Bdb} = [(26.4 x 0.4536) - (12.7 x 0.4536)] (100/(100 + 4.735)

M_{Bdb} = **5.9** kg

M_{BSidb} – Weight of test fuel burned during test run segment *i* , dry basis, kg
ASTM E2779 equation (2)

$$M_{BSidb} = (MS_{Siwb} - M_{ESiwb})(100/(100 + FM))$$

Where,

M_{SSiwb} = weight of test fuel in hopper at start of test run segment *i* , wet basis, kg

M_{ESiwb} = weight of test fuel in hopper at end of test run segment *i* , wet basis, kg

Sample Calculation (from medium burn rate segment):

FM = 4.7 %

M_{SSiwb} = 21.3 lbs

M_{ESiwb} = 16.9 lbs

0.4536 = Converstion factor from lbs to kg

M_{BSidb} = [(21.3 x 0.4536) - (16.9 x 0.4536)] (100/(100 + 5)

M_{BSidb} = **1.9** kg

BR – Average dry burn rate over full integrated test run, kg/hr
ASTM E2779 equation (3)

$$BR = \frac{60\ M_{Bdb}}{\theta}$$

Where,

θ = Total length of full intergrated test run, min

Sample Calculation:

M_{Bdb} = 5.93 kg

θ = 360 min

$$BR = \frac{60 \times 5.93}{360}$$

BR = **0.99** kg/hr

BR_{Si} – Average dry burn rate over test run segment *i* , kg/hr
ASTM E2779 equation (4)

$$BR_{Si} = \frac{60\ M_{BSidb}}{\theta_{Si}}$$

Where,

θ_{Si} = Total length of test run segment *i* , min

Sample Calculation (from medium burn rate segment):

M_{BSidb} = 1.91 kg

θ = 120 min

$$BR = \frac{60 \times 1.91}{120}$$

BR = **0.95** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (9)

$$V_s = F_p \times K_p \times C_P \times \left(\sqrt{\Delta P}\right)_{avg} \times \sqrt{\frac{T_s}{P_s \times M_s}}$$

Where:

F_p	=	Adjustment factor for center of tunnel pitot tube placement, Fp = $\frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)
v_{scent}	=	Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec
v_{strav}	=	Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec
k_p	=	Pitot tube constant, 85.49
C_p	=	Pitot tube coefficient: 0.99, unitless
ΔP*	=	Velocity pressure in the dilution tunnel, in H_2O
T_s	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_s	=	Absolute average gas static pressure in diltuion tunnel, = P_{bar} + P_g , in Hg
P_{bar}	=	Barometric pressure at test site, in. Hg
P_g	=	Static pressure of tunnel, in. H_20; (in Hg = in H_20/13.6)
M_s	=	**The dilution tunnel wet molecular weight; M_s = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{17.68}{18.95} = 0.933$$

$$V_s = 0.933 \times 85.49 \times 0.99 \times 0.279 \times \left(\frac{88.2 + 460}{\left(30.23 + \frac{-0.27}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **17.51** ft/s

*The ASTM test standard mistakenly has the square root of the average delta p instead of the average of the square root of delta p. The current EPA Method 2 is also incorrect. This was verified by Mike Toney at EPA.

**The ASTM test standard mistakenly identifies Ms as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr
ASTM E2515 equation (3)

$$Q_{sd} = 3600 \times (1 - B_{ws}) \times v_s \times A \times \frac{T_{std}}{T_s} \times \frac{P_s}{P_{std}}$$

Where:

3600	=	Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
B_{ws}	=	Water vapor in gas stream, proportion by volume; assume 2%
A	=	Cross sectional area of dilution tunnel, ft^2
T_{std}	=	Standard absolute temperature, 528 °R
P_s	=	Absolute average gas static pressure in diltuion tunnel, = P_{bar} + P_g , in Hg
T_s	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_{std}	=	Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 17.51 \times 0.196 \times \frac{528}{88.2 + 460} \times \frac{30.2 + \frac{-0.27}{13.6}}{29.92}$$

Q_{sd} = **11795.9** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

$$V_{m(std)} = K_1 \times V_m \times Y \times \frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}$$

Where:

K_1	=	17.64 °R/in. Hg
V_m	=	Volume of gas sample measured at the dry gas meter, dcf
Y	=	Dry gas meter calibration factor, dimensionless
P_{bar}	=	Barometric pressure at the testing site, in. Hg
ΔH	=	Average pressure differential across the orifice meter, in. H_2O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 57.983 \times 0.999 \times \frac{(30.23 + \frac{1.28}{13.6})}{(85.4 + 460)}$$

$V_{m(std)}$ = **56.814** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 57.646 \times 1.005 \times \frac{(30.23 + \frac{1.05}{13.6})}{(84.8 + 460)}$$

$V_{m(std)}$ = **56.850** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{(\underline{30.23} + \frac{0.00}{13.6})}{(75.5 + 460)}$$

$V_{m(std)}$ = **0.000** dscf

m_n – Total Particulate Matter Collected, mg
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg

m_f = mass of particulate matter from filters, mg

m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train 1 (first hour):

m_n = 0.0 + 2.9 + 0.0

m_n = 2.9 mg

Using equation for Train 1 (remainder):

m_n = 0.1 + 3.7 + 0.5

m_n = 4.3 mg

Train 1 Aggregate = **7.2** mg

Using equation for Train 2:

m_n = 0.2 + 6.5 + 0.0

m_n = **6.7** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dsc
ASTM E2515 equation (13)

$$C_s = K_2 \times \frac{m_n}{V_{m(std)}}$$

Where:

K_2	=	Constant, 0.001 g/mg
m_n	=	Total mass of particulate matter collected in the sampling train, mg
$V_{m(std)}$	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{7.2}{56.81}$$

C_s = **0.00013** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{6.7}{56.85}$$

C_s = **0.00012** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{0.00}$$

C_r = **0.000000** g/dscf

E_T – Total Particulate Emissions, g

ASTM E2515 equation (15)

$$E_T = (C_s - C_r) \times Q_{std} \times \theta$$

Where:

C_s	=	Concentration of particulate matter in tunnel gas, g/dscf
C_r	=	Concentration particulate matter room air, g/dscf
Q_{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

E_T = (0.000127 - 0.000000) x 11795.9 x 360 /60

E_T = 8.97 g

For Train 2

E_T = (0.000118 - 0.000000) x 11795.9 x 360 /60

E_T = 8.34 g

Average

E = 8.66 g

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.65
Train 1 difference =	0.31
Train 2 difference =	0.31

PR - Proportional Rate Variation
ASTM E2515 equation (16)

$$PR = \left[\frac{\theta \times V_{mi} \times V_s \times T_m \times T_{si}}{\theta_i \times V_m \times V_{si} \times T_{mi} \times T_s} \right] \times 100$$

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, min

V_{mi} = Volume of gas sample measured by the dry gas meter during the “ith” time interval, dcf

V_m = Volume of gas sample as measured by dry gas meter, dcf

V_{si} = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec

V_s = Average gas velocity in the dilution tunnel, ft/sec

T_{mi} = Absolute average dry gas meter temperature during the "ith" time interval, ^oR

T_m = Absolute average dry gas meter temperature, ^oR

T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, ^oR

T_s = Absolute average gas temperature in the dilution tunnel, ^oR

Sample calculation (for the first 1 minute interval of Train 1):

$$PR = \left(\frac{360 \times 0.156 \times 17.51 \times (97.0 + 460) \times (85.4 + 460)}{1 \times 57.98 \times 17.65 \times (88.2 + 460) \times (78.0 + 460)} \right) \times 100$$

PR = 99 %

PM_R – Average particulate emissions for full integrated test run, g/hr
ASTM E2779 equation (5)

$$PM_R = 60 (E_T/\theta)$$

Where,

E_T = Tota particulate emissions, grams

θ = Total length of full intergrated test run, min

Sample Calculation:

E_T (Dual train average) = 8.66 g

θ = 360 min

$PM_R = 60$ x (8.66 / 360)

PM_R = **1.44** g/hr

PM_F – Average particulate emission factor for full integrated test run, g/dry kg of fuel burned
ASTM E2779 equation (6)

$$PM_F = E_T/M_{Bdb}$$

Where,

E_T = Tota particulate emissions, grams

M_{Bdb} = Weight of test fuel burned during test run, dry basis, kg

Sample Calculation:

E_T (Dual train average) = 8.66 g

M_{Bdb} = 5.93 kg

PM_F = 8.66 / 5.93)

PM_F = **1.46** g/kg

Section 5

Labeling & Owner's Manual(s)

C-16227

DO NOT REMOVE THIS LABEL / NE RETIREZ PAS CETTE ÉTIQUETTE

0268PS024E.REV001
OMNI-Test
Laboratories

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

Ce poêle à granulés besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner`s pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner`s. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2020. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de 1.44 g/hr.

PLEASE KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

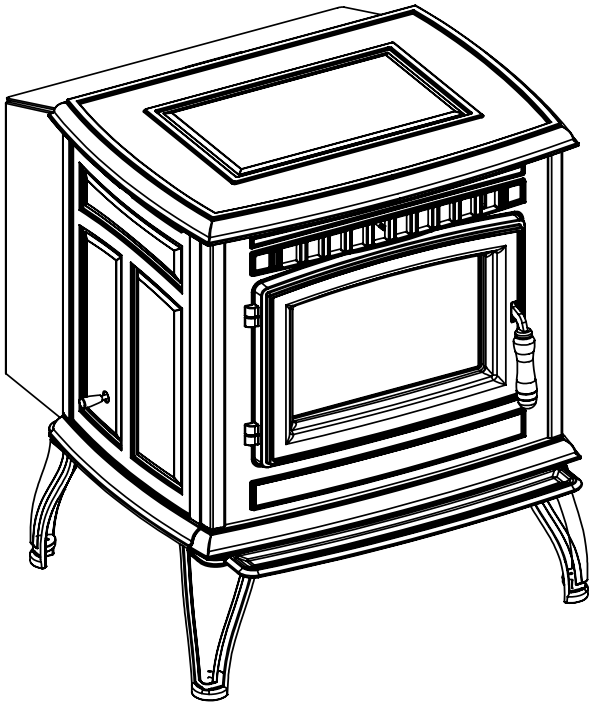
HUDSON RIVER STOVE WORKS

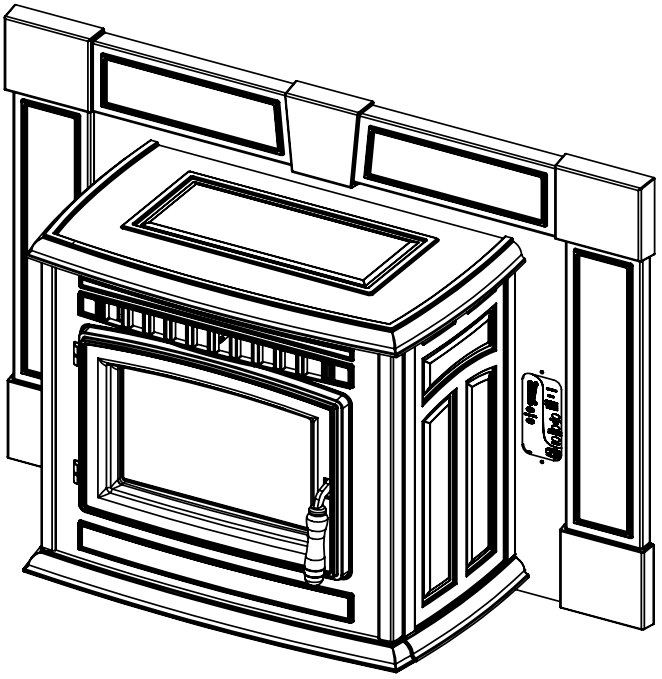
PELLET STOVE

CHATHAM-1

Freestanding and Fireplace Insert

OWNER'S MANUAL





NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We suggest that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

Contact your building or fire officials about restrictions and installation inspection requirements in your area.

US

Intertek

16621

PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS PELLET-BURNING ROOM HEATER. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

Table of Contents

Introduction

Rating Label Location:

Freestanding: The rating label is located on the inside of the hopper lid.

Insert: The rating label is located on the hopper cover.

Pellet Quality:

Pellet quality is important, please read the following:

Your Hudson River pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. The Pellet Fuel Industries (P.F.I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P.F.I. PELLET STANDARDS:

Fines (fine particles).....1% maximum through a ⅛" screen
Bulk Density.....40 pound per cubic foot minimum
Size.....¼" to 5/16" diameter ½ – 1½" long maximum
Ash Content.....1% maximum (Premium grade)
.....3% maximum (Standard grade)
Moisture Content.....8% maximum
Heat Content.....approximately 8200 Btu per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

CLINKERING: Clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the Routine Cleaning and Maintenance section of this manual.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low heat levels.

Since Hudson River Stove Works has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets at least 36" (1 m) away from the pellet stove.

Rating Label:

WH-

Serial No.

Model: Chatham-1 ☐ **FS** ☐ **FPI**

Listed Room Heater, Pelletized Fuel Type
Input rating: Wood Pellets - 8,852 to 32,134 BTU/Hr
Suitable For Mobile Home Installation. Conforms To: ASTM 1509-04.

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administrative rules 814-23-900 through 814-23-909.Install and use only in accordance with the manufacturer's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. ELECTRICAL RATING: 120 Volts, 60Hz, 3.3 Amps. Route Cord Away From Heater.

For use with pelletized solid fules only. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation 3in/75mm or 4in/100mm listed PL vent complete with components. Inspect and clean exhaust venting system frequently.

To Start Stove: Press the ON / OFF button. If the auger needs to be primed, press the FEED TRIM button.

To Operate Stove:

MANUAL MODE: When a fire has been established the stove settings are adjustable.

HIGH/LOW MODE: (Requires a thermostat) When the thermostat calls for heat the stove settings are adjustable. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat) When the thermostat contacts close, the unit will light automatically. Once up to temperature the stove settings are adjustable. When the thermostat contacts open, the stove will drop down to the LOW settings for 30 minutes. If within the 30 min the thermostat contacts close, the HEAT LEVEL will return to previous MANUAL setting or if the thermostat contacts remain open the stove begin its shutdown routine and it will restart when the thermostat closes.

To Turn Off Stove: MANUAL and HI / LOW mode: Press the ON / OFF button

AUTO / OFF mode: Turn the thermostat down or off.

DATE OF MANUFACTURE:

J F M A M J J A S O N D 2021 2022 2023

DO NOT REMOVE THIS LABEL

HUDSON RIVER STOVE WORKS

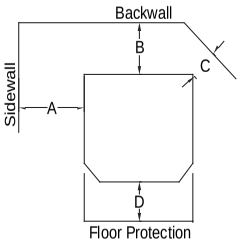
Installed as a freestanding stove - conventional or mobile home - Model FS. Minimum Clearances to Combustible Materials:

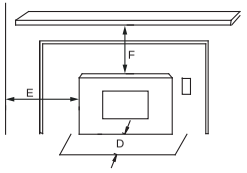
Sidewall to Unit:	A	6 in. / 152 mm
Backwall to Unit:	B	2 in. / 51 mm
Corner to Unit:	C	2 in. / 51 mm
Floor Protection:	D	9 in. / 229 mm

Installed as an insert for masonry or listed factory built wood burning fireplaces- Model FPI. Minimum Clearance to Combustible Materials:

Floor Protection:	D	9 in. / 229 mm
Sidewall to Unit:	E	9 in. / 229 mm
Unit to 10 in. / 250 mm Mantle:	F	8 in. / 203 mm

Combustible floor must be protected by a non-combustible material under the unit, extending (D) as shown.





CAUTION:

HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE BURNS. SEE NAMEPLATE AND INSTRUCTIONS.

US
Intertek
225767
Certified for use in USA

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.
U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

C-14693 R1

Emissions and Efficiencies

Emissions and Efficiency - Chatham-1:

Rates: This manual describes the installation and operation of the Hudson River Chatham-1 pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has an input rate ranging from 11,214-40,852 Btu/hr with an output ranging from 8,852-32,134 Btu/hr.

Efficiency: **HHV:** 76.7%

0268PS024E.REV001
OMNI-Test Laboratories

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet has a manufacturer set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this pellet heater in a manner inconsistent with operating instructions in this manual.

Introduction

Important Safety Data:

Please read this entire Owner's Manual before installing or operating your HUDSON RIVER Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. A HUDSON RIVER dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

Be sure to maintain the structural integrity of the home when passing a vent through walls, ceilings, or roofs.

The stove's exhaust system works with negative combustion chamber pressure (vacuum) and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

If you have any questions with regard to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

Safety Warnings And Recommendations:

Caution: Do not connect to any air distribution duct or system.
Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.
Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations. **HE USE OF CORDWOOD IS PROHIBITED BY LAW. Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.**

SOOT: Operation of the stove with insufficient combustion air will result in the formation of soot which will collect on the glass, the heat exchanger, the exhaust vent system, and may stain the outside of the house. This is a dangerous situation and is inefficient. Frequently check your stove and adjust the slider/damper as needed to ensure proper combustion. **See: "Adjusting the vacuum using the slider/damper".**

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

The appliance, flue gas connector and the chimney flue require regular cleaning. Check them for blockage prior to re-lighting after a prolonged shut down period.

Introduction

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be stored on a non-combustible floor, well away from all combustible materials pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: The use of a surge protected power bar is recommended. The unit must be grounded. The grounded electrical cord should be connected to a standard 115 volts (3.3 Amps), 60 hertz electrical outlet. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces, sharp edges, and is accessible. If this power cord should become damaged, a replacement power cord must be purchased from the manufacturer or a qualified HUDSON RIVER dealer. This unit's maximum power requirement is 400 watts.

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an HUDSON RIVER dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

FLAMMABLE LIQUIDS: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in the heater. Keep all such liquids well away from the heater while it is in use.

FIRE EXTINGUISHER AND SMOKE DETECTION: All homes with a wood burning stove should have at least one fire extinguisher in a central location known to all in the household. Smoke detectors and carbon monoxide detectors should be installed and maintained in the room containing the stove. If either sounds the alarm, correct the cause but do not deactivate. You may choose to relocate the detection devises within the room; DO NOT REMOVE THE SMOKE OR CARBON MONOXIDE DETECTORS FROM THE ROOM.

OPERATION: The ash pan, door, and hopper lid must be closed securely for proper and safe operation of the pellet stove. Ensure all gaskets and seals are checked regularly and replaced when necessary.

KEEP ASH PAN FREE OF RAW FUEL.
DO NOT PLACE UNBURNED OR NEW PELLET FUEL IN THE ASH PAN. A FIRE IN THE ASH PAN MAY OCCUR.

INSTALLATION: Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement.
DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

FRESH AIR: Outside Fresh Air connection is optional BUT MUST be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes. Consider all large air moving devices when installing your unit and provide room air accordingly. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE HUDSON RIVER STOVE WORKS HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, HUDSON RIVER STOVE WORKS GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, HUDSON RIVER STOVE WORKS ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE

Specifications

Dimensions - Freestanding:

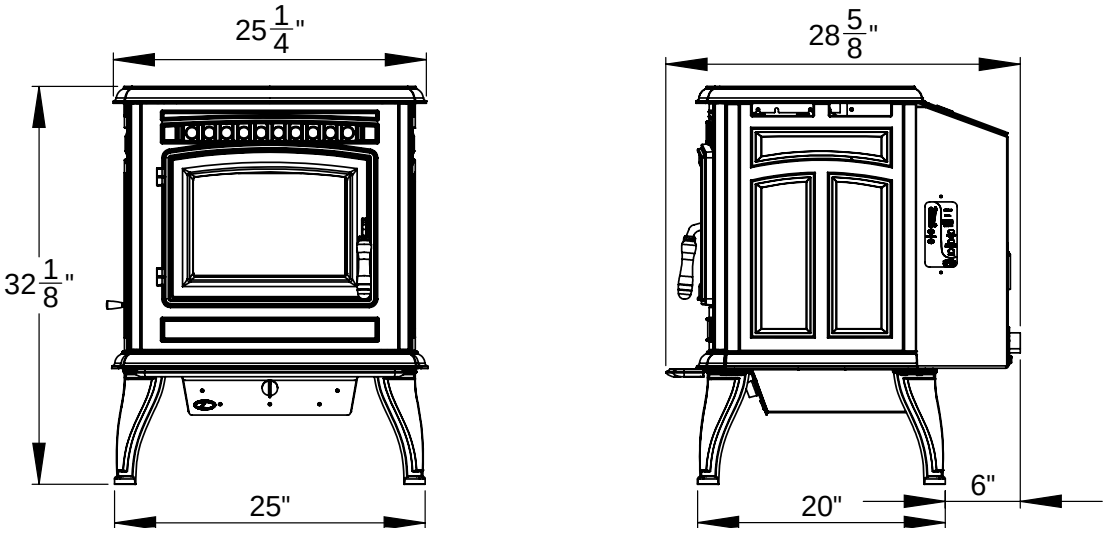


Figure 1: Chatham Freestanding Dimensions.

Dimensions - Fireplace Insert:

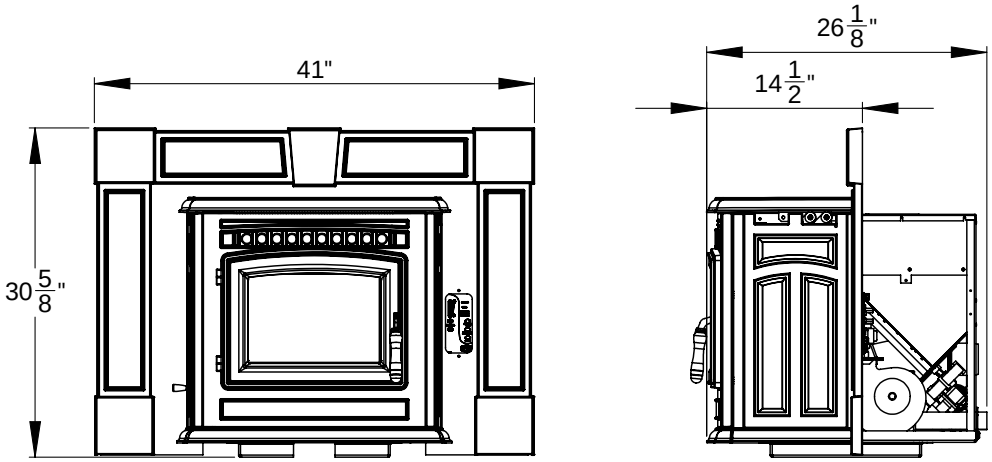


Figure 2: Chatham Fireplace Insert Dimensions.

Specifications:

Table 1: Chatham Specifications.

Description	Fuel type	
Residential Pellet Heater	6mm (¼") dia. Wood Pellets	
Voltage	Current	Max Power
110 - 120 V	3.3 Amps	400 Watts
Frequency	Hopper Capacity	Consumption on Low
60 Hz	40 lbs	1.5 lb/hr
Testing Standard	Weight** FS / FPI	Consumption on High
ASTM 1509-04	290 lbs / 300 lbs	5 lb/hr

*Consumption will vary with the type of fuel used.

**With Full Hopper.

Installation

Deciding Where to Locate your Pellet Appliance:

1. Check clearances to combustibles (see Installation - Clearances to Combustibles - Freestanding, Installation - Alcove Clearances - Freestanding, and Installation - Clearances to Combustibles - Fireplace Insert.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.

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We recommend that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training

Removing Your Pellet Stove From the Pallet:

To remove your new stove from its pallet, remove the two (2) screws securing the bottom to the pallet.

Freestanding:

1. Remove box and crate from front of unit packaging.
2. Remove the two (2) T-20 Torx screws each side of the ash box securing the hold-down brackets.
3. **IMPORTANT**: Once unit is removed from pallet, replace the screws into the ash box.

Fireplace Insert:

1. The screws are accessible from the back side of the unit.

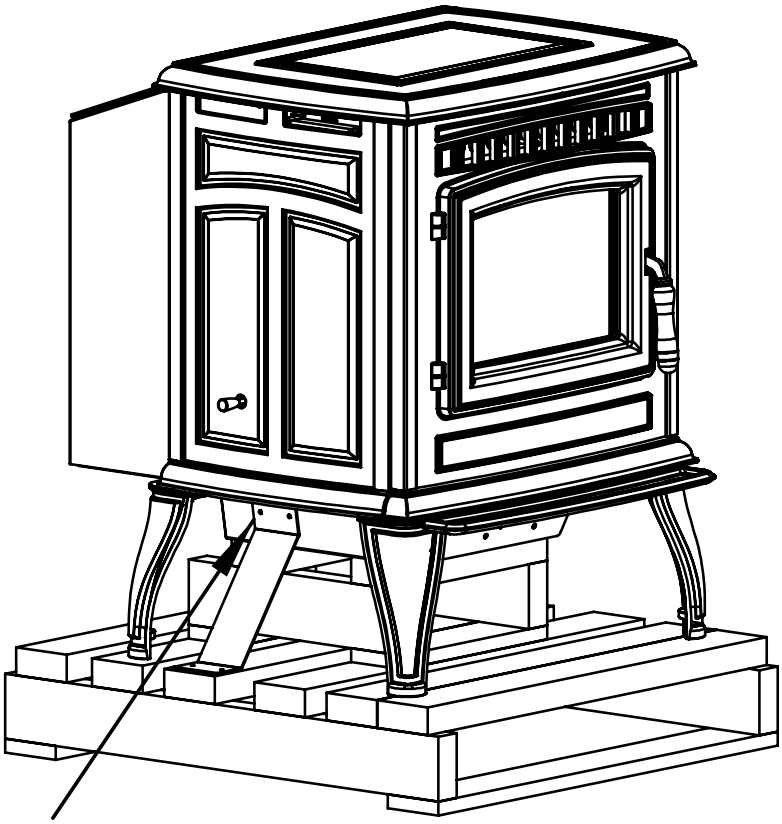


Figure 3: Removing Stove From the Pallet.

Clearances to Combustibles - Freestanding:

These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning, and maintenance.

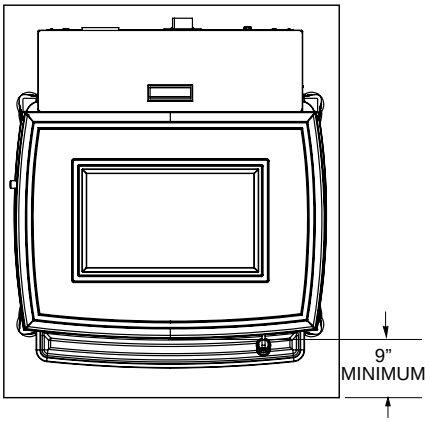


Figure 4: Chatham on Floor Protection.

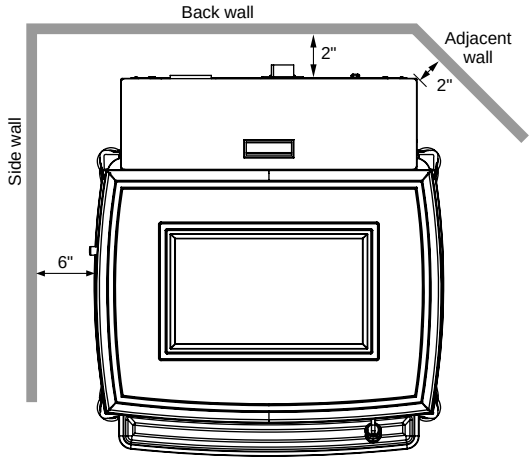


Figure 5: Minimum Clearances to Combustibles for Freestanding Chatham.

This pellet stove requires floor protection. The floor protection must be non-combustible, extending beneath the stove the full width and depth of the unit including 9“ in front for ember protection.

Alcove Clearances - Freestanding:

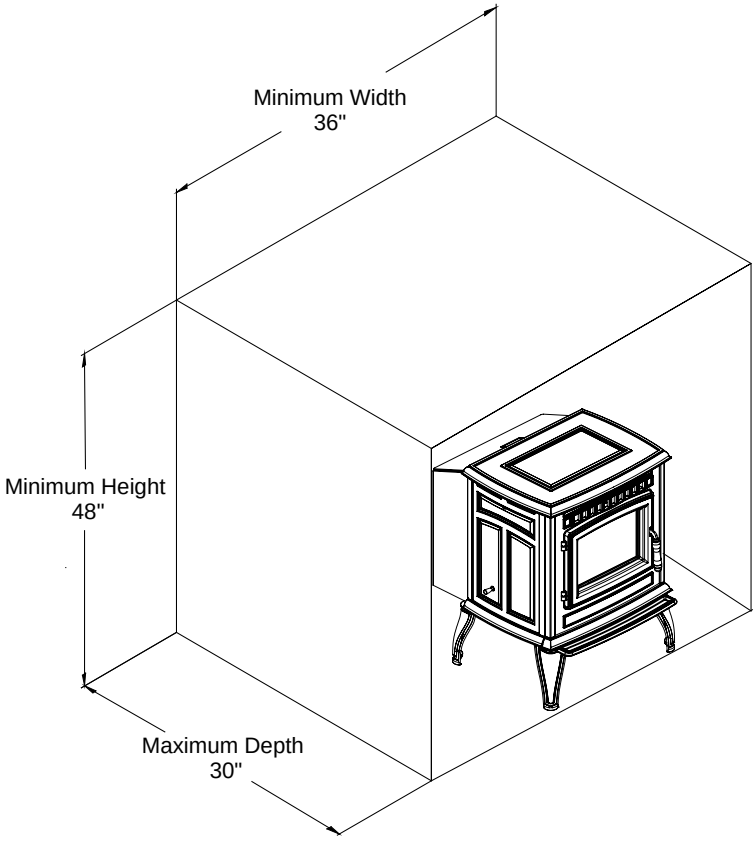


Figure 6: Alcove Clearances Freestanding Chatham.

Installation

Clearances to Combustibles - Fireplace Insert:

The fireplace insert must be installed into a masonry fireplace. This model includes a surround faceplate and a pedestal.

From the body of the heater to the side wall:	9 inches minimum
From the body of the heater to the Facing on masonry fireplace:	8 inches minimum
From the body of the heater to the 10" (203 mm) mantle:	8 inches minimum

Mobile Home Installation - Freestanding:

- Secure the heater to the floor using the holes in the legs of the appliance.
- Ensure the unit is electrically grounded to the chassis of your home (permanently).

WARNING: Do not install in a room people sleep in.

CAUTION: The structural integrity of the manufactured home floor, wall and ceiling/roof must be maintained

• Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three (3) screws evenly spaced.

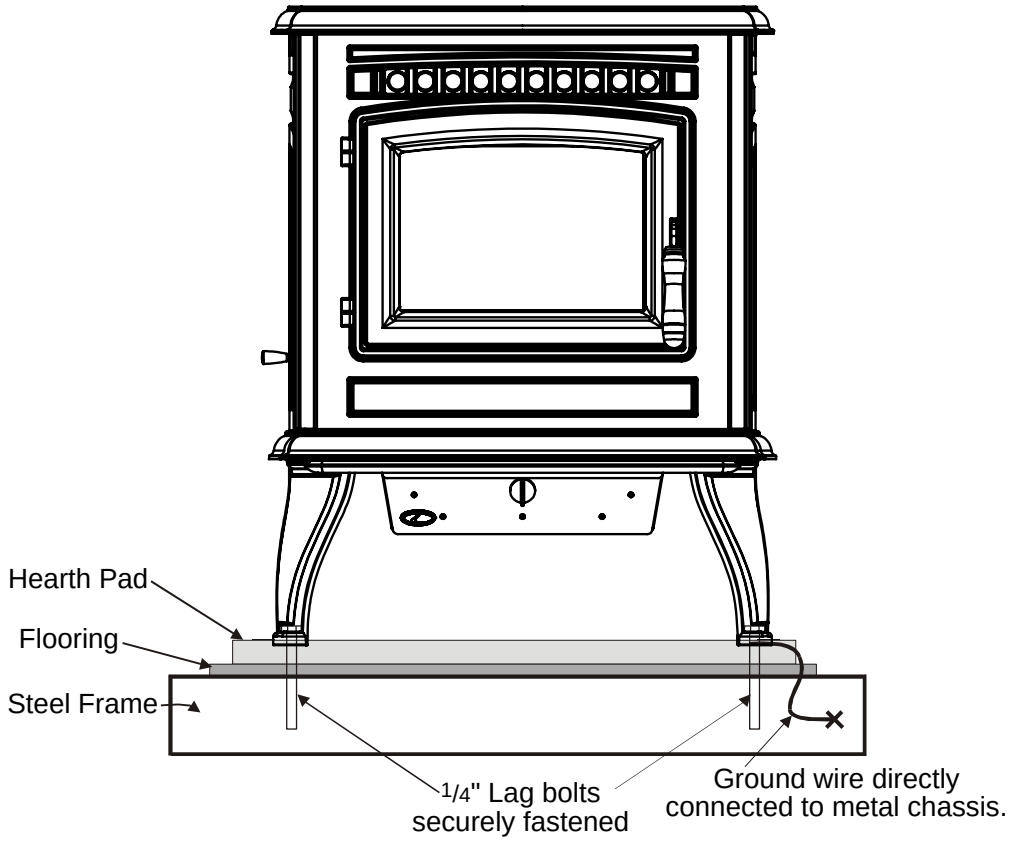


Figure 7: Mobile Home Install Mounting.

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 2: Use in conjunction with Figure 8 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	From beside/below any door or window that may be opened. (18" (46 cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/ regulator assembly	To each side of center line extended above natural gas or propane meter/ regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

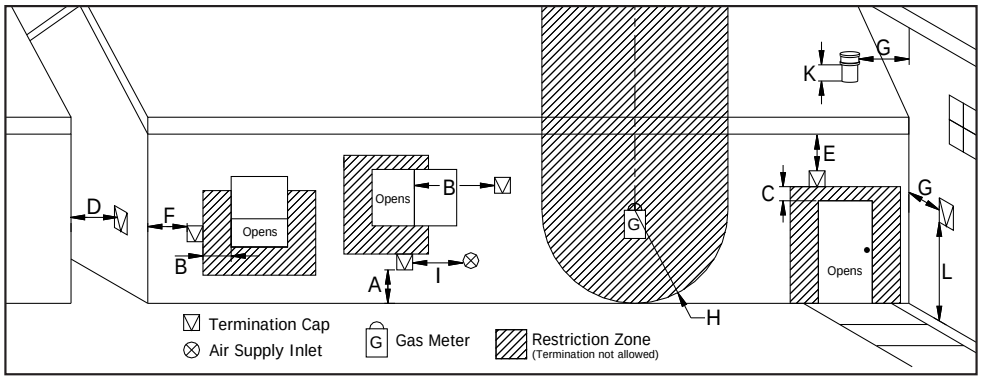


Figure 8: Use in conjunction with Table 1 for allowable exterior vent termination locations.

2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.
3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of Hudson River Stove Works, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

Exhaust And Fresh Air Intake Locations:

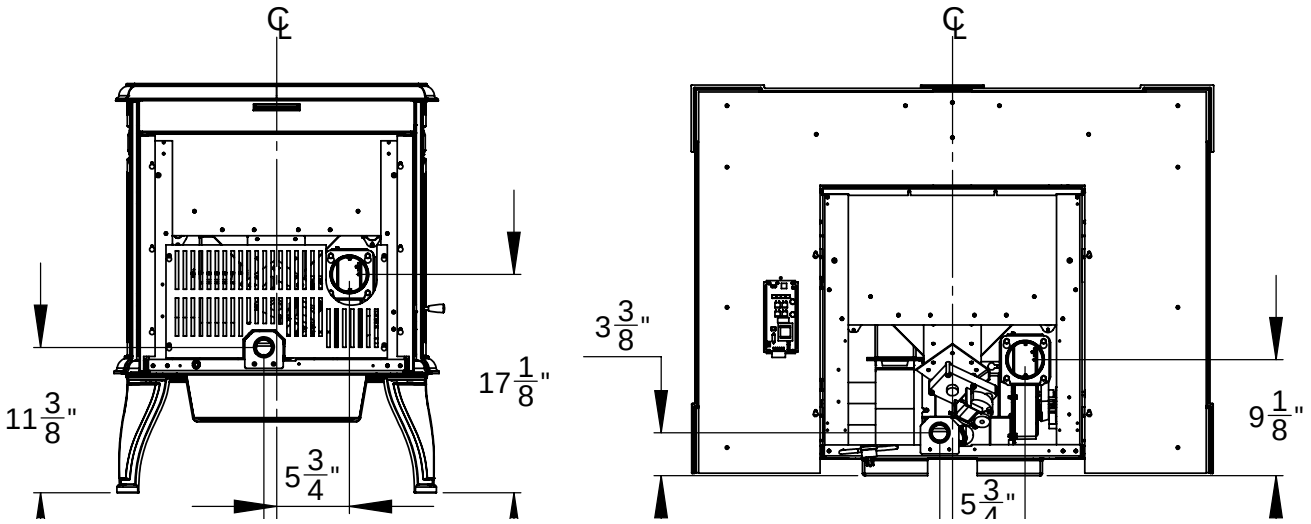


Figure 9: Chatham Inlet and Outlet Location.

INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENTING MANUFACTURER

Outside Fresh-Air Connection:

Outside fresh air is mandatory when installing this unit in airtight homes and mobile homes.

A Fresh-air intake is strongly recommended for all installations. Failure to install intake air may result in improper combustion as well as the unit smoking during power failures.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 2" minimum (51 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

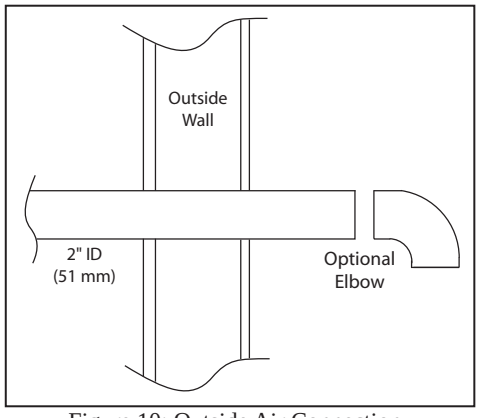


Figure 10: Outside Air Connection.

CORNER THROUGH WALL INSTALLATION - FREESTANDING:

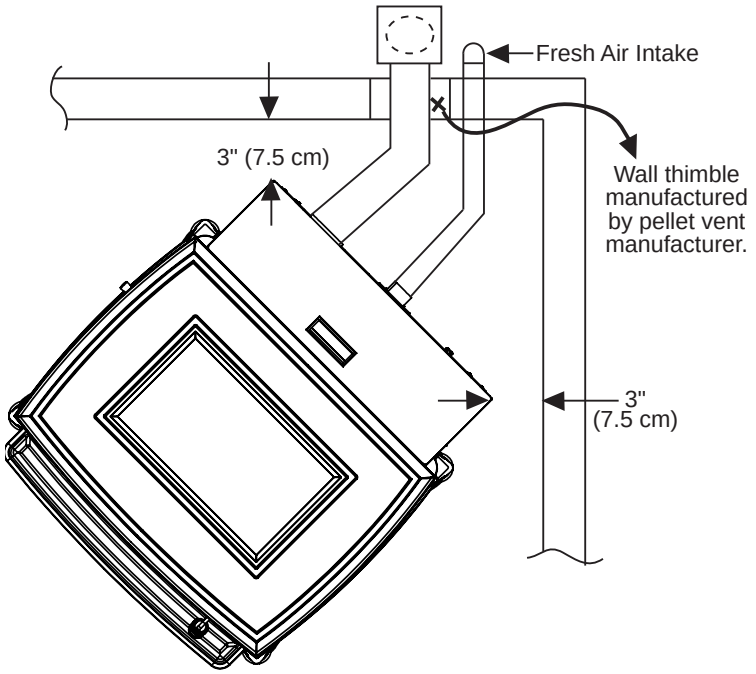


Figure 11: Corner Installation.

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION - FREESTANDING:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
6. Install a length of 3" (76 mm) or 4" (101 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Install the fresh air intake (see INSTALLATION - OUTSIDE FRESH AIR CONNECTION).
8. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
9. Push the stove straight back, leaving a minimum of 2" (5 cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.

10. The pipe must extend at least 12″ (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.

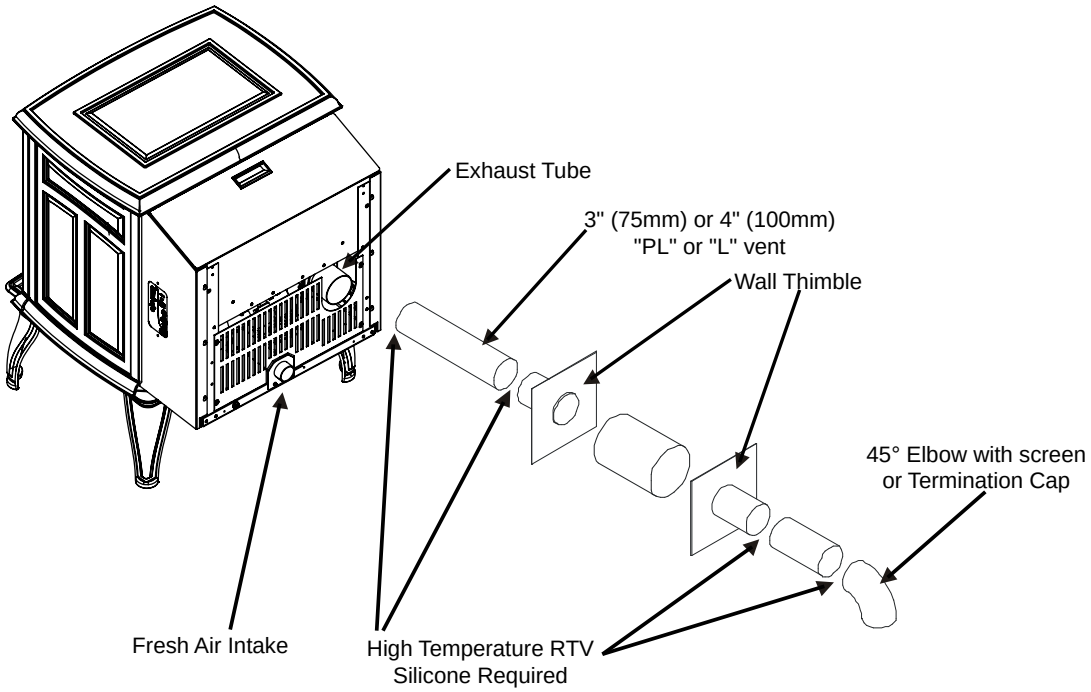


Figure 12: Straight through wall Installation.

11. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

NOTE:

- Some horizontal through wall installations may require a "T" and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help naturally draft the unit.
- This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set.
- This is due to the back pressure in the exhaust caused by airflow around the structure.
- All sections of pipe must have three (3) screws evenly spaced and all horizontal and vertical vent sections located within the house must have a bead of high temperature silicone installed on the male end of the pipe before installation to create a gas tight seal.

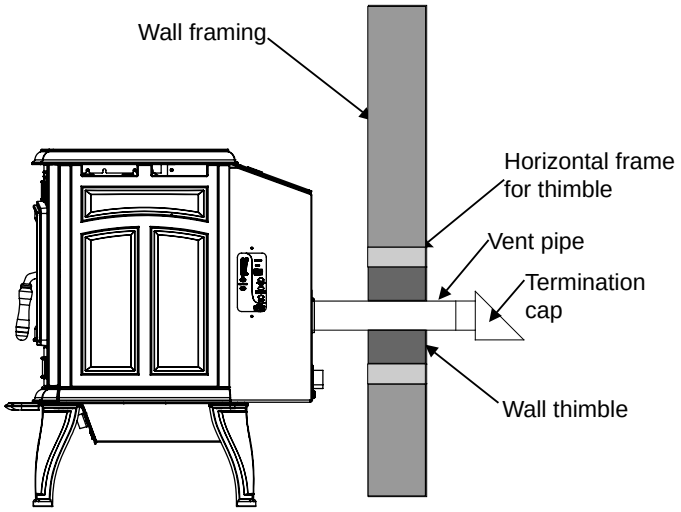


Figure 13: Straight through Wall Installation - Side View.

- The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.
- A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

Vertical Rise with Horizontal Termination Installation (Recommended) - Freestanding:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

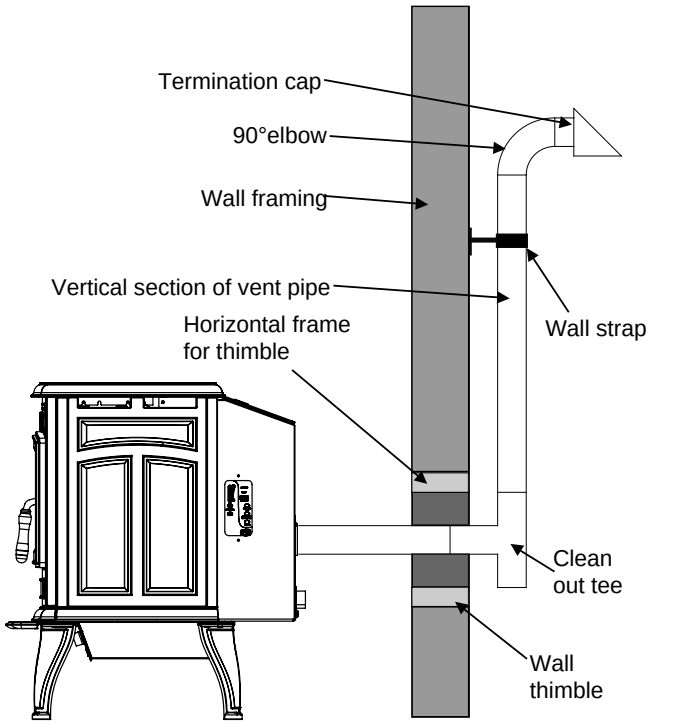


Figure 14: Through Wall with Horizontal Termination.

Through Concrete Wall With Vertical Rise Installations - Freestanding:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

This is the recommended installation to use if there is a concrete or retaining wall in line with exhaust vent on pellet stove.

The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

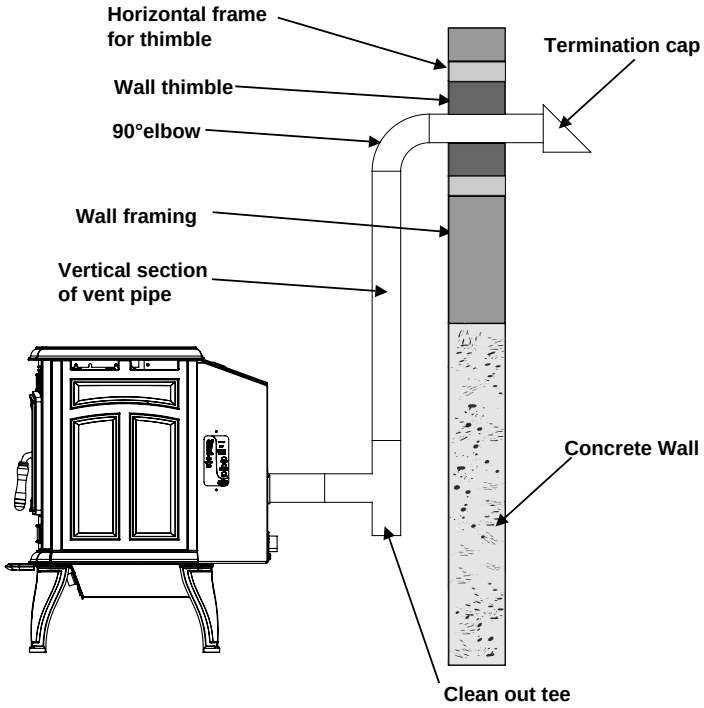


Figure 15: Vertical rise with Horizontal Termination.

Inside Vertical Installations - Freestanding:

1. Choose a stove location that is ideal. See the section "Installation - Deciding Where to Locate your Pellet Appliance."
2. Place the unit on the hearth pad (if installed on a carpeted surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3″ (76 mm) away from a combustible wall.
3. Locate the center of the fresh air intake pipe on the unit. Match that center with the same point on the wall and cut a hole about 2″ (51 mm) in diameter.
4. Install the fresh air intake pipe.
5. Install the tee with clean out.
6. Install the pellet vent upward from there. When you reach the ceiling, make sure that the vent goes through the ceiling fire stop. Maintain a 3″ (76 mm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier.
7. Finally, extend the pellet vent to go through the roof flashing.
8. Ensure that the rain cap is approximately 24″ (610 mm) above the roof.

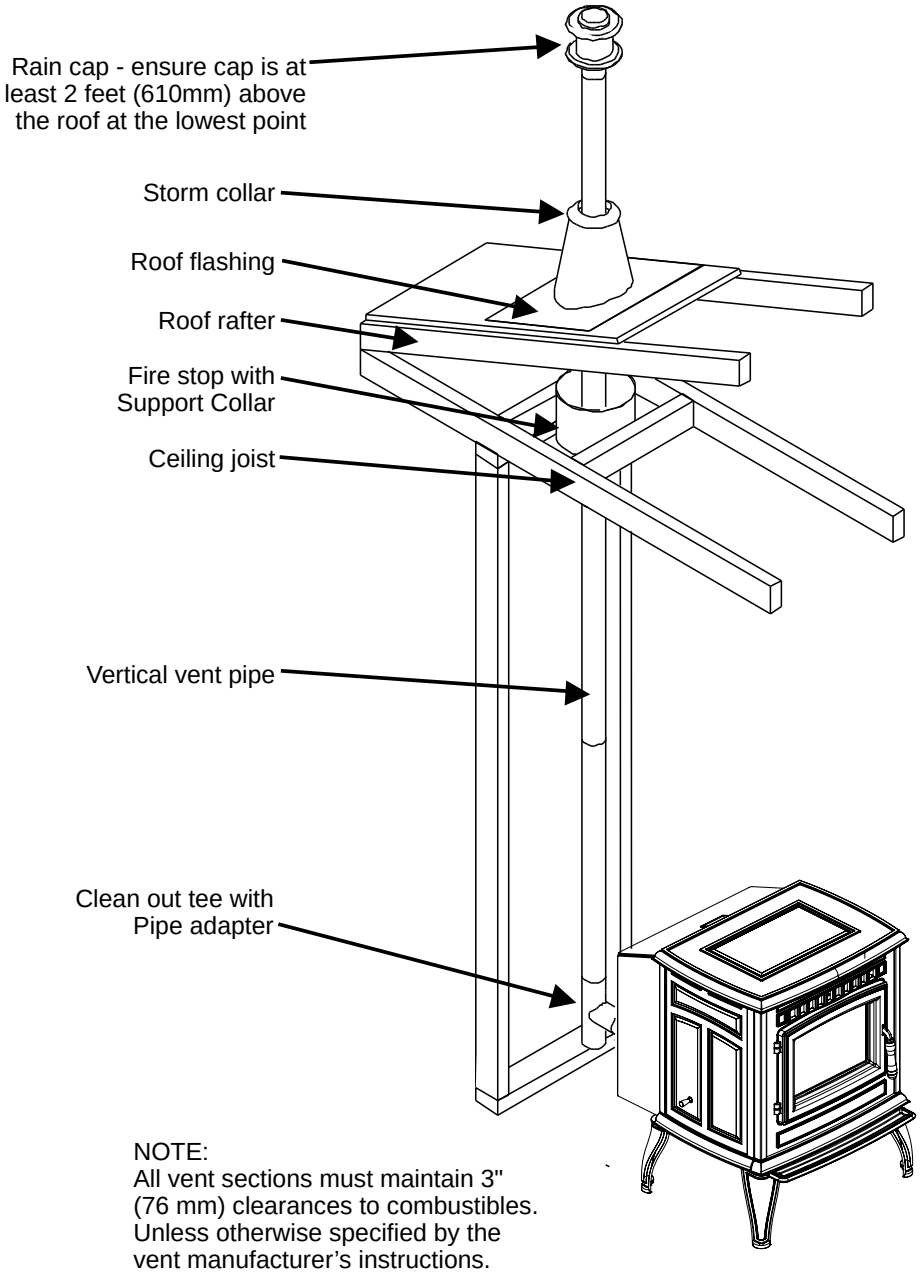


Figure 16: Inside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

Outside Vertical Installations - Freestanding:

To accomplish a outside vertical pipe installation, follow steps 1 through 5 in the "Inside Vertical Installations - Freestanding" section and then finish it by performing the following (refer to Figure 23).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (610 mm) above the roof.

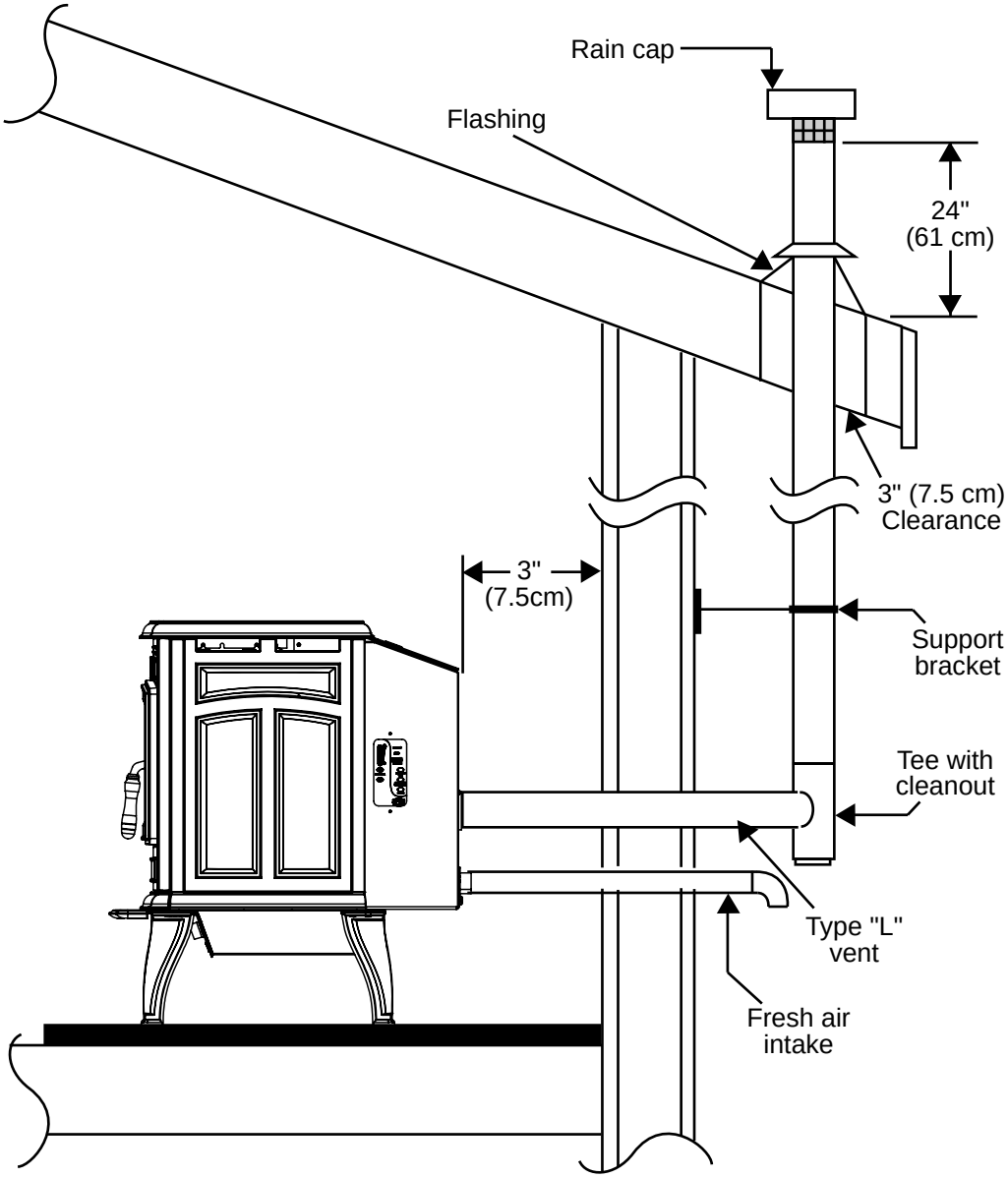


Figure 17: Outside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3" Vent

Over 15ft: 4" Vent

Hearth Mount Installation - Freestanding:

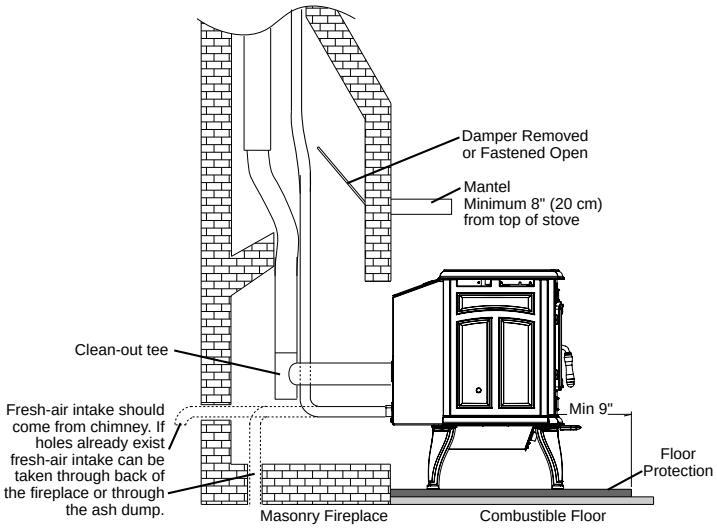


Figure 18: Hearth Mount - Side View.

1. Lock fireplace damper in the open position.
2. Install a positive flue connector at the fireplace dampers.
3. Connect a clean-out tee or a 90° elbow to the exhaust pipe.
4. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

<u>Recommended vent size for vertical installation:</u>

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

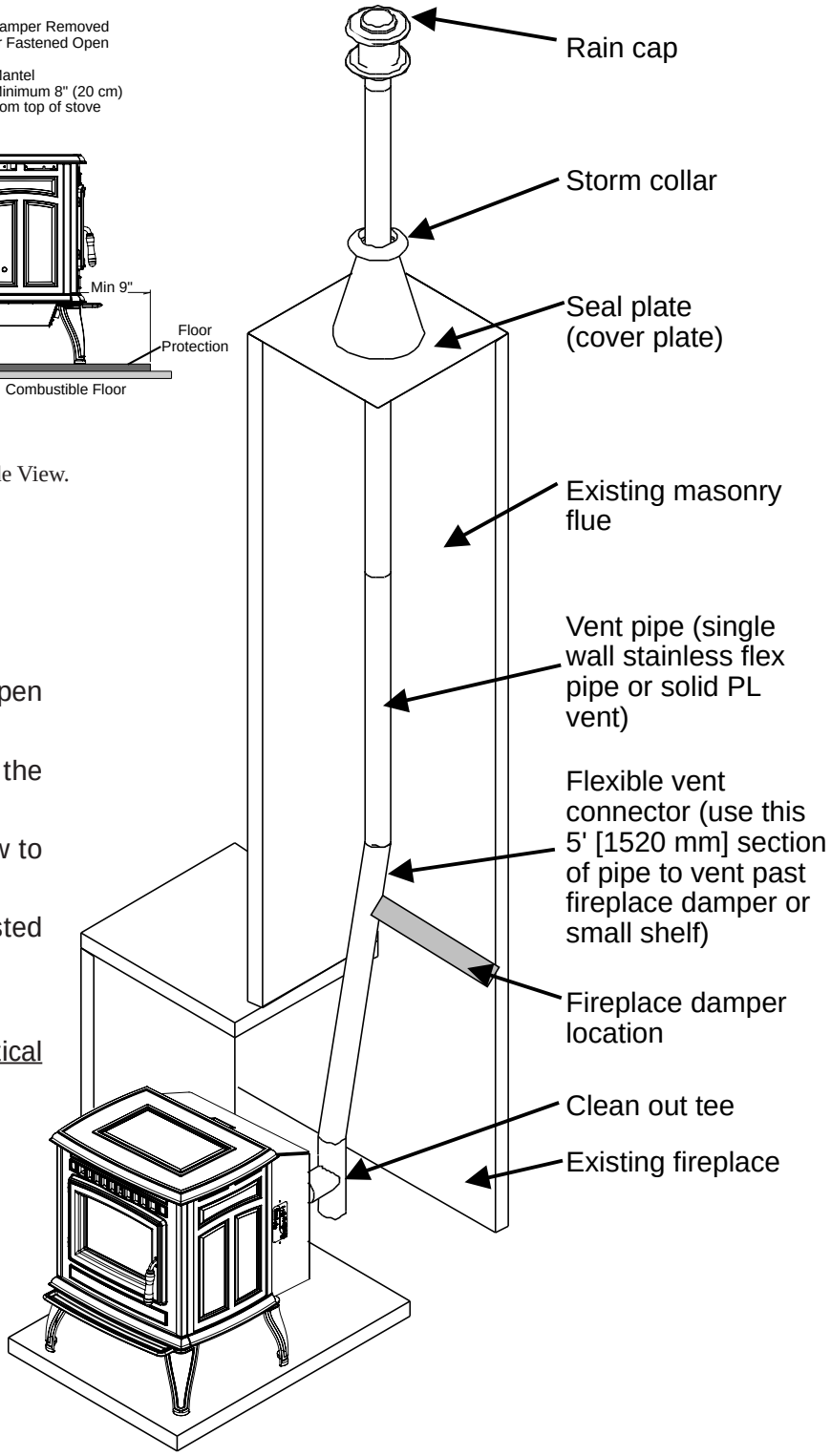


Figure 19: Hearth Mount - Over View.

Masonry Fireplace Insert Installation - Fireplace Insert:

The Fireplace insert model requires a surround faceplate and a pedestal. When installing this unit, ensure that the pedestal is removed from the inside of the hopper and installed on the bottom of the unit (Refer to Installation - Installation of Pedestal and Leveling Legs - Fireplace Insert).

Assemble surround panel (see Installation - Installation and Removal of Control Panel in The Surround Panel - Fireplace Insert and Installation - Assembly and Installation of Insert Surround Panels - Fireplace Insert) before starting installation.

A noncombustible hearth pad must cover combustible flooring underneath, as well as 9″ in front of the heater and 6″ to the side of the heater

1. Install the hearth pad.
2. Lock the fireplace damper in the open position.
3. Install a positive flue connector at the fireplace damper.
4. Connect a tee or 90° degree elbow to the exhaust pipe.
5. This fireplace insert must be installed with a continuous chimney liner of 3 or 4″ diameter extending from the fireplace insert to the top of the chimney. The liner must conform to type 3 requirements of CAN/ULC S635.
6. (Recommended) Install fresh air intake either through the back of the fireplace or through the positive flue connector.

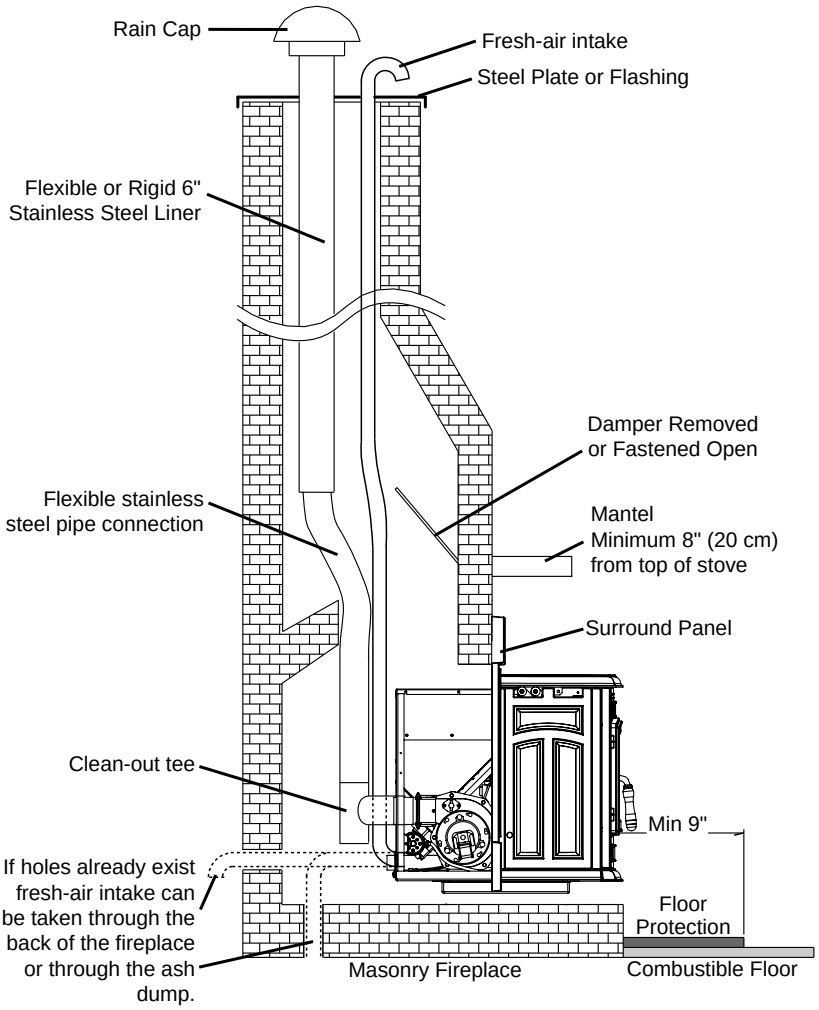


Figure 20: Installation of Fireplace Insert.

When installing the insert into a masonry fireplace DO NOT remove any bricks or masonry, with the following exception; masonry or steel, including the damper plate, may be removed from the smoke shelf and adjacent damper frame if necessary to accommodate a chimney liner. Provided that their removal will not weaken the structure of the fireplace and chimney, and will not reduce protection for combustible materials to less than that required by the national building code.

When installing the fireplace insert into a zero clearance fireplace, **DO NOT** cut or modify any factory firebox parts. If the fireplace insert does not fit into a zero clearance fireplace we recommend you use a freestanding model and install as a hearth mounted unit. Install a 3″ (76 mm) flex pipe from the stove to the top of the chimney (see "Installation - Hearth Mount Installation - Freestanding").

POSITIVE FLUE CONNECTION WITHOUT A FULL RELINE - FIREPLACE INSERT (USA ONLY):

This unit does not require a full reline (in USA only) when installing into a masonry fireplace, however, it is recommended to ensure proper drafting of the appliance.

IMPORTANT: Ensure the chimney and firebox are cleaned and free of all debris, including soot and ashes, before proceeding with this installation. If it is not clean soot maybe blown into the room through the unit's blower. Ensure the fireplace and chimney have not deteriorated in any way. If there is any sign of corrosion or damage in the chimney the unit can not be installed. This unit can be installing in a masonry fireplace built to (UBC 37 or ULC S628 standards) or a factory built fireplace (built to UL 127 or ULC S610 standards).

1. Install the hearth pad. The floor 9" in front of the unit and 6" to each side of the unit must be protected with a non-combustible hearth pad.
2. The vent connector from the insert must extend a minimum of 18" above the chimney seal plate. The chimney seal plate area must be sealed to prevent the exhaust from the chimney from coming back into the fireplace and prevent air from the fireplace from entering the chimney which will affect proper drafting of appliance.

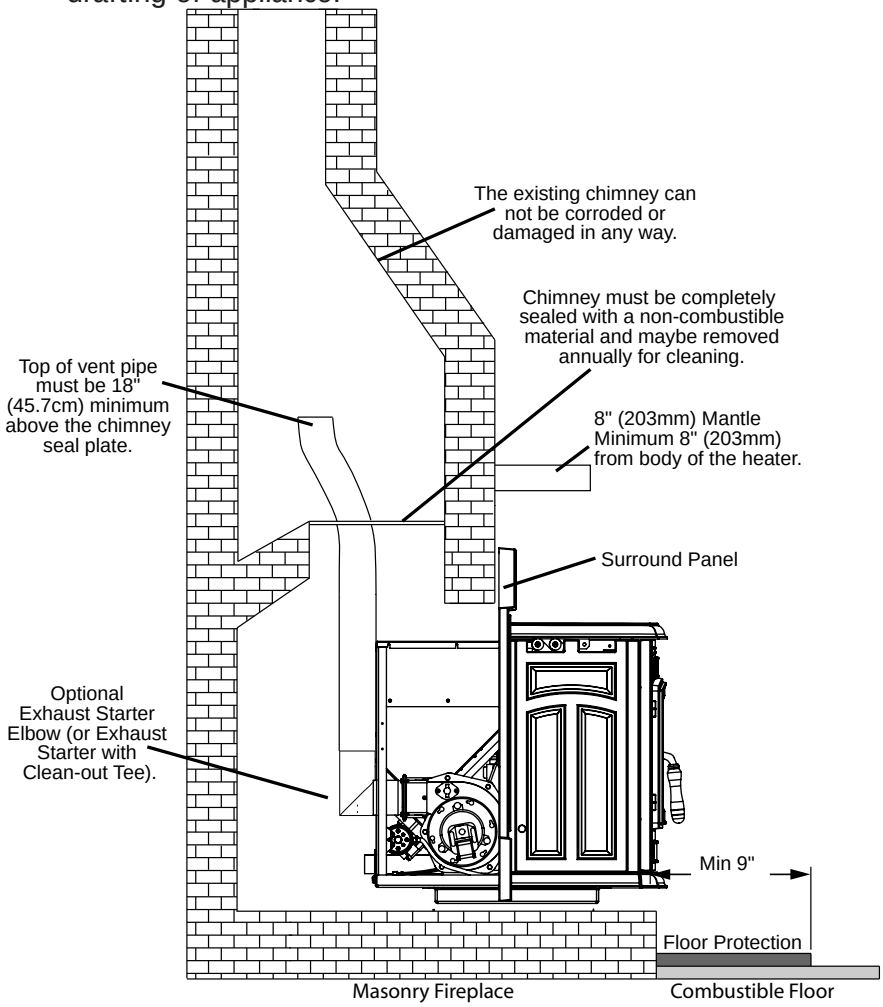


Figure 21: Masonry fireplace positive flue installation.

A qualified installer should evaluate the existing fireplace to determine the best method for achieving a positive flue connection between the vent pipe or liner and the chimney. Whatever method used must effectively seal the area to prevent room air passage to the chimney cavity of the fireplace. A couple examples of Approved Methods of Achieving a Positive Flue Connection are:

a) Secure a seal-off plate (i.e. 22-gage sheet steel) in the masonry fireplace throat using masonry screws.

b) Pack non-combustible material (i.e. rockwool) around the vent pipe or using a flue adapter.

3. Set leveling leg to approximate height.
4. Connect the Exhaust Starter Quick Connect, straight or elbow, to the exhaust pipe.

IMPORTANT: The chimney seal plate must be removed for the annually chimney cleaning as ash will build up on top of the plate.

Installation of Control Panel in The Surround Panel - Fireplace Insert:

Tools Required: Torx T-20 Screwdriver

1. Remove the control panel from the shipping position on the unit by removing one 8-32 x 3/8" Torx screw.

2. Align the control panel with the two holes in the surround panel and fasten using two (2) 8-32 x 3/8" Torx screws.

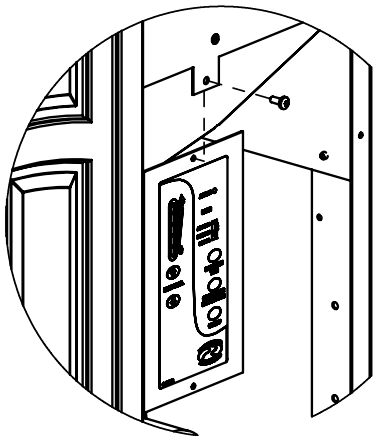


Figure 22: Removing the control panel from the unit

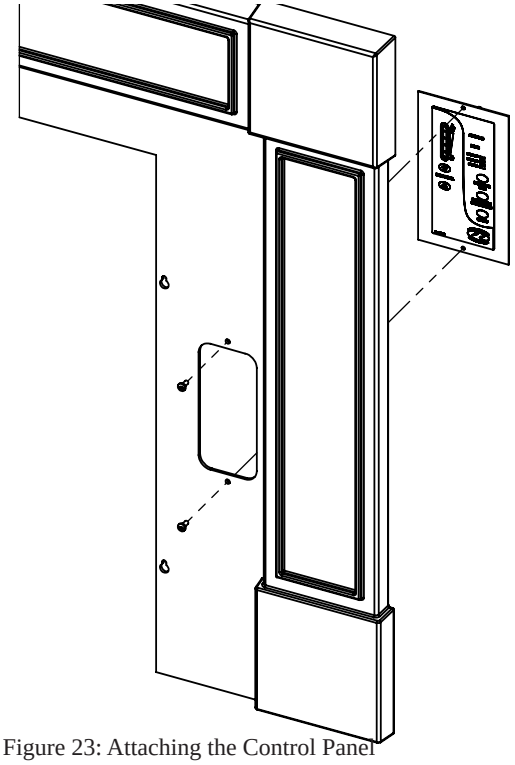


Figure 23: Attaching the Control Panel

Installation of Insert Surround Panel - Fireplace Insert:

Tools Required: None

1. Attach the control panel to the surround panel (see "Installation of Control Panel in the Surround Panel - Fireplace Insert")

2. Slip the surround panel down behind the unit as shown in Figure 32.

3. Hook the keyholes on the surround panel on the standoffs located behind the cast sides of the unit.

4. Connect the control panel to the wiring harness.

The power cord can be routed to either side of the unit.

The surround panel must be removed to perform maintenance on the internal components of the unit. Reverse the above steps to remove the surround panel.

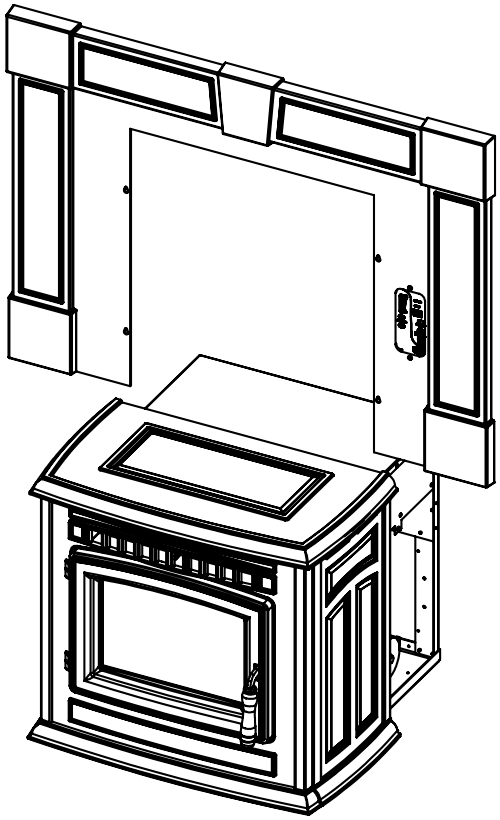


Figure 24: Attaching the Surround Panel

Installation

Thermostat Installation:

1. Install the wall thermostat in a location that is not too close to the unit but will effectively heat the desired area.

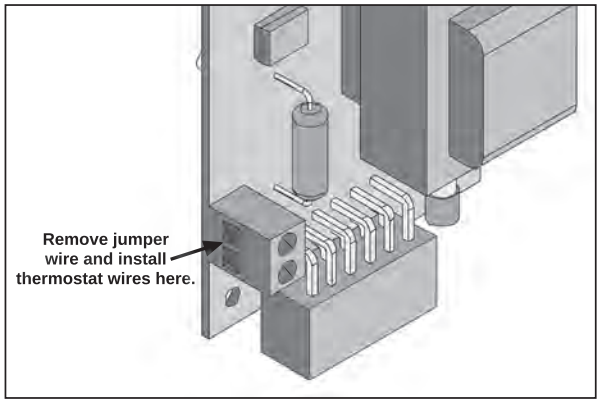


Figure 25: Thermostat wire placement.

2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

If the unit has been placed in the HI / LOW mode, the unit will be taken to a low or idle setting when the thermostat is not calling for heat. When the thermostat calls for heat, the unit will go to the setting that is displayed on the control board Heat Indicator.

Operating Instructions

Control Board Functions:

1. **AUGER LIGHT:** This green light will flash in conjunction with the auger pulse.
2. **MODE LIGHT:** Responsible for signaling the state of the control board. When the light is flashing the stove is in an automatic start mode or the thermostat has control of the unit. When the light is solid, the Heat Level Setting can be altered.
3. **THERMOSTAT SWITCH:** Used to set the unit's controls to one of three mode settings; manual, high/low, or auto/off.
4. **FEED RATE TRIM BUTTON:** Used to change the feed rate trims in ¼ second increments for all feed settings. When this button is pressed, all the lights will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 4 light. To adjust the setting hold the Feed Rate Trim button down and press the Heat Level up or down buttons.

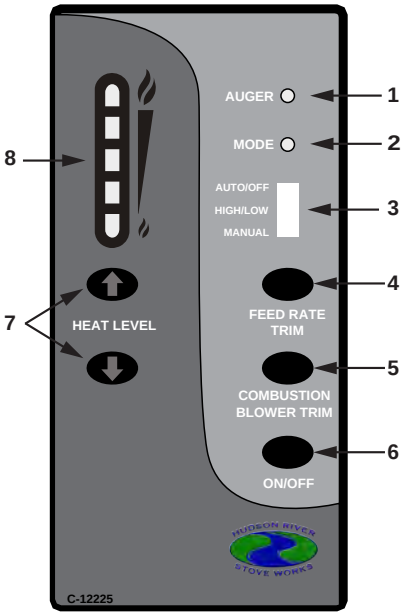


Figure 26: Circuit Board Control Panel Decal.

5. **COMBUSTION BLOWER TRIM BUTTON:** Used to change the Combustion Blower trims in 5 volt increments for all feed settings until it reaches line voltage. When this button is pressed, all the light s will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 2 light. To adjust the setting hold the Combustion Blower Trim button down and press the Heat Level up or down buttons.
6. **ON/OFF BUTTON:** Used to turn the unit ON and OFF.
7. **HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
8. **HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

Operating Instructions

Automatic Safety Features of Your Pellet Stove:

A. If the fire goes out (exhuast temperature drops below 120°F); the unit will automatically shut down.

B. This unit is equipped with a high temperature safety switch. If the temperature of the hopper reaches 200°F, the auger will automatically stop and the unit will shut down. Once the exhaust temperature cools below 120°F the #4 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

C. The unit is equipped with a vacuum switch to monitor the exhuast venting; if the unit is unable to establish sufficient vacuum for operation this switch will turn off the auger and the #2 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

Operating Your Pellet Stove:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

Note: The thermostat mode can be changed during normal operation.

MANUAL MODE:

All control of circuit board function is adjusted at the circuit board.

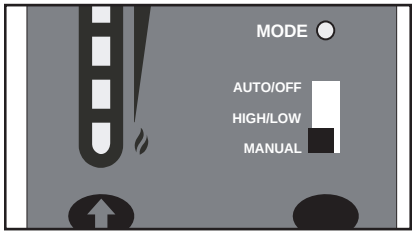


Figure 27: Thermostat Switch in MANUAL position.

To START: Press the ON / OFF button. The stove will turn on. The system light will flash. The Auger Light will flash with each pulse of the auger (the Auger Feed Rate is pre-programmed during start-up). The Heat Level Indicator will show the Heat Level that the stove will run at after start-up and can be adjusted; but the change will not take affect until the start -up has finished.

If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. This can be done by restarting the unit five (5) minutes into its start-up or by putting a small hand full of pellets into the burnpot.

To OPERATE: When a fire has been established, the System Light will turn solid (after approximately 10 - 15 minutes) and the Auger Light will continue to flash to the corresponding Heat Level setting.

The convection blower (room air blower) will turn on. The speed of this blower is controlled by the setting of the heat level output indicator.

HIGH/LOW MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat calls for heat (contacts are closed) the stove settings are adjustable as per Manual Mode. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. *The LOW heat setting can be adjusted for different fuel qualities (see "Operating Instructions - Control Board Functions"). The stove will come back to the previous HEAT LEVEL setting when the thermostat contacts close again.

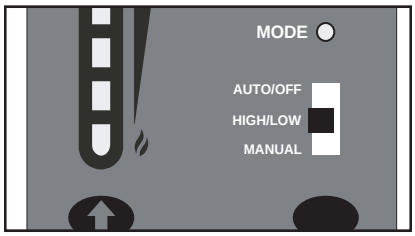


Figure 28: Thermostat Switch in HIGH/LOW position.

AUTO/OFF MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat contacts close, the unit will light automatically. Once up to temperature, the stove operates the same as in MANUAL. When the thermostat contacts open, the stove's HEAT LEVEL and Fans will drop down to the LOW setting for 30 minutes. If the thermostat contacts close within the 30 minutes, the HEAT LEVEL will return to the previous MANUAL setting. If the thermostat contacts remain open the stove automatically begins its shutdown routine. The ON / OFF button can be pressed at any time to immediately shut down the unit. The stove will re-light when the thermostat contacts close again.

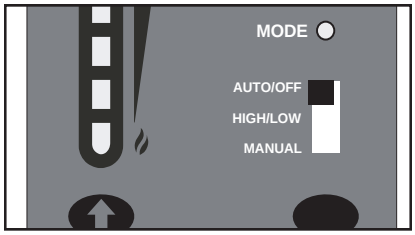


Figure 29: Thermostat Switch in ON/OFF position.

Turning Your Pellet Stove Off:

- MANUAL and HI / LOW mode: To turn the unit OFF, simply press the ON / OFF button. This will stop the feed of pellets. The blowers will continue to operate and cool the stove down. When cool enough, the stove will turn off.
- AUTO / OFF mode: To turn the unit OFF, turn the thermostat down or off. NOTE: The unit will run on low for three (3) minutes before it turns off.

DO NOT unplug the unit while Combustion fan is operating.
This may lead to smoke escaping from the stove.

Slider/Damper Set-Up:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION, IT IS USED TO REGULATE THE AIRFLOW THROUGH THE PELLET STOVE.

A Qualified Service Technician or Installer must set the Slider Damper.

The slider damper is used to regulate the airflow through the pellet stove and is located behind the left cab side (refer to Figure 30). On both the freestanding and insert models the adjustment rod is located on the left sode of the unit (See Figure 33).

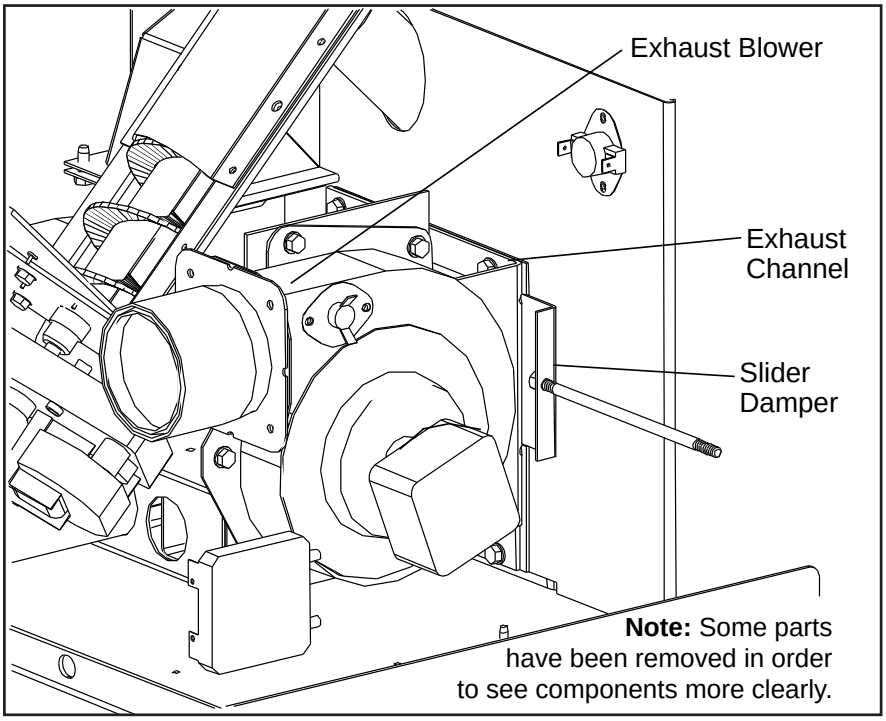


Figure 30: Slider / Damper

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the negative pressure inside the stove and as the heat output button is turned down. The negative pressure inside the firebox will increase as the combustion exhaust blower increases in speed (higher heat output setting).

Slider/Damper Set-Up:

The slider damper is used to regulate the airflow through the pellet stove.

For the most efficient burn, close the slider damper all the way (refer to Figure 31).

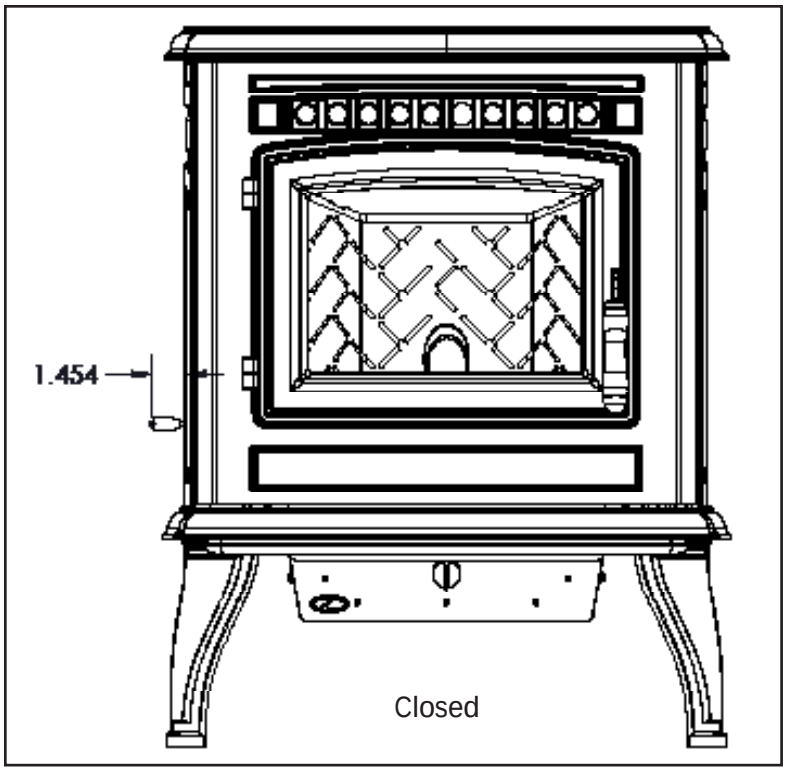


Figure 31: Slider / Damper Open

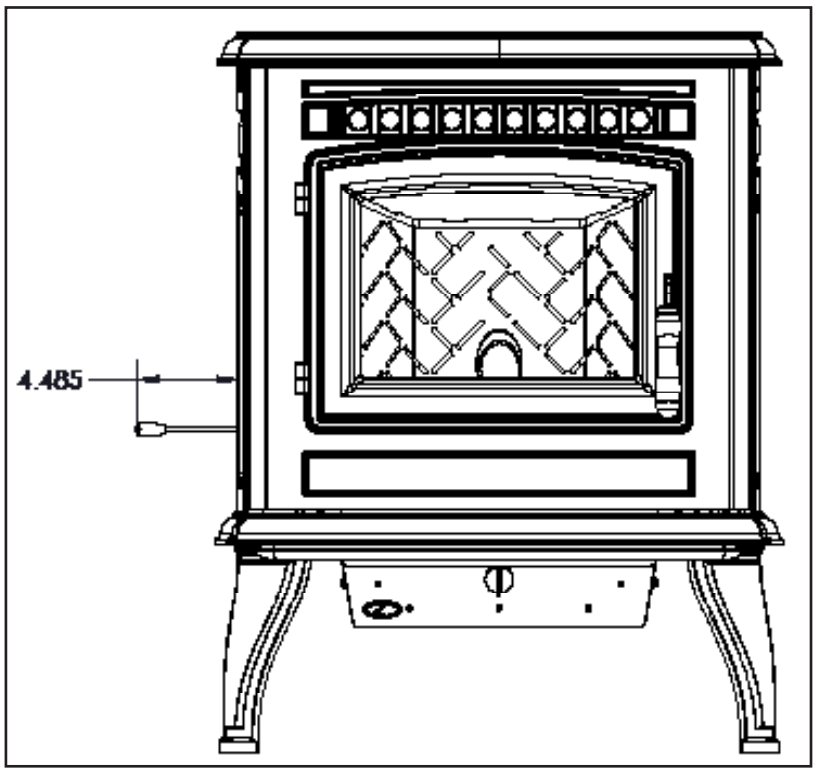


Figure 32: Slider / Damper Open

Operating Instructions

Slider/Damper Set-Up:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION. A Qualified Service Technician or Installer must set the Slider Damper. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 33). If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper should be pushed in slightly, decreasing the air in the firebox.

If, after long periods of burning, the fire builds up and overflows the burn pot or there is a build up of clinkers, this would be a sign that the pellet quality is poor, this requires more primary air, the slider damper must be pulled out to compensate. Pulling the slider damper out gives the fire more air.

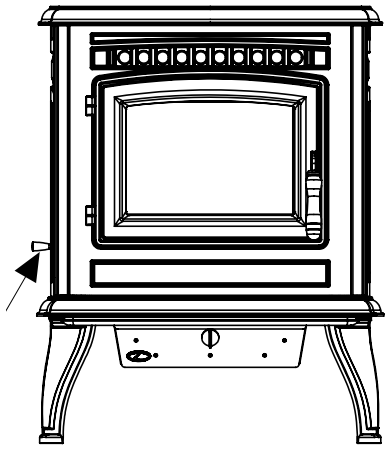


Figure 33: Slider / Damper Knob.

The easiest way to make sure that an efficient flame is achieved is to understand the characteristics of the fire.

- A tall, lazy flame with dark orange tips requires more air – Open slider (pull out) slightly.
- A short, brisk flame, like a blowtorch, has too much air – Close slider (push in) slightly.
- If the flame is in the middle of these two characteristics with a bright yellow/orange, active flame with no black tips then the air is set for proper operation, refer to Figure 34.

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the negatige pressure inside the stove when the heat output level is turned down.

Figure 34: Efficient Flame.

SPECIAL NOTES:

Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard ash build-up).

Guidelines For Fine-Tuning For Fuel Quality:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit builds up on all settings, the slider damper rod should be pulled out in small increments to give the unit more air.
2. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
3. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
4. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
5. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

How can I reduce the visible emissions?

If all of these steps are followed, there should be no visible emissions.

Routine Cleaning and Maintenance

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its optimum and giving you excellent heat value:

2-3 Days / Weekly	Semi-annually or 2 Tons of Fuel
Burn Pot and Liner	Exhaust Vent
Ash Pan	Fresh air Intake Tube
Inside Firebox	Blower Mechanisms
Door Glass	Heat exchanger tubes
Heat exchanger tubes	Behind firebox liners
Ash pan and Door gaskets	All Hinges
Door Latch	Post Season Clean-up

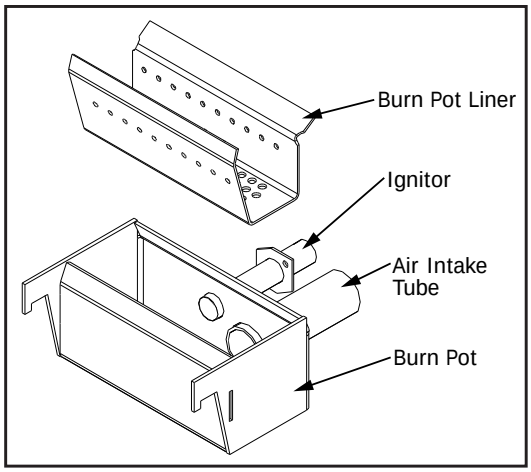


Figure 35: Burn pot assembly.

TOOLS REQUIRED TO CLEAN UNIT

- Torx T-20 Screwdriver
- Brush
- Soft Cloth
- 5/16" Wrench or Socket
- Vacuum with fine filter bag

BURN POT AND LINER (2-3 days)

Cleaning of the burn pot and liner must only be done when stove is cold. To remove the burn pot and burn pot liner, open the door using the door handle provided (located on the right-hand side of the stove). Swing the door open. Lift the liner from the burn pot. Lift the burn pot from the firebox by gently lifting up the front of the burn pot, then sliding the assembly from the air intake tube and the ignitor cartridge.

This is the 'pot' where the pellets are burned. Every two (2) to three (3) days (when the unit is cold), remove the burn-pot liner from the stove and inspected it to ensure proper air flow through the liner. **Failure to keep the liner clean may cause a build up of fuel past the burn pot liner and up the drop tube. This will cause the auger to jam and may result in pellets burning in the drop tube and hopper**. Using the metal scraper tool provided, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube. Press the liner up against the ignitor tube.

If, after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor or the stove may need cleaning. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door by lifting the handle. The glass can be cleaned by wiping down the outside and inside of the glass with a dry soft cloth.

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wipe down the outside and inside of the glass

DOOR LATCH (2-3 days)

Check the door latch every time the door is opened or closed to ensure proper movement.

Routine Cleaning and Maintenance

ASH PAN AND DOOR GASKETS (weekly)
After extended use the gasketing may come loose. To repair this, glue the gasketing on using high-temperature fiberglass gasket glue available from your local HUDSON RIVER dealer. This is important to maintain an airtight assembly.

ASH PAN (weekly)

The ash pan is located under the burner. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "Introduction - Safety Warnings And Recommendations" for disposal of ashes.

Freestanding: To remove the ash pan, simply turn the knob and pull out towards the front.

Insert: To remove the ash pan, remove the cast iron ash pan cover by pulling it forward. Use a blade screwdriver to unlock the ash pan from the unit. Pull the ash pan out of the

DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.

HEAT EXCHANGER TUBES (weekly)

The heat exchanger tube cleaning rod is located oon the front of the unit. Pull this rod in and out a few times to remove any fly ash that may have accumulated on the heat exchanger tubes. Different qualities of fuels will produce varying amounts of fly ash; so cleaning of the heat exchanger tubes should be done on a regular basis.

NEVER TOUCH THE TUBE CLEANING ROD WHEN THE UNIT IS HOT.

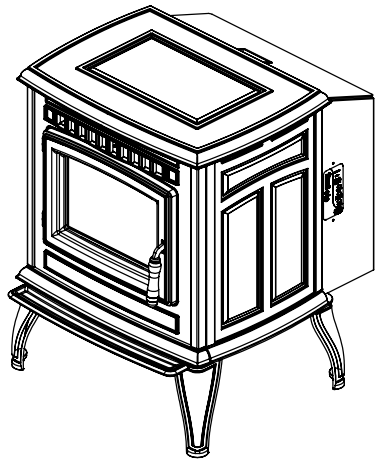


Figure 36: Heat Exchanger Tube Cleaner.

FRESH AIR INTAKE (season)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST VENT (season)

This vent should be cleaned every year or every two (2) tons of pellets. We recommend contacting your dealer for professional cleaning. To clean the vent pipe, tap lightly on the pipe to dislodge any loose ash. Open the bottom of the "T" to dump the ash, then vacuum as much of the ash out of the vent pipe as possible.

BLOWER MECHANISMS (season)

Unplug the stove then open the right and left side panels to access the two blowers. Vacuum all dust from motors. DO NOT lubricate the motors. Check gaskets and replace if needed.

ALL HINGES (season)

Check all the hinges on the unit to ensure proper movement.

Routine Cleaning and Maintenance

EXHAUST PASSAGES (season)

Removal of the firebox backing for bi-annual cleaning (refer to Figure 37):

- Open the door by lifting the handle, remove the burn pot and burn pot liner.
- Lubricate all screws with penetrating oil.
- Remove the two (2) port covers. Remove the four (4) screws that hold the brick liner in place. Remove brick liner. Remove the four (4) screws that hold the baffles in place. Remove side baffles by sliding them forward then out.
- Pull the center baffle out.
- Vacuum and clean thoroughly.

Installation of firebox backing:

- Insert center baffle with backing.
- Place the two (2) side baffles back into the firebox and reinstall the four (4) screws that hold them in place.
- Replace brick liner with four (4) screws.
- Replace the two (2) port covers.
- Replace the burn pot and burn pot liner
- Close the door and secure.

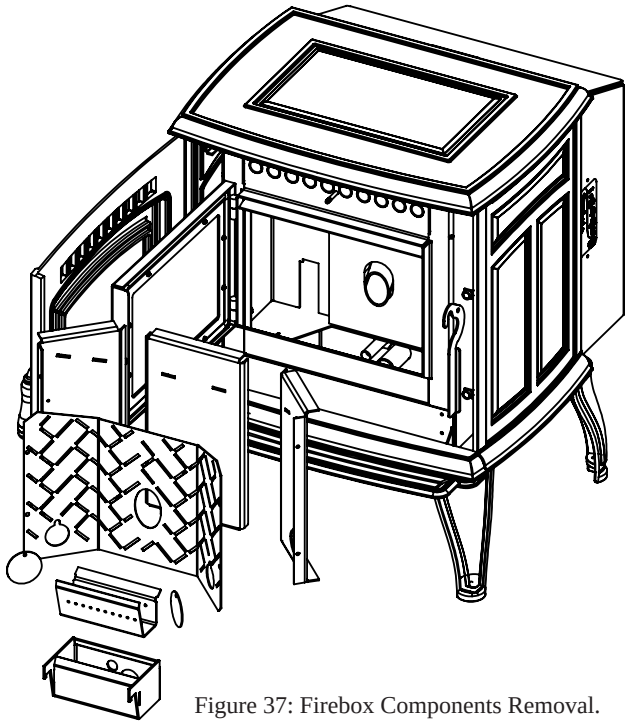


Figure 37: Firebox Components Removal.

POST SEASON CLEAN-UP

Once you are finished using the pellet appliance for the season, unplug the stove for added electrical protection. It is very important that the stove be cleaned and serviced as stated above.

CLEANING PLATED SURFACES

Painted surfaces should be wiped with a damp cloth periodically.

It is important to note that fingerprints and other marks can leave a permanent stain on plated finishes. To avoid this, give the surface a quick wipe with denatured alcohol on a soft cloth BEFORE lighting the fireplace. Never clean surfaces when they are hot. Do not use other cleaners or abrasives as they may leave a residue or scratches, which can become permanently etched into the surface.

FIREBOX PANEL

The paint on the steel firebox panels may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty.

REPLACING DOOR GLASS

It is recommended that your HUDSON RIVER dealer replace the glass if broken.

The door glass is made of high temperature PYRO CERAMIC 5 mm thick. Replace only with part# EF-061.

Troubleshooting

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Remove any screws from inside the firebox without first applying a penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. The stove will not operate when hot.
3. The exhaust blower will not function normally.
4. Light # 2 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. The 200 °F (93 °C) high limit temperature sensor has tripped.
7. The convection blower will not function normally.
8. Ignitor- the pellets will not light.
9. Control settings (Heat Level) has no effect on the fire.
10. The stove keeps going out.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

✓Make sure the stove is plugged in and the wall outlet is supplying power.

✓If the Control Board has been placed in the ON /OFF thermostat mode, then turn the thermostat up to call for heat.

✓Ensure the burn pot liner is correctly placed in the burn pot

✓Check the Heat Level Indicator. - If the # 2 light is flashing (see the # 2 light is flashing)

✓Check the fuse on the circuit board.

✓If the unit still does not start, contact your local service dealer for service.

2. The stove will not operate when hot.

✓Check the Heat Level Indicator if a fire is not detected, or if the fire has gone out **the #3 light will flash** because the Exhaust Temperature Sensor's contacts have opened.

✓Check the hopper for fuel.

✓Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a change to the vent system or installation of fresh air to correct Air to Fuel ratio problems).**

✓Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.

✓Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >115 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower.

✓Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.

✓Exhaust Temperature Sensor failure. – Bypass sensor located on Exhaust Blower if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.

✓Check the fuse on the circuit board.

3. The exhaust motor will not function normally.

✓Open the left side access panel; check all connections against the wiring diagram.

✓See "2. The stove will not operate when hot." section.

4. Light # 2 on Heat output bar flashing

(The Vacuum Switch contacts have opened for more than 15 sec.)

✓Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose

✓Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.

✓Blocked exhaust / venting system - Have stove and venting cleaned and inspected.

✓Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.

✓Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.

✓Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors

✓Combustion Blower failure - The Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visual Check; is the blower motor turning? Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 V on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >114 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge. (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - push the ON/OFF button

5. Auger light flashes but auger motor does not turn at all.

✓If the Auger gear box does not turn but the motor's armature does try to spin then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover after installation**

✓Check the fuse on the circuit board.

6. The 200 °F (93 °C) high limit temperature sensor has tripped.

✓Reset sensor and determine cause – was it Convection Blower failure or 160 °F (71 °C) Temperature Sensor failure? Bypass the 160 °F (71 °C) sensor, does the Convection blower come on high if not replace the blower? If yes, replace sensor (located on the left side of the firewall).

✓Check the fuse on the circuit board.

7. The convection blower will not function normally.

✓Clean all grill openings at the back and below unit .

✓Press the fan button; does the fan come on? Press again to verify that the blower turns on; if, not contact your local dealer for service.

8. Ignitor- the pellets will not light.

✓Everything else in the stove operates but the ignitor will not light the pellets.

✓Make sure the burn pot liner is up tight and square to the ignitor tube by pushing the burn pot back against the ignitor tube.

✓Check to see if the exhaust blower is operating. If not, contact your local dealer for service.

✓Check the fuse on the circuit board.

NOTE: The ignitor should be bright orange in color. If not replace the ignitor.

9. Control settings (Heat Level) has no effect on the fire.

✓NOTE: If the system light is flashing the Control Board has complete control of the unit. When the units system light becomes solid then control of the unit is given back to the operator.

✓If there is no control of the Heat Level button make sure the thermostat is calling for heat.

✓Call your local dealer for service.

10. The stove keeps going out.

If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

✓Check to see that the Slider / Damper is in the correct position.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

✓Set the auger trim till the #1 and #5 lights are illuminated.

If the stove goes out and there are partially burned pellets left in the burn pot liner, the stove has shut down due to a lack of air, exhaust temperature, or power failure.

✓Adjust the Slider / Damper.

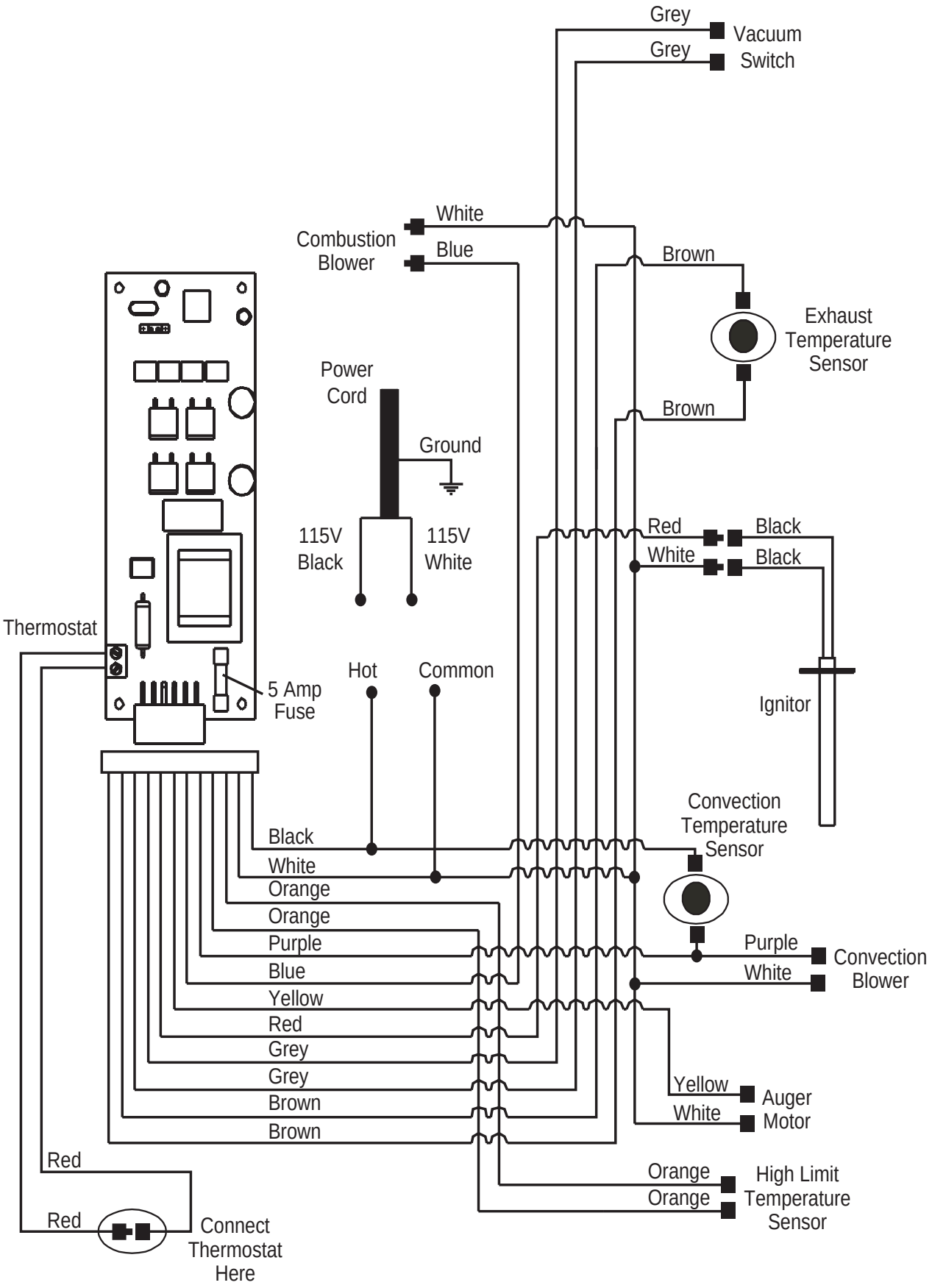
✓Check to see if the stove needs a more complete cleaning.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

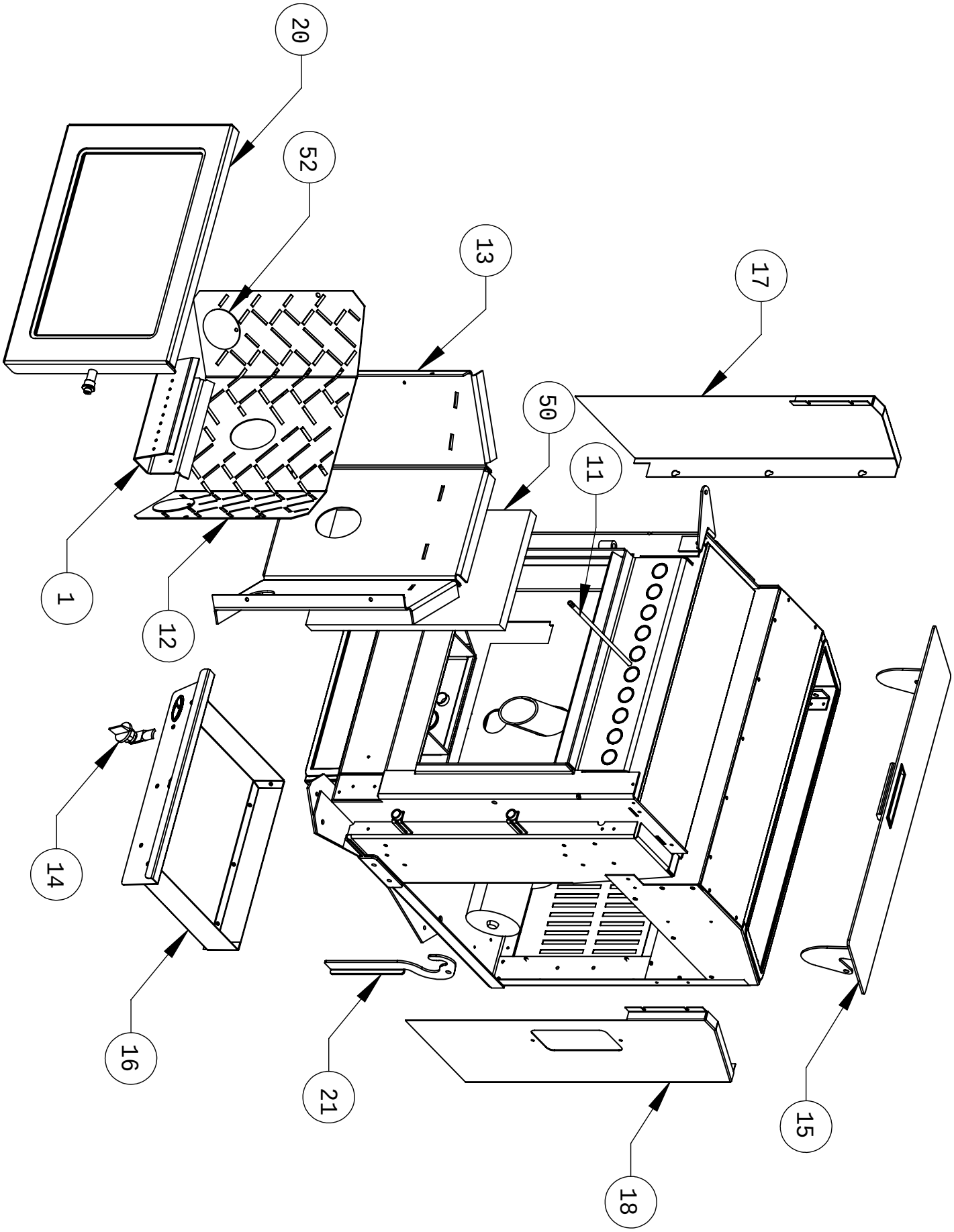
✓Did the power go out?

✓Contact your local Dealer for service.

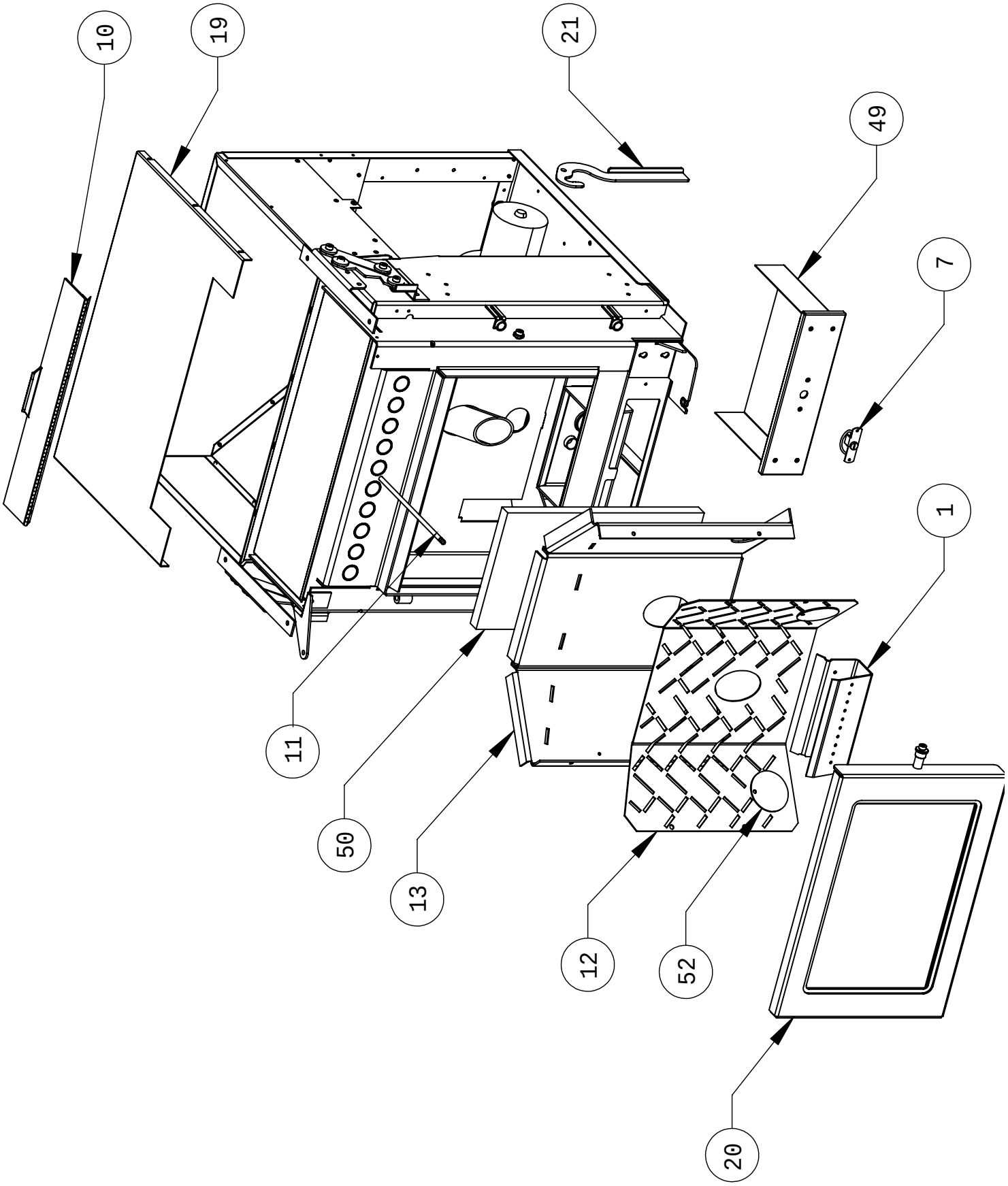
Wiring Diagram



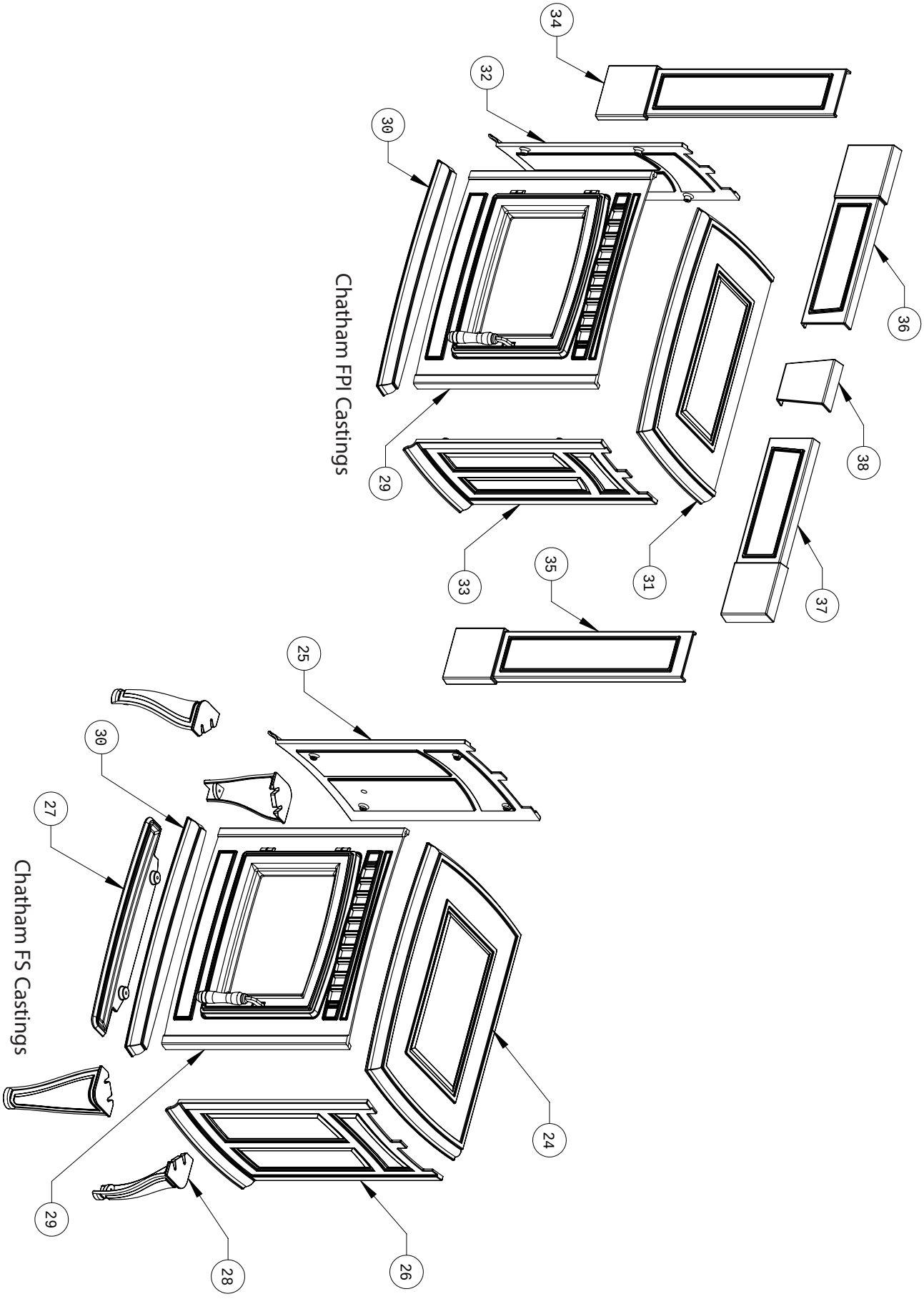
PARTS DIAGRAM - FS



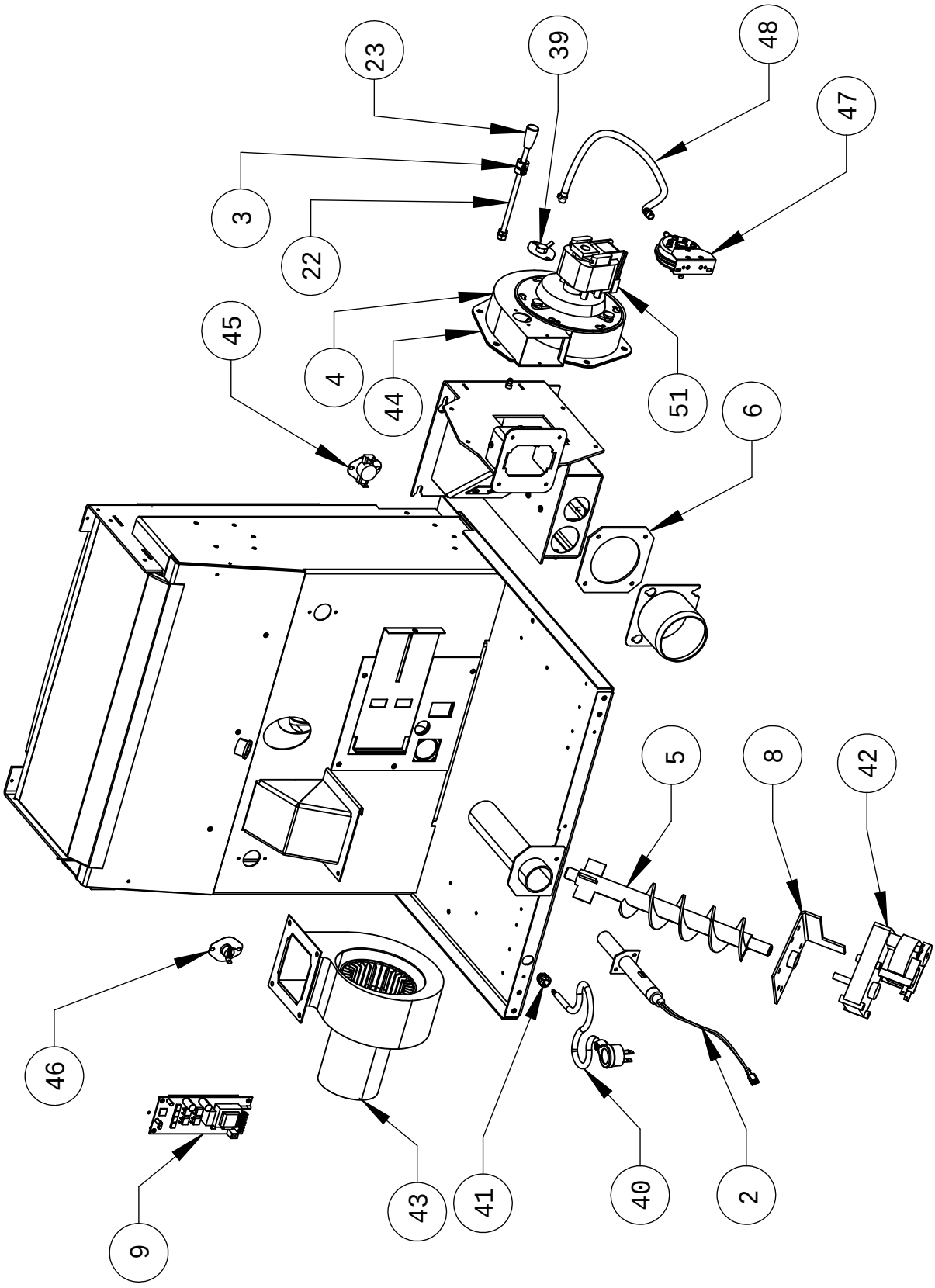
PARTS DIAGRAM - FPI



PARTS DIAGRAM - CASTINGS



PARTS DIAGRAM - ELECTRICAL



Parts list

ITEM NO.	PartNo	DESCRIPTION
OPTION	20-036	EF2/3/4/SOLUS/HUDSON RIVER LOG SET (ONE PIECE)
	50-554	MAGNAHELIC GAUGE & KIT
1	50-587	BURN POT LINER HIGH ASH
	50-754	PELLET/GAS MECH & ELEC FASTENER BAG
	50-968	5/8" ID AUGER COLLAR (WITH SCREW)
2	50-1067	IGNITOR 300W
3	50-1068	SLIDER DAMPER SET COLLAR KIT
4	50-1107	FORMED EXHAUST BLOWER HOUSING
	50-1254	BURN POT SCRAPER TOOL
5	50-1346	AUGER
	50-1380	MANUAL BAG - INCLUDING BOLTS AND SCREWS (SPECIFY UNIT)
	50-1410	AUGER TUBE COVER
6	50-1448	EXHAUST STARTER TUBE GASKET
7	50-1730	ASH PAN LATCH (SCREWDRIVER TYPE)
8	50-1780	AUGER BRASS BUSHING AND PLATE
	50-1806	5/8" ID AUGER BRASS BUSHINGS (SET OF 2)
9	50-1929	CIRCUIT BOARD
	50-1971	PELLET THERMOSTAT
10	50-2326	FPI HOPPER LID
	50-2329	GLASS RETAINER
11	50-2335	TUBE SCRAPER ROD
12	50-2336	BRICK LINER
	50-2337	CONTROL PANEL CW DECAL
13	50-2342	FIREBOX LINER CW INSULATION
14	50-2588	FS PELLET & FS WOODSTOVE SS QUAD LATCH
	50-2760	BACK GRILL
	50-2820	CHATHAM OWNERS TECHNICAL MANUAL
15	50-2821	CHATHAM FS HOPPER LID (OLD SERIALIZED PART MUST BE RETURNED)
16	50-2822	FS ASH PAN WITH LATCH
17	50-2823	CHATHAM FS CABINET SIDE LEFT
18	50-2824	CHATHAM FS CABINET SIDE RIGHT
19	50-2825	CHATHAM FPI HOPPER COVER (OLD SERIALIZED PART MUST BE RETURNED)
20	50-2826	CHATHAM DOOR ASSEMBLY COMPLETE
21	50-2827	CHATHAM DOOR HANDLE
22	50-2828	SLIDER DAMPER ROD W KNOB
23	50-2829	SLIDER ROD KNOB
24	50-2830	FS CAST TOP (SPECIFY COLOR)
25	50-2831	FS CAST LEFT SIDE (SPECIFY COLOR)
26	50-2832	FS CAST RIGHT SIDE (SPECIFY COLOR)
27	50-2833	FS CAST ASH SHELF (SPECIFY COLOR)
28	50-2834	FS CAST LEG (SPECIFY COLOR)
29	50-2835	CAST FRONT (SPECIFY COLOR)
30	50-2836	CAST LIP (SPECIFY COLOR)
31	50-2837	FPI CAST TOP (SPECIFY COLOR)
32	50-2838	FPI CAST LEFT SIDE (SPECIFY COLOR)
33	50-2839	FPI CAST RIGHT SIDE (SPECIFY COLOR)
34	50-2840	CAST SURROUND LEFT (SPECIFY COLOR)

35	50-2841	CAST SURROUND RIGHT (SPECIFY COLOR)
36	50-2842	CAST SURROUND TOP-LEFT (SPECIFY COLOR)
37	50-2843	CAST SURROUND TOP-RIGHT (SPECIFY COLOR)
38	50-2844	CAST SURROUND KEYSTONE (SPECIFY COLOR)
39	EC-001	120F (49C) Ceramic Fan Temperature Sensor
40	EC-042	DOMESTIC POWER CORD 115V
41	EC-044	HEYCO STRAIN RELIEF
	EC-058	WINDOW CHANNEL TAPE- 72IN
42	EF-001	AUGER MOTOR 1 RPM
43	EF-002	CONVECTION BLOWER 115V
	EF-004	CONVECTION BLOWER IMPELLER
	EF-006	CONVECTION BLOWER INSULATOR (GASKET)
	EF-008	COMBUSTION MAIN IMPELLER 1" x 4 1/2"
44	EF-011	COMBUSTION BLOWER MOUNTING GASKET
	EF-012	COMBUSTION BLOWER HOUSING GASKET (CIRCULAR)
45	EF-013	TEMPERATURE SENSOR 160F
46	EF-016	HIGH LIMIT TEMP SENSOR 200F MANUAL RESET
47	EF-017	VACUUM SWITCH
48	EF-018	SILICONE HOSE (RED)
	EF-019	ALUMINUM HOSE BARB
	EF-021	IGNITION BURN POT
	EF-057	.5IN ROUND DOOR GASKET (6FT)
	EF-061	GLASS WITH TAPE (13 X 9)
49	EF-105	FPI ASH PAN DRAWER WITH LATCH
50	EF-126	FIREBOX CERAMIC WOOL INSULATION
	EF-156	PELLET STOVE CLEANING BRUSH
51	EF-161A	COMBUSTION BLOWER MOTOR WITH IMPELLER ONLY
52	EF-194A	FIREBOX CLEANING PORT COVERS -PD
	EF-208	PEDESTAL & ASH PAN GASKET - 10'

Warranty

Limited Lifetime Warranty:

Under this warranty, Hudson River Stove Works covers the body of the stove including all exterior metals. This warranty covers: Firebox, Heat Exchanger, Pedestals, Legs, and Door Assembly. Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

Limited Two Year Warranty:

Under this warranty, Hudson River Stove Works covers electrical components against defects in materials and workmanship for part repair and replacement for the first two years and labor for the first year only to the original purchaser. (Glass and all gaskets are not included under any part of this warranty.) Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

There is no written or implied performance warranty on the stove, as the manufacturer has no control over the installation, daily operations, maintenance or the type of fuel burned.

This warranty does will not apply if the stove has not been installed, operated and maintained in strict accordance with the manufacturer's instructions.
This warranty does not cover damage or breakage due to misuse, improper handling or modifications.

All Claims under this warranty must be made through the dealer in which the stove was originally purchased from. If an inspection by the dealer indicated that a warranty claim is justified, and that all conditions of this warranty have been met, the manufacturer's total responsibilities and liabilities shall be to repair or replace the defective part(s). All costs of removal, shipment to and from the dealer of manufacturer, any losses during shipment and reinstallation and any other losses due to the stove being removed shall be covered by the owner of the stove.

Here is how our Warranty works
If you have any concerns with your Hudson River product please contact the dealer where you purchased the fireplace or stove. Your dealer shall make all claims under this warranty in writing.

To the Dealer
When filling out a warranty claim please complete the following information on an official warranty claim form:

Customer information: Name, address and telephone number of purchaser and date of purchase.

Dealer information: Date of installation, name of installer and dealer, serial number of the appliance, nature of complaint, defects or malfunction, description and part numbers of any parts replaced.

To the Distributor
Sign and verify that work and information are correct.

Notes

Notes

Installation Data Sheet

The following information must be recorded by the installer for warranty purposes and future reference.

NAME OF OWNER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

NAME OF DEALER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MODEL: Chatham

SERIAL NUMBER:_____

DATE OF PURCHASE: _____ (dd/mm/yyyy)

DATE OF INSTALLATION:_____(dd/mm/yyyy)

MAGNEHELIC AT INSTALL:_____

INSTALLER'S SIGNATURE:

_____

NAME OF INSTALLER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MANUFACTURED FOR HUDSON RIVER STOVE WORKS BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
Winter 2021
C-14645

C-16227

DO NOT REMOVE THIS LABEL / NE RETIREZ PAS CETTE ÉTIQUETTE

0268PS024E.REV001
OMNI-Test
Laboratories

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

Ce poêle à granulés besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner`s pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner`s. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2020. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de 1.44 g/hr.

C-16226

WH-

Model / Modèle:

EF2-1 ☐**FS** ☐**FPI**

Serial No. / No. De Serié:

Ouput Rating (Les données évaluant): 8,852 to 32,134 BTU/Hr (2.59 to 9.42 kW)
Listed Room Heater, Pelletized Fuel Type (Appareil de chauffage à granules certifié)
Suitable For Mobile Home Installation (Accepté pour l'installation dans une maison mobile, test)
Conforms to (conforme à): ASTM E1509-12 Certified to: ULC S627-00 / ULC S628-M93

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacture's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.3 Amps. / Cet appareil a été testé et certifié pour utilisation dans les maisons mobiles en accord avec les "Règles Administratives de l'Oregon 814-23-900 à 814-23-909". Installez et utilisez cet appareil seulement selon les instructions d'installation et d'opération du fabricant. Contactez les autorités locales de votre quartier concernant les restrictions et les inspections d'installation. Consultez les codes de bâtiment locaux et les instructions du fabricant pour les précautions à prendre lorsque une cheminée doit être installée au travers un mur ou un plafond combustible. CLASSEMENT ÉLECTRIQUE : 120 Volts, 60 Hz, 4.1 Amps.

For Use With Only Pelletized Wood fuels. Keep viewing and ash removal doors tightly closed during operation. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Insert and Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently. / Utilisation avec les combustibles sous forme de boulets uniquement Utiliser seulement lorsque les portes avants et la porte du réceptacle de cendre sont fermées. Si une ou des vitres devaient être remplacées, utilisez seulement du verre céramique. Les composantes requises pour l'installation sont un évent PL certifié de 3in/75mm or 4in/100mm avec ses composantes. Les installations insertion et de mont de foyer ; un paquebot de cheminée de mur de seul énuméré peut être utilisé.

CAUTION:

Hot while in operation. DO NOT touch, keep children, clothing & furniture away. Contact may cause skin burns. See nameplate & instructions.

ATTENTION:

Chaud pendant le fonctionnement. NE PAS toucher, garder les enfants, vêtements et meubles. Le contact peut provoquer des brûlures de la peau. Voir plaque signalétique et les instructions

DATE OF MANUFACTURE:

J F M A M J J A S O N D 2020 2021 2022 2023

DO NOT REMOVE THIS LABEL / NE RETIREZ PAS CETTE ÉTIQUETTE

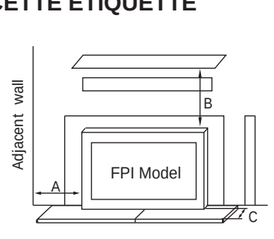
INSTALLED AS A FREESTANDING STOVE MODEL / A INSTALLE COMME UN MODÈLE FS, QU'IL SOIT ENCASTRÉ, SUR PIED OU DANS UNE MAISON MOBILE:
Minimum clearances to combustible materials. Les dégagements minimums aux matériels combustibles:

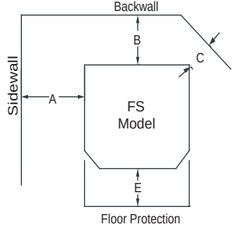
A	Sidewall to Unit (Du mur de côté à l'appareil)	6" (152 mm)
B	Backwall to Unit (Du mur de derrière à l'appareil)	2" (51 mm)
C	Corner to Unit (Du coin à l'appareil)	2" (51 mm)
E	From door opening of unit to edge of floor protection (De la porte ouvrant au devant de protection de plancher)	9" (229 mm)

INSTALLED AS A FIREPLACE INSERT STOVE MODEL / A INSTALLE COMME UN MODÈLE SUR PIED DE POELE :
Minimum clearances to combustible materials. Les dégagements minimums aux matériels combustibles:

A	Sidewall to Unit (Du mur de côté à l'appareil)	9" (229mm)
B	Top of unit to an unshielded 8" (203 mm) mantle (Le sommet de l'unité à un manteau de cheminée non blindé)	8" (203 mm)
C	From door opening of unit to edge of floor protection (De la porte ouvrant au devant de protection de plancher)	9" (229mm)

Combustible floors must be protected by a non-combustible material. - See Owners Manual.
Le plancher combustible doit être protégé par un matériel incombustible. - Consultez le manual.





MANUFACTURED BY / FABRIQUE PAR
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

Intertek
Certified for use in USA
Certifié pour installation aux Etats-Unis

WARRANTY REGISTRATION
enviro.com/warranty

EF2-1

FREESTANDING & FIREPLACE INSERT

OWNER'S MANUAL

PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS PELLET-BURNING ROOM HEATER. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

US

Intertek

Contact your building or fire officials about restrictions and installation inspection requirements in your area.

Table of Contents

Introduction

Rating Label Location:

Freestanding: The rating label is located on the inside of the hopper lid.

Insert: The rating label is located on the inside of the ash pan cover as well as the inside of the hopper lid.

Pellet Quality:

Pellet quality is important, please read the following:

Your ENVIRO pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. The Pellet Fuel Industries (P.F.I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P.F.I. PELLET STANDARDS:

Fines (fine particles).....1% maximum through a ⅛" screen
Bulk Density.....40 pound per cubic foot minimum
Size.....¼" to 5/16" diameter ½ – 1½" long maximum
Ash Content.....1% maximum (Premium grade)
.....3% maximum (Standard grade)
Moisture Content.....8% maximum
Heat Content.....approximately 8200 Btu per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

CLINKERING: Clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the Routine Cleaning and Maintenance section of this manual.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low heat levels.

Since ENVIRO has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets at least 36" (1 m) away from the pellet stove.

Emissions and Efficiency - EF2-1:

Rates: This manual describes the installation and operation of the Enviro EF2-1 pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has an input rate ranging from 11,214-40,852 Btu/hr with an output ranging from 8,852-32,134 Btu/hr.

Efficiency: **HHV:** 76.7%

0268PS024E.REV001
OMNI-Test Laboratories

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet has a manufacturer set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this pellet heater in a manner inconsistent with operating instructions in this manual.

Introduction

Important Safety Data:

Please read this entire Owner's Manual before installing or operating your ENVIRO Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. An ENVIRO dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

Be sure to maintain the structural integrity of the home when passing a vent through walls, ceilings, or roofs.

The stove's exhaust system works with negative combustion chamber pressure (vacuum) and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

If you have any questions with regard to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

Safety Warnings And Recommendations:

Caution: Do not connect to any air distribution duct or system.
Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.
Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations.

THE USE OF CORDWOOD IS PROHIBITED BY LAW.

SOOT: Operation of the stove with insufficient combustion air will result in the formation of soot which will collect on the glass, the heat exchanger, the exhaust vent system, and may stain the outside of the house. This is a dangerous situation and is inefficient. Frequently check your stove and adjust the slider/damper as needed to ensure proper combustion. **See: "Adjusting the vacuum using the slider/damper".**

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

Introduction

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be stored on a non-combustible floor, well away from all combustible materials pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: The use of a surge protected power bar is recommended. The unit must be grounded. The grounded electrical cord should be connected to a standard 115 volts (3.3 Amps), 60 hertz electrical outlet. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces, sharp edges, and is accessible. If this power cord should become damaged, a replacement power cord must be purchased from the manufacturer or a qualified ENVIRO dealer. This unit's maximum power requirement is 400 watts.

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an ENVIRO dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

FLAMMABLE LIQUIDS: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in the heater. Keep all such liquids well away from the heater while it is in use.

SMOKE DETECTORS & CO MONITORS: Smoke detectors and carbon monoxide (CO) monitors should be installed and maintained in the structure when installing and operating a pellet burning appliance.

OPERATION: The ash pan, door, and hopper lid must be closed securely for proper and safe operation of the pellet stove. Ensure all gaskets and seals are checked regularly and replaced when necessary.

KEEP ASH PAN FREE OF RAW FUEL.
DO NOT PLACE UNBURNED OR NEW PELLET FUEL IN THE ASH PAN. A FIRE IN THE ASH PAN MAY OCCUR.

INSTALLATION: Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement.
DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

FRESH AIR: Outside Fresh Air connection is optional BUT MUST be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes. Consider all large air moving devices when installing your unit and provide room air accordingly. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE ENVIRO HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, ENVIRO GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, ENVIRO ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE

Specifications

Dimensions - Freestanding:

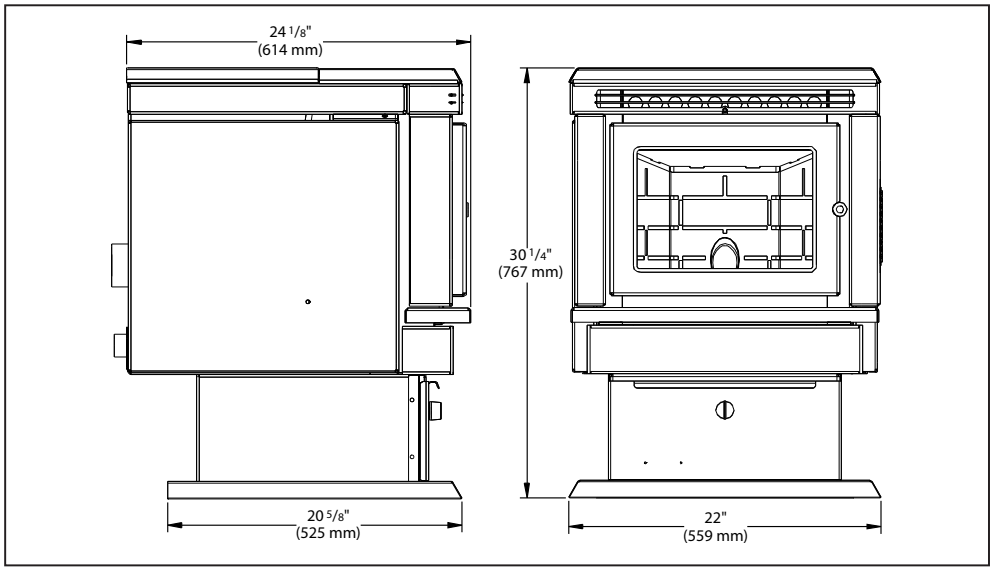


Figure 1 : EF2-1 Freestanding Dimensions.

Dimensions - Fireplace Insert:

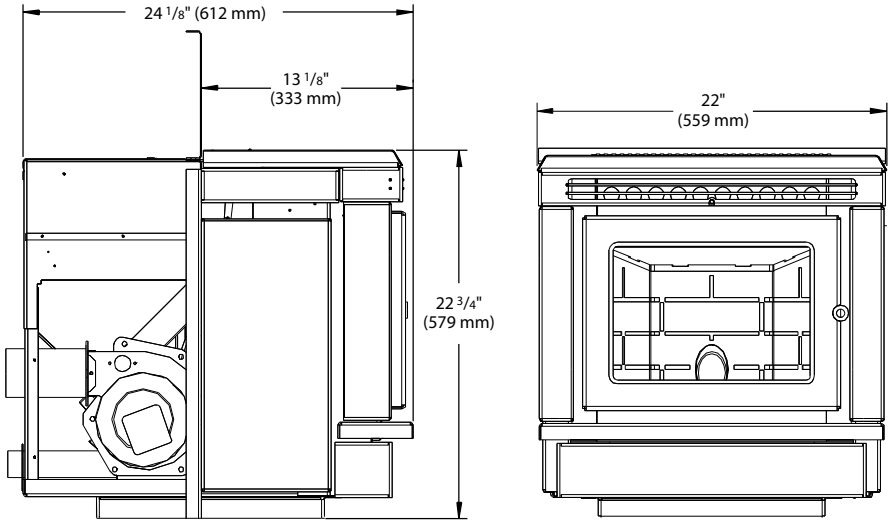


Figure 2 : EF2-1 Fireplace Insert Dimensions.

Specifications:

Table 1 : EF2-1 Specifications.

Description	Fuel type	
Residential Pellet Heater	6mm (¼") dia. Wood Pellets	
Voltage	Current	Max Power
110 - 120 V	3.3 Amps	400 Watts
Frequency	Hopper Capacity FS / FPI	Consumption on Low
60 Hz	60 lbs / 40 lbs	1.5 lb/hr
Testing Standard	Weight** FS / FPI	Consumption on High
ASTM 1509-04	290 lbs / 250 lbs	5 lb/hr

*Consumption will vary with the type of fuel used.

**With Full Hopper.

Installation

Deciding Where to Locate your Pellet Appliance:

1. Check clearances to combustibles (see Installation - Clearances to Combustibles - Freestanding, Installation - Alcove Clearances - Freestanding, and Installation - Clearances to Combustibles - Fireplace Insert.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.

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We recommend that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training
www.wettinc.ca

Removing Your Pellet Stove From the Pallet:

To remove your new stove from its pallet, open the left and right side panels. To open the side panels remove the ash pan cover from the magnets located below the door. Remove the two (2) T-20 screws located at the bottom corners of the left and right side panels. Remove the two (2) T-20 screws located between the hopper side rails and the side panels at the front edge of the side panel.

There are two (2) wood screws that are holding the bottom of the stove to the pallet. Remove the screws. Close the side panels. See "Pedestal Installation" to install the pedestal.

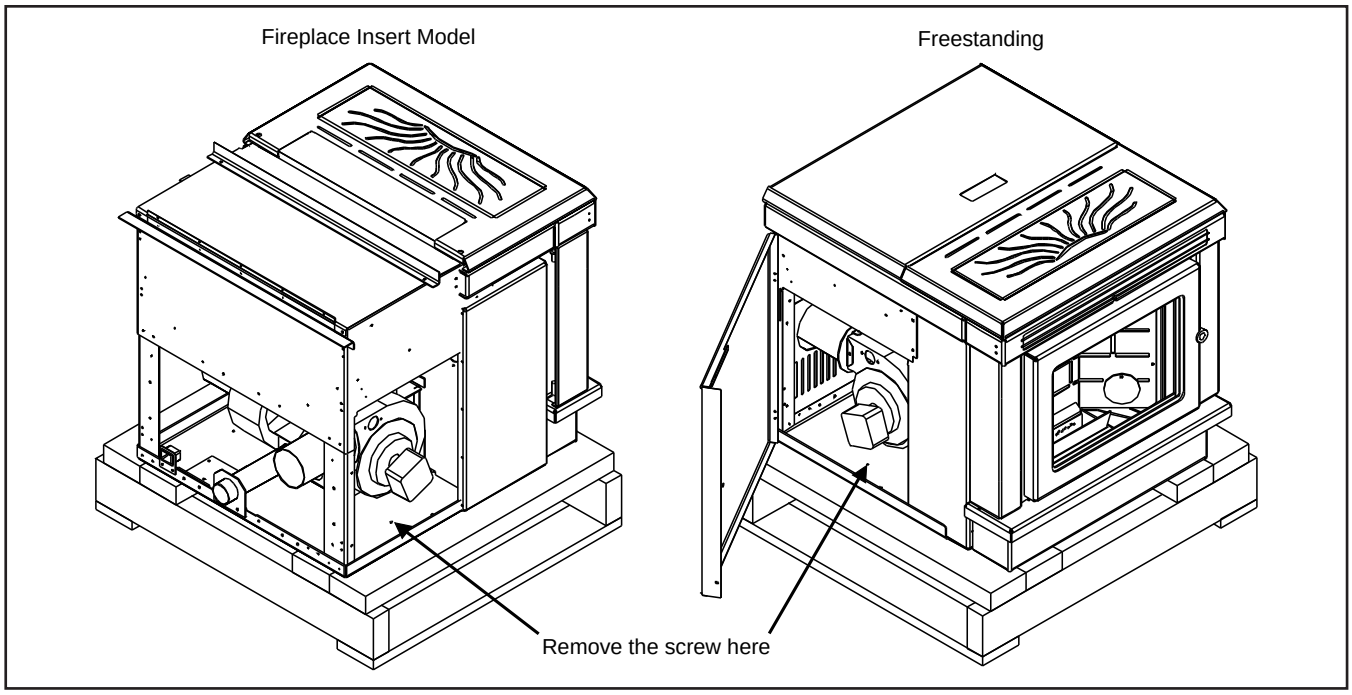


Figure 3 : Removing Freestanding Stove From the Pallet.

CLEARANCES TO COMBUSTIBLES - FREESTANDING:

When installing this unit on a combustible floor (for example linoleum, hardwood flooring) a non-combustible hearth pad must be under the unit. The pad must extend at least the width of the appliance 22" (55.8 cm) and at least the depth of the appliance plus 9" (22.8 cm) in front of the appliance.

Side wall to unit - 6 inches (15 cm)
Back wall to unit - 1 inches (2.5 cm)
Corner to unit - 1 inches (2.5 cm)
Door front to edge of floor protection
- 9 inches (22.8 cm)

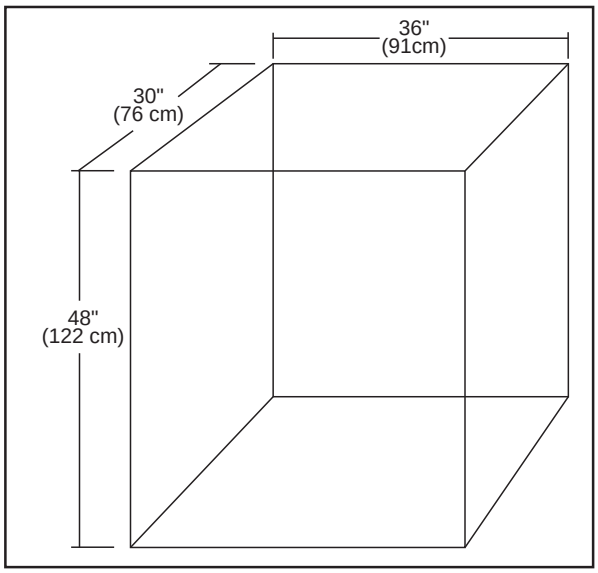


Figure 5 : EF2-1 FS Minimum Alcove Size.

These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning and maintenance.

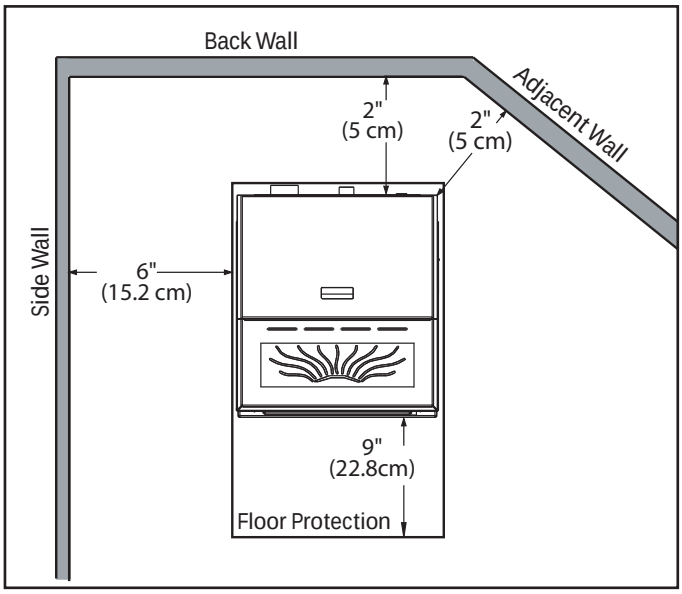


Figure 4 : EF2-1 FS Clearance to Combustibles.

Minimum Alcove width - 36 inches (91 cm)
Minimum Alcove height - 48 inches (122 cm)
Minimum Alcove depth - 30 inches (76 cm)

CLEARANCES TO COMBUSTIBLES - FIREPLACE INSERT:

Refer to Figure 6.
Side wall to unit - 8 inches (20.3 cm)
Mantel projection - 10 inches (25.4 cm)
Mantel to top of unit - 8 inches (20.3 cm)
Top facing to unit - 8 inches (20.3 cm)
Side facing to unit - 9 inches (22.8 cm)
Floor protection - 9 inches (22.8 cm)
on either side and to the front must be protected by non-combustible material.

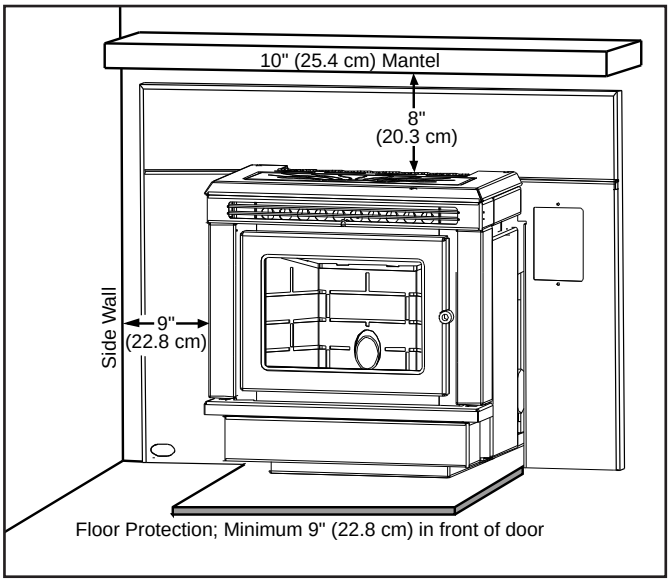


Figure 6 : EF2 -1 FPI Clearance to Combustibles.

Installation

Pedestal Installation:

All models comes with a pedestal that has to be attached prior to installation:

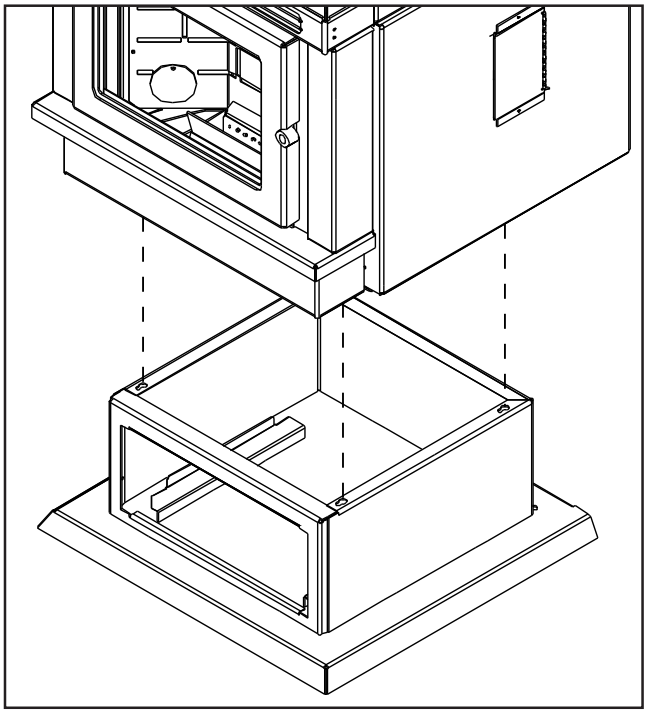


Figure 7 : Freestanding Pedestal.

- Remove the unit from the box
- Remove the freestanding pedestal from the box. Remove the FPI pedestal from the hopper.
- Place the unit on its back on the pallet.
- Back the four (4) 5/16" hex head screws in the base off three (3) to four (4) full turns.
- Align the keyholes in the pedestal with the screws, lock into place.
- Secure the two (2) pieces by tightening the four (4) screws from the inside of the pedestal for the freestanding or from the outside of the pedestal for the FPI .

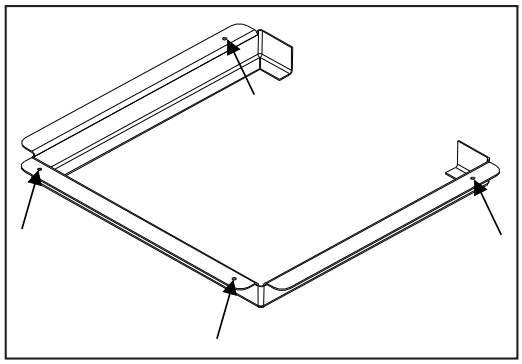


Figure 8 : Fireplace Insert Pedestal.

Mobile Home Installation - Freestanding:

● Secure the heater to the floor using the holes in the pedestal of the appliance.

● Ensure the unit is electrically grounded to the chassis of your home (permanently).

<u>WARNING:</u> Do not install in a room people sleep in.

<u>CAUTION</u>: The structural integrity of the manufactured home floor, wall and ceiling/ roof must be maintained

• Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three (3) screws evenly spaced.

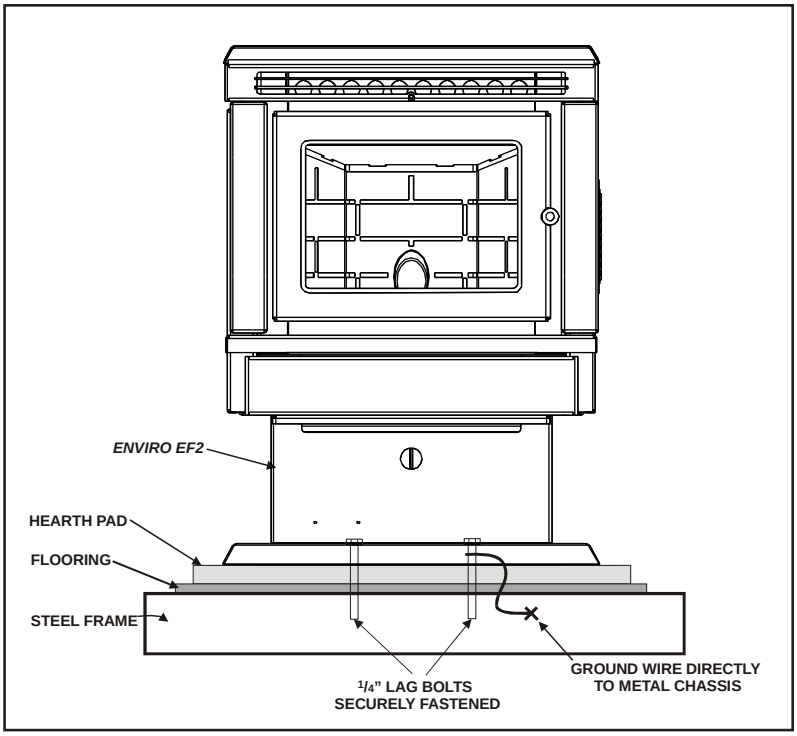


Figure 9 : Mobile Home Install Mounting.

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 2 : Use in conjunction with Figure 10 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	From beside/below any door or window that may be opened. (18" (46 cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/ regulator assembly	To each side of center line extended above natural gas or propane meter/ regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.
2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.

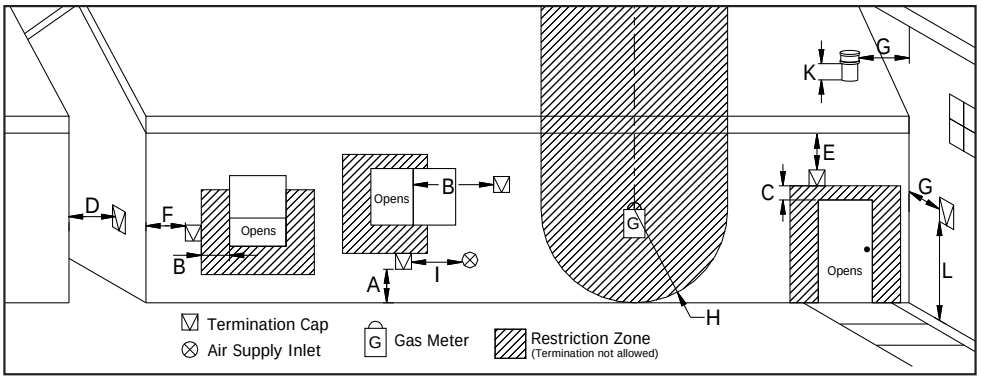


Figure 10 : Use in conjunction with Table 2 for allowable exterior vent termination locations.

3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of ENVIRO, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

OUTSIDE FRESH-AIR CONNECTION:

Outside fresh air is mandatory when installing this unit in airtight homes and mobile homes.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 1⅝" minimum (42 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

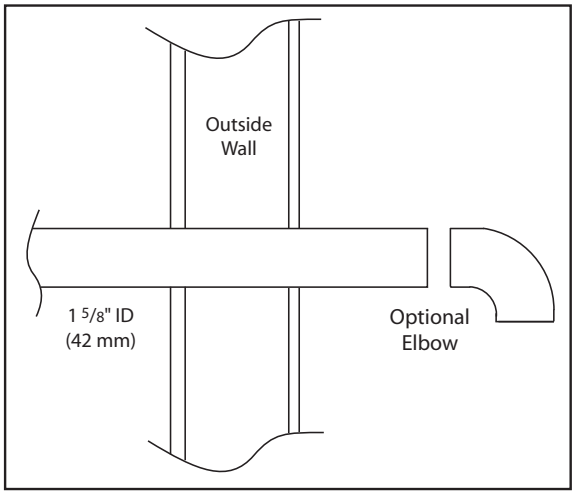


Figure 11 : Outside Air Connection.

EXHAUST AND FRESH AIR INTAKE LOCATIONS:

EXHAUST	Freestanding		Fireplace Insert	
Base of unit to center of flue	16 ⅜"	(41.5 cm)	9"	(22.8 cm)
Center of unit to center of flue	5 ¾"	(14.6 cm)	5 ¾"	(14.6 cm)
FRESH AIR INTAKE.				
Base of unit to center of intake	10 ¾"	(27.3 cm)	3 ⅜"	(7.4 cm)
Center of unit to center of intake	1"	(2.5 cm)	1"	(2.5 cm)

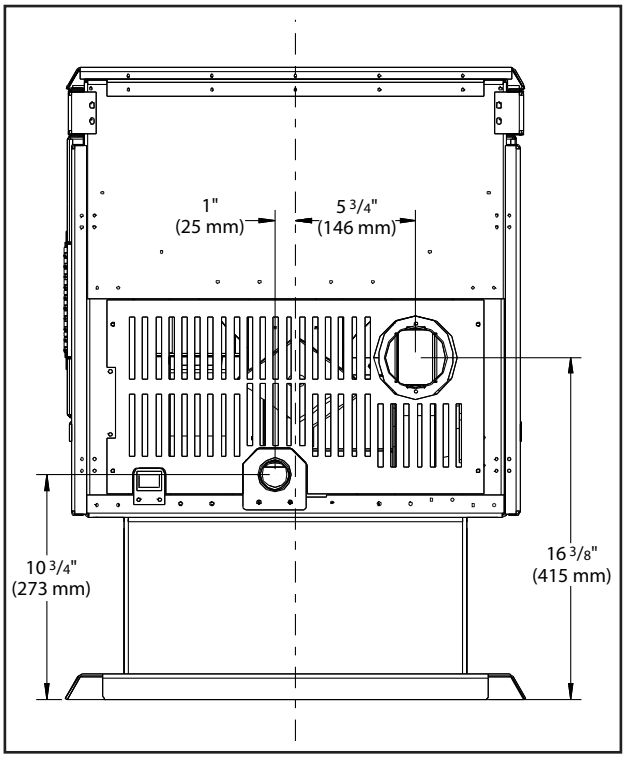


Figure 12 : EF2-1 FS Inlet and Outlet Location.

INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENTING MANUFACTURER

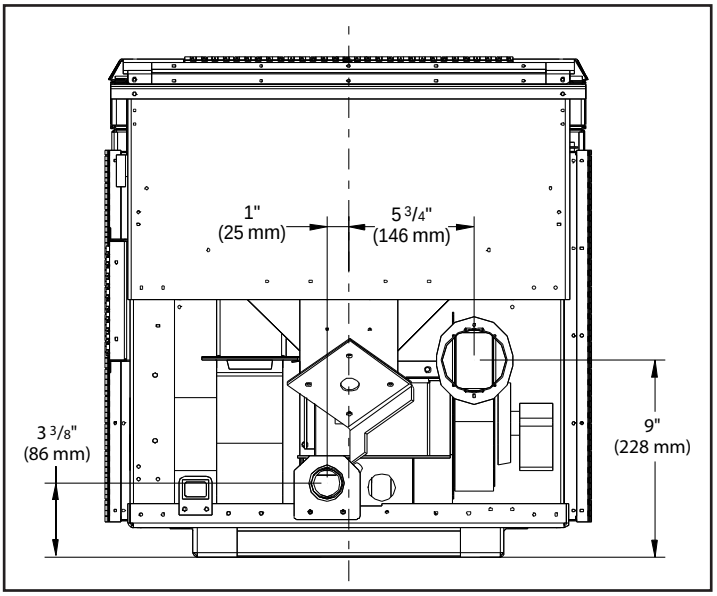


Figure 13 : EF2-1 FPI Inlet and Outlet Location.

CORNER THROUGH WALL INSTALLATION - FREESTANDING:

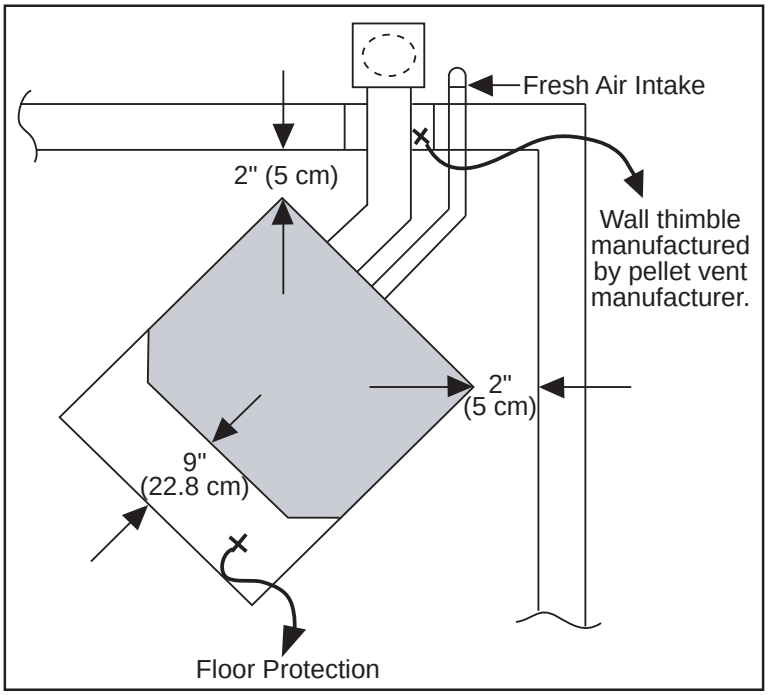


Figure 14 : Corner Installation.

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION - FREESTANDING:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
6. Install a length of 3" (76 mm) or 4" (101 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Install the fresh air intake (see INSTALLATION - OUTSIDE FRESH AIR CONNECTION).
8. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
9. Push the stove straight back, leaving a minimum of 2" (5 cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.

10. The pipe must extend at least 12″ (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.

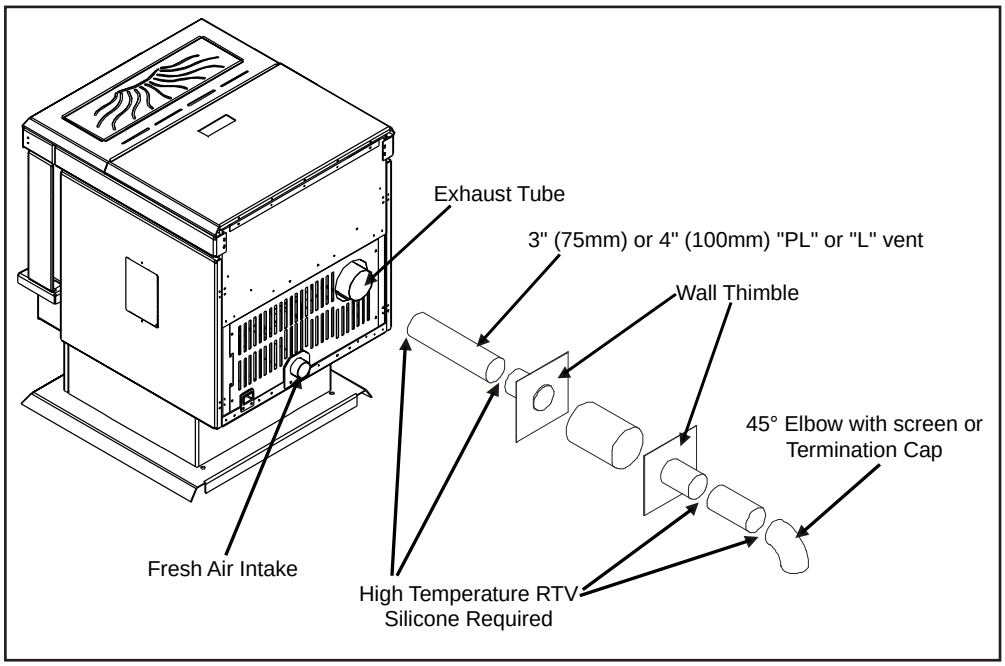


Figure 15 : Straight through wall Installation.

11. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

NOTE:

- Some horizontal through wall installations may require a "T" and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help naturally draft in the unit.
- This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set.
- This is due to the back pressure in the exhaust caused by airflow around the structure.
- All sections of pipe must have three (3) screws evenly spaced and all horizontal and vertical vent sections located within the house must have a bead of high temperature silicone installed on the male end of the pipe before installation to create a gas tight seal.
- The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.
- A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

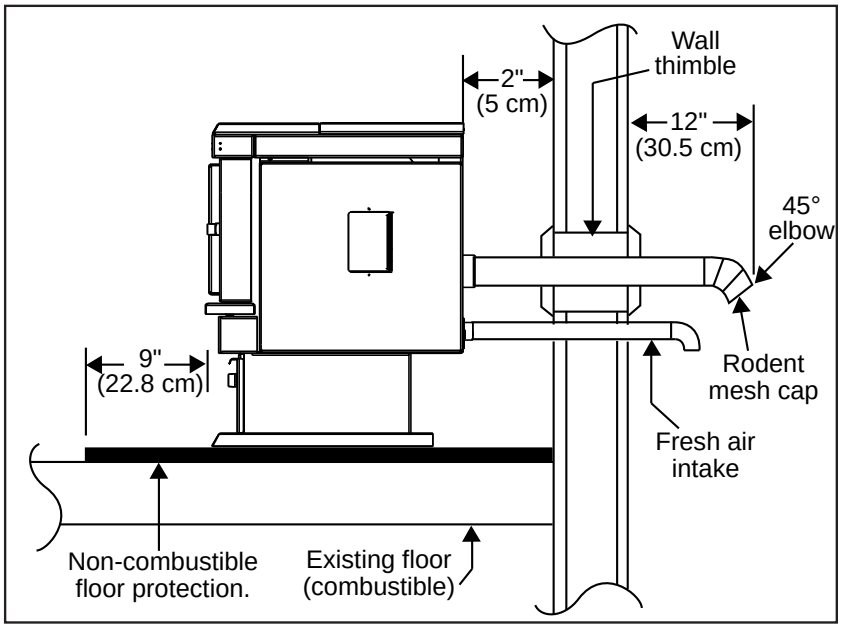


Figure 16 : Straight through Wall Installation - Side View.

Vertical Rise with Horizontal Termination Installation (Recommended) - Freestanding:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

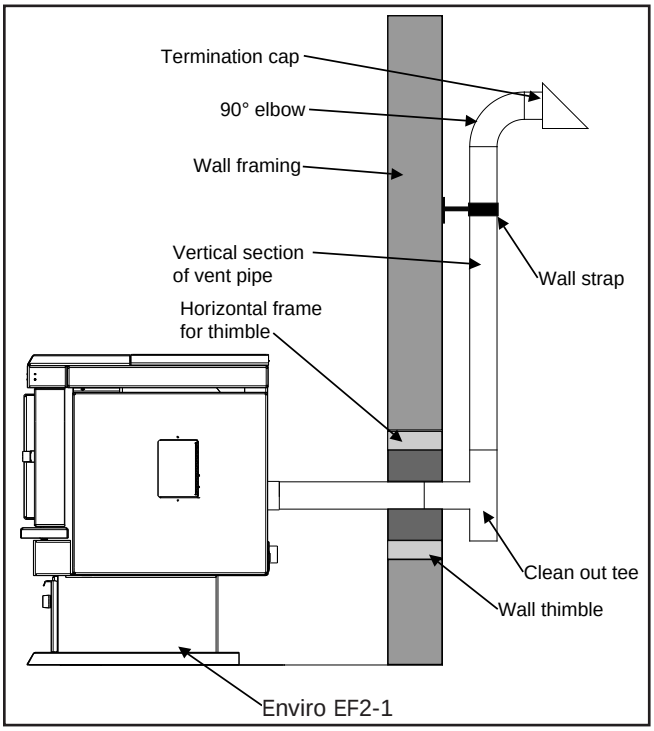


Figure 17 : Through Wall with Horizontal Termination.

Through Concrete Wall With Vertical Rise Installations - Freestanding:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

This is the recommended installation to use if there is a concrete or retaining wall in line with exhaust vent on pellet stove.

The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

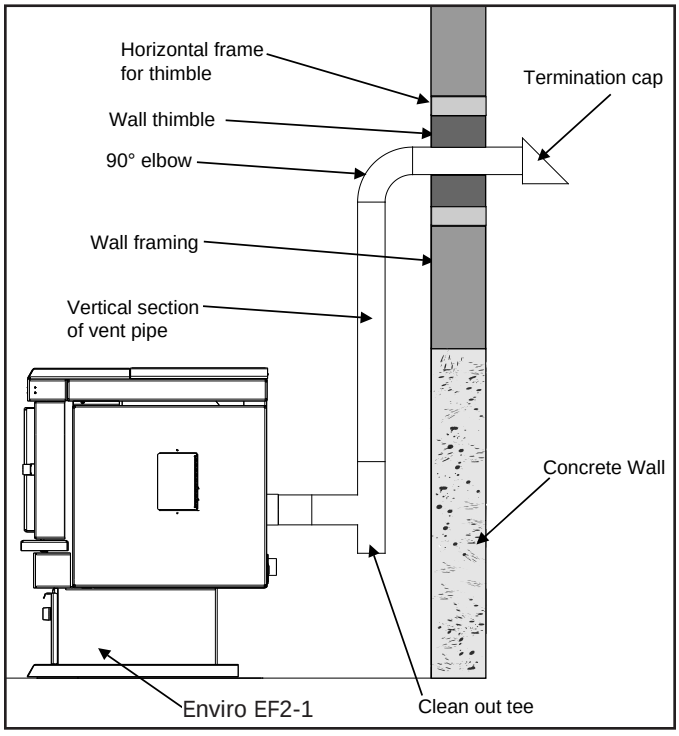


Figure 18 : Vertical rise with Horizontal Termination.

INSIDE VERTICAL INSTALLATIONS - FREESTANDING:

1. Choose a stove location that is ideal. See the section "INSTALLATION - DECIDING WHERE TO LOCATE YOUR PELLET APPLIANCE."
2. Place the unit on the hearth pad (if installed on a carpeted surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3" (76 mm) away from a combustible wall.
3. Locate the center of the fresh air intake pipe on the unit. Match that center with the same point on the wall and cut a hole about 2" (51 mm) in diameter.
4. Install the fresh air intake pipe.
5. Install the tee with clean out.
6. Install the pellet vent upward from there. When you reach the ceiling, make sure that the vent goes through the ceiling fire stop. Maintain a 3" (76 mm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier.
7. Finally, extend the pellet vent to go through the roof flashing.
8. Ensure that the rain cap is approximately 24" (610 mm) above the roof.

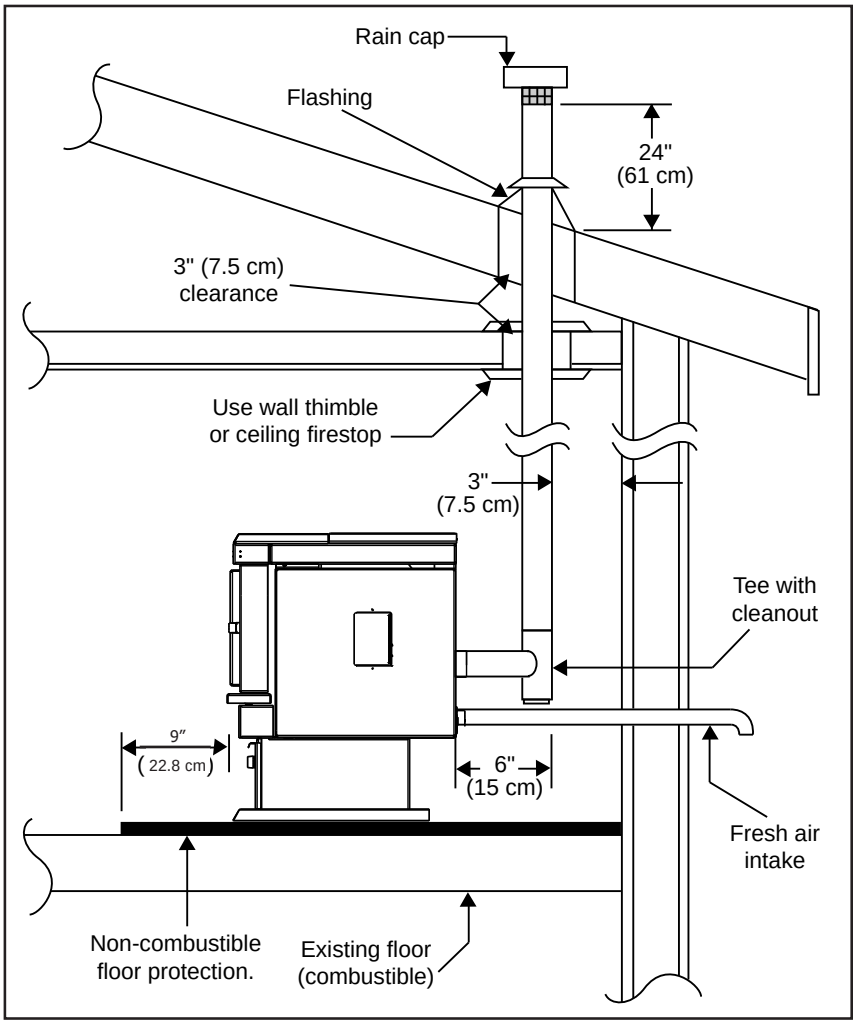


Figure 19 : Inside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3" Vent

Over 15ft: 4" Vent

OUTSIDE VERTICAL INSTALLATIONS - FREESTANDING:

To accomplish an outside vertical pipe installation, follow steps 1 through 5 in the "INSIDE VERTICAL INSTALLATIONS - FREESTANDING" section and then finish it by performing the following (refer to Figure 20).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (610 mm) above the roof.

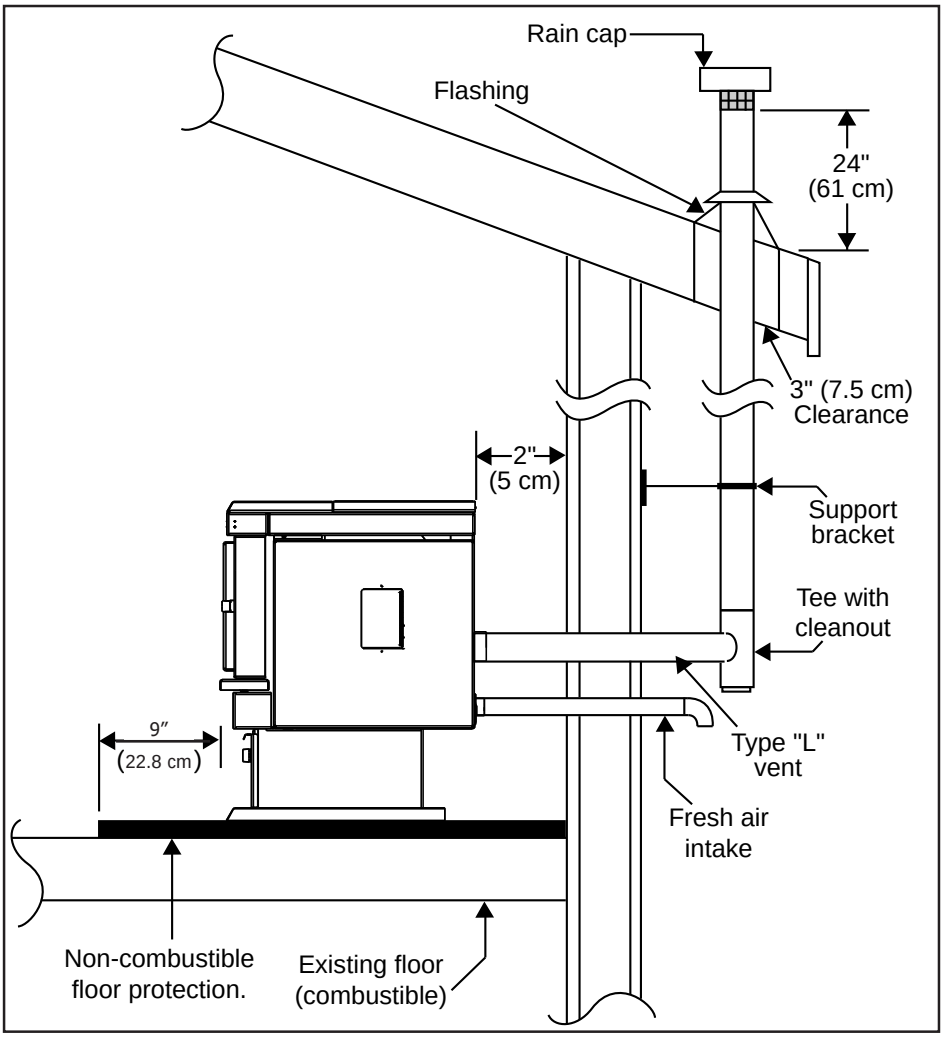


Figure 20 : Outside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3" Vent

Over 15ft: 4" Vent

HEARTH MOUNT INSTALLATION - FREESTANDING:

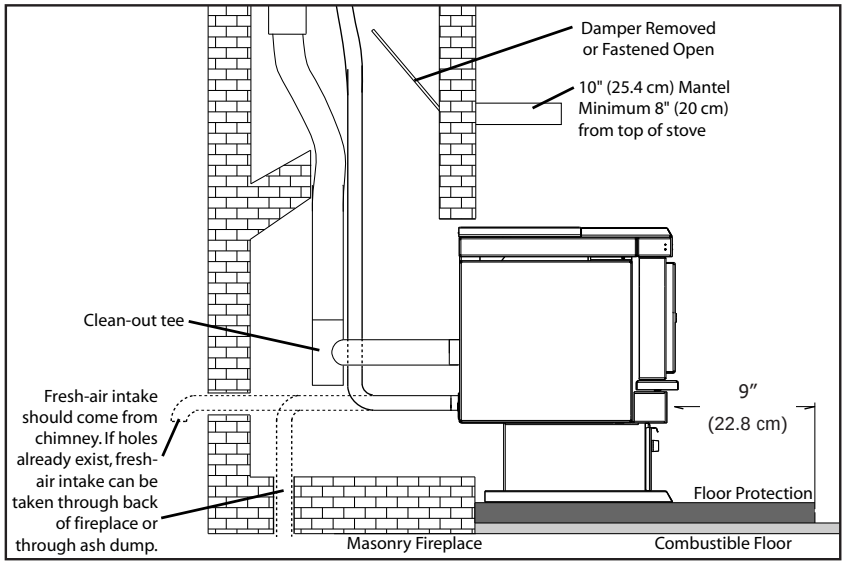


Figure 21 : Hearth Mount - Side View.

1. Lock fireplace damper in the open position.
2. Install a positive flue connector at the fireplace dampers.
3. Connect a clean-out tee or a 90° elbow to the exhaust pipe.
4. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

<u>Recommended vent size for vertical installation:</u>

Under 15ft: 3" Vent

Over 15ft: 4" Vent

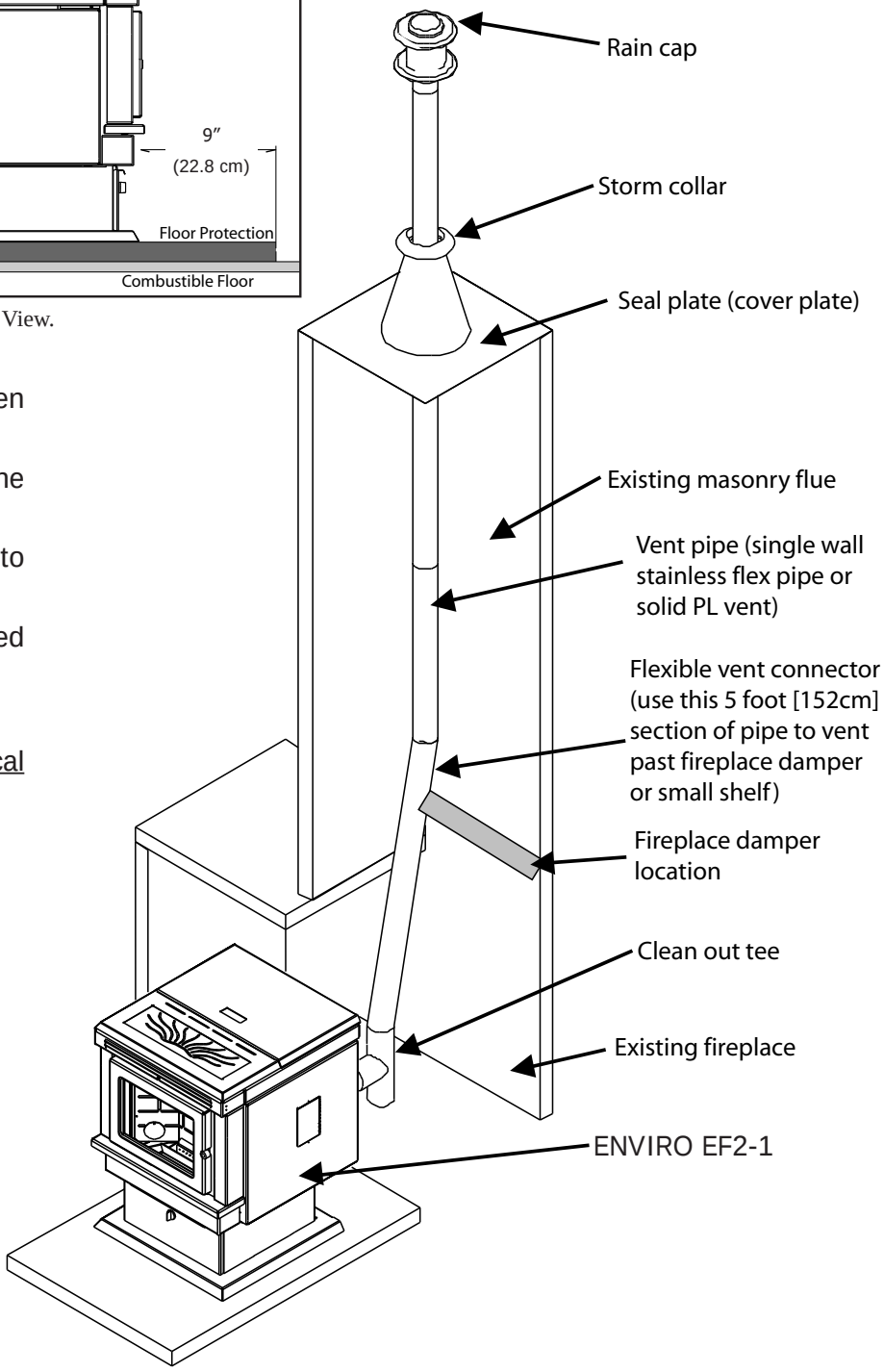


Figure 22 : Hearth Mount - Over View.

Masonry Fireplace Insert Installation - Fireplace Insert:

The Fireplace insert model requires a surround faceplate and a pedestal. When installing this unit, ensure that the pedestal is removed from the inside of the hopper and installed on the bottom of the unit (Refer to Installation - Installation of Pedestal and Leveling Legs - Fireplace Insert).

Adjust hopper height (see Installation - Installing Hopper Cover and Adjusting Hopper Height - Fireplace Insert) and assemble surround panel (see Installation - Installation and Removal of Control Panel in The Surround Panel - Fireplace Insert and Installation - Assembly and Installation of Insert Surround Panels - Fireplace Insert) before starting installation.

A noncombustible hearth pad must cover combustible flooring underneath, as well as 9″ in front of the heater and 6″ to the side of the heater

1. Install the hearth pad.
2. Lock the fireplace damper in the open position.
3. Install a positive flue connector at the fireplace damper.
4. Connect a tee or 90° degree elbow to the exhaust pipe.
5. This fireplace insert must be installed with a continuous chimney liner of 3 or 4″ diameter extending from the fireplace insert to the top of the chimney. The liner must conform to type 3 requirements of CAN/ULC S635.
6. (Recommended) Install fresh air intake either through the back of the fireplace or through the positive flue connector.

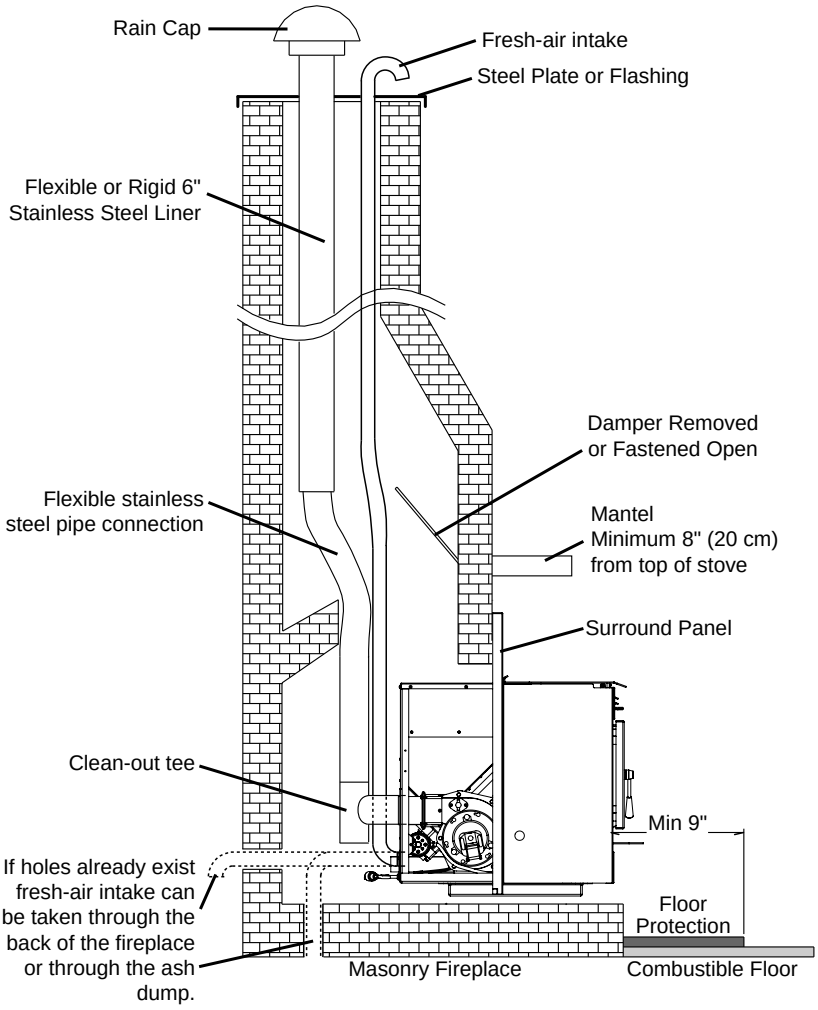


Figure 23 : Installation of Fireplace Insert.

When installing the insert into a masonry fireplace DO NOT remove any bricks or masonry, with the following exception; masonry or steel, including the damper plate, may be removed from the smoke shelf and adjacent damper frame if necessary to accommodate a chimney liner. Provided that their removal will not weaken the structure of the fireplace and chimney, and will not reduce protection for combustible materials to less than that required by the national building code.

When installing the fireplace insert into a zero clearance fireplace, **DO NOT** cut or modify any factory firebox parts. If the fireplace insert does not fit into a zero clearance fireplace we recommend you use an ENVIRO freestanding model and install as a hearth mounted unit. Install a 3″ (76 mm) flex pipe from the stove to the top of the chimney (see "Installation - Hearth Mount Installation - Freestanding").

Positive Flue Connection without a Full Reline - Fireplace Insert (USA Only):

This unit does not require a full reline (in USA only) when installing into a masonry fireplace, however, it is recommended to ensure proper drafting of the appliance.

IMPORTANT: Ensure the chimney and firebox are cleaned and free of all debris, including soot and ashes, before proceeding with this installation. If it is not clean soot maybe blown into the room through the unit's blower. Ensure the fireplace and chimney have not deteriorated in any way. If there is any sign of corrosion or damage in the chimney the unit can not be installed. This unit can be installing in a masonry fireplace built to (UBC 37 or ULC S628 standards) or a factory built fireplace (built to UL 127 or ULC S610 standards).

1. If installing the fireplace with a skirt, the skirt must be installed before the installation.
2. Install the hearth pad. The floor 9" in front of the unit and 6" to each side of the unit must be protected with a non-combustible hearth pad.
3. The vent connector from the insert must extend a minimum of 18" above the chimney seal plate. The chimney seal plate area must be sealed to prevent the exhaust from the chimney from coming back into the fireplace and prevent air from the fireplace from entering the chimney which will affect proper drafting of appliance.

   A qualified installer should evaluate the existing fireplace to determine the best method for achieving a positive flue connection between the vent pipe or liner and the chimney. Whatever method used must effectively seal the area to prevent room air passage to the chimney cavity of the fireplace. A couple examples of Approved Methods of Achieving a Positive Flue Connection are:

   a) Secure a seal-off plate (i.e. 22-gage sheet steel) in the masonry fireplace throat using masonry screws.

   b) Pack non-combustible material (i.e. rockwool) around the vent pipe or using a flue adapter.
4. Set leveling leg to approximate height.
5. Connect the Exhaust Starter Quick Connect, straight or elbow, to the exhaust pipe.

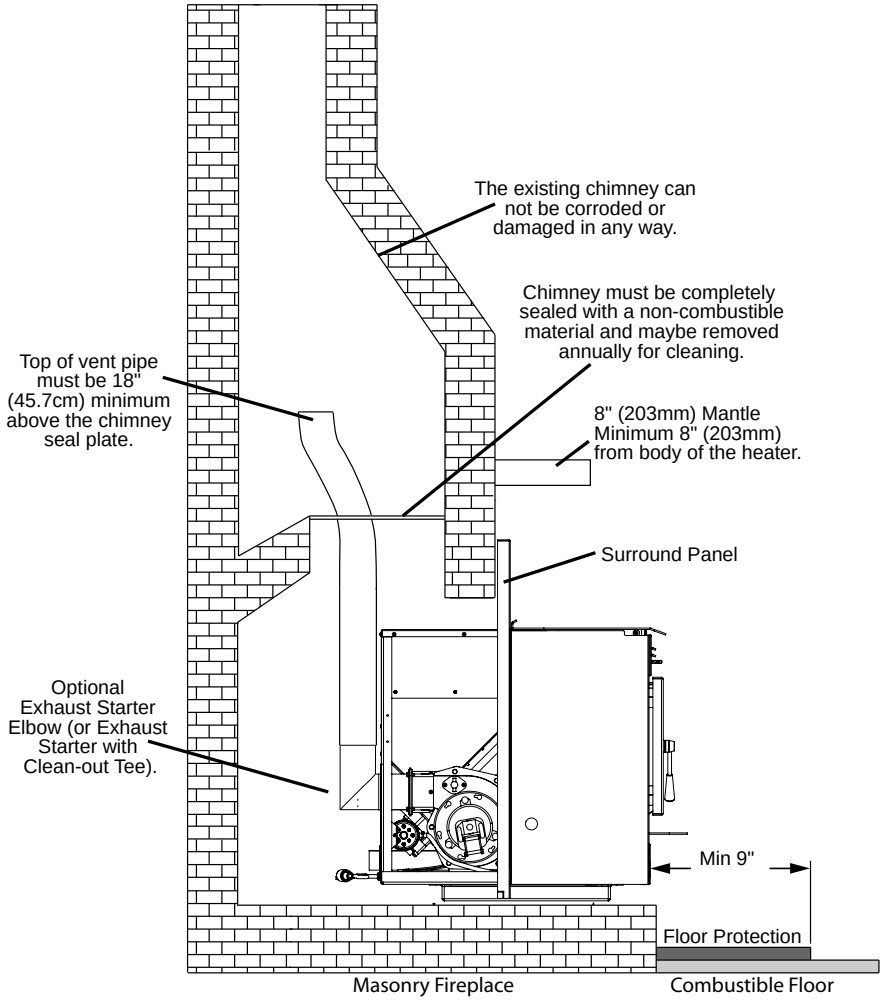


Figure 24 : Masonry fireplace positive flue installation.

IMPORTANT: The chimney seal plate must be removed for the annually chimney cleaning as ash will build up on top of the plate.

Installation of Control Panel in The Surround Panel - Fireplace Insert:

Tools Required: Torx T-20 Screwdriver

1. Remove the control panel from the shipping position on the unit by removing one 8-32 x 3/8" Torx screw.

2. Align the control panel with the two holes in the surround panel and fasten using two (2) 8-32 x 3/8" Torx screws.

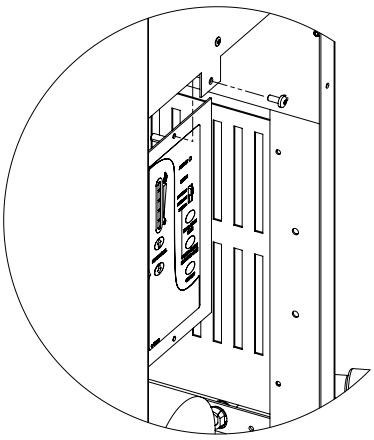


Figure 25 : Removing the control panel from the unit

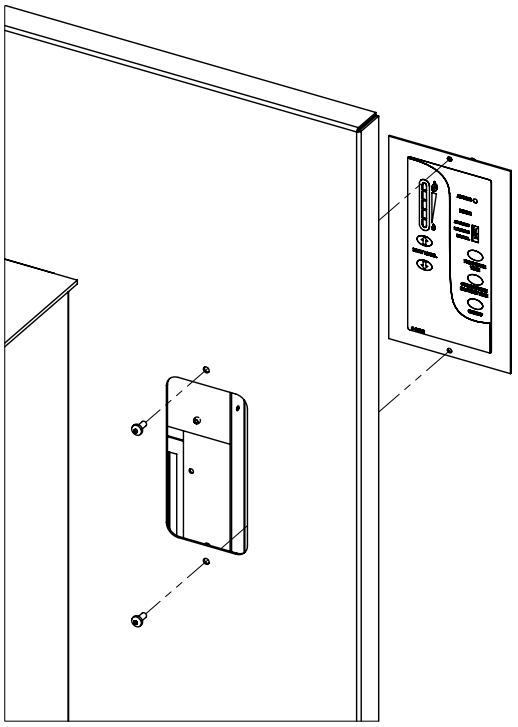


Figure 26 : Attaching the Control Panel

Installation of Insert Surround Panel - Fireplace Insert:

Tools Required: None

1. Attach the control panel to the surround panel (see "Installation of Control Panel in the Surround Panel - Fireplace Insert")

2. Slip the surround panel down behind the unit as shown in Figure 27.

3. Hook the keyholes on the surround panel on the standoffs located on the side panels of the unit.

4. Connect the control panel to the wiring harness.

The power cord can be routed to either side of the unit, the surround panel has a knock-out on each side to allow for passage of the power cord.

The surround panel must be removed to perform maintenance on the internal components of the unit. Reverse the above steps to remove the surround panel.

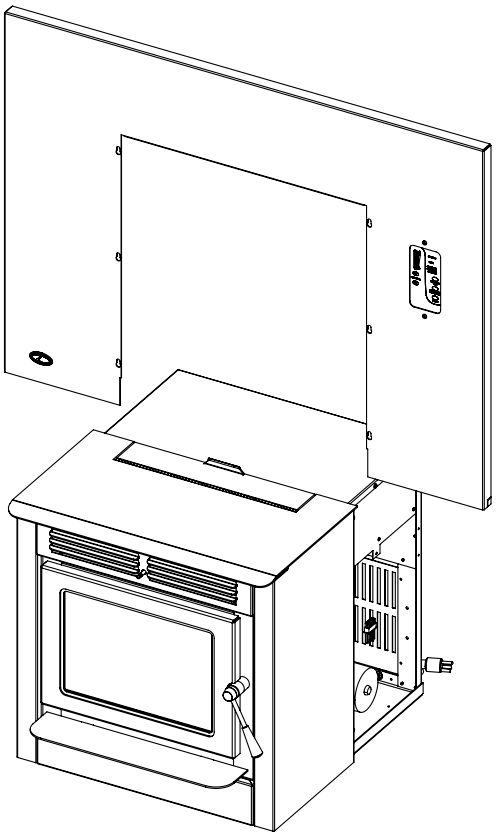


Figure 27 : Attaching the Surround Panel

THERMOSTAT INSTALLATION:

1. Install the wall thermostat in a location that is not to close too the unit but will effectively heat the desired area.

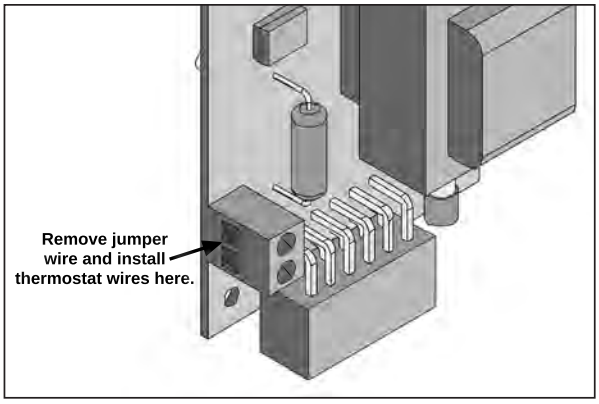


Figure 28 : Thermostat wire placement.

2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

If the unit has been placed in the HI / LOW mode, the unit will be taken to a low or idle setting when the thermostat is not calling for heat. When the thermostat calls for heat, the unit will go to the setting that is displayed on the control board Heat Indicator. If the heating load is not great enough when the stove is on low, the high limit switch will turn the stove off and the switch will have to be manually reset. To reset the high limit switch, remove the right cabinet side. The switch is found behind the control panel. Avoid setting off the high limit switch.

Operating Instructions

Control Board Functions:

1. **AUGER LIGHT:** This green light will flash in conjunction with the auger pulse.
2. **MODE LIGHT:** Responsible for signaling the state of the control board. When the light is flashing the stove is in an automatic start mode or the thermostat has control of the unit. When the light is solid, the Heat Level Setting can be altered.
3. **THERMOSTAT SWITCH:** Used to set the unit's controls to one of three mode settings; manual, high/low, or auto/off.
4. **FEED RATE TRIM BUTTON:** Used to change the feed rate trims in ¼ second increments for all feed settings. When this button is pressed, all the lights will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 4 light. To adjust the setting hold the Feed Rate Trim button down and press the Heat Level up or down buttons.

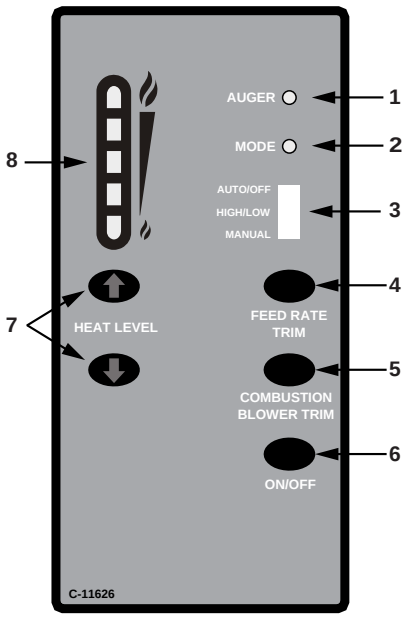


Figure 29 : Circuit Board Control Panel Decal.

5. **COMBUSTION BLOWER TRIM BUTTON:** Used to change the Combustion Blower trims in 5 volt increments for all feed settings until it reaches line voltage. When this button is pressed, all the light s will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 2 light. To adjust the setting hold the Combustion Blower Trim button down and press the Heat Level up or down buttons.
6. **ON/OFF BUTTON:** Used to turn the unit ON and OFF.
7. **HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
8. **HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

Automatic Safety Features of Your Pellet Stove:

A. If the fire goes out (exhuast temperature drops below 120°F); the unit will automatically shut down.

B. This unit is equipped with a high temperature safety switch. If the temperature of the hopper reaches 200°F, the auger will automatically stop and the unit will shut down. Once the exhaust temperature cools below 120°F the #4 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

C. The unit is equipped with a vacuum switch to monitor the exhuast venting; if the unit is unable to establish sufficient vacuum for operation this switch will turn off the auger and the #2 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

Operating Your Pellet Stove:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

Note: The thermostat mode can be changed during normal operation.

Operating Instructions

MANUAL MODE:

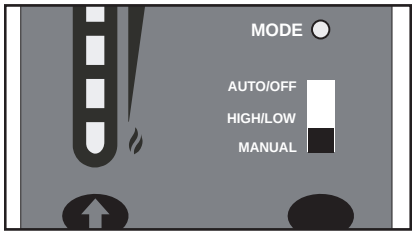


Figure 30 : Thermostat Switch in MANUAL position.

All control of circuit board function is adjusted at the circuit board.

To START: Press the ON / OFF button. The stove will turn on. The system light will flash. The Auger Light will flash with each pulse of the auger (the Auger Feed Rate is pre-programmed during start-up). The Heat Level Indicator will show the Heat Level that the stove will run at after start-up and can be adjusted; but the change will not take affect until the start -up has finished.

If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. This can be done by restarting the unit five (5) minutes into its start-up or by putting a small hand full of pellets into the burnpot.

To OPERATE: When a fire has been established, the System Light will turn solid (after approximately 10 - 15 minutes) and the Auger Light will continue to flash to the corresponding Heat Level setting.

The convection blower (room air blower) will turn on. The speed of this blower is controlled by the setting of the heat level output indicator.

HIGH/LOW MODE: (Requires a thermostat)

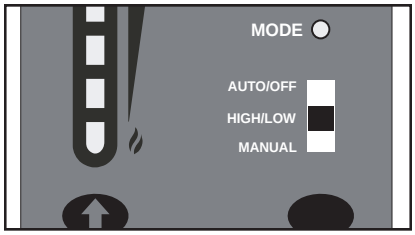


Figure 31 : Thermostat Switch in HIGH/LOW position.

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat calls for heat (contacts are closed) the stove settings are adjustable as per Manual Mode. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. *The LOW heat setting can be adjusted for different fuel qualities (see "Operating Instructions - Control Board Functions"). The stove will come back to the previous HEAT LEVEL setting when the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat)

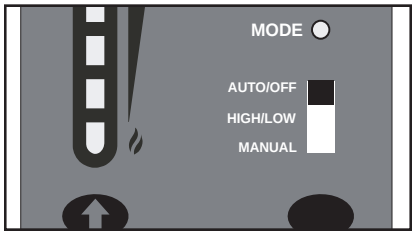


Figure 32 : Thermostat Switch in ON/OFF position.

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat contacts close, the unit will light automatically. Once up to temperature, the stove operates the same as in MANUAL. When the thermostat contacts open, the stove's HEAT LEVEL and Fans will drop down to the LOW setting for 30 minutes. If the thermostat contacts close within the 30 minutes, the HEAT LEVEL will return to the previous MANUAL setting. If the thermostat contacts remain open the stove automatically begins its shutdown routine. The ON / OFF button can be pressed at any time to immediately shut down the unit. The stove will re-light when the thermostat contacts close again.

Turning Your Pellet Stove Off:

- MANUAL and HI / LOW mode: To turn the unit OFF, simply press the ON / OFF button. This will stop the feed of pellets. The blowers will continue to operate and cool the stove down. When cool enough, the stove will turn off.
- AUTO / OFF mode: To turn the unit OFF, turn the thermostat down or off. NOTE: The unit will run on low for three (3) minutes before it turns off.

DO NOT unplug the unit while Combustion fan is operating.
This may lead to smoke escaping from the stove.

Slider/Damper Set-Up:

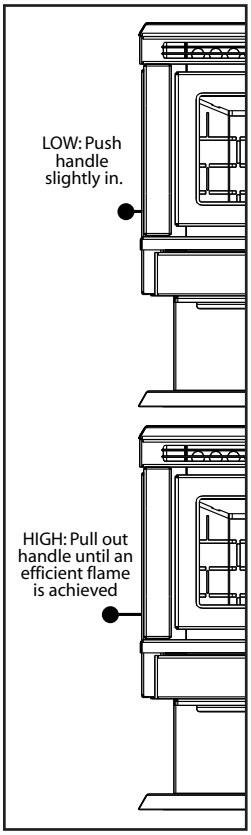


Figure 33 : Slider / Damper Knob.

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION. A Qualified Service Technician or Installer must set the Slider Damper. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 33).

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper should be pushed in slightly, decreasing the air in the firebox.

If, after long periods of burning, the fire builds up and overflows the burn pot or there is a build up of clinkers, this would be a sign that the pellet quality is poor, this requires more primary air, the slider damper must be pulled out to compensate. Pulling the slider damper out gives the fire more air.

The easiest way to make sure that an efficient flame is achieved is to understand the characteristics of the fire.

- A tall, lazy flame with dark orange tips requires more air – Open slider (pull out) slightly.
- A short, brisk flame, like a blowtorch, has too much air – Close slider (push in) slightly. For the
- If the flame is in the middle of these two characteristics with a bright yellow/ orange, active flame with no black tips then the air is set for proper operation, refer to Figure 34.


Figure 34 : Efficient Flame.

Taking a reading of vacuum pressure inside the firebox with a magnehelic gauge can be used to set the slider for best combustion. **The best settings are a reading of 0.12 to 0.13 inches of water column (30 Pa) on the high fire setting**. **Some fuels may require higher or lower settings.** For the most efficient burn, the slider damper must be pushed all the way in. The reading can be taken from the ⅛" (3 mm) hole located on the front of the unit below the door and behind the magnetic ash lip.

SPECIAL NOTES: Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard ash build-up).

Guidelines For Fine-Tuning For Fuel Quality:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit builds up on all settings, the slider damper rod should be pulled out in small increments to give the unit more air.
2. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
3. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
4. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
5. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

Routine Cleaning and Maintenance

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its optimum and giving you excellent heat value:

2-3 Days / Weekly	Semi-annually or 2 Tons of Fuel
Burn Pot and Liner	Exhaust Vent
Ash Pan	Fresh air Intake Tube
Inside Firebox	Blower Mechanisms
Door Glass	Heat exchanger tubes
Heat exchanger tubes	Behind firebox liners
Ash pan and Door gaskets	All Hinges
Door Latch	Post Season Clean-up

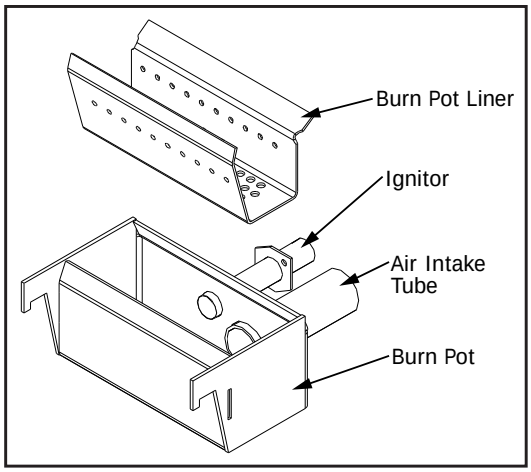


Figure 35 : Burn pot assembly.

TOOLS REQUIRED TO CLEAN UNIT

- Torx T-20 Screwdriver
- Brush
- Soft Cloth
- 5/16" Wrench or Socket
- Vacuum with fine filter bag

BURN POT AND LINER (2-3 days)

Cleaning of the burn pot and liner must only be done when stove is cold. To remove the burn pot and burn pot liner, open the door using the door handle provided (located on the right-hand side of the stove). Swing the door open. Lift the liner from the burn pot. Lift the burn pot from the firebox by gently lifting up the front of the burn pot, then sliding the assembly from the air intake tube and the ignitor cartridge.

This is the 'pot' where the pellets are burned. Every two (2) to three (3) days (when the unit is cold), remove the burn-pot liner from the stove and inspected it to ensure proper air flow through the liner. **Failure to keep the liner clean may cause a build up of fuel past the burn pot liner and up the drop tube. This will cause the auger to jam and may result in pellets burning in the drop tube and hopper**. Using the metal scraper tool provided, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube. Press the liner up against the ignitor tube.

If, after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor or the stove may need cleaning. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door by lifting the handle. The glass can be cleaned by wiping down the outside and inside of the glass with a dry soft cloth.

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wipe down the outside and inside of the glass

DOOR LATCH (2-3 days)

Check the door latch every time the door is opened or closed to ensure proper movement.

Routine Cleaning and Maintenance

ASH PAN AND DOOR GASKETS (weekly)
After extended use the gasketing may come loose. To repair this, glue the gasketing on using high-temperature fiberglass gasket glue available from your local ENVIRO dealer. This is important to maintain an airtight assembly.

ASH PAN (weekly)

The ash pan is located under the burner. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "Introduction - Safety Warnings And Recommendations" for disposal of ashes.

Freestanding: To remove the ash pan, simply turn the knob and pull out towards the front.

Insert: To remove the ash pan, remove the ash pan cover. Use a blade screwdriver to unlock the ash pan from the unit. Pull the ash pan out of the

DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.

HEAT EXCHANGER TUBES (weekly)

The heat exchanger tube cleaning rod is located oon the front of the unit. Pull this rod in and out a few times to remove any fly ash that may have accumulated on the heat exchanger tubes. Different qualities of fuels will produce varying amounts of fly ash; so cleaning of the heat exchanger tubes should be done on a regular basis.

NEVER TOUCH THE TUBE CLEANING ROD WHEN THE UNIT IS HOT.

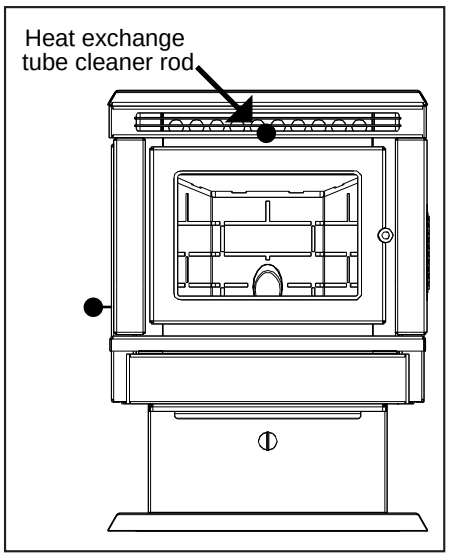


Figure 36 : Heat Exchanger Tube Cleaner.

FRESH AIR INTAKE (season)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST VENT (season)

This vent should be cleaned every year or every two (2) tons of pellets. We recommend contacting your dealer for professional cleaning. To clean the vent pipe, tap lightly on the pipe to dislodge any loose ash. Open the bottom of the "T" to dump the ash, then vacuum as much of the ash out of the vent pipe as possible.

BLOWER MECHANISMS (season)

Unplug the stove then open the right and left side panels to access the two blowers. Vacuum all dust from motors. DO NOT lubricate the motors. Check gaskets and replace if needed.

ALL HINGES (season)

Check all the hinges on the unit to ensure proper movement.

Routine Cleaning and Maintenance

EXHAUST PASSAGES (season)

Removal of the firebox backing for bi-annual cleaning (refer to Figure 38):

- Open the door by lifting the handle, remove the burn pot and burn pot liner.
- Lubricate all screws with penetrating oil.
- Remove the two (2) port covers. Remove the four (4) screws that hold the brick liner in place. Remove brick liner. Remove the four (4) screws that hold the baffles in place. Remove side baffles by sliding them forward then out.
- Pull the center baffle out.
- Vacuum and clean thoroughly.

Installation of firebox backing:

- Insert center baffle with backing.
- Place the two (2) side baffles back into the firebox and reinstall the four (4) screws that hold them in place.
- Replace brick liner with four (4) screws.
- Replace the two (2) port covers.

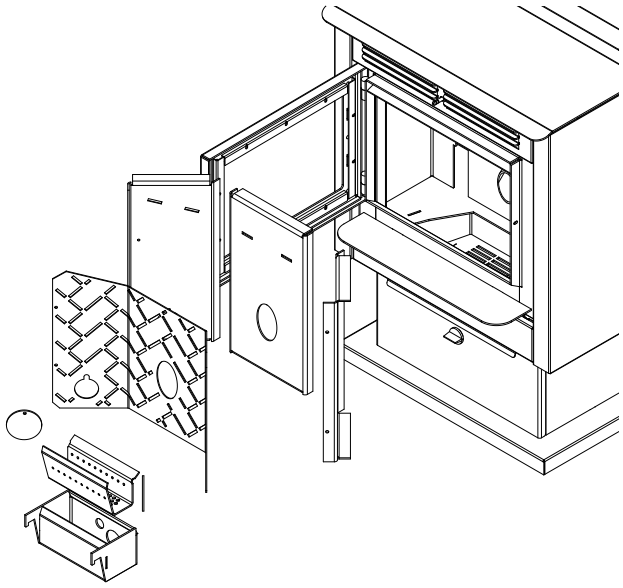


Figure 37 : Firebox Components Removal.

- Replace the burn pot and burn pot liner
- Close the door and secure.

POST SEASON CLEAN-UP

Once you are finished using the pellet appliance for the season, unplug the stove for added electrical protection. It is very important that the stove be cleaned and serviced as stated above.

CLEANING PLATED SURFACES

Painted surfaces should be wiped with a damp cloth periodically.

It is important to note that fingerprints and other marks can leave a permanent stain on plated finishes. To avoid this, give the surface a quick wipe with denatured alcohol on a soft cloth BEFORE lighting the fireplace. Never clean surfaces when they are hot. Do not use other cleaners or abrasives as they may leave a residue or scratches, which can become permanently etched into the surface.

FIREBOX PANEL

The paint on the steel firebox panels may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty.

REPLACING DOOR GLASS

It is recommended that your ENVIRO dealer replace the glass if broken.

The door glass is made of high temperature 5mm ceramic. Replace only with part# EF-061.

Troubleshooting

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Remove any screws from inside the firebox without first applying a penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. The stove will not operate when hot.
3. The exhaust blower will not function normally.
4. Light # 2 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. The 200 °F (93 °C) high limit temperature sensor has tripped.
7. The convection blower will not function normally.
8. Ignitor- the pellets will not light.
9. Control settings (Heat Level) has no effect on the fire.
10. The stove keeps going out.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

✓Make sure the stove is plugged in and the wall outlet is supplying power.

✓If the Control Board has been placed in the ON /OFF thermostat mode, then turn the thermostat up to call for heat.

✓Ensure the burn pot liner is correctly placed in the burn pot

✓Check the Heat Level Indicator. - If the # 2 light is flashing (see the # 2 light is flashing)

✓Check the fuse on the circuit board.

✓If the unit still does not start, contact your local service dealer for service.

2. The stove will not operate when hot.

✓Check the Heat Level Indicator if a fire is not detected, or if the fire has gone out **the #3 light will flash** because the Exhaust Temperature Sensor's contacts have opened.

✓Check the hopper for fuel.

✓Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a change to the vent system or installation of fresh air to correct Air to Fuel ratio problems).**

✓Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.

✓Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >115 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower.

✓Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.

✓Exhaust Temperature Sensor failure. – Bypass sensor located on Exhaust Blower if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.

✓Check the fuse on the circuit board.

3. The exhaust motor will not function normally.

✓Open the left side access panel; check all connections against the wiring diagram.

✓See "2. The stove will not operate when hot." section.

4. Light # 2 on Heat output bar flashing

(The Vacuum Switch contacts have opened for more than 15 sec.)

✓Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose

✓Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.

✓Blocked exhaust / venting system - Have stove and venting cleaned and inspected.

✓Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.

✓Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.

✓Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors

✓Combustion Blower failure - The Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visual Check; is the blower motor turning? Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 V on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >114 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge. (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - push the ON/OFF button

5. Auger light flashes but auger motor does not turn at all.

✓If the Auger gear box does not turn but the motor's armature does try to spin then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover after installation**

✓Check the fuse on the circuit board.

6. The 200 °F (93 °C) high limit temperature sensor has tripped.

✓Reset sensor and determine cause – was it Convection Blower failure or 160 °F (71 °C) Temperature Sensor failure? Bypass the 160 °F (71 °C) sensor, does the Convection blower come on high if not replace the blower? If yes, replace sensor (located on the left side of the firewall).

✓Check the fuse on the circuit board.

7. The convection blower will not function normally.

✓Clean all grill openings at the back and below unit .

✓Press the fan button; does the fan come on? Press again to verify that the blower turns on; if, not contact your local dealer for service.

8. Ignitor- the pellets will not light.

✓Everything else in the stove operates but the ignitor will not light the pellets.

✓Make sure the burn pot liner is up tight and square to the ignitor tube by pushing the burn pot back against the ignitor tube.

✓Check to see if the exhaust blower is operating. If not, contact your local dealer for service.

✓Check the fuse on the circuit board.

NOTE: The ignitor should be bright orange in color. If not replace the ignitor.

9. Control settings (Heat Level) has no effect on the fire.

✓NOTE: If the system light is flashing the Control Board has complete control of the unit. When the units system light becomes solid then control of the unit is given back to the operator.

✓If there is no control of the Heat Level button make sure the thermostat is calling for heat.

✓Call your local dealer for service.

10. The stove keeps going out.

If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

✓Check to see that the Slider / Damper is in the correct position.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

✓Set the auger trim till the #1 and #5 lights are illuminated.

If the stove goes out and there are partially burned pellets left in the burn pot liner, the stove has shut down due to a lack of air, exhaust temperature, or power failure.

✓Adjust the Slider / Damper.

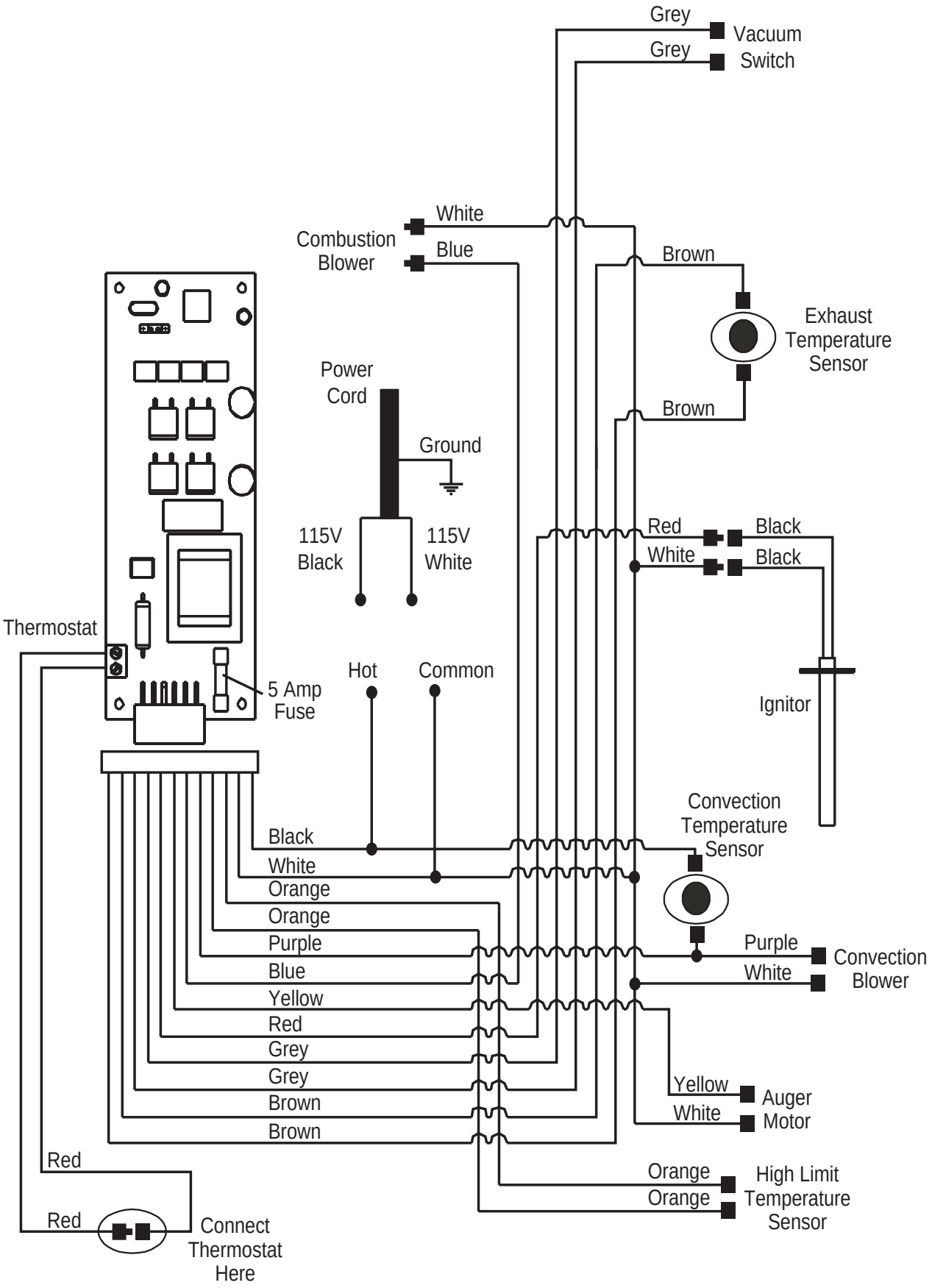
✓Check to see if the stove needs a more complete cleaning.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

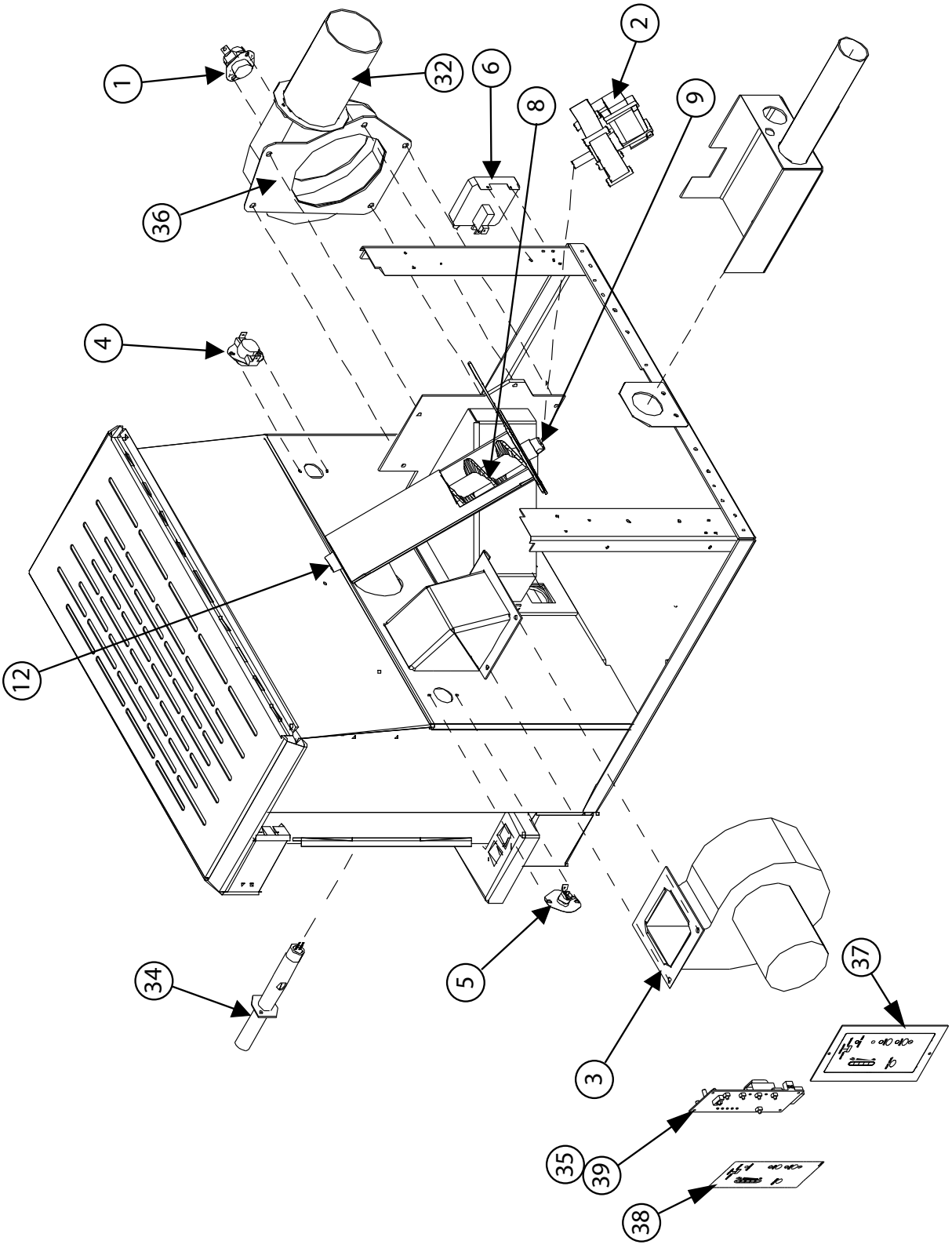
✓Did the power go out?

✓Contact your local Dealer for service.

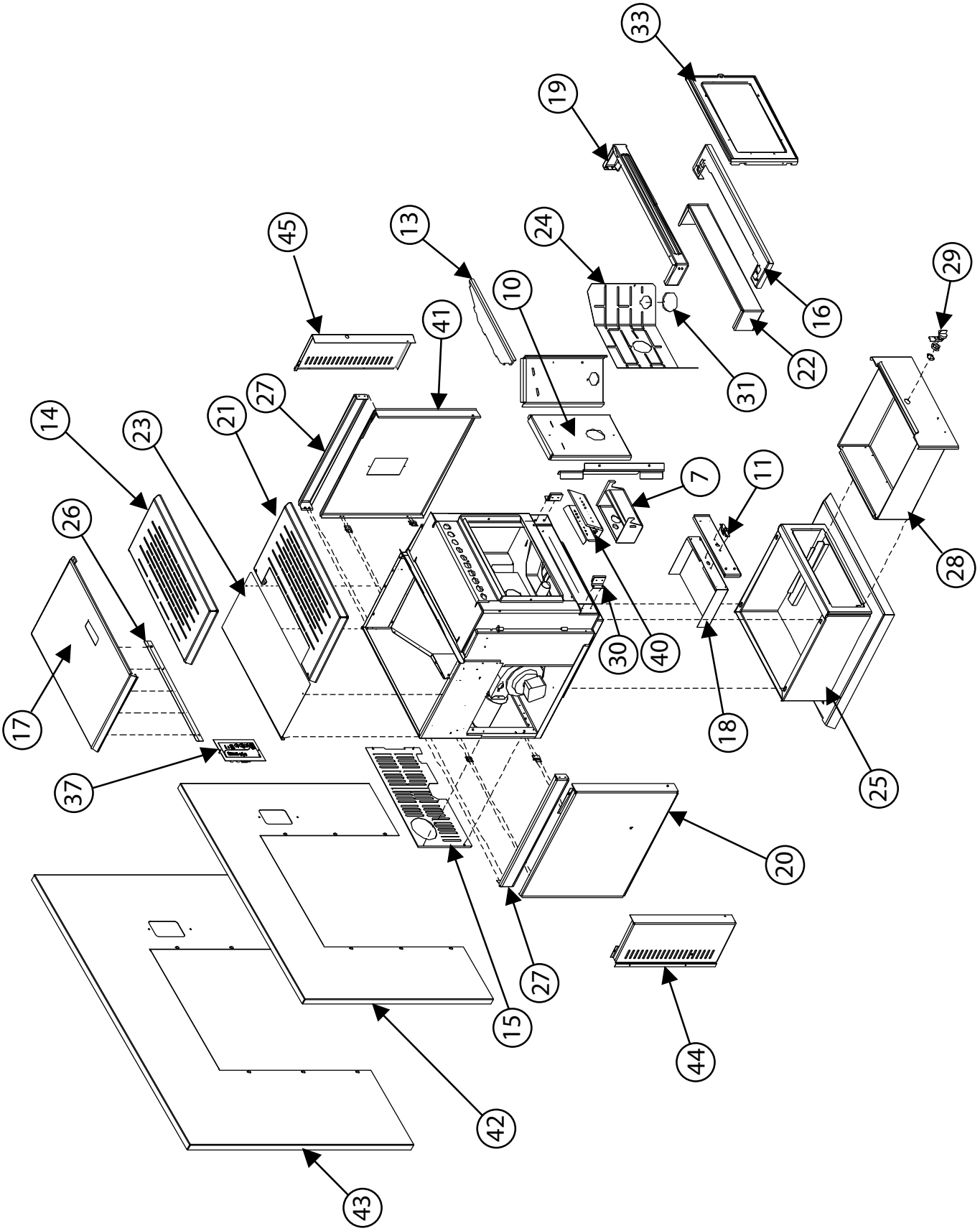
Wiring Diagram



PARTS DIAGRAM - COMPONENTS



PARTS DIAGRAM - STEEL



PARTS LIST

Reference #	Description	Part #
1	120°F (49°C) Ceramic Fan Temp Sensor	EC-001
2	Auger Motor	EF-001
3	Convection Blower 115V	EF-002
	Convection Blower Impeller	EF-004
	Convection Blower Insulator (Gasket)	EF-006
	Combustion Main Impeller	EF-008
	Combustion Cooling Impeller	EF-009
	Combustion Blower Mounting Gasket	EF-011
	Combustion Blower Housing Gasket	EF-012
4	Fan Temperature Sensor 160°F (71°C)	EF-013
5	High Limit Temperature Sensor 200°F (93°C) Manual Reset	EF-016
6	Vacuum Switch	EF-017
	Silicone Hose	EF-018
	Aluminum Hose Barb	EF-019
7	Ignition Burn Pot	EF-021
8	Auger	EF-025
9	Auger Brass Bushing & Plate	EF-026
	Door Handle with Knob, Rod, & Cams	EF-030
10	Firebox Liner CW Insulation	50-2342
	Heat Exchanger Rod With Knob	EF-051
	⅝” Door Gasket 7’ (2.1 m)	EF-056
	½” Round Door Gasket 72” (1.8 m)	EF-057
	Window Channel Tape 60” (1.5 m)	EF-058
11	FPI Ash Pan Latch	EF-060
	Glass Set With Tape	EF-061
	Slider Damper Plate	EF-064
12	Auger Brass Bushings (Set of 2)	EF-065
13	Firebox Liner Top Plate	EF-066
	Knob 1 Inch Round	EF-068
	¾” ID Auger Collar with Set Screw	EF-069
	Fireplace Insert Pedestal Complete	EF-074
14	Freestanding Stove Top	50-4113
15	Freestanding Back Grill	EF-097
16	Ash Sill	EF-103
17	Freestanding Hopper Lid With Handle	EF-104
18	Fireplace Insert Ash Pan Drawer With Latch	EF-105
19	Front Grill	EF-106
20	Freestanding Left Cabinet Side	EF-107
21	Fireplace Insert Stove Top	50-4115
22	Ash Pan Cover	EF-117
23	FPI Hopper Cover	EF-122
	Shoulder Bolt & Nut	EF-125
	Firebox Ceramic Wool Insulation	EF-126
24	Brick Liner	50-2336
25	Freestanding Pedestal Complete	EF-138
	Ignitor Tube Only	EF-140

PARTS LIST

Reference #	Description	Part #
26	Freestanding Hopper Lid Hinge	EF-141
27	Freestanding Hopper Side Rail (Left & Right)	EF-142
	FPI Hopper Side Rail (Left & Right)	EF-144
	Thermostat Interface Kit	EF-152
	Pellet Stove Cleaning Brush	EF-156
28	Freestanding Ash Drawer with Latch	EF-159
29	Freestanding Ash Pan Latch	EF-178
30	FPI Ash Pan Cover Magnet Set	EF-188
31	Firebox Cleaning Port Covers	EF-194A
	Pedestal & Ash Pan Gasket 10’ (3 m)	EF-208
	Domestic Power Cord - 115V	EC-042
	60° Exterior Exhaust Adaptor	50-096
	Enviro Logo Gel Decal	50-322
32	Combustion Blower Exhaust Tube	50-327
	Firebox Liner Top Rod	50-591
33	Door Assembly Complete	50-2328
34	Ignitor 300W	50-1067
35	Circuit Board 5 Amp Fuse 115V (SET OF 2)	50-833
36	Exhaust Blower Assembly - 115V	50-901
	Wiring Harness	50-914
	Classic Freestanding Pedestal	50-965
	Fireplace Insert Hopper Lid	50-967
37	Control Panel and Decal - Freestanding	50-1481
38	Control Panel Decal	50-1482
39	Circuit Board	50-1929
40	Stainless Steel Burn Pot Liner	50-1745
41	Freestanding Right Cabinet Side	50-4114
	Log Set	20-036
42	Regular Surround Panel	50-4111
43	Oversized Surround Panel	50-4112
44	Fireplace Insert Cabinet Side Left	EF-132
45	Fireplace Insert Cabinet Side Right	EF-132A
	EF2-1 Owner's Manual	50-4118

NOTES

Warranty for Enviro **Pellet** Products

Sherwood Industries Ltd. ("Sherwood") hereby warrants, subject to the terms and conditions herein set forth, this product against defects in material and workmanship during the specified warranty period starting from the date of original purchase at retail. In the event of a defect of material or workmanship during the specified warranty period, Sherwood reserves the right to make repairs or to assess the replacement of a defective product at Sherwood's factory. The shipping costs are to be paid by the consumer. All warranties by Sherwood are set forth herein and no claim shall be made against Sherwood on any oral warranty or representation.

Conditions

- A completed warranty registration must be submitted to Sherwood within 90 days of original purchase via the online warranty registration page or via the mail-in warranty registration card provided. Have the installer fill in the installation data sheet in the back of the manual for warranty and future reference.
- This warranty applies only to the original owner in the original location from date of install.
- The unit must have been properly installed by a qualified technician or installer, and must meet all local and national building code requirements.
- The warranty does not cover removal and re-installation costs.
- Sherwood Industries Ltd. reserves the right to make changes without notice.
- Sherwood Industries Ltd. and its employees or representatives will not assume any damages, either directly or indirectly caused by improper usage, operation, installation, servicing or maintenance of this appliance.
- A proof of original purchase must be provided by you or the dealer including serial number.
- This warranty is void if the unit is used to burn materials for which the unit is not certified by the EPA and void if not operated according to the Owner's Manual.

Exclusions

An expanded list of exclusions is available at www.enviro.com/help/warranty.html

This warranty does not cover:

- Damage as a result of improper usage or abuse.
- Damage caused from over-firing due to incorrect setup or tampering.
- Damage caused by incorrect installation.

To the Dealer

- Provide name, address and telephone number of purchaser and date of purchase.
- Provide date of purchase. Name of installer and dealer. Serial number of the appliance. Nature of complaint, defects or malfunction, description and part # of any parts replaced.
- Pictures or return of damaged or defective product may be required.

To the Distributor

- Sign and verify that work and information are correct.

Sherwood Industries Ltd.
6782 Oldfield Road, Victoria, BC . Canada V8M 2A3
Online warranty registration: www.enviro.com/warranty/

Category	One Year	Two Year	Limited Lifetime (7yr)
Parts [1] (unit serial number required)		✔	
Firebox Brick Panels (Cast)		✔	
Firebox			✔
Heat Exchanger			✔
Burn Pot			✔
Burn Pot Liner		✔	
Firebox Liner Panels w/Insulation			✔
Ceramic Glass [2]	✔		
Pedestal / Legs (excluding finish)			✔
Surround Panels (excluding finish)			✔
Exterior Panels (excluding finish)			Up to 5 years
Electrical Components		✔	
Steel Brick Liner (Metal)	✔		
Exterior Surface Finishing [3]	✔		
Labour	✔		

[1] Whereas warranty has expired, replacement parts will be warrantied for 90 days from part purchase date. Labour not included. Unit serial number required.

[2] Glass is covered for thermal breakage. Photos of box, inside of door, and unit serial # must be supplied for breakage due to shipping.

[3] Exterior Surface finishing covers Plating, Enamel or Paint and excludes colour changes, chipping, and fingerprints.

Gaskets not covered by Warranty.

Travel costs not included.

Cast Agitator: 1 year for pellet. Not covered when burning alternative fuels. (Cast agitators are a consumable item)

Installation Data Sheet

The following information must be recorded by the installer for warranty purposes and future reference.

NAME OF OWNER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

NAME OF DEALER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MODEL: EF2-1

SERIAL NUMBER:_____

DATE OF PURCHASE: _____ (dd/mm/yyyy)

DATE OF INSTALLATION:_____(dd/mm/yyyy)

MAGNEHELIC AT INSTALL:_____

INSTALLER'S SIGNATURE:

_____

NAME OF INSTALLER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
Winter, 2022
C-16181

Model :

WH- **Kinderhook-1** ☐ **Davenport-1** ☐ **FS** ☐ **FPI**

Serial No.:

HUDSON RIVER STOVE WORKS

Ouput Rating: 8,852 to 32,134 BTU/Hr
Listed Room Heater, Pelletized Fuel Type
Suitable For Mobile Home Installation Conforms to: ASTM E1509-12 Certified to: ULC S627-00 / ULC S628-M93

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacture's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.3 Amps.

For Use With Only Pelletized Wood fuels. Keep viewing and ash removal doors tightly closed during operation. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Insert and Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently.

To Start Stove: Press the ON / OFF button. If the auger needs to be primed, press the Manual Auger Feed button until fuel starts to drop into the Burn Pot.

To Operate Stove: MANUAL MODE: When a fire has been established the stove settings are adjustable.

HIGH/LOW MODE: (Requires a thermostat) When the thermostat calls for heat the stove settings are adjustable. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat) When the thermostat contacts close, the unit will light automatically. Once up to temperature the stove settings are adjustable. When the thermostat contacts open, the stove will drop down to the LOW settings for 30 minutes. If within the 30 min the thermostat contacts close, the HEAT LEVEL will return to previous MANUAL setting or if the thermostat contacts remain open the stove begin its shutdown routine.

To Turn Off Stove: MANUAL and HI / LOW mode: Press the ON / OFF button; AUTO / OFF mode: Turn the thermostat down or off.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

DATE OF MANUFACTURE:

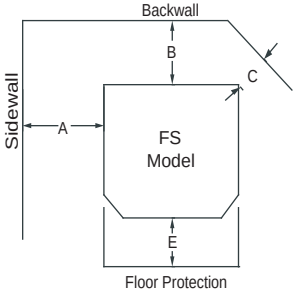
J F M A M J J A S O N D 2021 2022 2023 2024 2025

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

DO NOT REMOVE THIS LABEL

INSTALLED AS A FREESTANDING STOVE MODEL
Minimum clearances to combustible materials.

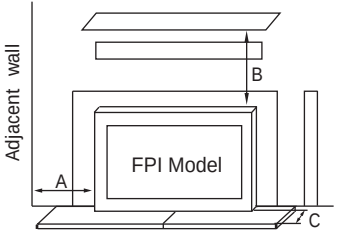
A	Sidewall to Unit	6" (152 mm)
B	Backwall to Unit	2" (51 mm)
C	Corner to Unit	2" (51 mm)
E	From door opening of unit to edge of floor protection	Davenport FS 9" (229 mm)
		Kinderhook FS 6" (152 mm)



INSTALLED AS A FIREPLACE INSERT STOVE MODEL:

A	Sidewall to Unit (Du mur de côté à l'appareil)	9" (229mm)
B	Top of unit to an unshielded 8" (203 mm) mantle (Le sommet de l'unité à un manteau de cheminée non blindé)	8" (203 mm)
C	From door opening of unit to edge of floor protection (De la porte ouvrant au devant de protection de plancher)	9" (229mm)

Combustible floors must be protected by a non-combustible material. - See Owners Manual.



CAUTION:

Hot while in operation. DO NOT touch, keep children, clothing & furniture away. Contact may cause skin burns. See nameplate & instructions

Intertek US — Certified for use in USA

ETL LISTED Intertek US — C#4001609

C-15802 R1

PLEASE KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

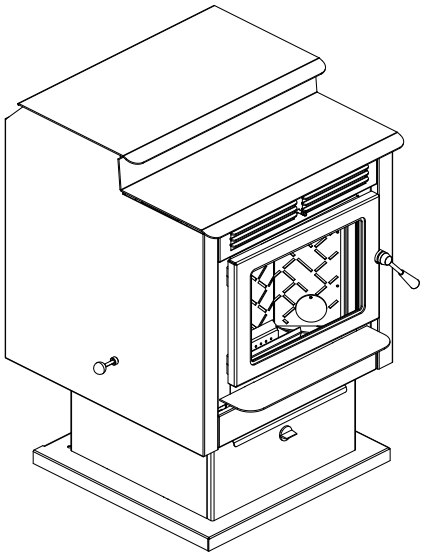
HUDSON RIVER STOVE WORKS

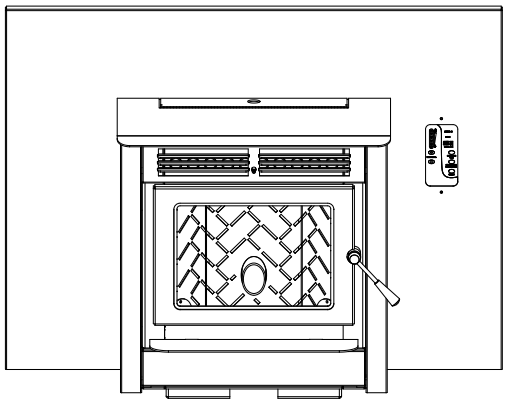
PELLET STOVE

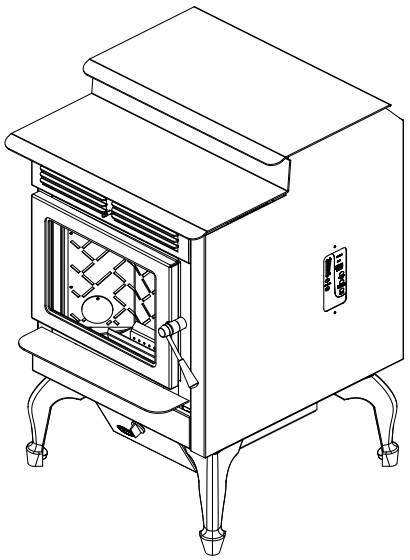
DAVENPORT-1

Freestanding and Fireplace Insert

OWNER'S MANUAL







NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We suggest that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

Contact your building or fire officials about restrictions and installation inspection requirements in your area.

US

Intertek

16621

PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS PELLET-BURNING ROOM HEATER. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

Table of Contents

Introduction

Rating Label Location:

Freestanding: The rating label is located on the inside of the hopper lid.

Insert: The rating label is located on the hopper cover.

Pellet Quality:

Pellet quality is important, please read the following:

Your Hudson River pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. The Pellet Fuel Industries (P.F.I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P.F.I. PELLET STANDARDS:

Fines (fine particles).....1% maximum through a ⅛" screen
Bulk Density.....40 pound per cubic foot minimum
Size.....¼" to 5/16" diameter ½ – 1½" long maximum
Ash Content.....1% maximum (Premium grade)
.....3% maximum (Standard grade)
Moisture Content.....8% maximum
Heat Content.....approximately 8200 Btu per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

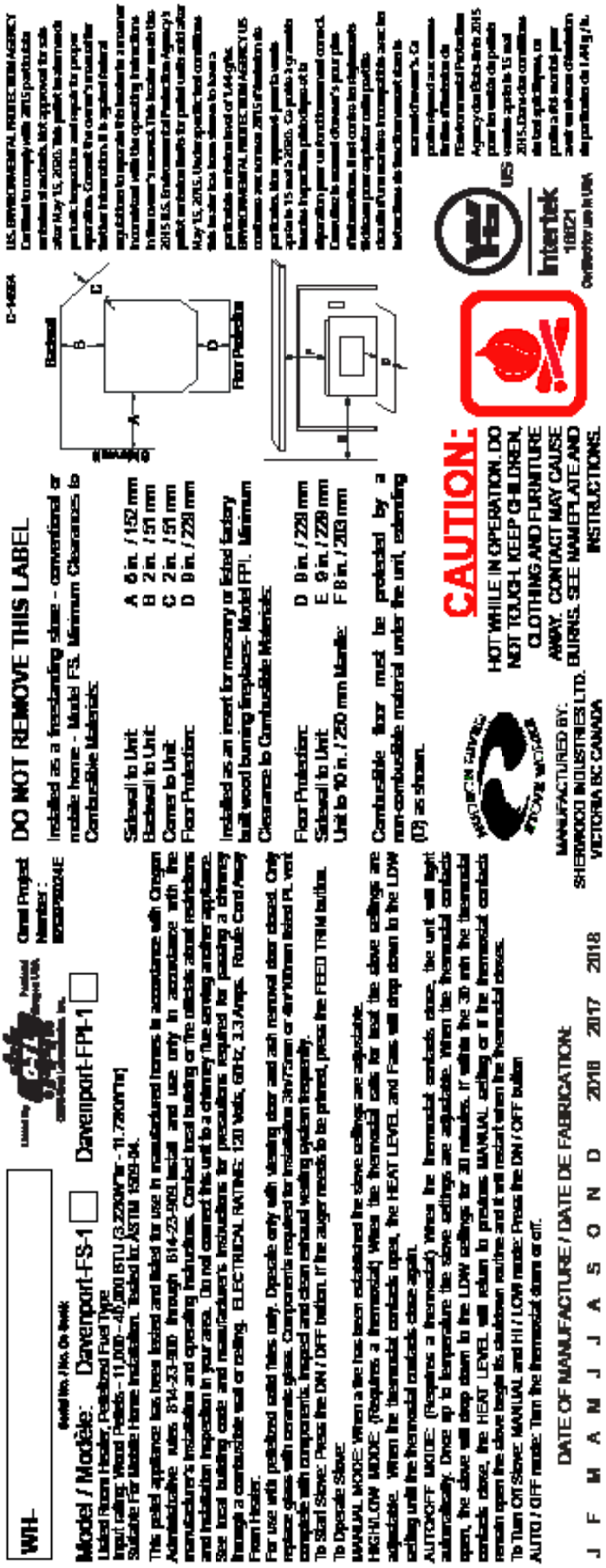
CLINKERING: Clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the Routine Cleaning and Maintenance section of this manual.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low heat levels.

Since Hudson River Stove Works has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets at least 36" (1 m) away from the pellet stove.

Rating Label:



Emissions and Efficiency - Davenport-1:

Rates: This manual describes the installation and operation of the Hudson River Davenport-1 pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has an input rate ranging from 11,214-40,852 Btu/hr with an output ranging from 8,852-32,134 Btu/hr.

Efficiency: **HHV:** 76.7%

0268PS024E.REV001
OMNI-Test Laboratories

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet has a manufacturer set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this pellet heater in a manner inconsistent with operating instructions in this manual.

Introduction

Important Safety Data:

Please read this entire Owner's Manual before installing or operating your HUDSON RIVER Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. A HUDSON RIVER dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

Be sure to maintain the structural integrity of the home when passing a vent through walls, ceilings, or roofs.

The stove's exhaust system works with negative combustion chamber pressure (vacuum) and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

If you have any questions with regard to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

Safety Warnings And Recommendations:

Caution: Do not connect to any air distribution duct or system.
Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.
Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations.

THE USE OF CORDWOOD IS PROHIBITED BY LAW.

SOOT: Operation of the stove with insufficient combustion air will result in the formation of soot which will collect on the glass, the heat exchanger, the exhaust vent system, and may stain the outside of the house. This is a dangerous situation and is inefficient. Frequently check your stove and adjust the slider/damper as needed to ensure proper combustion. **See: "Adjusting the vacuum using the slider/damper".**

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

Introduction

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be stored on a non-combustible floor, well away from all combustible materials pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: The use of a surge protected power bar is recommended. The unit must be grounded. The grounded electrical cord should be connected to a standard 115 volts (3.3 Amps), 60 hertz electrical outlet. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces, sharp edges, and is accessible. If this power cord should become damaged, a replacement power cord must be purchased from the manufacturer or a qualified HUDSON RIVER dealer. This unit's maximum power requirement is 400 watts.

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an HUDSON RIVER dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

FLAMMABLE LIQUIDS: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in the heater. Keep all such liquids well away from the heater while it is in use.

SMOKE DETECTORS & CO MONITORS: Smoke detectors and carbon monoxide (CO) monitors should be installed and maintained in the structure when installing and operating a pellet burning appliance.

OPERATION: The ash pan, door, and hopper lid must be closed securely for proper and safe operation of the pellet stove. Ensure all gaskets and seals are checked regularly and replaced when necessary.

KEEP ASH PAN FREE OF RAW FUEL.
DO NOT PLACE UNBURNED OR NEW PELLET FUEL IN THE ASH PAN. A FIRE IN THE ASH PAN MAY OCCUR.

INSTALLATION: Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement.
DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

FRESH AIR: Outside Fresh Air connection is optional BUT MUST be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes. Consider all large air moving devices when installing your unit and provide room air accordingly. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE HUDSON RIVER STOVE WORKS HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, HUDSON RIVER STOVE WORKS GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, HUDSON RIVER STOVE WORKS ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE

Specifications

Dimensions - Freestanding:

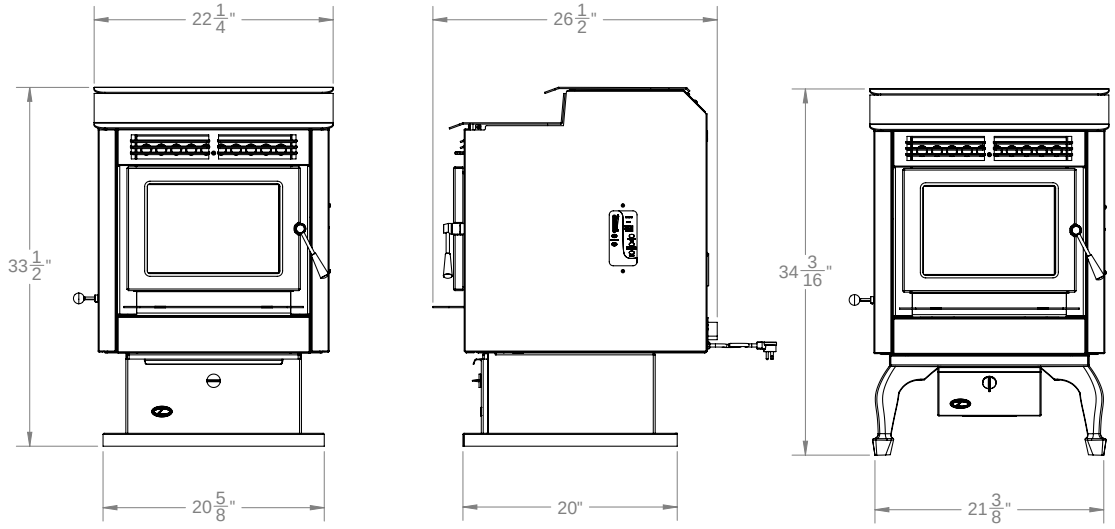


Figure 1: Davenport Freestanding Dimensions.

Dimensions - Fireplace Insert:

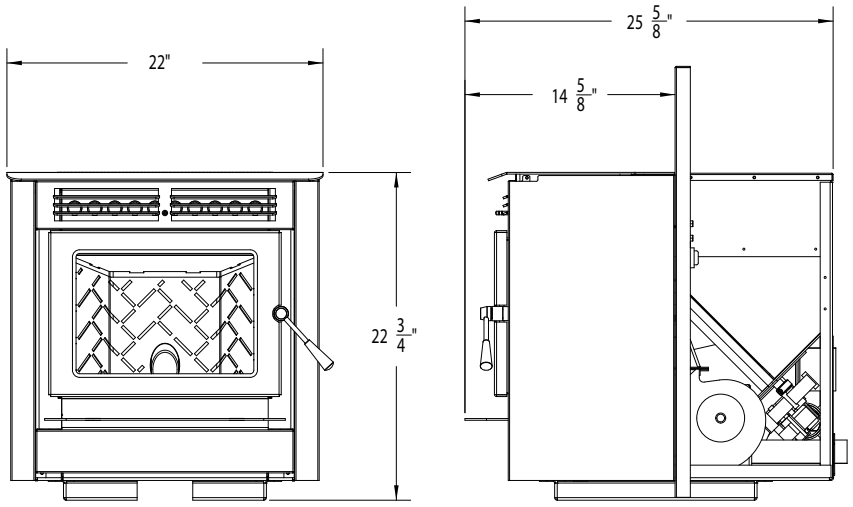


Figure 2: Davenport Fireplace Insert Dimensions.

Specifications:

Input rating: 42,500BTU

Table 1: Davenport Specifications.

Description	Fuel type	
Residential Pellet Heater	6mm (¼") dia. Wood Pellets	
Voltage	Current	Max Power
110 - 120 V	3.3 Amps	400 Watts
Frequency	Hopper Capacity FS / FPI	Consumption on Low
60 Hz	60 lbs / 40 lbs	1.5 lb/hr
Testing Standard	Weight** FS Ped/ FS Legs / FPI	Consumption on High
ASTM 1509-04	290 lbs / 300 lbs / 250 lbs	5 lb/hr

*Consumption will vary with the type of fuel used.

**With Full Hopper.

Installation

Deciding Where to Locate your Pellet Appliance:

1. Check clearances to combustibles (see Installation - Clearances to Combustibles - Freestanding, Installation - Alcove Clearances - Freestanding, and Installation - Clearances to Combustibles - Fireplace Insert.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.

NATIONAL FIREPLACE INSTITUTE
NFI
CERTIFIED
www.nficertified.org

We recommend that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training
www.wettinc.ca

Removing Your Pellet Stove From the Pallet:

To remove your new stove from its pallet, remove the two (2) screws securing the bottom to the pallet.

Freestanding:

1. Remove access cover from front of unit.
2. Remove the two (2) T-20 Torx screws each side holding the cabinet sides closed.
3. Open the side cabinets. The screw holding the unit to the pallet are now accessible.

Fireplace Insert:

1. The screws are accessible from the back side of the unit.

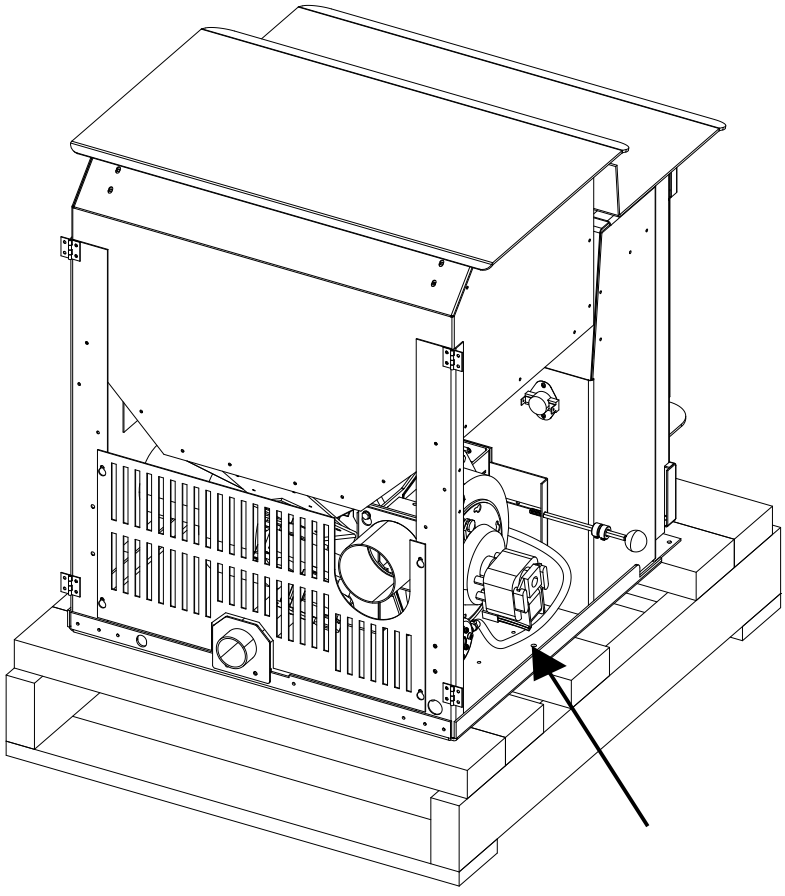


Figure 3: Removing Freestanding Stove From the Pallet.

CLEARANCES TO COMBUSTIBLES - FREESTANDING:

These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning, and maintenance.

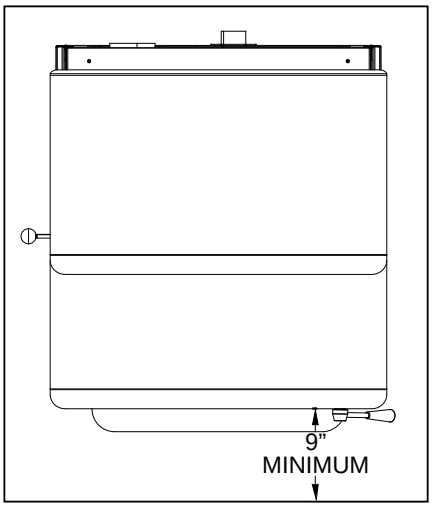


Figure 4: Davenport on Floor Protection.

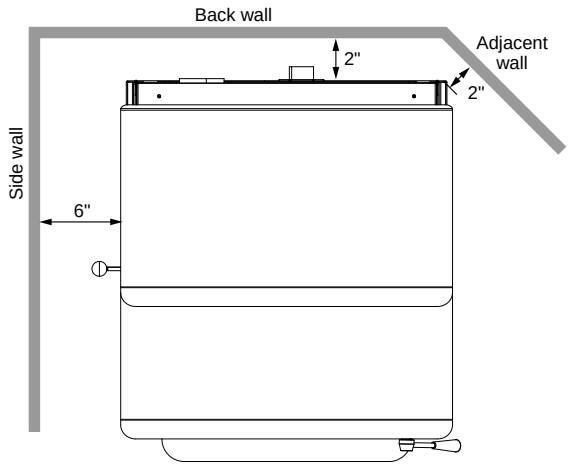


Figure 5: Minimum Clearances to Combustibles for Freestanding Davenport.

This pellet stove requires floor protection. The floor protection must be non-combustible, extending beneath the stove the full width and depth of the unit including 9“ in front for ember protection.

ALCOVE CLEARANCES - FREESTANDING:

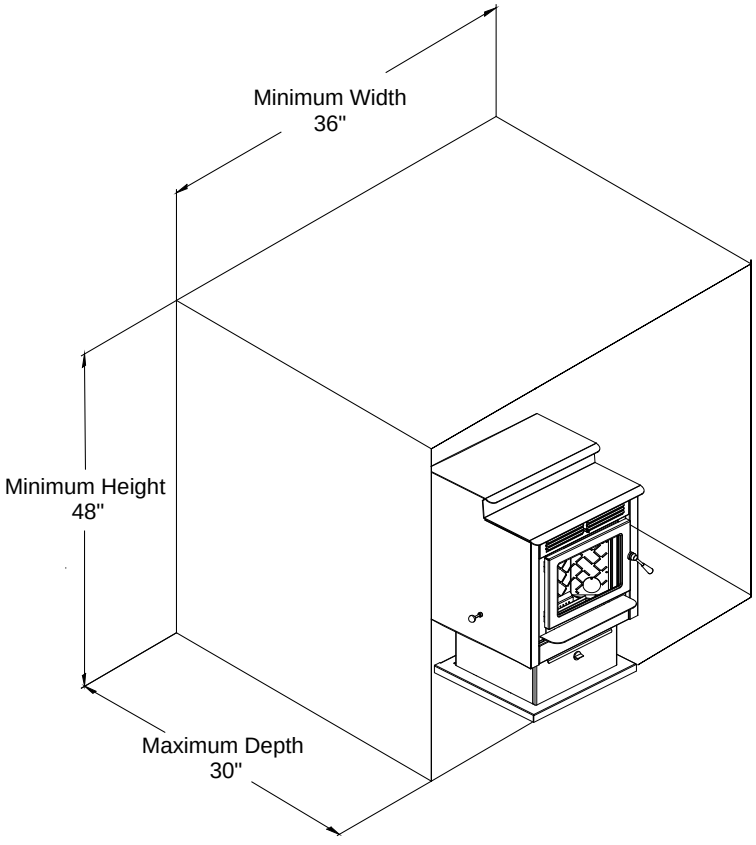


Figure 6: Alcove Clearances Freestanding Davenport.

Installation

Clearances to Combustibles - Fireplace Insert:

The fireplace insert must be installed into a masonry fireplace. This model includes a surround faceplate and a pedestal.

From the body of the heater to the side wall:	9 inches minimum
From the body of the heater to the Facing on masonry fireplace:	8 inches minimum
From the body of the heater to the 10" (203 mm) mantle:	8 inches minimum

Mobile Home Installation - Freestanding:

- Secure the heater to the floor using the holes in the pedestal of the appliance.
- Ensure the unit is electrically grounded to the chassis of your home (permanently).

WARNING: Do not install in a room people sleep in.

CAUTION: The structural integrity of the manufactured home floor, wall and ceiling/roof must be maintained

• Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three (3) screws evenly spaced.

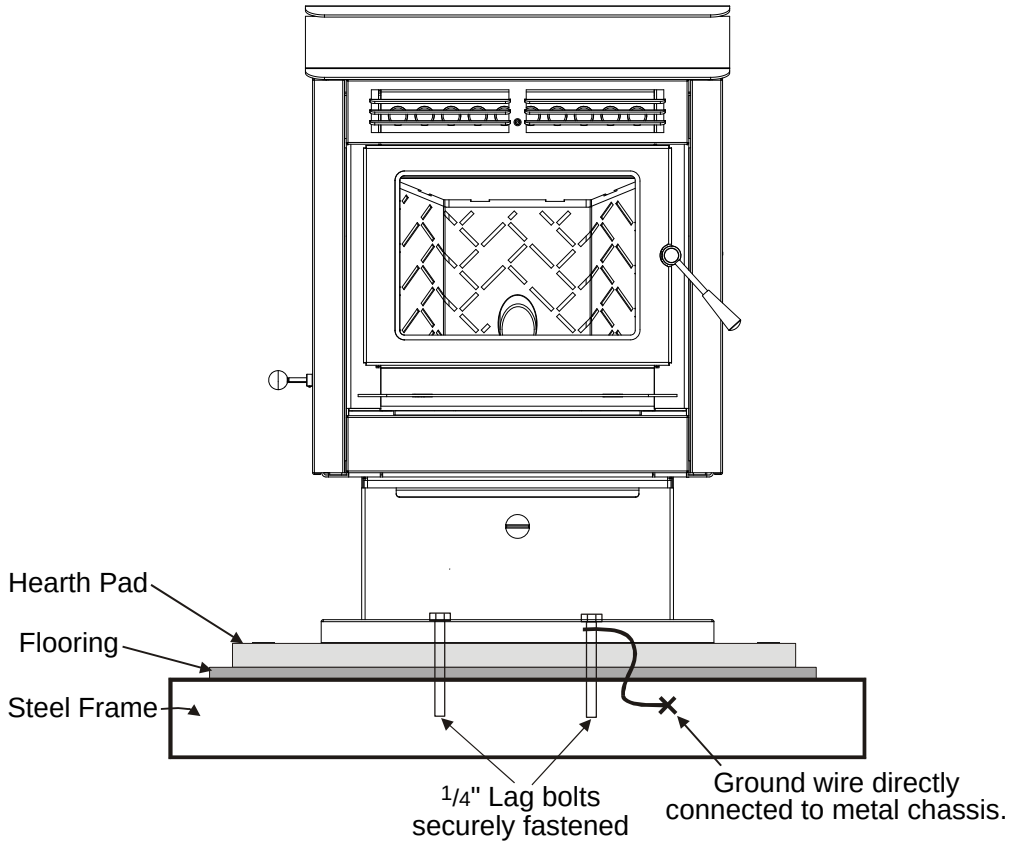


Figure 7: Mobile Home Install Mounting.

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 2: Use in conjunction with Figure 8 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	From beside/below any door or window that may be opened. (18" (46 cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/ regulator assembly	To each side of center line extended above natural gas or propane meter/ regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

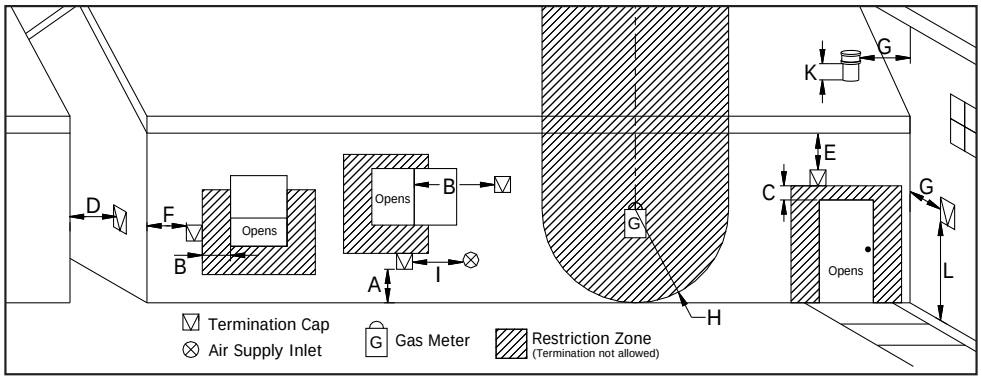


Figure 8: Use in conjunction with Table 1 for allowable exterior vent termination locations.

2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.
3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of Hudson River Stove Works, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

Exhaust And Fresh Air Intake Locations:

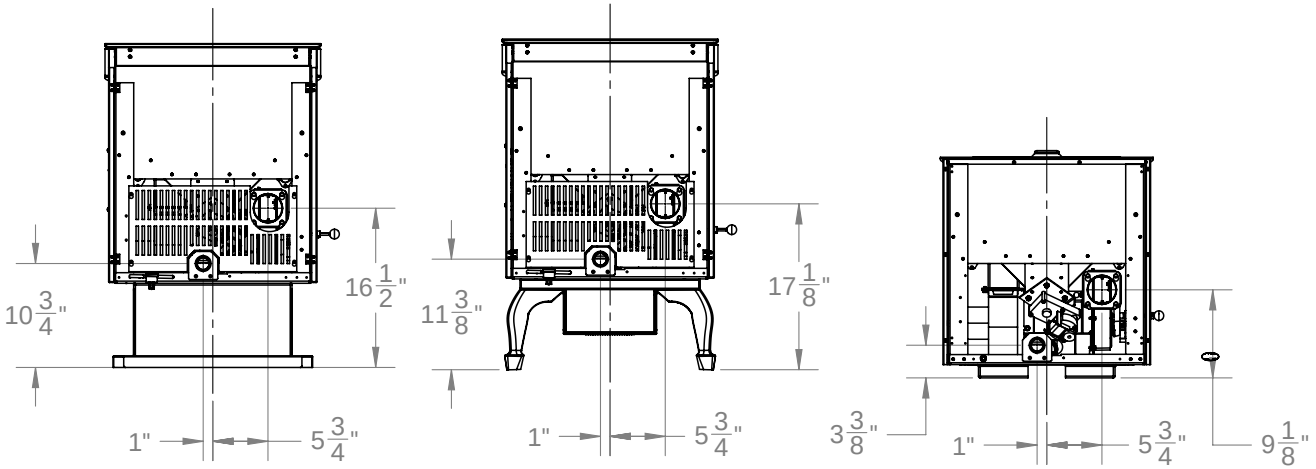


Figure 9: Davenport Inlet and Outlet Location.

INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENTING MANUFACTURER

Outside Fresh-Air Connection:

Outside fresh air is mandatory when installing this unit in airtight homes and mobile homes.

A Fresh-air intake is strongly recommended for all installations. Failure to install intake air may result in improper combustion as well as the unit smoking during power failures.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 2" minimum (51 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

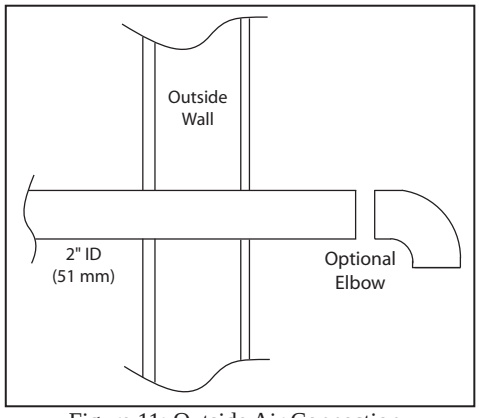


Figure 11: Outside Air Connection.

CORNER THROUGH WALL INSTALLATION - FREESTANDING:

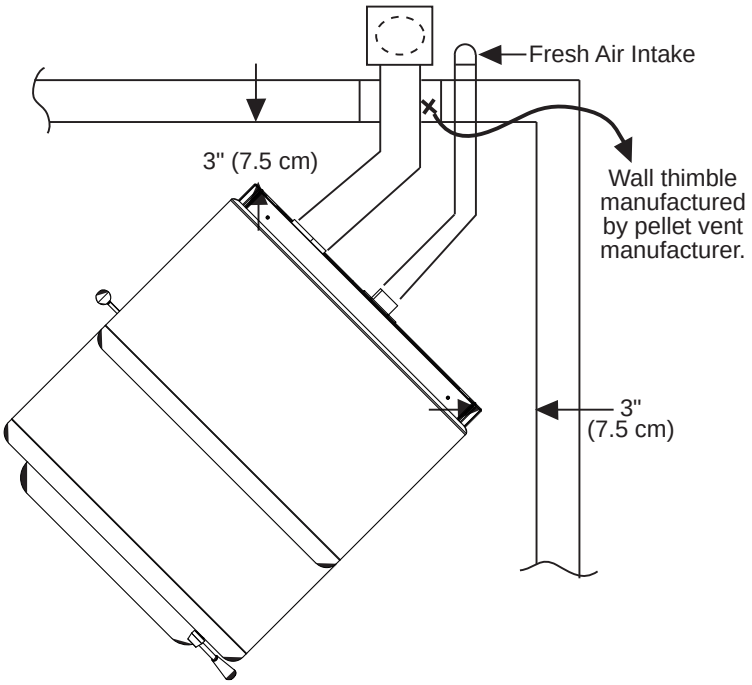


Figure 12: Corner Installation.

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION - FREESTANDING:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
6. Install a length of 3" (76 mm) or 4" (101 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Install the fresh air intake (see INSTALLATION - OUTSIDE FRESH AIR CONNECTION).
8. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
9. Push the stove straight back, leaving a minimum of 2" (5 cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.

10. The pipe must extend at least 12″ (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.

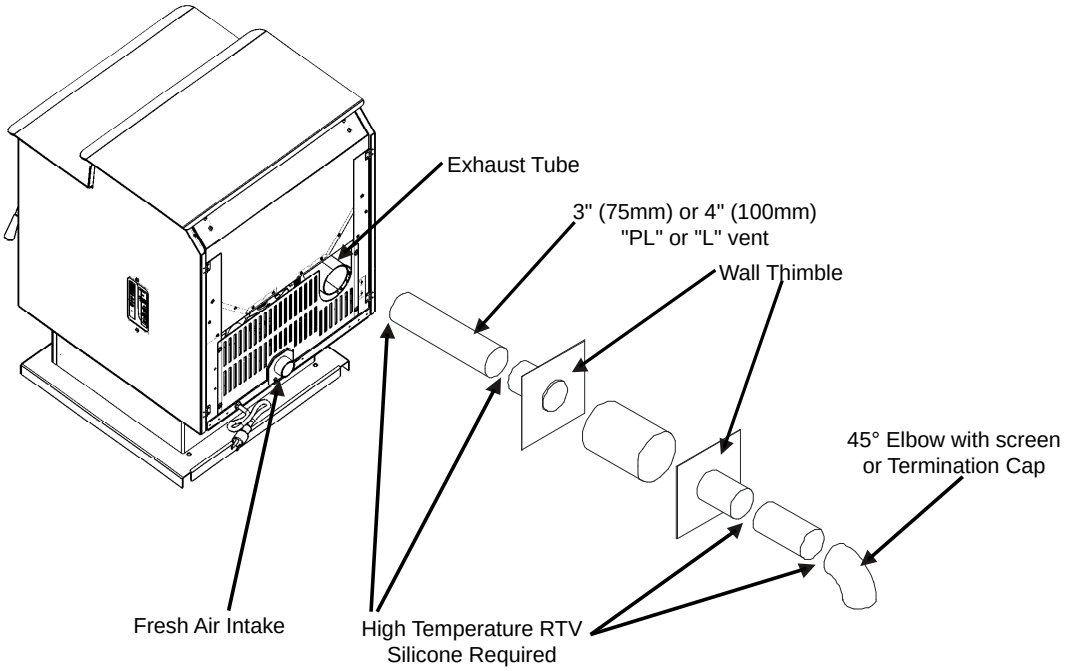


Figure 13: Straight through wall Installation.

11. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

NOTE:

- Some horizontal through wall installations may require a "T" and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help naturally draft in the unit.
- This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set.
- This is due to the back pressure in the exhaust caused by airflow around the structure.
- All sections of pipe must have three (3) screws evenly spaced and all horizontal and vertical vent sections located within the house must have a bead of high temperature silicone installed on the male end of the pipe before installation to create a gas tight seal.

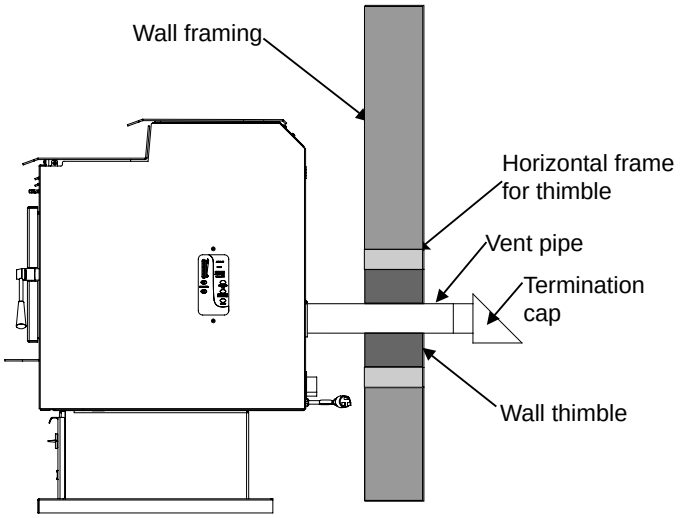


Figure 14: Straight through Wall Installation - Side View.

- The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.
- A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

VERTICAL RISE WITH HORIZONTAL TERMINATION INSTALLATION (RECOMMENDED) - FREESTANDING:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

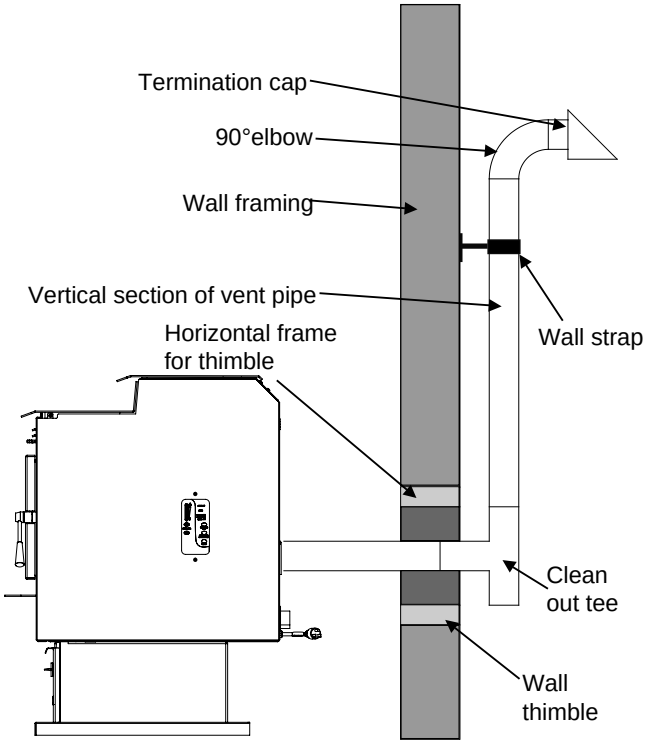


Figure 15: Through Wall with Horizontal Termination.

THROUGH CONCRETE WALL WITH VERTICAL RISE INSTALLATIONS - FREESTANDING:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

This is the recommended installation to use if there is a concrete or retaining wall in line with exhaust vent on pellet stove.

The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

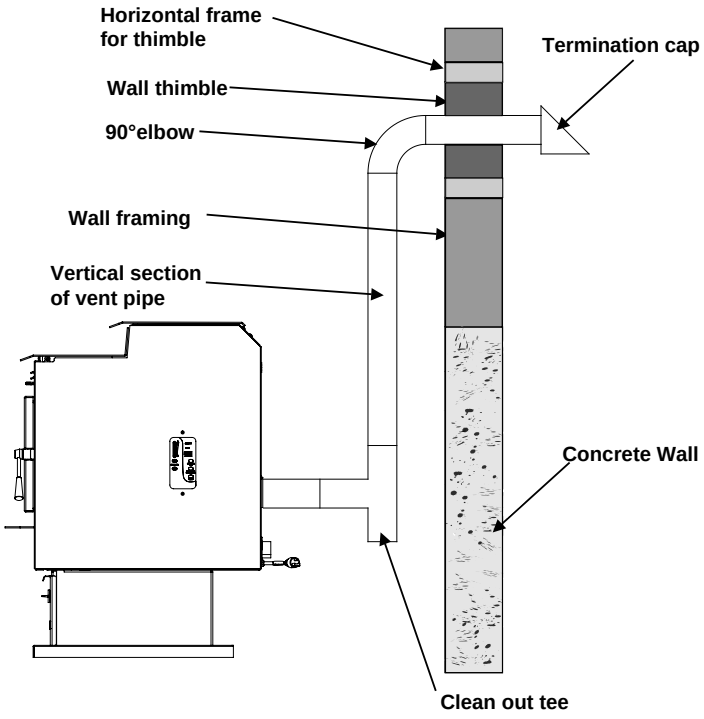


Figure 16: Vertical rise with Horizontal Termination.

Inside Vertical Installations - Freestanding:

1. Choose a stove location that is ideal. See the section "Installation - Deciding Where to Locate your Pellet Appliance."
2. Place the unit on the hearth pad (if installed on a carpeted surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3″ (76 mm) away from a combustible wall.
3. Locate the center of the fresh air intake pipe on the unit. Match that center with the same point on the wall and cut a hole about 2″ (51 mm) in diameter.
4. Install the fresh air intake pipe.
5. Install the tee with clean out.
6. Install the pellet vent upward from there. When you reach the ceiling, make sure that the vent goes through the ceiling fire stop. Maintain a 3″ (76 mm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier.
7. Finally, extend the pellet vent to go through the roof flashing.
8. Ensure that the rain cap is approximately 24″ (610 mm) above the roof.

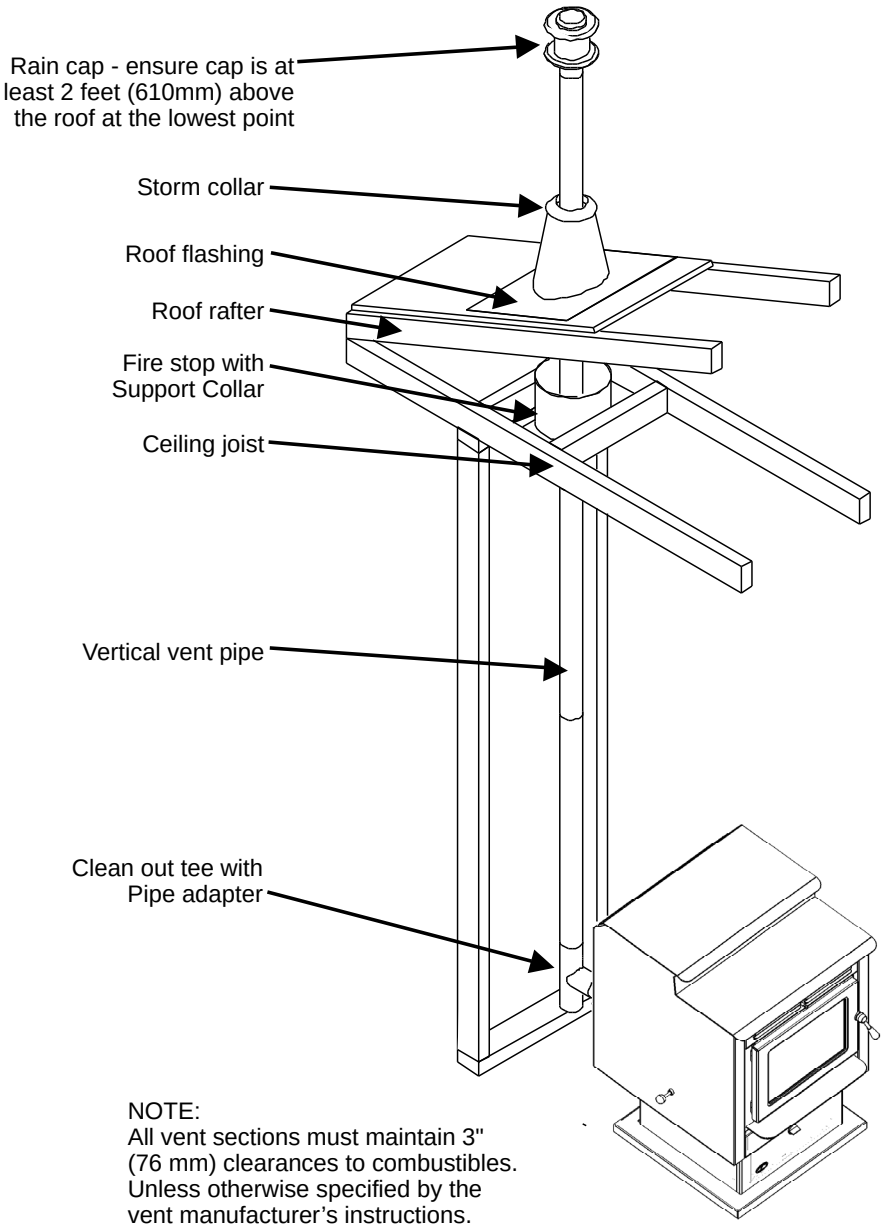


Figure 17: Inside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

Outside Vertical Installations - Freestanding:

To accomplish a outside vertical pipe installation, follow steps 1 through 5 in the "Inside Vertical Installations - Freestanding" section and then finish it by performing the following (refer to Figure 23).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (610 mm) above the roof.

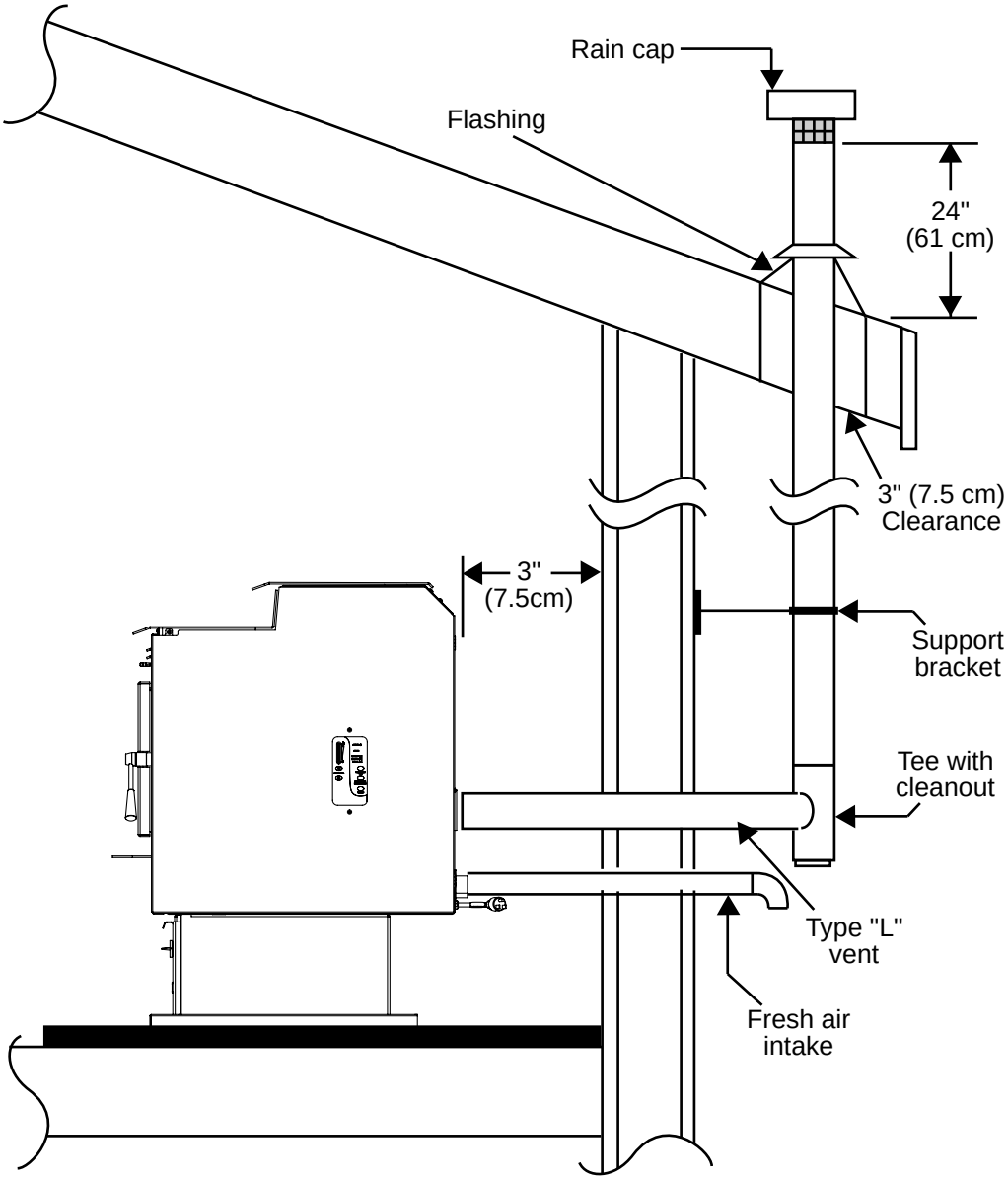


Figure 18: Outside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3" Vent

Over 15ft: 4" Vent

Hearth Mount Installation - Freestanding:

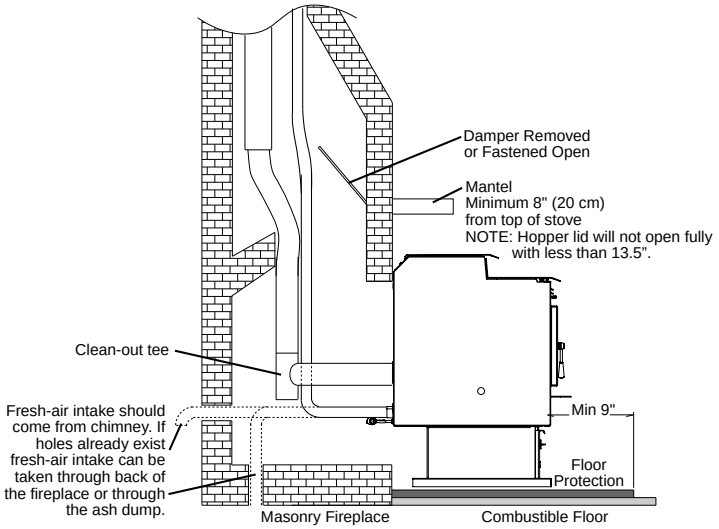


Figure 19: Hearth Mount - Side View.

1. Lock fireplace damper in the open position.
2. Install a positive flue connector at the fireplace dampers.
3. Connect a clean-out tee or a 90° elbow to the exhaust pipe.
4. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

<u>Recommended vent size for vertical installation:</u>

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

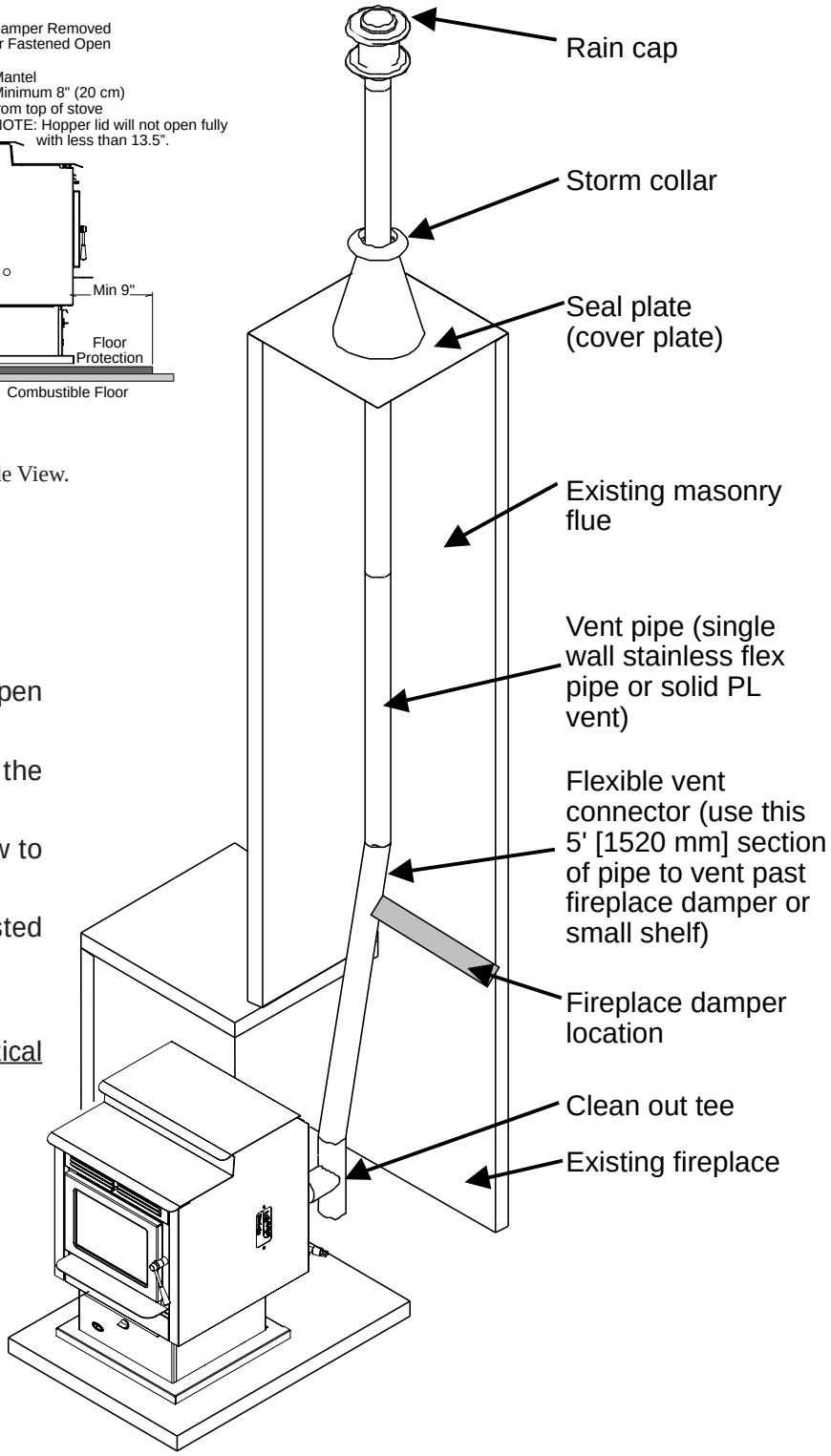


Figure 20: Hearth Mount - Over View.

MASONRY FIREPLACE INSERT INSTALLATION - FIREPLACE INSERT:

The Fireplace insert model requires a surround faceplate and a pedestal. When installing this unit, ensure that the pedestal is removed from the inside of the hopper and installed on the bottom of the unit (Refer to INSTALLATION - INSTALLATION OF PEDESTAL AND LEVELING LEGS - FIREPLACE INSERT).

Adjust hopper height (see INSTALLATION - INSTALLING HOPPER COVER AND ADJUSTING HOPPER HEIGHT - FIREPLACE INSERT) and assemble surround panel (see Installation - INSTALLATION AND REMOVAL OF CONTROL PANEL IN THE SURROUND PANEL - FIREPLACE INSERT and Installation - ASSEMBLY AND INSTALLATION OF INSERT SURROUND PANELS - FIREPLACE INSERT) before starting installation.

A noncombustible hearth pad must cover combustible flooring underneath, as well as 9″ in front of the heater and 6″ to the side of the heater

1. Install the hearth pad.
2. Lock the fireplace damper in the open position.
3. Install a positive flue connector at the fireplace damper.
4. Connect a tee or 90° degree elbow to the exhaust pipe.
5. This fireplace insert must be installed with a continuous chimney liner of 3 or 4″ diameter extending from the fireplace insert to the top of the chimney. The liner must conform to type 3 requirements of CAN/ULC S635.
6. (Recommended) Install fresh air intake either through the back of the fireplace or through the positive flue connector.

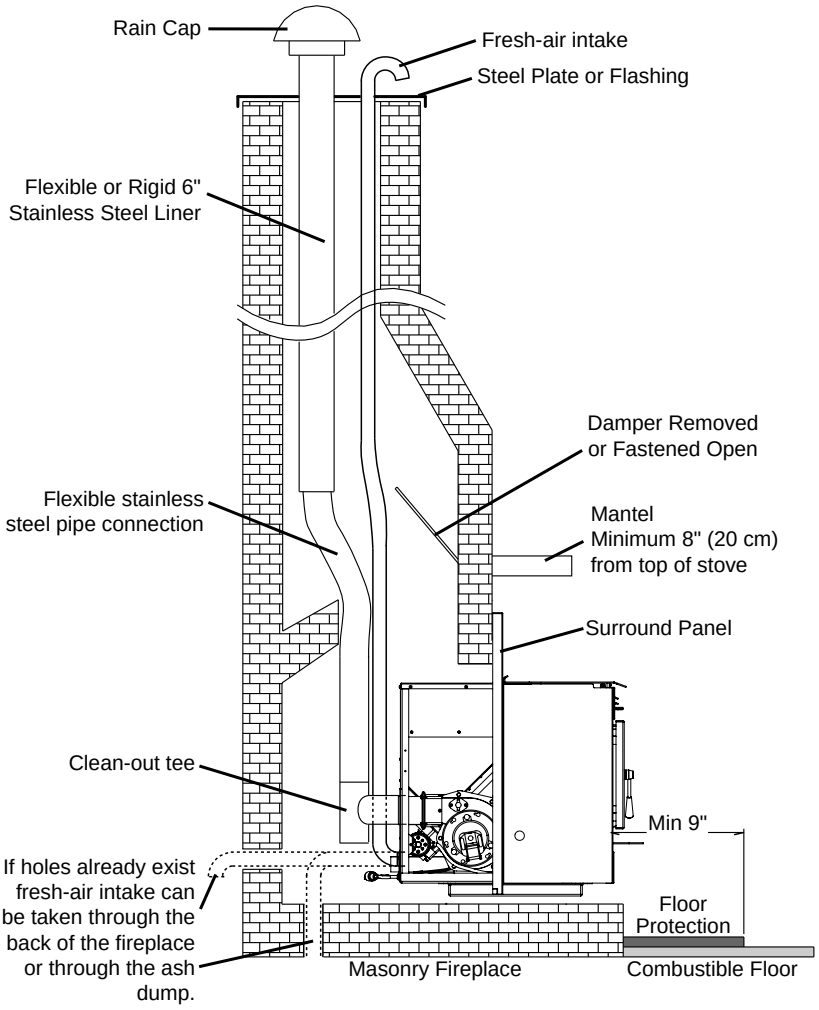


Figure 21: Installation of Fireplace Insert.

When installing the insert into a masonry fireplace DO NOT remove any bricks or masonry, with the following exception; masonry or steel, including the damper plate, may be removed from the smoke shelf and adjacent damper frame if necessary to accommodate a chimney liner. Provided that their removal will not weaken the structure of the fireplace and chimney, and will not reduce protection for combustible materials to less than that required by the national building code.

When installing the fireplace insert into a zero clearance fireplace, **DO NOT** cut or modify any factory firebox parts. If the fireplace insert does not fit into a zero clearance fireplace we recommend you use an ENVIRO freestanding model and install as a hearth mounted unit. Install a 3″ (76 mm) flex pipe from the stove to the top of the chimney (see "INSTALLATION - HEARTH MOUNT INSTALLATION - FREESTANDING").

POSITIVE FLUE CONNECTION WITHOUT A FULL RELINE - FIREPLACE INSERT (USA ONLY):

This unit does not require a full reline (in USA only) when installing into a masonry fireplace, however, it is recommended to ensure proper drafting of the appliance.

IMPORTANT: Ensure the chimney and firebox are cleaned and free of all debris, including soot and ashes, before proceeding with this installation. If it is not clean soot maybe blown into the room through the unit's blower. Ensure the fireplace and chimney have not deteriorated in any way. If there is any sign of corrosion or damage in the chimney the unit can not be installed. This unit can be installing in a masonry fireplace built to (UBC 37 or ULC S628 standards) or a factory built fireplace (built to UL 127 or ULC S610 standards).

1. If installing the Empress with a skirt, the skirt must be installed before the installation.
2. Install the hearth pad. The floor 9" in front of the unit and 6" to each side of the unit must be protected with a non-combustible hearth pad.
3. The vent connector from the insert must extend a minimum of 18" above the chimney seal plate. The chimney seal plate area must be sealed to prevent the exhaust from the chimney from coming back into the fireplace and prevent air from the fireplace from entering the chimney which will affect proper drafting of appliance.

   A qualified installer should evaluate the existing fireplace to determine the best method for achieving a positive flue connection between the vent pipe or liner and the chimney. Whatever method used must effectively seal the area to prevent room air passage to the chimney cavity of the fireplace. A couple examples of Approved Methods of Achieving a Positive Flue Connection are:

   a) Secure a seal-off plate (i.e. 22-gage sheet steel) in the masonry fireplace throat using masonry screws.

   b) Pack non-combustible material (i.e. rockwool) around the vent pipe or using a flue adapter.

4. Set leveling leg to approximate height.
5. Connect the Exhaust Starter Quick Connect, straight or elbow, to the exhaust pipe.

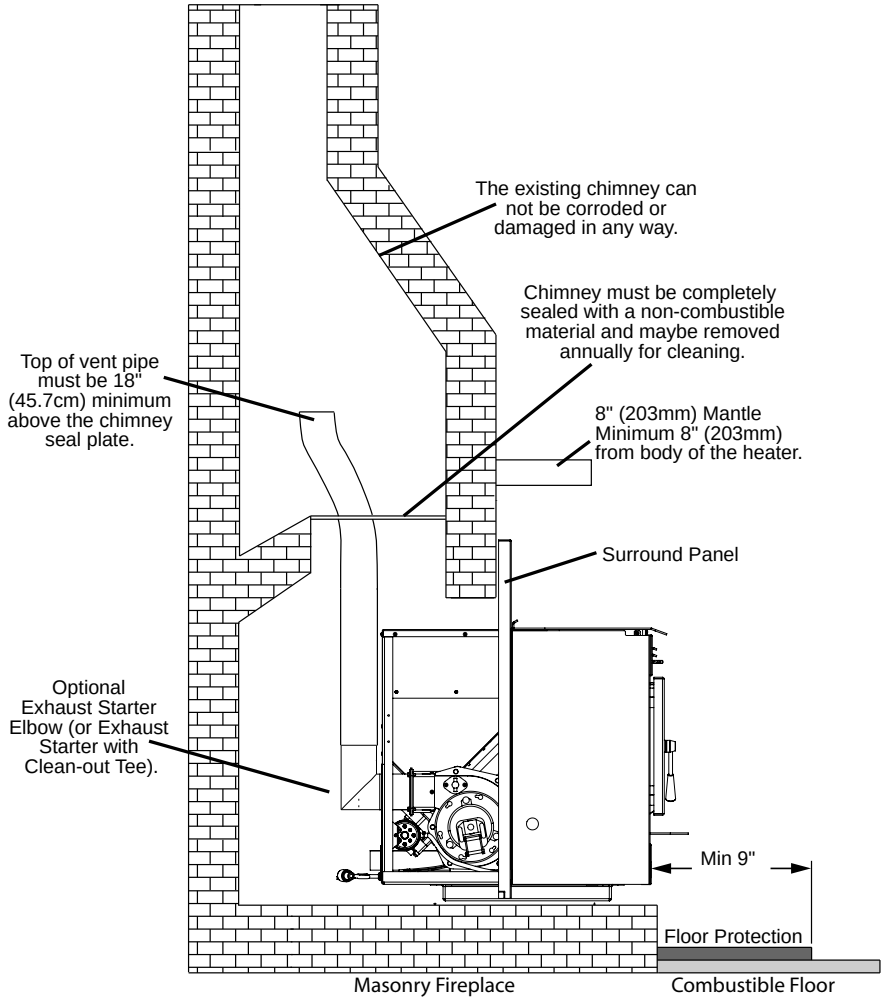


Figure 22: Masonry fireplace positive flue installation.

IMPORTANT: The chimney seal plate must be removed for the annually chimney cleaning as ash will build up on top of the plate.

Installation of Control Panel in The Surround Panel - Fireplace Insert:

Tools Required: Torx T-20 Screwdriver

1. Remove the control panel from the shipping position on the unit by removing one 8-32 x 3/8" Torx screw.

2. Align the control panel with the two holes in the surround panel and fasten using two (2) 8-32 x 3/8" Torx screws.

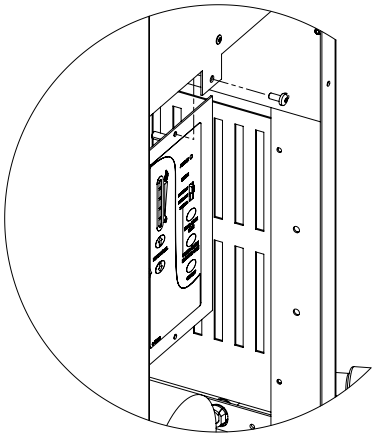


Figure 23: Removing the control panel from the unit

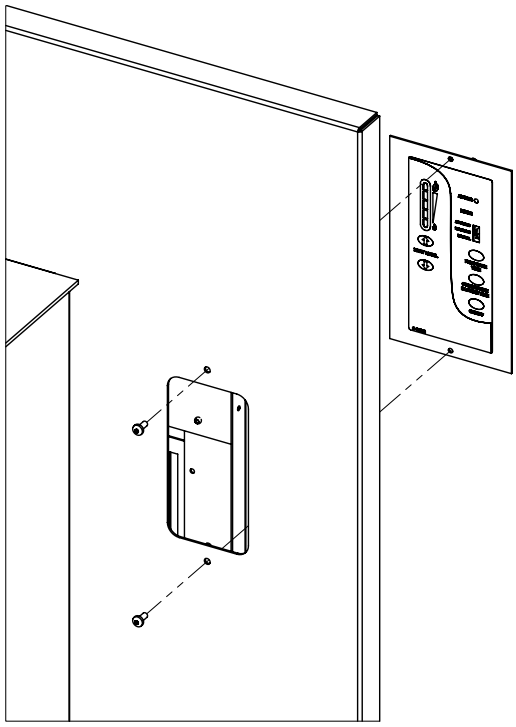


Figure 24: Attaching the Control Panel

Installation of Insert Surround Panel - Fireplace Insert:

Tools Required: None

1. Attach the control panel to the surround panel (see "Installation of Control Panel in the Surround Panel - Fireplace Insert")

2. Slip the surround panel down behind the unit as shown in Figure 32.

3. Hook the keyholes on the surround panel on the standoffs located on the side panels of the unit.

4. Connect the control panel to the wiring harness.

The power cord can be routed to either side of the unit, the surround panel has a knock-out on each side to allow for passage of the power cord.

The surround panel must be removed to perform maintenance on the internal components of the unit. Reverse the above steps to remove the surround panel.

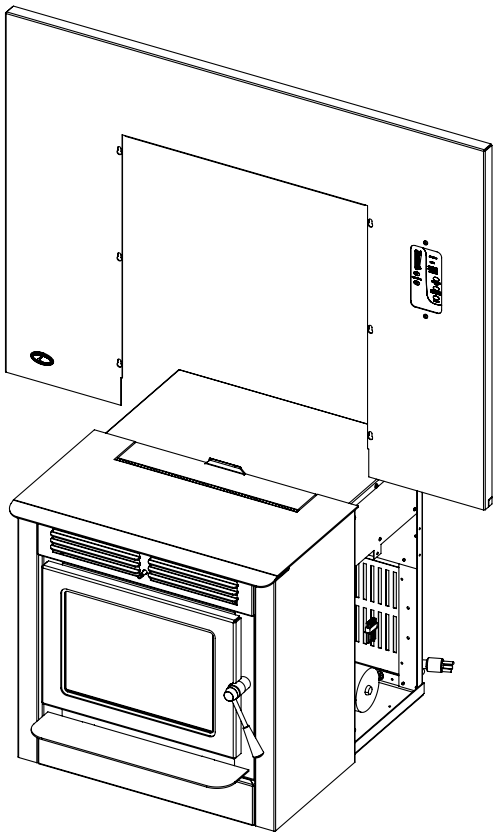


Figure 25: Attaching the Surround Panel

THERMOSTAT INSTALLATION:

1. Install the wall thermostat in a location that is not to close too the unit but will effectively heat the desired area.

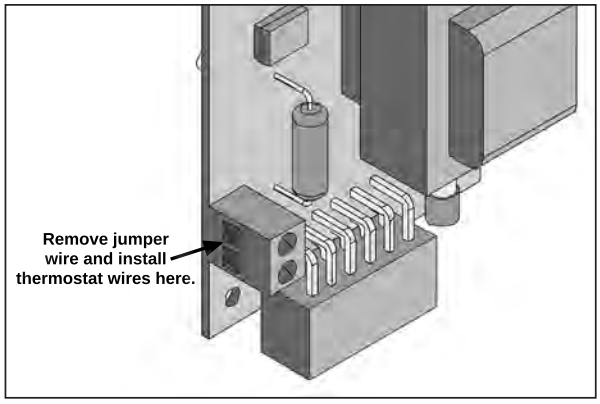


Figure 26: Thermostat wire placement.

2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

If the unit has been placed in the HI / LOW mode, the unit will be taken to a low or idle setting when the thermostat is not calling for heat. When the thermostat calls for heat, the unit will go to the setting that is displayed on the control board Heat Indicator. If the heating load is not great enough when the stove is on low, the high limit switch will turn the stove off and the switch will have to be manually reset. To reset the high limit switch, remove the right cabinet side. The switch is found behind the control panel. Avoid setting off the high limit switch.

SLIDER/DAMPER SET-UP:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION, IT IS USED TO REGULATE THE AIRFLOW THROUGH THE PELLET STOVE.

A Qualified Service Technician or Installer must set the Slider Damper.

The slider damper is used to regulate the airflow through the pellet stove and is located behind the left cab side (refer to Figure 27). On freestanding model loosen the two 8-32 x 3/8" Torx screws, one on the side of the unit and one behind the removable panel, swing open left panel to access. On insert model remove the two (2) 8-32 x 3/8" Torx screws, one on the side of the unit and one behind the removable panel, and the one T-20 at the top of the cab side under the top front.

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the vacuum pressure inside the stove and as the heat output button is turned down. The vacuum pressure inside the firebox will increase as the combustion exhaust blower increases in speed (higher heat output setting).

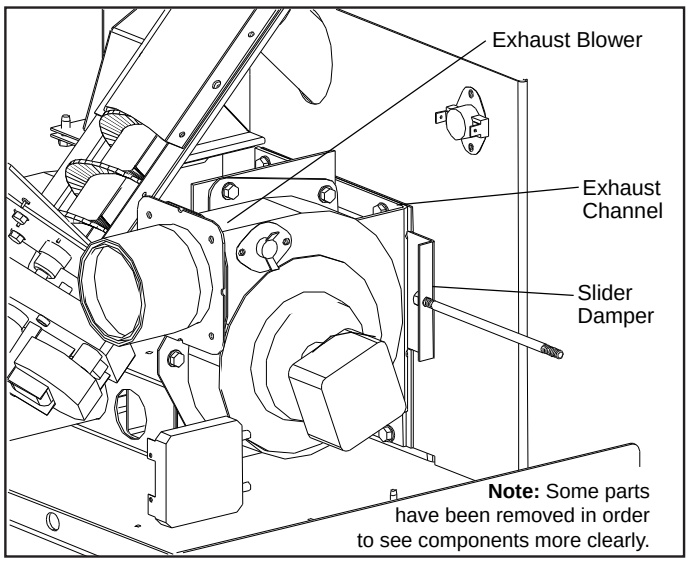


Figure 27: Slider / Damper

The slider damper is used to regulate the airflow through the pellet stove.

For the most efficient burn, push the slider damper in all the way. Figure 32 shows this configuration.

Operating Instructions

Control Board Functions:

1. **AUGER LIGHT:** This green light will flash in conjunction with the auger pulse.
2. **MODE LIGHT:** Responsible for signaling the state of the control board. When the light is flashing the stove is in an automatic start mode or the thermostat has control of the unit. When the light is solid, the Heat Level Setting can be altered.
3. **THERMOSTAT SWITCH:** Used to set the unit's controls to one of three mode settings; manual, high/low, or auto/off.
4. **FEED RATE TRIM BUTTON:** Used to change the feed rate trims in ¼ second increments for all feed settings. When this button is pressed, all the lights will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 4 light. To adjust the setting hold the Feed Rate Trim button down and press the Heat Level up or down buttons.

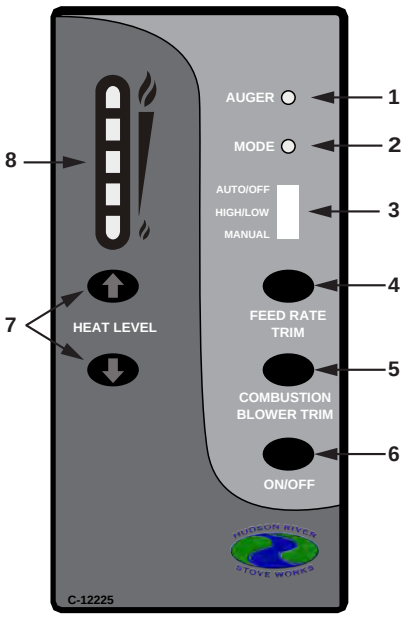


Figure 28: Circuit Board Control Panel Decal.

5. **COMBUSTION BLOWER TRIM BUTTON:** Used to change the Combustion Blower trims in 5 volt increments for all feed settings until it reaches line voltage. When this button is pressed, all the light s will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 2 light. To adjust the setting hold the Combustion Blower Trim button down and press the Heat Level up or down buttons.
6. **ON/OFF BUTTON:** Used to turn the unit ON and OFF.
7. **HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
8. **HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

Automatic Safety Features of Your Pellet Stove:

A. If the fire goes out (exhuast temperature drops below 120°F); the unit will automatically shut down.

B. This unit is equipped with a high temperature safety switch. If the temperature of the hopper reaches 200°F, the auger will automatically stop and the unit will shut down. Once the exhaust temperature cools below 120°F the #4 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

C. The unit is equipped with a vacuum switch to monitor the exhuast venting; if the unit is unable to establish sufficient vacuum for operation this switch will turn off the auger and the #2 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

Operating Your Pellet Stove:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

Note: The thermostat mode can be changed during normal operation.

MANUAL MODE:

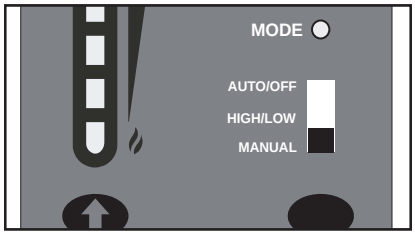


Figure 29: Thermostat Switch in MANUAL position.

All control of circuit board function is adjusted at the circuit board.

To START: Press the ON / OFF button. The stove will turn on. The system light will flash. The Auger Light will flash with each pulse of the auger (the Auger Feed Rate is pre-programmed during start-up). The Heat Level Indicator will show the Heat Level that the stove will run at after start-up and can be adjusted; but the change will not take affect until the start -up has finished.

If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. This can be done by restarting the unit five (5) minutes into its start-up or by putting a small hand full of pellets into the burnpot.

To OPERATE: When a fire has been established, the System Light will turn solid (after approximately 10 - 15 minutes) and the Auger Light will continue to flash to the corresponding Heat Level setting.

The convection blower (room air blower) will turn on. The speed of this blower is controlled by the setting of the heat level output indicator.

HIGH/LOW MODE: (Requires a thermostat)

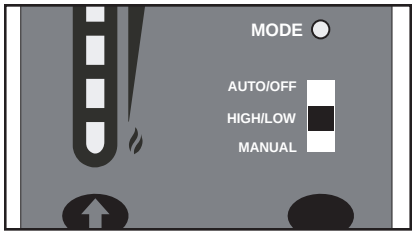


Figure 30: Thermostat Switch in HIGH/LOW position.

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat calls for heat (contacts are closed) the stove settings are adjustable as per Manual Mode. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. *The LOW heat setting can be adjusted for different fuel qualities (see "Operating Instructions - Control Board Functions"). The stove will come back to the previous HEAT LEVEL setting when the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat)

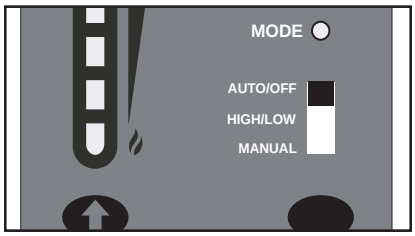


Figure 31: Thermostat Switch in ON/OFF position.

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat contacts close, the unit will light automatically. Once up to temperature, the stove operates the same as in MANUAL. When the thermostat contacts open, the stove's HEAT LEVEL and Fans will drop down to the LOW setting for 30 minutes. If the thermostat contacts close within the 30 minutes, the HEAT LEVEL will return to the previous MANUAL setting. If the thermostat contacts remain open the stove automatically begins its shutdown routine. The ON / OFF button can be pressed at any time to immediately shut down the unit. The stove will re-light when the thermostat contacts close again.

Turning Your Pellet Stove Off:

- MANUAL and HI / LOW mode: To turn the unit OFF, simply press the ON / OFF button. This will stop the feed of pellets. The blowers will continue to operate and cool the stove down. When cool enough, the stove will turn off.
- AUTO / OFF mode: To turn the unit OFF, turn the thermostat down or off. NOTE: The unit will run on low for three (3) minutes before it turns off.

DO NOT unplug the unit while Combustion fan is operating.
This may lead to smoke escaping from the stove.

Operating Instructions

Slider/Damper Set-Up:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION. A Qualified Service Technician or Installer must set the Slider Damper. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 7).

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper should be pushed in slightly, decreasing the air in the firebox.

If, after long periods of burning, the fire builds up and overflows the burn pot or there is a build up of clinkers, this would be a sign that the pellet quality is poor, this requires more primary air, the slider damper must be pulled out to compensate. Pulling the slider damper out gives the fire more air.

The easiest way to make sure that an efficient flame is achieved is to understand the characteristics of the fire.

- A tall, lazy flame with dark orange tips requires more air – Open slider (pull out) slightly.
- A short, brisk flame, like a blowtorch, has too much air – Close slider (push in) slightly.
- If the flame is in the middle of these two characteristics with a bright yellow/orange, active flame with no black tips then the air is set for proper operation, refer to Figure 8.

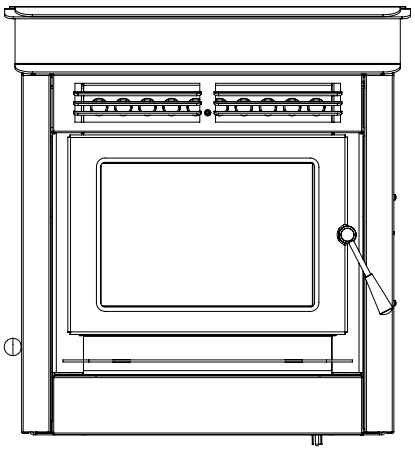


Figure 32: Slider / Damper Knob.

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the vacuum pressure inside the stove when the heat output level is turned down.

SPECIAL NOTES:

Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard ash build-up).

Figure 33: Efficient Flame.

Guidelines For Fine-Tuning For Fuel Quality:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit builds up on all settings, the slider damper rod should be pulled out in small increments to give the unit more air.
2. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
3. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
4. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
5. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

Routine Cleaning and Maintenance

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its optimum and giving you excellent heat value:

2-3 Days / Weekly	Semi-annually or 2 Tons of Fuel
Burn Pot and Liner	Exhaust Vent
Ash Pan	Fresh air Intake Tube
Inside Firebox	Blower Mechanisms
Door Glass	Heat exchanger tubes
Heat exchanger tubes	Behind firebox liners
Ash pan and Door gaskets	All Hinges
Door Latch	Post Season Clean-up

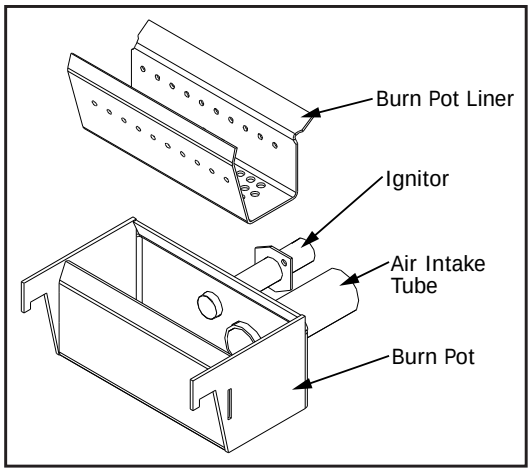


Figure 34: Burn pot assembly.

TOOLS REQUIRED TO CLEAN UNIT

- Torx T-20 Screwdriver
- Brush
- Soft Cloth
- 5/16" Wrench or Socket
- Vacuum with fine filter bag

BURN POT AND LINER (2-3 days)

Cleaning of the burn pot and liner must only be done when stove is cold. To remove the burn pot and burn pot liner, open the door using the door handle provided (located on the right-hand side of the stove). Swing the door open. Lift the liner from the burn pot. Lift the burn pot from the firebox by gently lifting up the front of the burn pot, then sliding the assembly from the air intake tube and the ignitor cartridge.

This is the 'pot' where the pellets are burned. Every two (2) to three (3) days (when the unit is cold), remove the burn-pot liner from the stove and inspected it to ensure proper air flow through the liner. **Failure to keep the liner clean may cause a build up of fuel past the burn pot liner and up the drop tube. This will cause the auger to jam and may result in pellets burning in the drop tube and hopper**. Using the metal scraper tool provided, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube. Press the liner up against the ignitor tube.

If, after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor or the stove may need cleaning. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door by lifting the handle. The glass can be cleaned by wiping down the outside and inside of the glass with a dry soft cloth.

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wipe down the outside and inside of the glass

DOOR LATCH (2-3 days)

Check the door latch every time the door is opened or closed to ensure proper movement.

Routine Cleaning and Maintenance

ASH PAN AND DOOR GASKETS (weekly)
After extended use the gasketing may come loose. To repair this, glue the gasketing on using high-temperature fiberglass gasket glue available from your local HUDSON RIVER dealer. This is important to maintain an airtight assembly.

ASH PAN (weekly)

The ash pan is located under the burner. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "Introduction - Safety Warnings And Recommendations" for disposal of ashes.

Freestanding: To remove the ash pan, simply turn the knob and pull out towards the front.

Insert: To remove the ash pan, remove the ash pan cover. Use a blade screwdriver to unlock the ash pan from the unit. Pull the ash pan out of the

DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.

HEAT EXCHANGER TUBES (weekly)

The heat exchanger tube cleaning rod is located oon the front of the unit. Pull this rod in and out a few times to remove any fly ash that may have accumulated on the heat exchanger tubes. Different qualities of fuels will produce varying amounts of fly ash; so cleaning of the heat exchanger tubes should be done on a regular basis.

NEVER TOUCH THE TUBE CLEANING ROD WHEN THE UNIT IS HOT.

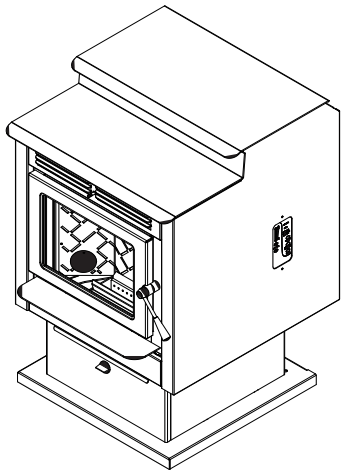


Figure 35: Heat Exchanger Tube Cleaner.

FRESH AIR INTAKE (season)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST VENT (season)

This vent should be cleaned every year or every two (2) tons of pellets. We recommend contacting your dealer for professional cleaning. To clean the vent pipe, tap lightly on the pipe to dislodge any loose ash. Open the bottom of the "T" to dump the ash, then vacuum as much of the ash out of the vent pipe as possible.

BLOWER MECHANISMS (season)

Unplug the stove then open the right and left side panels to access the two blowers. Vacuum all dust from motors. DO NOT lubricate the motors. Check gaskets and replace if needed.

ALL HINGES (season)

Check all the hinges on the unit to ensure proper movement.

Routine Cleaning and Maintenance

EXHAUST PASSAGES (season)

Removal of the firebox backing for bi-annual cleaning (refer to Figure 10):

- Open the door by lifting the handle, remove the burn pot and burn pot liner.
- Lubricate all screws with penetrating oil.
- Remove the two (2) port covers. Remove the four (4) screws that hold the brick liner in place. Remove brick liner. Remove the four (4) screws that hold the baffles in place. Remove side baffles by sliding them forward then out.
- Pull the center baffle out.
- Vacuum and clean thoroughly.

Installation of firebox backing:

- Insert center baffle with backing.
- Place the two (2) side baffles back into the firebox and reinstall the four (4) screws that hold them in place.
- Replace brick liner with four (4) screws.
- Replace the two (2) port covers.
- Replace the burn pot and burn pot liner
- Close the door and secure.

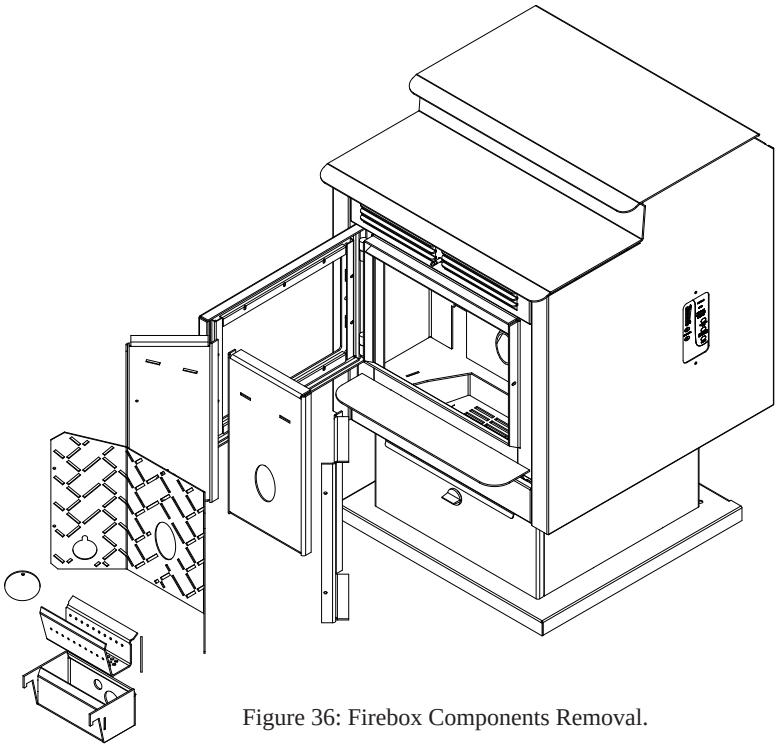


Figure 36: Firebox Components Removal.

POST SEASON CLEAN-UP

Once you are finished using the pellet appliance for the season, unplug the stove for added electrical protection. It is very important that the stove be cleaned and serviced as stated above.

CLEANING PLATED SURFACES

Painted surfaces should be wiped with a damp cloth periodically.

It is important to note that fingerprints and other marks can leave a permanent stain on plated finishes. To avoid this, give the surface a quick wipe with denatured alcohol on a soft cloth BEFORE lighting the fireplace. Never clean surfaces when they are hot. Do not use other cleaners or abrasives as they may leave a residue or scratches, which can become permanently etched into the surface.

FIREBOX PANEL

The paint on the steel firebox panels may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty.

REPLACING DOOR GLASS

It is recommended that your HUDSON RIVER dealer replace the glass if broken.

The door glass is made of high temperature PYRO CERAMIC 5 mm thick. Replace only with part# EF-061.

Troubleshooting

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Remove any screws from inside the firebox without first applying a penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. The stove will not operate when hot.
3. The exhaust blower will not function normally.
4. Light # 2 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. The 200 °F (93 °C) high limit temperature sensor has tripped.
7. The convection blower will not function normally.
8. Ignitor- the pellets will not light.
9. Control settings (Heat Level) has no effect on the fire.
10. The stove keeps going out.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

✓Make sure the stove is plugged in and the wall outlet is supplying power.

✓If the Control Board has been placed in the ON /OFF thermostat mode, then turn the thermostat up to call for heat.

✓Ensure the burn pot liner is correctly placed in the burn pot

✓Check the Heat Level Indicator. - If the # 2 light is flashing (see the # 2 light is flashing)

✓Check the fuse on the circuit board.

✓If the unit still does not start, contact your local service dealer for service.

2. The stove will not operate when hot.

✓Check the Heat Level Indicator if a fire is not detected, or if the fire has gone out **the #3 light will flash** because the Exhaust Temperature Sensor's contacts have opened.

✓Check the hopper for fuel.

✓Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a change to the vent system or installation of fresh air to correct Air to Fuel ratio problems).**

✓Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.

✓Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >115 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower.

✓Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.

✓Exhaust Temperature Sensor failure. – Bypass sensor located on Exhaust Blower if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.

✓Check the fuse on the circuit board.

3. The exhaust motor will not function normally.

✓Open the left side access panel; check all connections against the wiring diagram.

✓See "2. The stove will not operate when hot." section.

4. Light # 2 on Heat output bar flashing

(The Vacuum Switch contacts have opened for more than 15 sec.)

✓Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose

✓Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.

✓Blocked exhaust / venting system - Have stove and venting cleaned and inspected.

✓Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.

✓Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.

✓Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors

✓Combustion Blower failure - The Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visual Check; is the blower motor turning? Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 V on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >114 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge. (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - push the ON/OFF button

5. Auger light flashes but auger motor does not turn at all.

✓If the Auger gear box does not turn but the motor's armature does try to spin then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover after installation**

✓Check the fuse on the circuit board.

6. The 200 °F (93 °C) high limit temperature sensor has tripped.

✓Reset sensor and determine cause – was it Convection Blower failure or 160 °F (71 °C) Temperature Sensor failure? Bypass the 160 °F (71 °C) sensor, does the Convection blower come on high if not replace the blower? If yes, replace sensor (located on the left side of the firewall).

✓Check the fuse on the circuit board.

7. The convection blower will not function normally.

✓Clean all grill openings at the back and below unit .

✓Press the fan button; does the fan come on? Press again to verify that the blower turns on; if, not contact your local dealer for service.

8. Ignitor- the pellets will not light.

✓Everything else in the stove operates but the ignitor will not light the pellets.

✓Make sure the burn pot liner is up tight and square to the ignitor tube by pushing the burn pot back against the ignitor tube.

✓Check to see if the exhaust blower is operating. If not, contact your local dealer for service.

✓Check the fuse on the circuit board.

NOTE: The ignitor should be bright orange in color. If not replace the ignitor.

9. Control settings (Heat Level) has no effect on the fire.

✓NOTE: If the system light is flashing the Control Board has complete control of the unit. When the units system light becomes solid then control of the unit is given back to the operator.

✓If there is no control of the Heat Level button make sure the thermostat is calling for heat.

✓Call your local dealer for service.

10. The stove keeps going out.

If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

✓Check to see that the Slider / Damper is in the correct position.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

✓Set the auger trim till the #1 and #5 lights are illuminated.

If the stove goes out and there are partially burned pellets left in the burn pot liner, the stove has shut down due to a lack of air, exhaust temperature, or power failure.

✓Adjust the Slider / Damper.

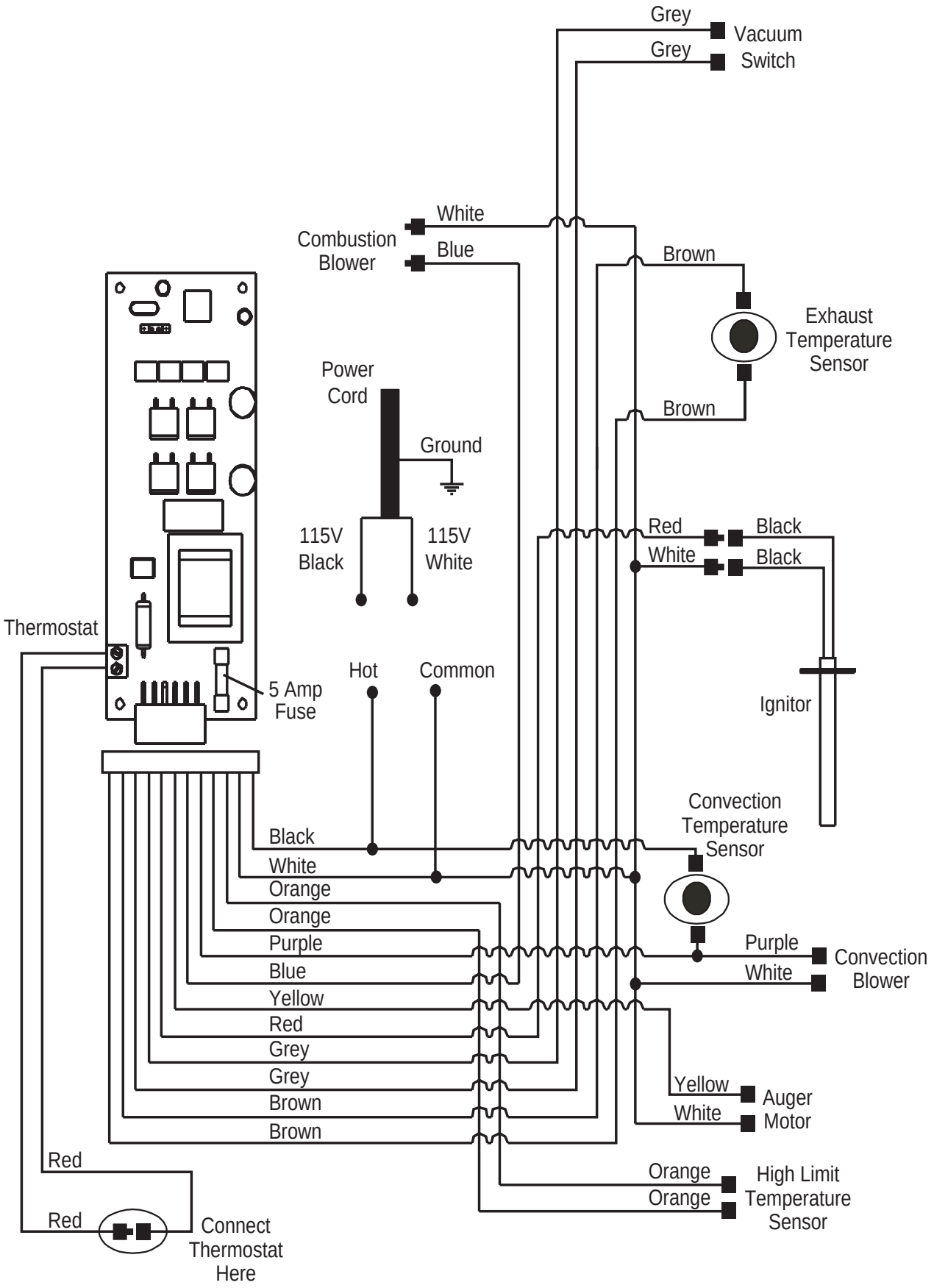
✓Check to see if the stove needs a more complete cleaning.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

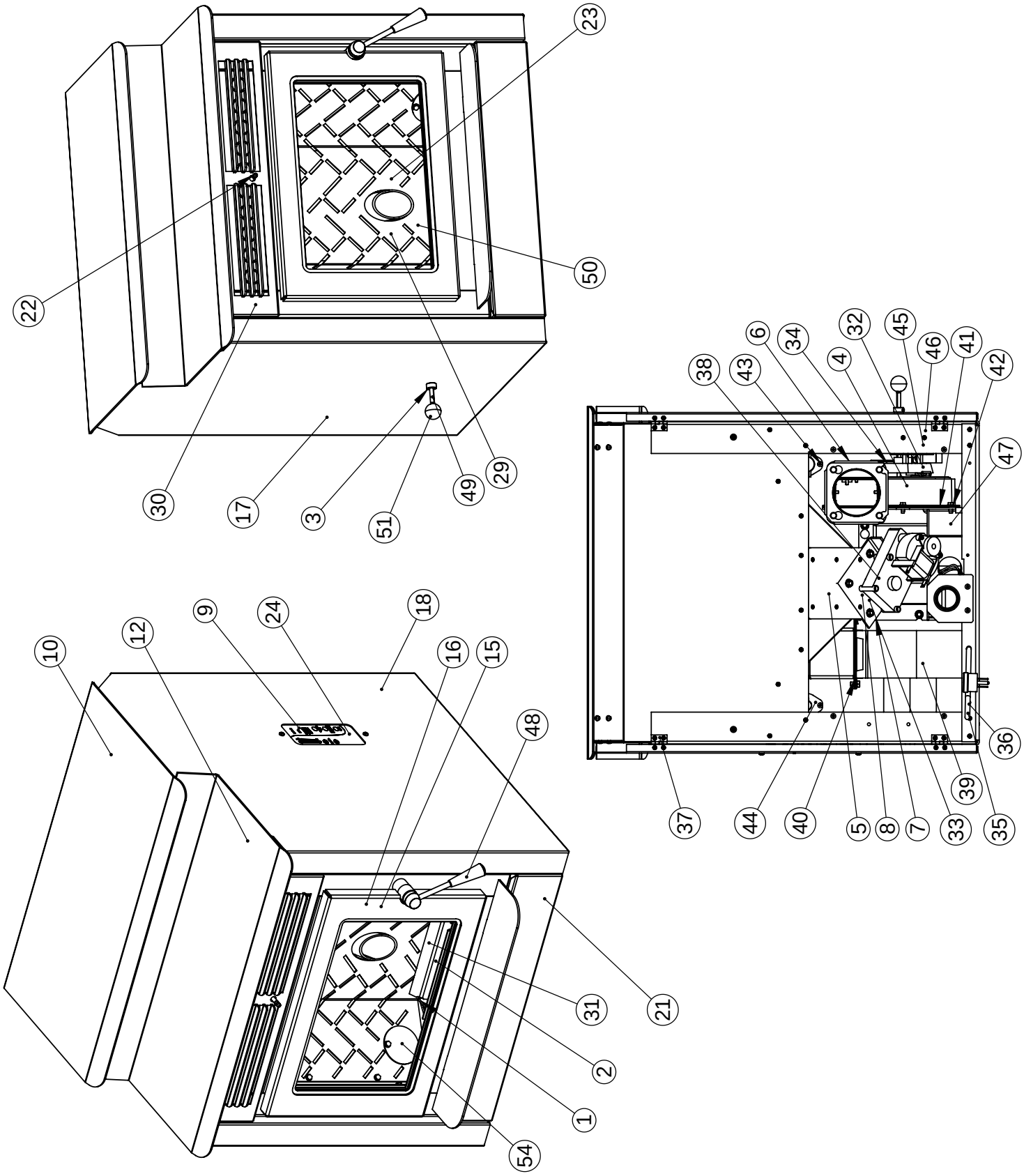
✓Did the power go out?

✓Contact your local Dealer for service.

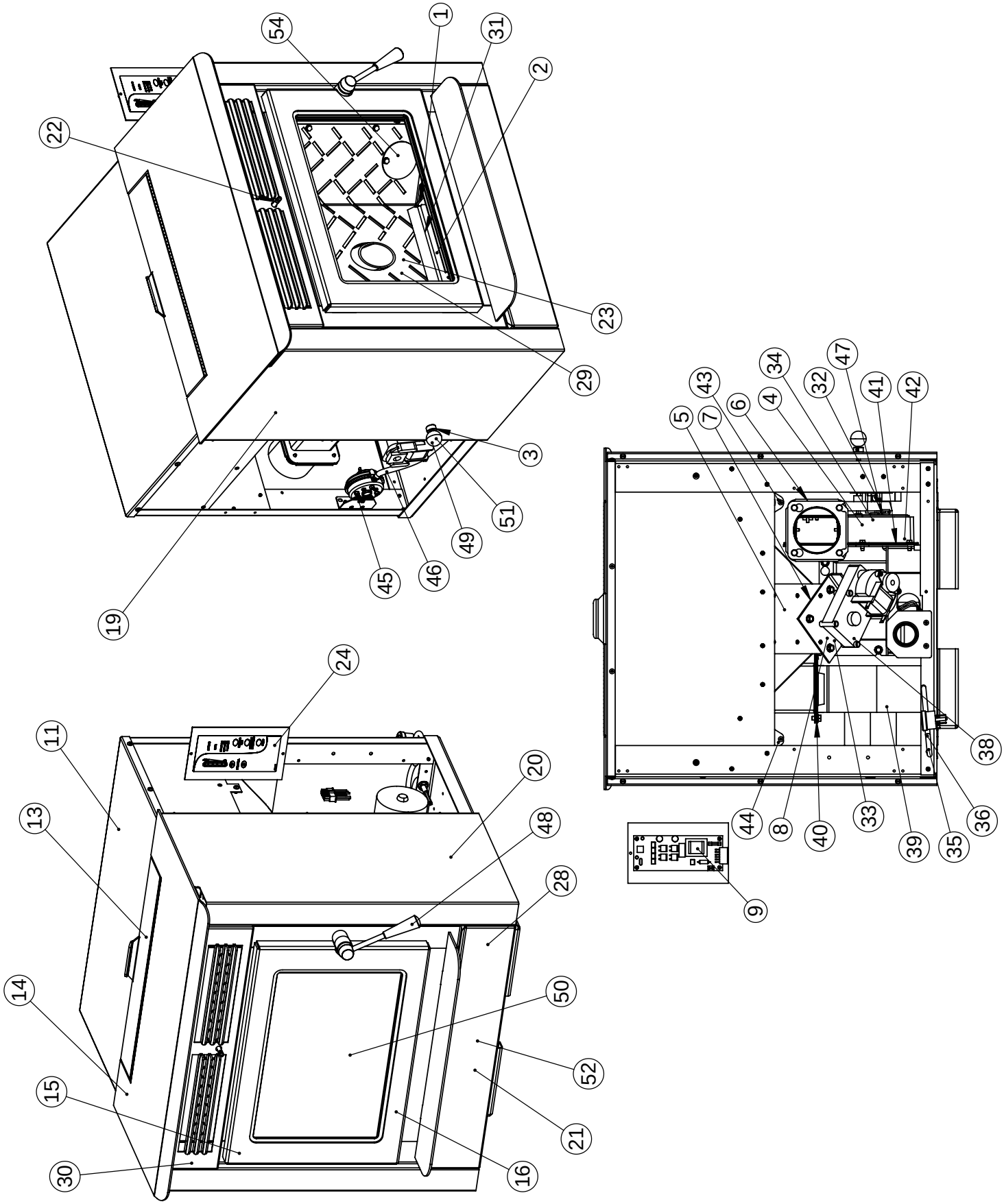
Wiring Diagram



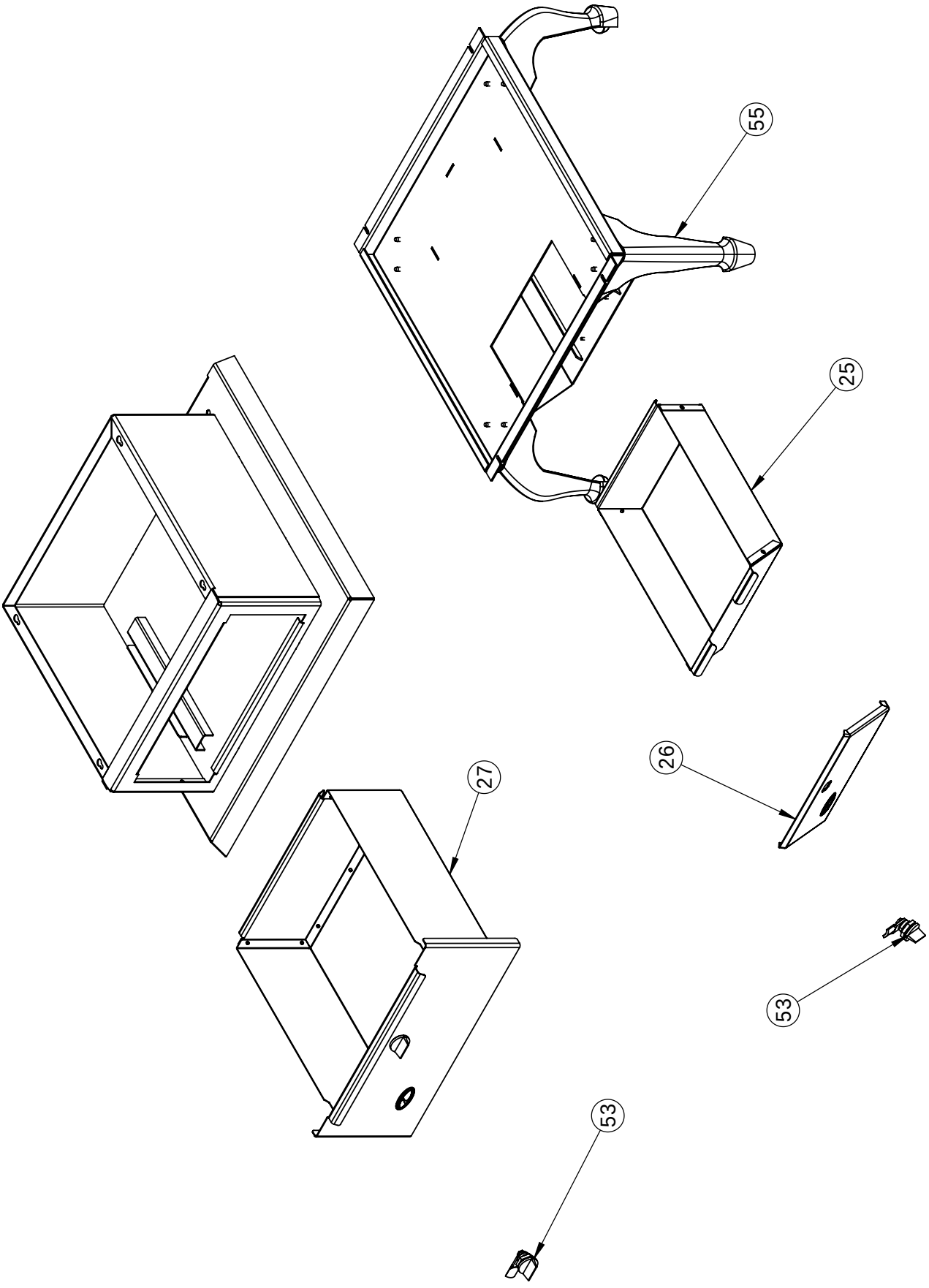
PARTS DIAGRAM - FS



PARTS DIAGRAM - FPI



PARTS DIAGRAM - OPTIONS



Parts list

ITEM NO.	PartNo	DESCRIPTION
OPTION	20-036	EF2/3/4/SOLUS/HUDSON RIVER LOG SET (ONE PIECE)
1	EF-021	IGNITION BURN POT
2	50-1067	IGNITOR 300W
3	50-1068	SLIDER DAMPER SET COLLAR KIT
4	50-1107	FORMED EXHAUST BLOWER HOUSING
	50-1254	BURN POT SCRAPER TOOL
5	50-1346	AUGER
	50-1380	MANUAL BAG - INCLUDING BOLTS AND SCREWS (SPECIFY UNIT)
	50-1383	OPTION HARDWARE BAG INCLUDING BOLTS AND SCREWS (SPECIFY OPTION)
	50-1410	AUGER TUBE COVER
6	50-1448	EXHAUST STARTER TUBE GASKET
7	50-1780	AUGER BRASS BUSHING AND PLATE
8	50-1806	5/8" ID AUGER BRASS BUSHINGS (SET OF 2)
9	50-1929	CIRCUIT BOARD
	50-1971	PELLET THERMOSTAT
OPTION	50-2222	DAVENPORT FPI REG SURROUND PANEL
OPTION	50-2223	HUDSON RIVER FS PEDESTAL
OPTION	50-2224	HUDSON RIVER FS LEG KIT
	50-2322	DAVENPORT OWNERS TECHNICAL MANUAL
10	50-2323	DAVENPORT FS HOPPER LID (OLD SERIALIZED PART MUST BE RETURNED)
11	50-2324	DAVENPORT FPI HOPPER COVER (OLD SERIALIZED PART MUST BE RETURNED)
12	50-2325	DAVENPORT FS TOP
13	50-2326	DAVENPORT FPI HOPPER LID
14	50-2327	DAVENPORT FPI TOP
15	50-2328	DAVENPORT DOOR ASSEMBLY COMPLETE
16	50-2329	DAVENPORT GLASS RETAINER
17	50-2330	DAVENPORT FS CABINET SIDE LEFT
18	50-2331	DAVENPORT FS CABINET SIDE RIGHT
19	50-2332	DAVENPORT FPI CAB SIDE LEFT
20	50-2333	DAVENPORT FPI CAB SIDE RIGHT
21	50-2334	DAVENPORT ASH PAN COVER
22	50-2335	DAVENPORT TUBE SCRAPER ROD
23	50-2336	DAVENPORT BRICK LINER
24	50-2337	DAVENPORT CONTROL PANEL CW DECAL
25	50-2338	DAVENPORT LEG KIT ASH PAN
26	50-2339	DAVENPORT LEG KIT DOOR C/W DECAL
27	50-2340	DAVENPORT PED ASH DRAWER C/W DECAL
28	50-2341	DAVENPORT ASH PAN COVER MAGNET (SET 2)
29	50-2342	DAVENPORT FIREBOX LINER CW INSULATION
30	50-2343	DAVENPORT LOUVER SET
	50-554	MAGNAHELIC GAUGE & KIT
31	50-587	BURN POT LINER HIGH ASH
	50-754	PELLET/GAS MECH & ELEC FASTENER BAG
32	EF-161A	COMBUSTION BLOWER MOTOR WITH IMPELLER ONLY
33	50-968	5/8" ID AUGER COLLAR (WITH SCREW)

Parts list

34	EC-001	120F (49C) Ceramic Fan Temperature Sensor
35	EC-042	DOMESTIC POWER CORD 115V
36	EC-044	HEYCO STRAIN RELIEF
37	EC-054	1 X 1 CABINET SIDE HINGE (1)
	EC-058	WINDOW CHANNEL TAPE- 72IN
38	EF-001	AUGER MOTOR 1 RPM
39	EF-002	CONVECTION BLOWER 115V
	EF-004	CONVECTION BLOWER IMPELLER
40	EF-006	CONVECTION BLOWER INSULATOR (GASKET)
	EF-008	COMBUSTION MAIN IMPELLER 1" x 4 1/2"
41	EF-011	COMBUSTION BLOWER MOUNTING GASKET
42	EF-012	COMBUSTION BLOWER HOUSING GASKET (CIRCULAR)
43	EF-013	TEMPERATURE SENSOR 160F
44	EF-016	HIGH LIMIT TEMP SENSOR 200F MANUAL RESET
45	EF-017	VACUUM SWITCH
46	EF-018	SILICONE HOSE (RED)
47	EF-019	ALUMINUM HOSE BARB
48	EF-030	DOOR HANDLE WITH KNOB, ROD, AND CAMS
49	EF-050	SLIDER DAMPER ROD W KNOB
	EF-057	.5IN ROUND DOOR GASKET (6FT)
50	EF-061	GLASS WITH TAPE (13 X 9)
51	EF-068	1IN KNOB
52	EF-105	FPI ASH PAN DRAWER WITH LATCH
	EF-126	FIREBOX CERAMIC WOOL INSULATION
	EF-156	PELLET STOVE CLEANING BRUSH
53	EF-178	ASH PAN LATCH
54	EF-194A	FIREBOX CLEANING PORT COVERS -PD
	EF-208	PEDESTAL & ASH PAN GASKET - 10'
55	EFW-253	CAST LEG (1)
	EF-125	SHOULDER BOLT & NUT (DOOR LATCH)
	50-1730	ASH PAN LATCH (SCREWDRIVER TYPE)

Warranty

Limited Lifetime Warranty:

Under this warranty, Hudson River Stove Works covers the body of the stove including all exterior metals. This warranty covers: Firebox, Heat Exchanger, Pedestals, Legs, and Door Assembly. Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

Limited Two Year Warranty:

Under this warranty, Hudson River Stove Works covers electrical components against defects in materials and workmanship for part repair and replacement for the first two years and labor for the first year only to the original purchaser. (Glass and all gaskets are not included under any part of this warranty.) Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

There is no written or implied performance warranty on the stove, as the manufacturer has no control over the installation, daily operations, maintenance or the type of fuel burned.

This warranty does will not apply if the stove has not been installed, operated and maintained in strict accordance with the manufacturer's instructions.
This warranty does not cover damage or breakage due to misuse, improper handling or modifications.

All Claims under this warranty must be made through the dealer in which the stove was originally purchased from. If an inspection by the dealer indicated that a warranty claim is justified, and that all conditions of this warranty have been met, the manufacturer's total responsibilities and liabilities shall be to repair or replace the defective part(s). All costs of removal, shipment to and from the dealer of manufacturer, any losses during shipment and reinstallation and any other losses due to the stove being removed shall be covered by the owner of the stove.

Here is how our Warranty works
If you have any concerns with your Hudson River product please contact the dealer where you purchased the fireplace or stove. Your dealer shall make all claims under this warranty in writing.

To the Dealer
When filling out a warranty claim please complete the following information on an official warranty claim form:

Customer information: Name, address and telephone number of purchaser and date of purchase.

Dealer information: Date of installation, name of installer and dealer, serial number of the appliance, nature of complaint, defects or malfunction, description and part numbers of any parts replaced.

To the Distributor
Sign and verify that work and information are correct.

Installation Data Sheet

The following information must be recorded by the installer for warranty purposes and future reference.

NAME OF OWNER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

NAME OF DEALER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MODEL: DAVENPORT

SERIAL NUMBER:_____

DATE OF PURCHASE: _____ (dd/mm/yyyy)

DATE OF INSTALLATION:_____(dd/mm/yyyy)

MAGNEHELIC AT INSTALL:_____

INSTALLER'S SIGNATURE:

_____

NAME OF INSTALLER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MANUFACTURED FOR HUDSON RIVER STOVE WORKS BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
Winter, 2022
C-14965

Model :

WH- **Kinderhook-1** ☐ **Davenport-1** ☐ **FS** ☐ **FPI**

Serial No.:

HUDSON RIVER STOVE WORKS

Ouput Rating: 8,852 to 32,134 BTU/Hr
Listed Room Heater, Pelletized Fuel Type
Suitable For Mobile Home Installation Conforms to: ASTM E1509-12 Certified to: ULC S627-00 / ULC S628-M93

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacture's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.3 Amps.

For Use With Only Pelletized Wood fuels. Keep viewing and ash removal doors tightly closed during operation. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Insert and Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently.

To Start Stove: Press the ON / OFF button. If the auger needs to be primed, press the Manual Auger Feed button until fuel starts to drop into the Burn Pot.

To Operate Stove: MANUAL MODE: When a fire has been established the stove settings are adjustable.

HIGH/LOW MODE: (Requires a thermostat) When the thermostat calls for heat the stove settings are adjustable. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat) When the thermostat contacts close, the unit will light automatically. Once up to temperature the stove settings are adjustable. When the thermostat contacts open, the stove will drop down to the LOW settings for 30 minutes. If within the 30 min the thermostat contacts close, the HEAT LEVEL will return to previous MANUAL setting or if the thermostat contacts remain open the stove begin its shutdown routine.

To Turn Off Stove: MANUAL and HI / LOW mode: Press the ON / OFF button; AUTO / OFF mode: Turn the thermostat down or off.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

DATE OF MANUFACTURE:

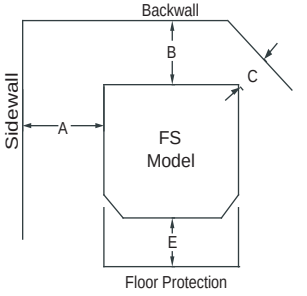
J F M A M J J A S O N D 2021 2022 2023 2024 2025

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

DO NOT REMOVE THIS LABEL

INSTALLED AS A FREESTANDING STOVE MODEL
Minimum clearances to combustible materials.

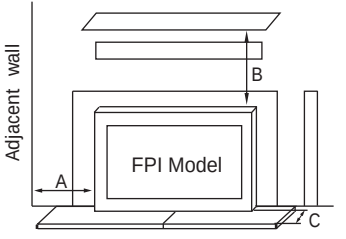
A	Sidewall to Unit	6" (152 mm)
B	Backwall to Unit	2" (51 mm)
C	Corner to Unit	2" (51 mm)
E	From door opening of unit to edge of floor protection	Davenport FS 9" (229 mm)
		Kinderhook FS 6" (152 mm)



INSTALLED AS A FIREPLACE INSERT STOVE MODEL:

A	Sidewall to Unit (Du mur de côté à l'appareil)	9" (229mm)
B	Top of unit to an unshielded 8" (203 mm) mantle (Le sommet de l'unité à un manteau de cheminée non blindé)	8" (203 mm)
C	From door opening of unit to edge of floor protection (De la porte ouvrant au devant de protection de plancher)	9" (229mm)

Combustible floors must be protected by a non-combustible material. - See Owners Manual.



CAUTION:

Hot while in operation. DO NOT touch, keep children, clothing & furniture away. Contact may cause skin burns. See nameplate & instructions

Intertek US — Certified for use in USA

ETL LISTED Intertek US — C#4001609

C-15802 R1

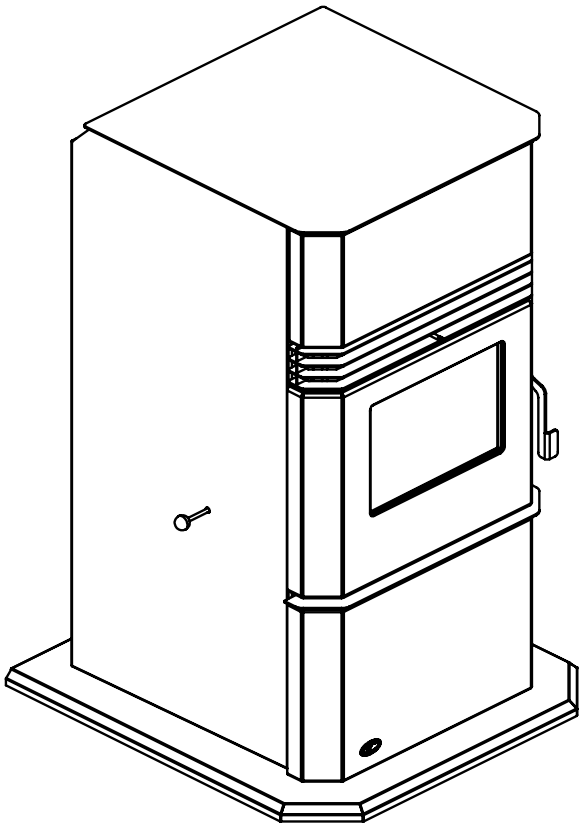
PLEASE KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

HUDSON RIVER STOVE WORKS

PELLET STOVE

KINDERHOOK-1

OWNER'S MANUAL



NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We suggest that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

Contact your building or fire officials about restrictions and installation inspection requirements in your area.

US Intertek WH 225767

ETL LISTED US Intertek 4001609

PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS PELLET-BURNING ROOM HEATER. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

Table of Contents

Introduction

Rating Label Location:

The rating label is located on the inside of the hopper lid.

Pellet Quality:

Pellet quality is important, please read the following:

Your Hudson River pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. The Pellet Fuel Industries (P.F.I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P.F.I. PELLET STANDARDS:

Fines (fine particles).....1% maximum through a ⅛" screen
Bulk Density.....40 pound per cubic foot minimum
Size.....¼" to 5/16" diameter ½ – 1½" long maximum
Ash Content.....1% maximum (Premium grade)
.....3% maximum (Standard grade)
Moisture Content.....8% maximum
Heat Content.....approximately 8200 Btu per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

CLINKERING: Clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the Routine Cleaning and Maintenance section of this manual.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low heat levels.

Since Hudson River Stove Works has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets at least 36" (1 m) away from the pellet stove.

WH-

Serial No. / No. De Serié:

Model / Modèle: Kinderhook-FS-1

Listed Room Heater, Pelletized Fuel Type
Input rating: Wood Pellets - 11,000 - 40,000 BTU (3.22KW*hr - 11.72KW*hr)
Suitable For Mobile Home Installation. Tested to: ASTM 1509-04.

DO NOT REMOVE THIS LABEL C-14962

Omni Project Number : **0268PS024E**

Listed By O-T-L C US Portland Oregon USA
OMNI-Test Laboratories, Inc.

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administrative rules 814-23-900 through 814-23-909.Install and use only in accordance with the manufacturer's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. ELECTRICAL RATING: 120 Volts, 60Hz, 3.3 Amps. Route Cord Away From Heater.
For use with pelletized solid fules only. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation 3in/75mm or 4in/100mm listed PL vent complete with components. Inspect and clean exhaust venting system frequently.

To Start Stove: Press the ON / OFF button. If the auger needs to be primed, press the FEED TRIM button.
To Operate Stove:
MANUAL MODE: When a fire has been established the stove settings are adjustable.
HIGH/LOW MODE: (Requires a thermostat) When the thermostat calls for heat the stove settings are adjustable. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again.
AUTO/OFF MODE: (Requires a thermostat) When the thermostat contacts close, the unit will light automatically. Once up to temperature the stove settings are adjustable. When the thermostat contacts open, the stove will drop down to the LOW settings for 30 minutes. If within the 30 min the thermostat contacts close, the HEAT LEVEL will return to previous MANUAL setting or if the thermostat contacts remain open the stove begin its shutdown routine and it will restart when the thermostat closes.
To Turn Off Stove: MANUAL and HI / LOW mode: Press the ON / OFF button
AUTO / OFF mode: Turn the thermostat down or off.

DATE OF MANUFACTURE / DATE DE FABRICATION:

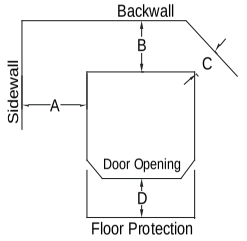
J F M A M J J A S O N D 2016 2017 2018

HUDSON RIVER STOVE WORKS

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

Installed as a freestanding stove - conventional or mobile home. Minimum Clearances to Combustible Materials:

Sidewall to Unit: ..... A 6 in. / 152 mm
Backwall to Unit: ..... B 2 in. / 51 mm
Corner to Unit: ..... C 2 in. / 51 mm
Floor Protection*: ..... D 6 in. / 152 mm
*If the unit is installed on combustible material, the pedestal base can be moved to the forward position to satisfy the 6" floor protection requirement shown in measurement "D".



U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2015 particulate emission standards. Not approved for sale after May 15, 2020. This pellet heater needs periodic inspection and repair for proper operation. Consult the owner`s manual for further information. It is against federal regulations to operate this heater in a manner inconsistent with the operating instructions in the owner`s manual. This heater meets the 2015 U.S. Environmental Protection Agency's pellet emission limits for pellet units sold after May 15, 2015. Under specific test conditions this heater has been shown to have a particulate emission level of 1.44 g/hr.

ENVIRONMENTAL PROTECTION AGENCY US conforme aux normes 2015 d'émission de particules. Non approuvé pour la vente après le 15 mai à 2020. Ce poêle à granulés besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner`s pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner`s. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2015 pour les unités de pellets vendus après le 15 mai 2015. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de 1.44 g / h.

CAUTION:

HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE BURNS. SEE NAMEPLATE AND INSTRUCTIONS.

US Intertek WH 225767

US Intertek 4001609

Certified for use in USA

Emissions and Efficiency - Kinderhook-1:

Rates: This manual describes the installation and operation of the Hudson River Kinderhook-1 pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has an input rate ranging from 11,214-40,852 Btu/hr with an output ranging from 8,852-32,134 Btu/hr.

Efficiency: **HHV:** 76.7%

0268PS024E.REV001
OMNI-Test Laboratories

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet has a manufacturer set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this pellet heater in a manner inconsistent with operating instructions in this manual.

Introduction

Important Safety Data:

Please read this entire Owner's Manual before installing or operating your HUDSON RIVER Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. A HUDSON RIVER dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

Be sure to maintain the structural integrity of the home when passing a vent through walls, ceilings, or roofs.

The stove's exhaust system works with negative combustion chamber pressure (vacuum) and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

If you have any questions with regard to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

Safety Warnings And Recommendations:

Caution: Do not connect to any air distribution duct or system.
Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.
Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations.

THE USE OF CORDWOOD IS PROHIBITED BY LAW.

SOOT: Operation of the stove with insufficient combustion air will result in the formation of soot which will collect on the glass, the heat exchanger, the exhaust vent system, and may stain the outside of the house. This is a dangerous situation and is inefficient. Frequently check your stove and adjust the slider/damper as needed to ensure proper combustion. **See: "Adjusting the vacuum using the slider/damper".**

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

Introduction

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be stored on a non-combustible floor, well away from all combustible materials pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: The use of a surge protected power bar is recommended. The unit must be grounded. The grounded electrical cord should be connected to a standard 115 volts (3.3 Amps), 60 hertz electrical outlet. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces, sharp edges, and is accessible. If this power cord should become damaged, a replacement power cord must be purchased from the manufacturer or a qualified HUDSON RIVER dealer. This unit's maximum power requirement is 400 watts.

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an HUDSON RIVER dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

FLAMMABLE LIQUIDS: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in the heater. Keep all such liquids well away from the heater while it is in use.

SMOKE DETECTORS & CO MONITORS: Smoke detectors and carbon monoxide (CO) monitors should be installed and maintained in the structure when installing and operating a pellet burning appliance.

OPERATION: The ash pan, door, and hopper lid must be closed securely for proper and safe operation of the pellet stove. Ensure all gaskets and seals are checked regularly and replaced when necessary.

KEEP ASH PAN FREE OF RAW FUEL.
DO NOT PLACE UNBURNED OR NEW PELLET FUEL IN THE ASH PAN. A FIRE IN THE ASH PAN MAY OCCUR.

INSTALLATION: Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement.
DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

FRESH AIR: Outside Fresh Air connection is optional BUT MUST be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes. Consider all large air moving devices when installing your unit and provide room air accordingly. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE HUDSON RIVER STOVE WORKS HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, HUDSON RIVER STOVE WORKS GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, HUDSON RIVER STOVE WORKS ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE

Specifications

Dimensions - Freestanding:

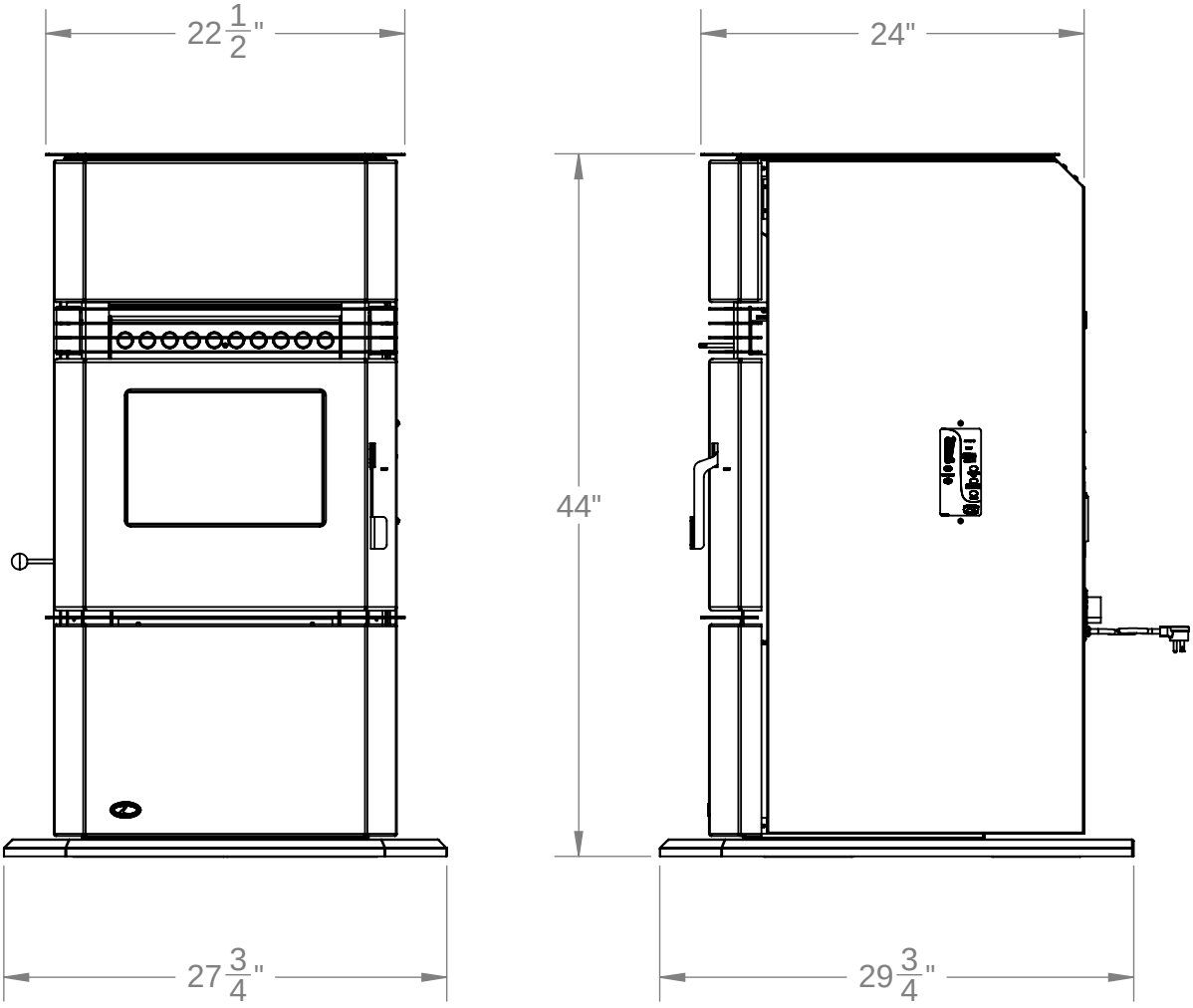


Figure 1: Kinderhook Dimensions.

Specifications:

Input rating: 42,500BTU

Table 1: Kinderhook Specifications.

Description	Fuel type	
Residential Pellet Heater	6mm (¼") dia. Wood Pellets	
Voltage	Current	Max Power
110 - 120 V	3.3 Amps	400 Watts
Frequency	Hopper Capacity	Consumption on Low
60 Hz	130 lbs	1.5 lb/hr
Testing Standard	Weight**	Consumption on High
ASTM 1509-04	350 lbs	5 lb/hr

*Consumption will vary with the type of fuel used.

**With Full Hopper.

Installation

Deciding Where to Locate your Pellet Appliance:

1. Check clearances to combustibles (see Installation - Clearances to Combustibles, Installation - Alcove Clearances, and Installation.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.

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We recommend that our pellet hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Pellet Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training
www.wettinc.ca

Removing Your Pellet Stove From the Pallet:

There are four screws holding your new pellet stove to the pallet.

1. Two of the screws are at the back of the unit as shown in Figure 2.
2. To remove the screws from the front of the unit first open the ash door and remove the ash pan.
3. Remove the two metal plugs from the bottom of the unit. DO NOT DISCARD!
4. Remove the two screws from under the metal plugs.
5. Replace the metal plugs.

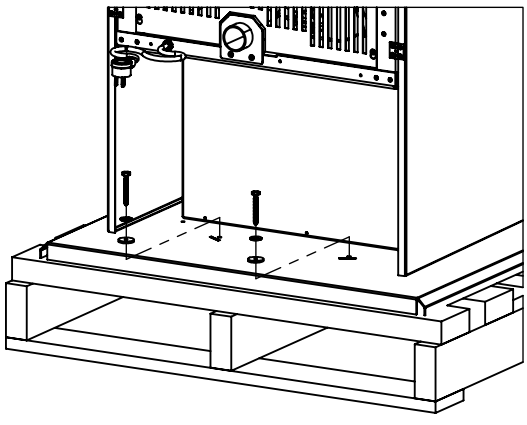


Figure 2: Removing screws from the rear of the stove.

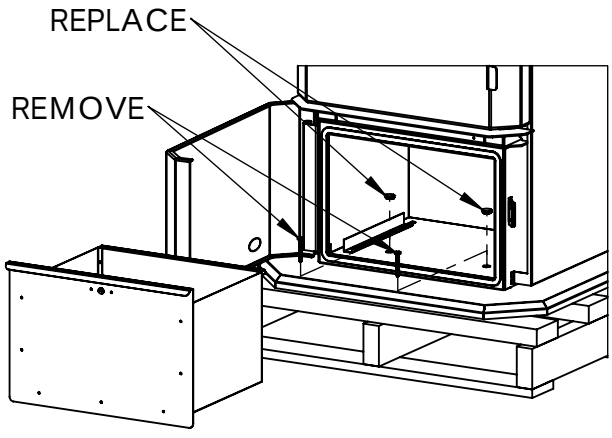


Figure 3: Removing Freestanding Stove From the Pallet.

Installation

Clearances to Combustibles:

These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning, and maintenance.

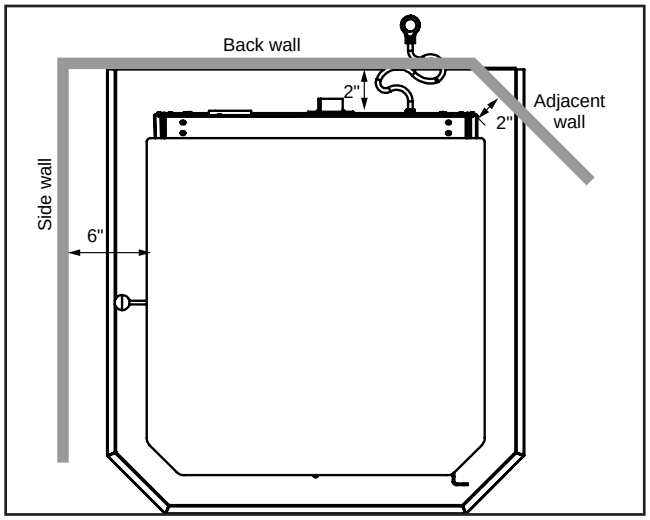
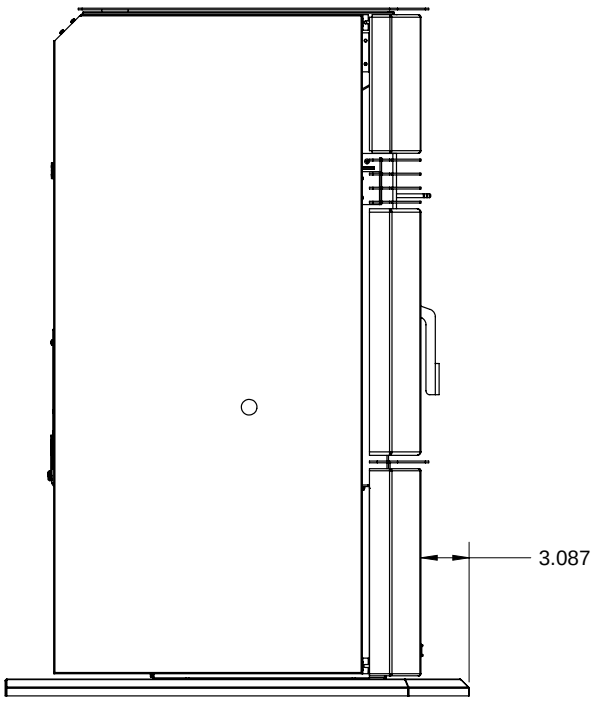


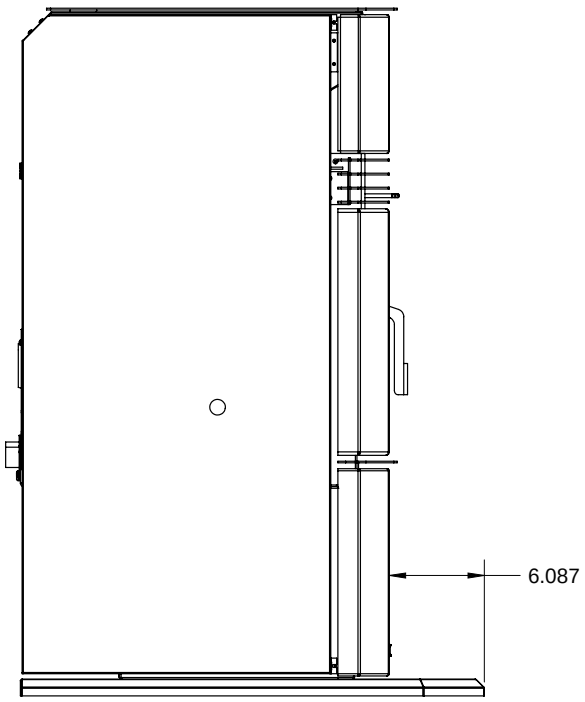
Figure 4: Minimum Clearances to Combustibles for Freestanding Kinderhook.

Adjustable Pedestal/Floor Protection:

If the unit is installed on combustible material, there must be a minimum of 6” of floor protection in front of the unit. The Kinderhook has an adjustable pedestal base which has two positions. When in the forward position as shown below, it provides 6” of floor protection and a hearth pad is not needed. The bolts for adjusting the pedestal base are located under the unit.



Rear position as shipped from the factory.



Forward position providing 6” of floor protection.

Figure 5: Adjustable Pedestal Base Positions

Alcove Clearances:

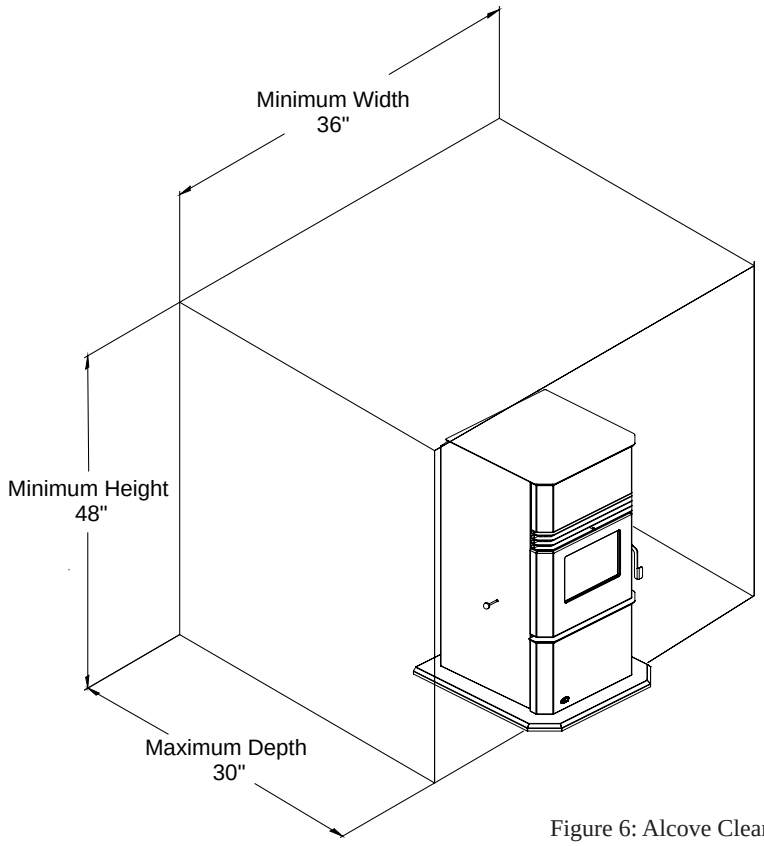


Figure 6: Alcove Clearances Kinderhook.

Mobile Home Installation:

● Secure the heater to the floor using the holes in the pedestal of the appliance.

● Ensure the unit is electrically grounded to the chassis of your home (permanently).

WARNING: Do not install in a room people sleep in.

CAUTION: The structural integrity of the manufactured home floor, wall and ceiling/roof must be maintained

• Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three (3) screws evenly spaced.

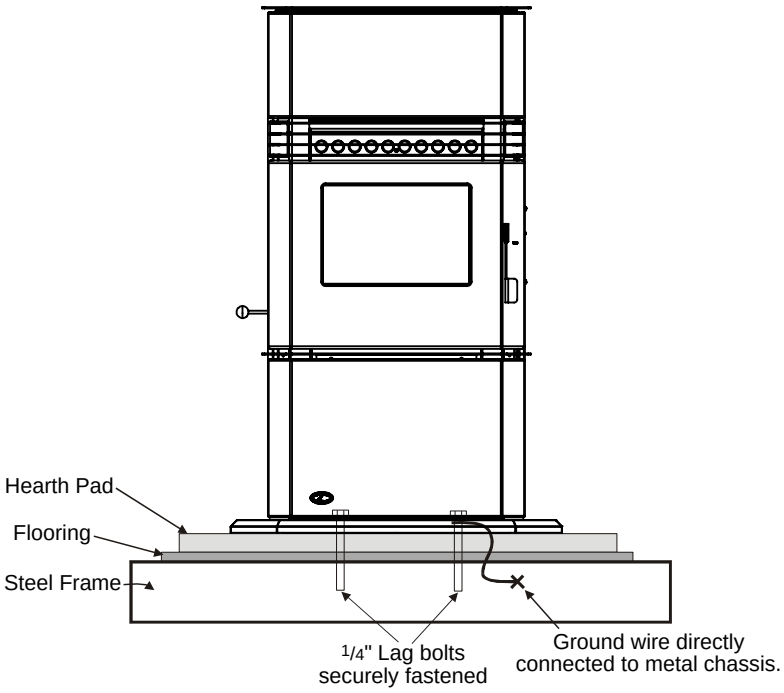


Figure 7: Mobile Install Mounting

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 2: Use in conjunction with Figure 13 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	From beside/below any door or window that may be opened. (18" (46cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/ regulator assembly	To each side of center line extended above natural gas or propane meter/ regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

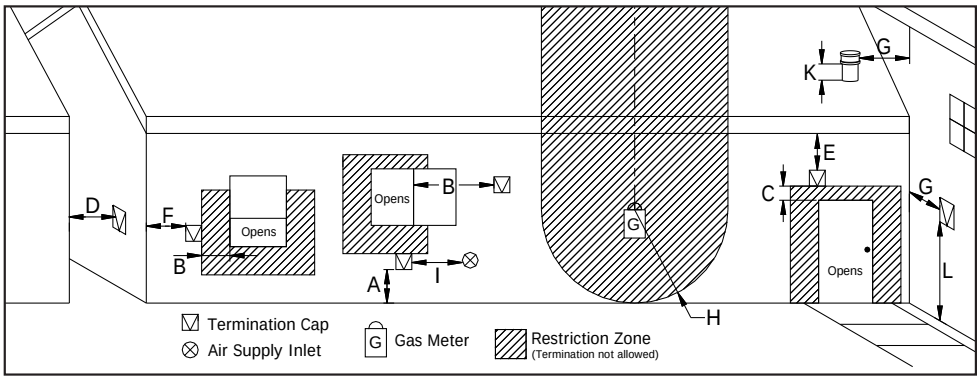


Figure 8: Use in conjunction with Table 1 for allowable exterior vent termination locations.

2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.
3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of Hudson River Stove Works, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

Exhaust And Fresh Air Intake Locations:

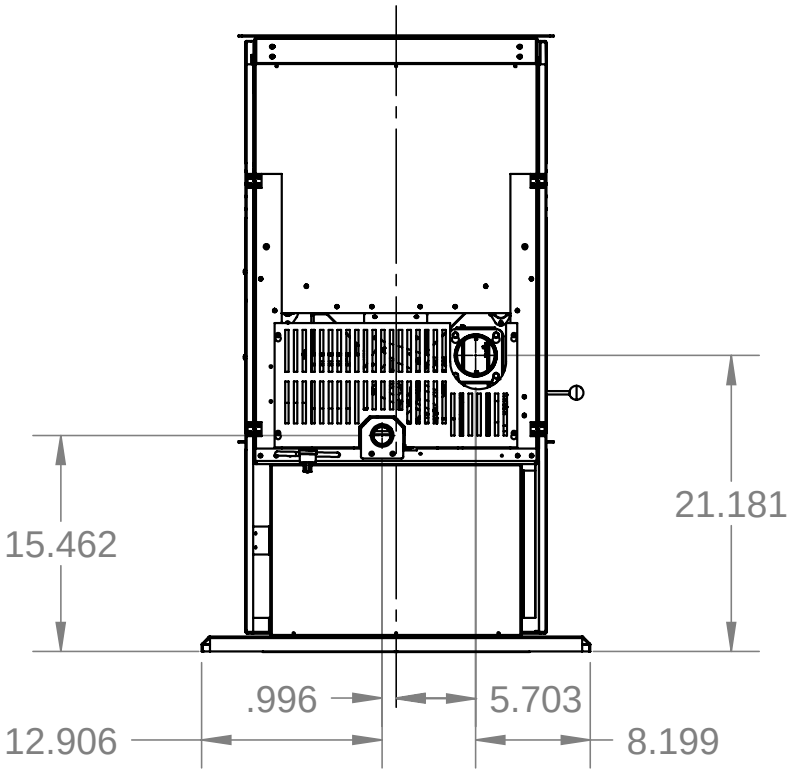


Figure 9: Kinderhook Inlet and Outlet Location.

INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENTING MANUFACTURER

Outside Fresh-Air Connection:

Outside fresh air is mandatory when installing this unit in airtight homes and mobile homes.

A Fresh-air intake is strongly recommended for all installations. Failure to install intake air may result in improper combustion as well as the unit smoking during power failures.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 2" minimum (51 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

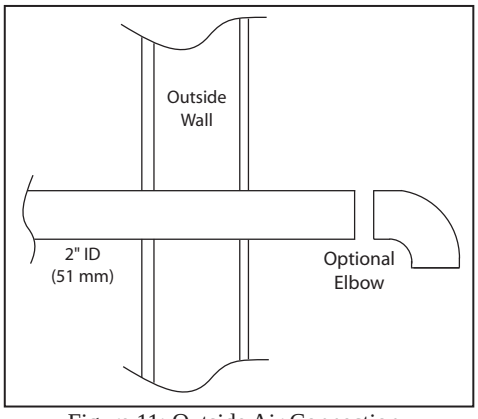


Figure 11: Outside Air Connection.

CORNER THROUGH WALL INSTALLATION:

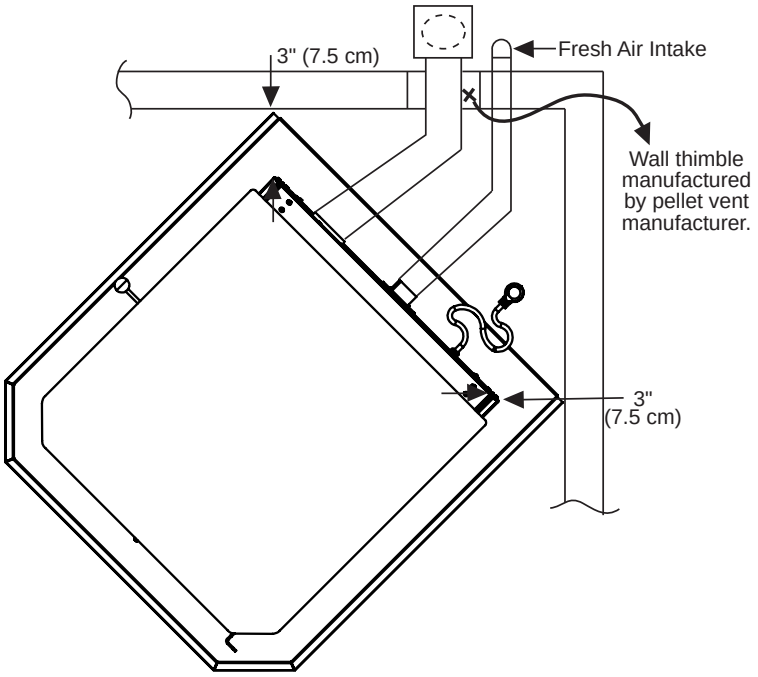


Figure 12: Corner Installation.

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION - FREESTANDING:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
6. Install a length of 3" (76 mm) or 4" (101 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Install the fresh air intake (see INSTALLATION - OUTSIDE FRESH AIR CONNECTION).
8. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
9. Push the stove straight back, leaving a minimum of 2" (5 cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.

10. The pipe must extend at least 12″ (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.
11. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

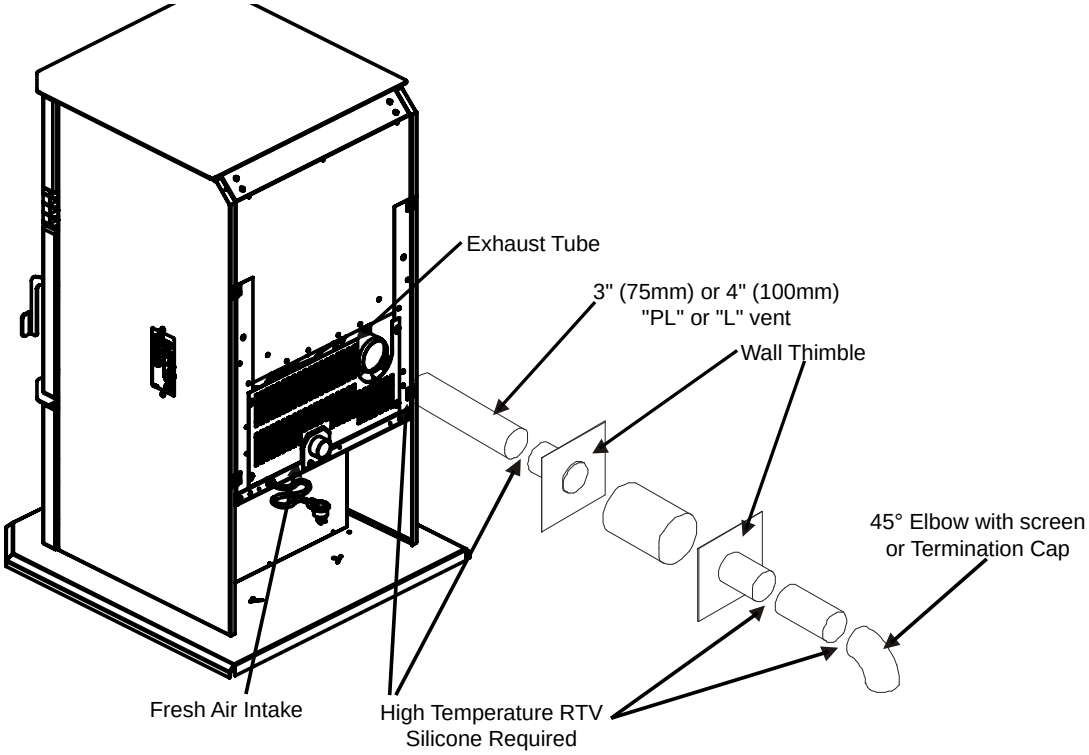


Figure 13: Straight through wall Installation.

NOTE:

- Some horizontal through wall installations may require a "T" and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help naturally draft in the unit.
- This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set.
- This is due to the back pressure in the exhaust caused by airflow around the structure.
- All sections of pipe must have three (3) screws evenly spaced and all horizontal and vertical vent sections located within the house must have a bead of high temperature silicone installed on the male end of the pipe before installation to create a gas tight seal.
- The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

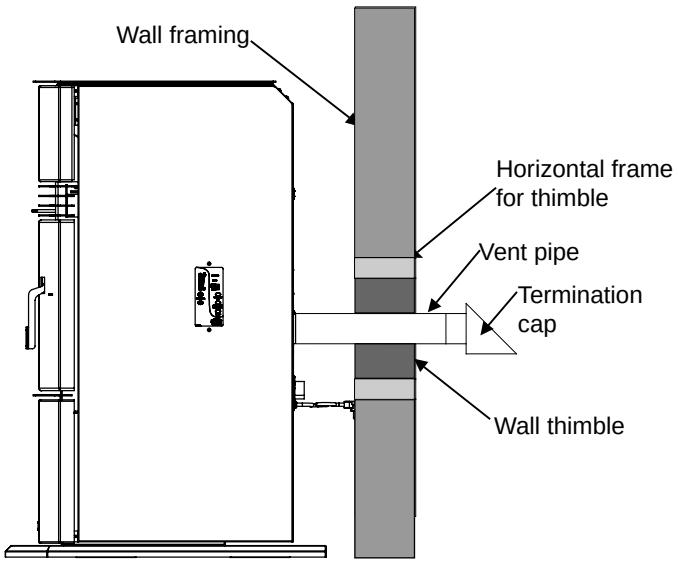


Figure 14: Straight through Wall Installation - Side View.

- A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

VERTICAL RISE WITH HORIZONTAL TERMINATION INSTALLATION (RECOMMENDED):

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

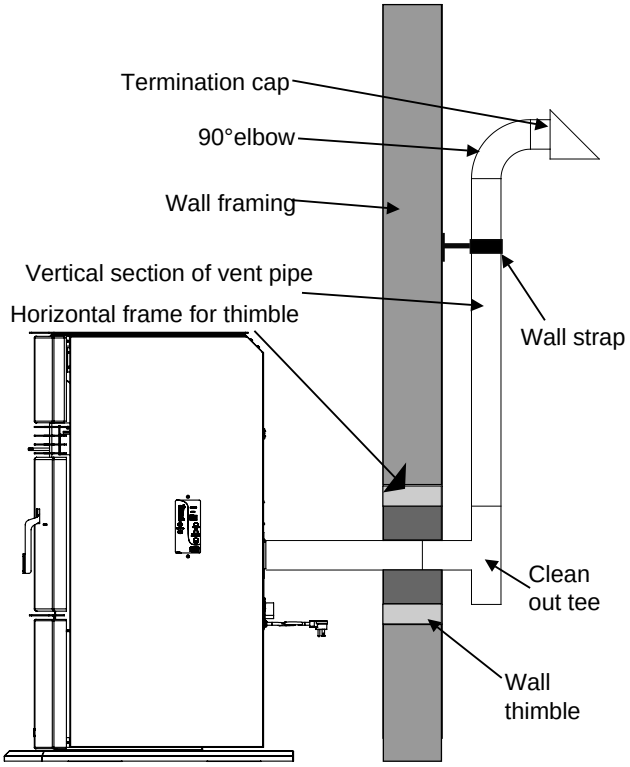


Figure 15: Through Wall with Horizontal Termination.

THROUGH CONCRETE WALL WITH VERTICAL RISE INSTALLATIONS:

A 45° elbow with a rodent screen may be used in place of the termination cap (or stainless steel termination hood).

This is the recommended installation to use if there is a concrete or retaining wall in line with exhaust vent on pellet stove.

The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

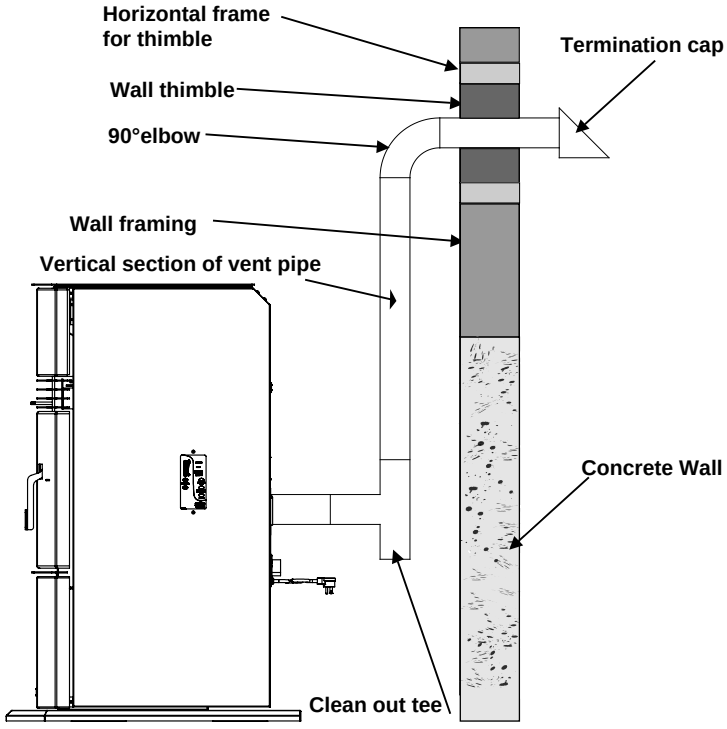


Figure 16: Vertical rise with Horizontal Termination.

Inside Vertical Installations:

1. Choose a stove location that is ideal. See the section "Installation - Deciding Where to Locate your Pellet Appliance."
2. Place the unit on the hearth pad (if installed on a carpeted surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3″ (76 mm) away from a combustible wall.
3. Locate the center of the fresh air intake pipe on the unit. Match that center with the same point on the wall and cut a hole about 2″ (51 mm) in diameter.
4. Install the fresh air intake pipe.
5. Install the tee with clean out.
6. Install the pellet vent upward from there. When you reach the ceiling, make sure that the vent goes through the ceiling fire stop. Maintain a 3″ (76 mm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier.
7. Finally, extend the pellet vent to go through the roof flashing.
8. Ensure that the rain cap is approximately 24″ (610 mm) above the roof.

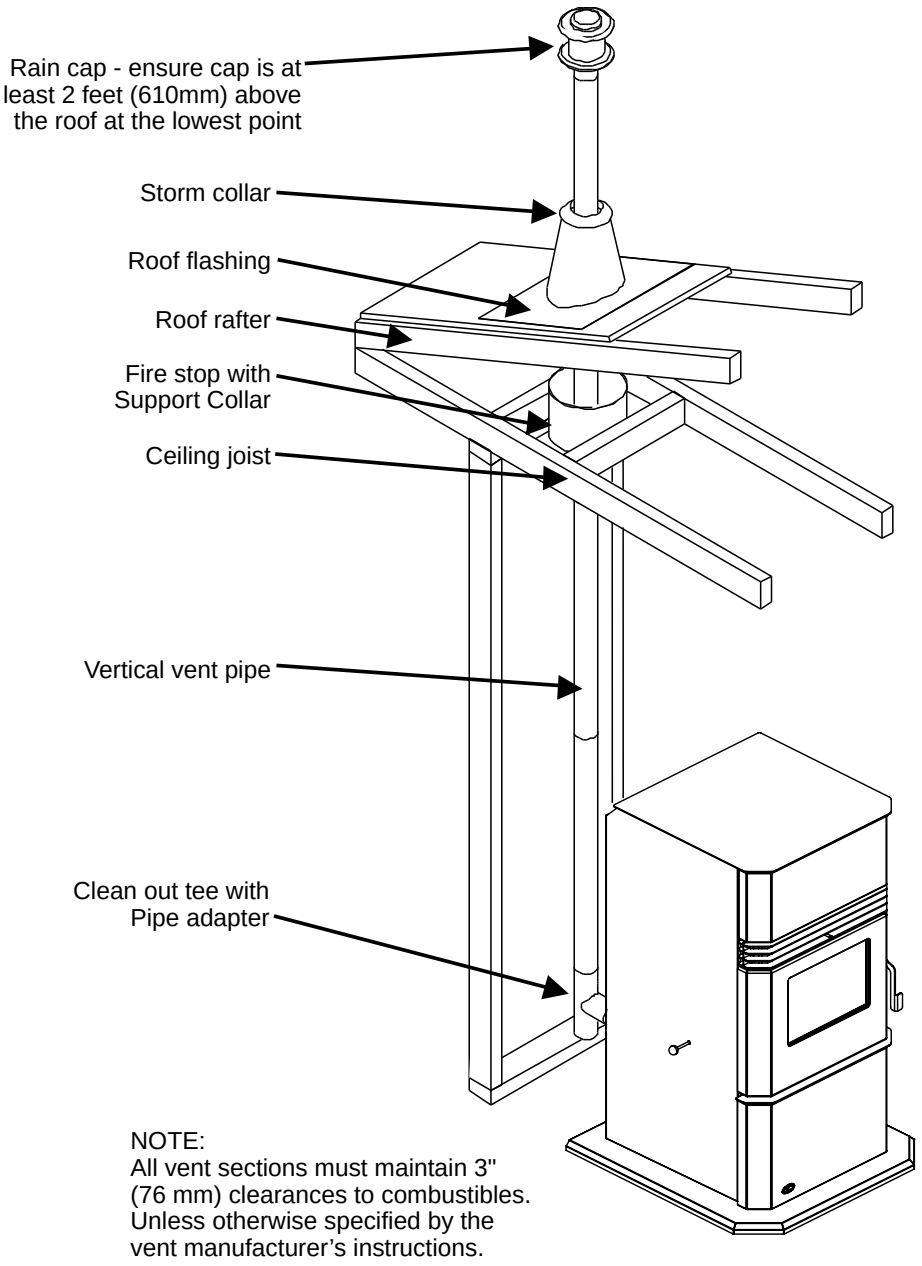


Figure 17: Inside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

Outside Vertical Installations:

To accomplish a outside vertical pipe installation, follow steps 1 through 5 in the "Inside Vertical Installations" section and then finish it by performing the following (refer to Figure 23).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (610 mm) above the roof.

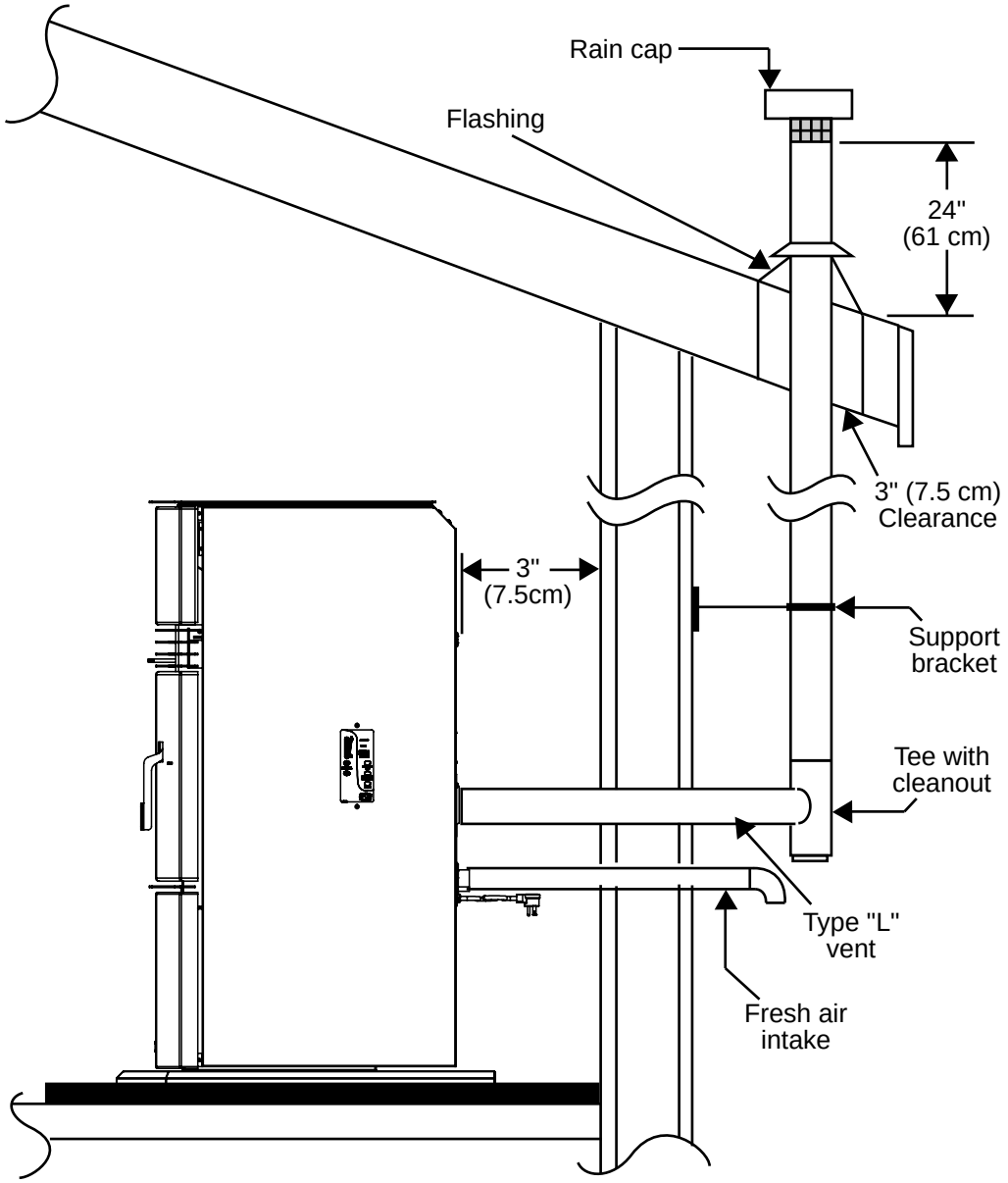


Figure 18: Outside Vertical Installation.

Recommended vent size for vertical installation:

Under 15ft: 3" Vent

Over 15ft: 4" Vent

Hearth Mount Installation:

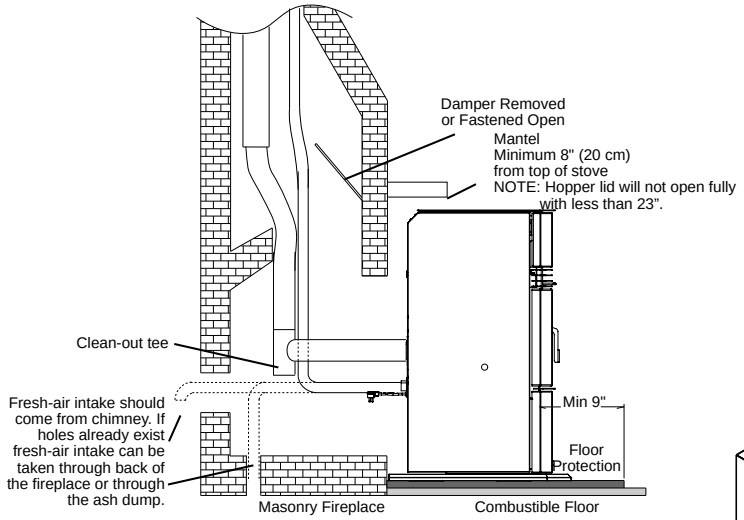


Figure 19: Hearth Mount - Side View.

1. Lock fireplace damper in the open position.
2. Install a positive flue connector at the fireplace dampers.
3. Connect a clean-out tee or a 90° elbow to the exhaust pipe.
4. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

<u>Recommended vent size for vertical installation:</u>

Under 15ft: 3″ Vent

Over 15ft: 4″ Vent

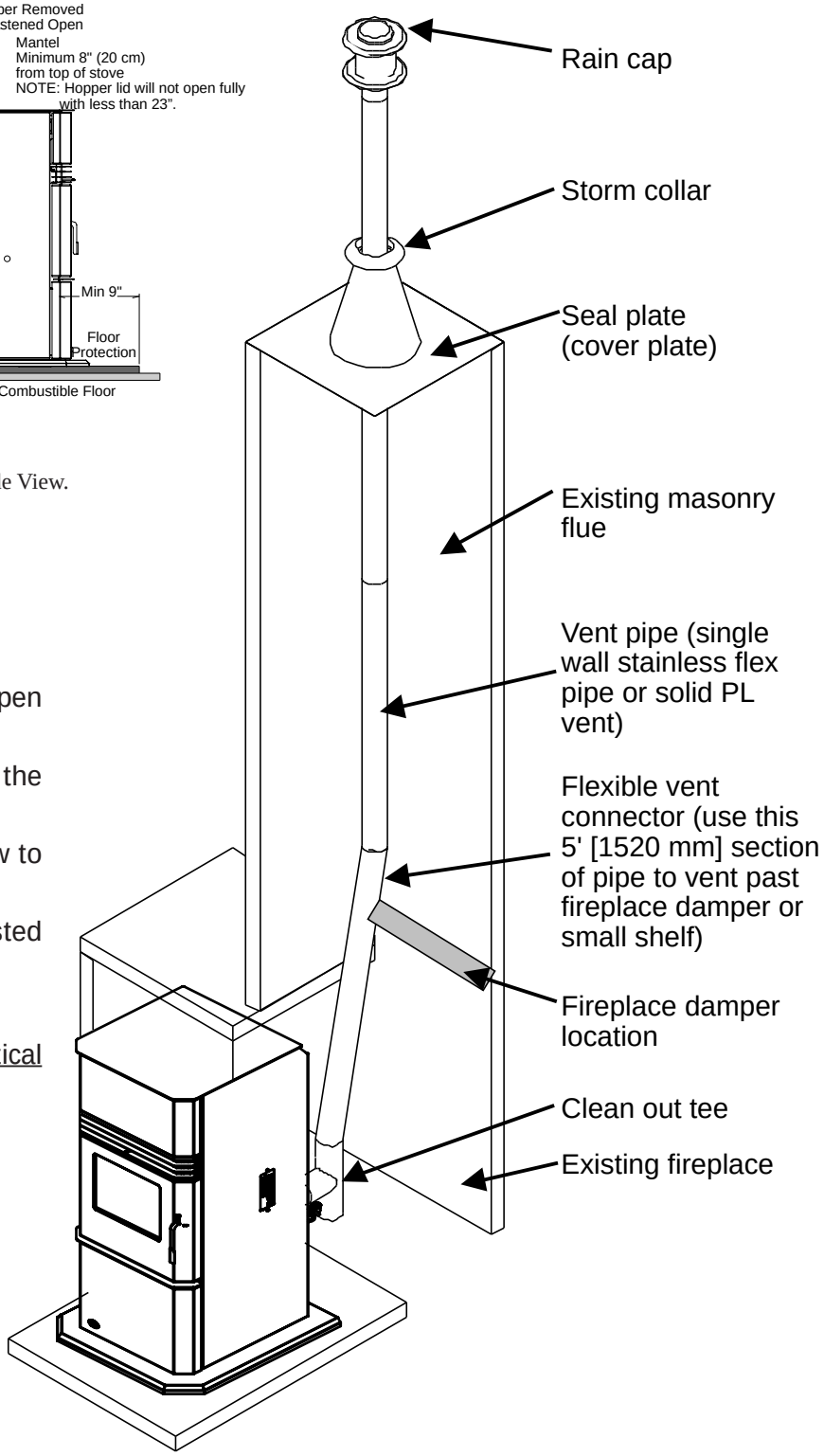


Figure 20: Hearth Mount - Over View.

Thermostat Installation:

1. Install the wall thermostat in a location that is not to close too the unit but will effectively heat the desired area.
2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

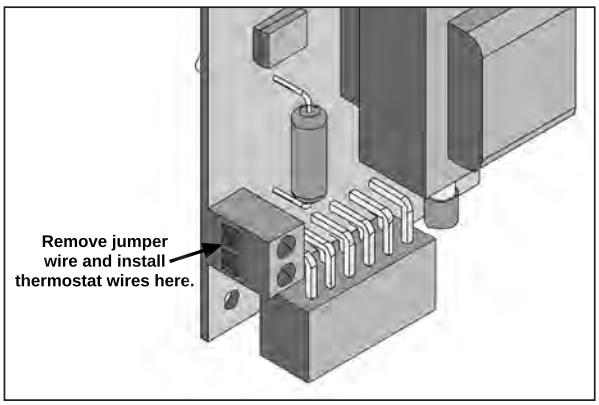


Figure 26: Thermostat wire placement.

If the unit has been placed in the HI / LOW mode, the unit will be taken to a low or idle setting when the thermostat is not calling for heat. When the thermostat calls for heat, the unit will go to the setting that is displayed on the control board Heat Indicator. If the heating load is not great enough when the stove is on low, the high limit switch will turn the stove off and the switch will have to be manually reset. To reset the high limit switch, remove the right cabinet side. The switch is found behind the control panel. Avoid setting off the high limit switch.

Slider/Damper Set-Up:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION, IT IS USED TO REGULATE THE AIRFLOW THROUGH THE PELLET STOVE.

A Qualified Service Technician or Installer must set the Slider Damper.

The slider damper is used to regulate the airflow through the pellet stove and is located behind the left cab side (refer to Figure 40). On freestanding model loosen the two 8-32 x 3/8" Torx screws, one on the side of the unit and one behind the removable panel, swing open left panel to access. On insert model remove the two (2) 8-32 x 3/8" Torx screws, one on the side of the unit and one behind the removable panel, and the one T-20 at the top of the cab side under the top front.

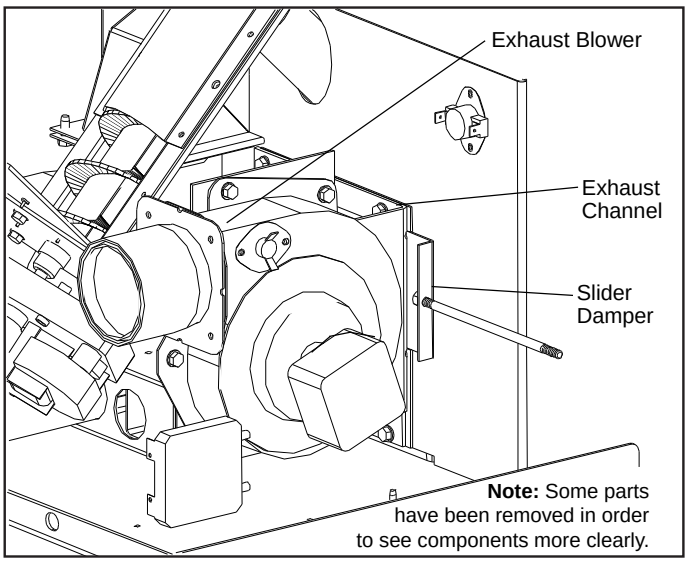


Figure 27: Slider / Damper

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the vacuum pressure inside the stove and as the heat output button is turned down. The vacuum pressure inside the firebox will increase as the combustion exhaust blower increases in speed (higher heat output setting).

The slider damper is used to regulate the airflow through the pellet stove.

For the most efficient burn, push the slider damper in all the way. Figure 32 shows this configuration.

Operating Instructions

Control Board Functions:

1. **AUGER LIGHT:** This green light will flash in conjunction with the auger pulse.
2. **MODE LIGHT:** Responsible for signaling the state of the control board. When the light is flashing the stove is in an automatic start mode or the thermostat has control of the unit. When the light is solid, the Heat Level Setting can be altered.
3. **THERMOSTAT SWITCH:** Used to set the unit's controls to one of three mode settings; manual, high/low, or auto/off.

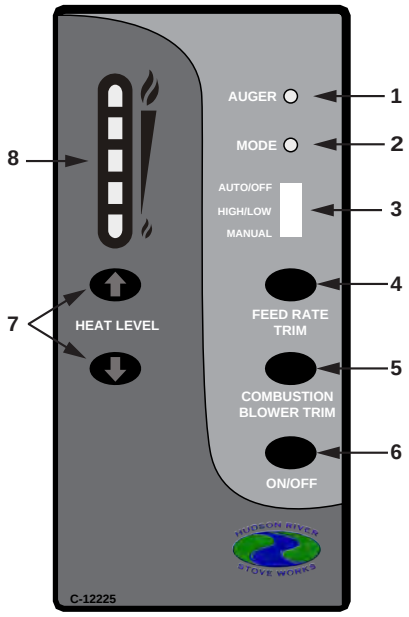


Figure 28: Circuit Board Control Panel Decal.

4. **FEED RATE TRIM BUTTON:** Used to change the feed rate trims in ¼ second increments for all feed settings. When this button is pressed, all the lights will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 4 light. To adjust the setting hold the Feed Rate Trim button down and press the Heat Level up or down buttons.
5. **COMBUSTION BLOWER TRIM BUTTON:** Used to change the Combustion Blower trims in 5 volt increments for all feed settings until it reaches line voltage. When this button is pressed, all the light s will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 2 light. To adjust the setting hold the Combustion Blower Trim button down and press the Heat Level up or down buttons.
6. **ON/OFF BUTTON:** Used to turn the unit ON and OFF.
7. **HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
8. **HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

Automatic Safety Features of Your Pellet Stove:

A. If the fire goes out (exhaust temperature drops below 120°F); the unit will automatically shut down.

B. This unit is equipped with a high temperature safety switch. If the temperature of the hopper reaches 200°F, the auger will automatically stop and the unit will shut down. Once the exhaust temperature cools below 120°F the #4 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

C. The unit is equipped with a vacuum switch to monitor the exhaust venting; if the unit is unable to establish sufficient vacuum for operation this switch will turn off the auger and the #2 light on the control board will flash. Refer to the Troubleshooting section of this manual if this occurs.

Operating Your Pellet Stove:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

Note: The thermostat mode can be changed during normal operation.

Operating Instructions

MANUAL MODE:

All control of circuit board function is adjusted at the circuit board.

To START: Press the ON / OFF button. The stove will turn on. The system light will flash. The Auger Light will flash with each pulse of the auger (the Auger Feed Rate is pre-programmed during start-up). The Heat Level Indicator will show the Heat Level that the stove will run at after start-up and can be adjusted; but the change will not take affect until the start -up has finished.

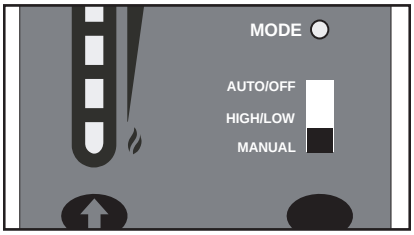


Figure 29: Thermostat Switch in MANUAL position.

If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. This can be done by restarting the unit five (5) minutes into its start-up or by putting a small hand full of pellets into the burn pot.

To OPERATE: When a fire has been established, the System Light will turn solid (after approximately 10 - 15 minutes) and the Auger Light will continue to flash to the corresponding Heat Level setting.

The convection blower (room air blower) will turn on. The speed of this blower is controlled by the setting of the heat level output indicator.

HIGH/LOW MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat calls for heat (contacts are closed) the stove settings are adjustable as per Manual Mode. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. *The LOW heat setting can be adjusted for different fuel qualities (see "Operating Instructions - Control Board Functions"). The stove will come back to the previous HEAT LEVEL setting when the thermostat contacts close again.

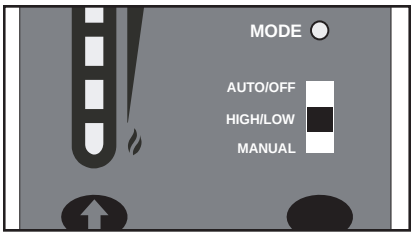


Figure 30: Thermostat Switch in HIGH/LOW position.

AUTO/OFF MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat contacts close, the unit will light automatically. Once up to temperature, the stove operates the same as in MANUAL. When the thermostat contacts open, the stove's HEAT LEVEL and Fans will drop down to the LOW setting for 30 minutes. If the thermostat contacts close within the 30 minutes, the HEAT LEVEL will return to the previous MANUAL setting. If the thermostat contacts remain open the stove automatically begins its shutdown routine. The ON / OFF button can be pressed at any time to immediately shut down the unit. The stove will re-light when the thermostat contacts close again.

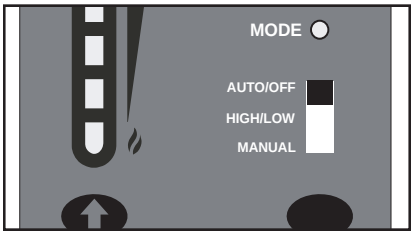


Figure 31: Thermostat Switch in ON/OFF position.

Turning Your Pellet Stove Off:

- MANUAL and HI / LOW mode: To turn the unit OFF, simply press the ON / OFF button. This will stop the feed of pellets. The blowers will continue to operate and cool the stove down. When cool enough, the stove will turn off.
- AUTO / OFF mode: To turn the unit OFF, turn the thermostat down or off. NOTE: The unit will run on low for three (3) minutes before it turns off.

DO NOT unplug the unit while Combustion fan is operating.
This may lead to smoke escaping from the stove.

Slider/Damper Set-Up:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION. A Qualified Service Technician or Installer must set the Slider Damper. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 7).

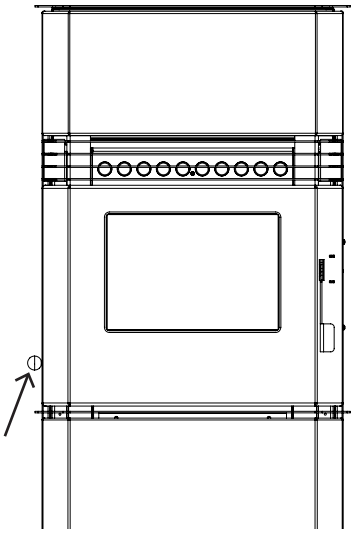


Figure 32: Slider / Damper Knob.

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper should be pushed in slightly, decreasing the air in the firebox.

If, after long periods of burning, the fire builds up and overflows the burn pot or there is a build up of clinkers, this would be a sign that the pellet quality is poor, this requires more primary air, the slider damper must be pulled out to compensate. Pulling the slider damper out gives the fire more air.

The easiest way to make sure that an efficient flame is achieved is to understand the characteristics of the fire.

- A tall, lazy flame with dark orange tips requires more air – Open slider (pull out) slightly.
- A short, brisk flame, like a blowtorch, has too much air – Close slider (push in) slightly.
- If the flame is in the middle of these two characteristics with a bright yellow/orange, active flame with no black tips then the air is set for proper operation, refer to Figure 8.

Figure 33: Efficient Flame.

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the vacuum pressure inside the stove when the heat output level is turned down.

SPECIAL NOTES:

Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard ash build-up).

Guidelines For Fine-Tuning For Fuel Quality:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit builds up on all settings, the slider damper rod should be pulled out in small increments to give the unit more air.
2. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
3. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
4. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
5. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

Routine Cleaning and Maintenance

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its optimum and giving you excellent heat value:

2-3 Days / Weekly	Semi-annually or 2 Tons of Fuel
Burn Pot and Liner	Exhaust Vent
Ash Pan	Fresh air Intake Tube
Inside Firebox	Blower Mechanisms
Door Glass	Heat exchanger tubes
Heat exchanger tubes	Behind firebox liners
Ash pan and Door gaskets	All Hinges
Door Latch	Post Season Clean-up

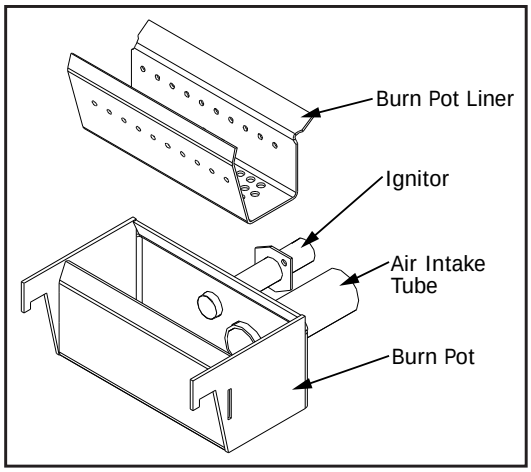


Figure 34: Burn pot assembly.

TOOLS REQUIRED TO CLEAN UNIT

- Torx T-20 Screwdriver
- Brush
- Soft Cloth
- 5/16" Wrench or Socket
- Vacuum with fine filter bag

BURN POT AND LINER (2-3 days)

Cleaning of the burn pot and liner must only be done when stove is cold. To remove the burn pot and burn pot liner, open the door using the door handle provided (located on the right-hand side of the stove). Swing the door open. Lift the liner from the burn pot. Lift the burn pot from the firebox by gently lifting up the front of the burn pot, then sliding the assembly from the air intake tube and the ignitor cartridge.

This is the 'pot' where the pellets are burned. Every two (2) to three (3) days (when the unit is cold), remove the burn-pot liner from the stove and inspected it to ensure proper air flow through the liner. **Failure to keep the liner clean may cause a build up of fuel past the burn pot liner and up the drop tube. This will cause the auger to jam and may result in pellets burning in the drop tube and hopper**. Using the metal scraper tool provided, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube. Press the liner up against the ignitor tube.

If, after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor or the stove may need cleaning. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door by lifting the handle. The glass can be cleaned by wiping down the outside and inside of the glass with a dry soft cloth.

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wipe down the outside and inside of the glass

DOOR LATCH (2-3 days)

Check the door latch every time the door is opened or closed to ensure proper movement.

Routine Cleaning and Maintenance

ASH PAN AND DOOR GASKETS (weekly)
After extended use the gasketing may come loose. To repair this, glue the gasketing on using high-temperature fiberglass gasket glue available from your local HUDSON RIVER dealer. This is important to maintain an airtight assembly.

ASH PAN (weekly)

The ash pan is located under the burner. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "Introduction - Safety Warnings And Recommendations" for disposal of ashes.

Freestanding: To remove the ash pan, simply turn the knob and pull out towards the front.

Insert: To remove the ash pan, remove the ash pan cover. Use a blade screwdriver to unlock the ash pan from the unit. Pull the ash pan out of the

DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.

HEAT EXCHANGER TUBES (weekly)

The heat exchanger tube cleaning rod is located oon the front of the unit. Pull this rod in and out a few times to remove any fly ash that may have accumulated on the heat exchanger tubes. Different qualities of fuels will produce varying amounts of fly ash; so cleaning of the heat exchanger tubes should be done on a regular basis.

NEVER TOUCH THE TUBE CLEANING ROD WHEN THE UNIT IS HOT.

BLOWER MECHANISMS (season)

Unplug the stove then open the right and left side panels to access the two blowers. Vacuum all dust from motors. DO NOT lubricate the motors. Check gaskets and replace if needed.

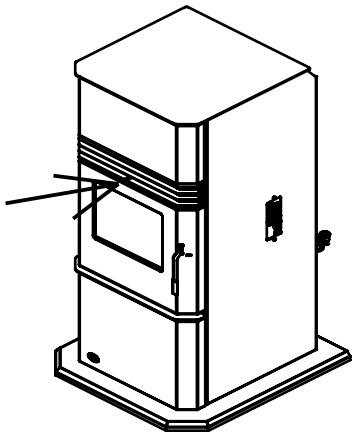


Figure 35: Heat Exchanger Tube Cleaner.

ALL HINGES (season)

Check all the hinges on the unit to ensure proper movement.

FRESH AIR INTAKE (season)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST VENT (season)

This vent should be cleaned every year or every two (2) tons of pellets. We recommend contacting your dealer for professional cleaning. To clean the vent pipe, tap lightly on the pipe to dislodge any loose ash. Open the bottom of the "T" to dump the ash, then vacuum as much of the ash out of the vent pipe as possible.

Routine Cleaning and Maintenance

EXHAUST PASSAGES (season)

Removal of the firebox backing for bi-annual cleaning (refer to Figure 10):

- Open the door by lifting the handle, remove the burn pot and burn pot liner.
- Lubricate all screws with penetrating oil.
- Remove the two (2) port covers. Remove the four (4) screws that hold the brick liner in place. Remove brick liner. Remove the four (4) screws that hold the baffles in place. Remove side baffles by sliding them forward then out.
- Pull the center baffle out.
- Vacuum and clean thoroughly.

Installation of firebox backing:

- Insert center baffle with backing.
- Place the two (2) side baffles back into the firebox and reinstall the four (4) screws that hold them in place.
- Replace brick liner with four (4) screws.
- Replace the two (2) port covers.
- Replace the burn pot and burn pot liner
- Close the door and secure.

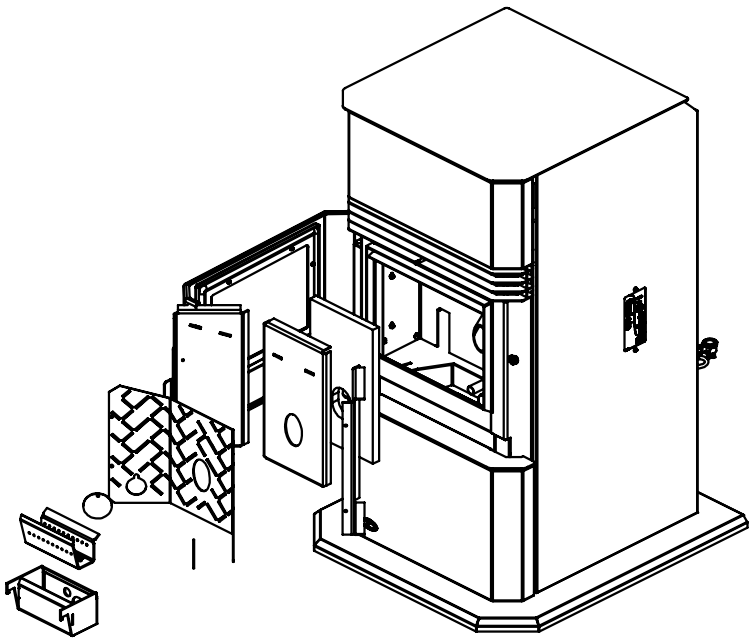


Figure 36: Firebox Components Removal.

POST SEASON CLEAN-UP

Once you are finished using the pellet appliance for the season, unplug the stove for added electrical protection. It is very important that the stove be cleaned and serviced as stated above.

CLEANING PLATED SURFACES

Painted surfaces should be wiped with a damp cloth periodically.

It is important to note that fingerprints and other marks can leave a permanent stain on plated finishes. To avoid this, give the surface a quick wipe with denatured alcohol on a soft cloth BEFORE lighting the fireplace. Never clean surfaces when they are hot. Do not use other cleaners or abrasives as they may leave a residue or scratches, which can become permanently etched into the surface.

FIREBOX PANEL

The paint on the steel firebox panels may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty.

REPLACING DOOR GLASS

It is recommended that your HUDSON RIVER dealer replace the glass if broken.

The door glass is made of high temperature PYRO CERAMIC 5 mm thick. Replace only with part# EF-061.

Troubleshooting

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Remove any screws from inside the firebox without first applying a penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. The stove will not operate when hot.
3. The exhaust blower will not function normally.
4. Light # 2 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. The 200 °F (93 °C) high limit temperature sensor has tripped.
7. The convection blower will not function normally.
8. Ignitor- the pellets will not light.
9. Control settings (Heat Level) has no effect on the fire.
10. The stove keeps going out.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

✓Make sure the stove is plugged in and the wall outlet is supplying power.

✓If the Control Board has been placed in the ON /OFF thermostat mode, then turn the thermostat up to call for heat.

✓Ensure the burn pot liner is correctly placed in the burn pot

✓Check the Heat Level Indicator. - If the # 2 light is flashing (see the # 2 light is flashing)

✓Check the fuse on the circuit board.

✓If the unit still does not start, contact your local service dealer for service.

2. The stove will not operate when hot.

✓Check the Heat Level Indicator if a fire is not detected, or if the fire has gone out **the #3 light will flash** because the Exhaust Temperature Sensor's contacts have opened.

✓Check the hopper for fuel.

✓Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a change to the vent system or installation of fresh air to correct Air to Fuel ratio problems).**

✓Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.

✓Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >115 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower.

✓Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.

✓Exhaust Temperature Sensor failure. – Bypass sensor located on Exhaust Blower if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.

✓Check the fuse on the circuit board.

3. The exhaust motor will not function normally.

✓Open the left side access panel; check all connections against the wiring diagram.

✓See "2. The stove will not operate when hot." section.

4. Light # 2 on Heat output bar flashing

(The Vacuum Switch contacts have opened for more than 15 sec.)

✓Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose

✓Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.

✓Blocked exhaust / venting system - Have stove and venting cleaned and inspected.

✓Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.

✓Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.

✓Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors

✓Combustion Blower failure - The Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visual Check; is the blower motor turning? Check the Exhaust Blower voltage across the blower wires (>=114 V on #5 setting and >= 82 V on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >114 V AC.

✓Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge. (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - push the ON/OFF button

5. Auger light flashes but auger motor does not turn at all.

✓If the Auger gear box does not turn but the motor's armature does try to spin then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover after installation**

✓Check the fuse on the circuit board.

6. The 200 °F (93 °C) high limit temperature sensor has tripped.

✓Reset sensor and determine cause – was it Convection Blower failure or 160 °F (71 °C) Temperature Sensor failure? Bypass the 160 °F (71 °C) sensor, does the Convection blower come on high if not replace the blower? If yes, replace sensor (located on the left side of the firewall).

✓Check the fuse on the circuit board.

7. The convection blower will not function normally.

✓Clean all grill openings at the back and below unit .

✓Press the fan button; does the fan come on? Press again to verify that the blower turns on; if, not contact your local dealer for service.

8. Ignitor- the pellets will not light.

✓Everything else in the stove operates but the ignitor will not light the pellets.

✓Make sure the burn pot liner is up tight and square to the ignitor tube by pushing the burn pot back against the ignitor tube.

✓Check to see if the exhaust blower is operating. If not, contact your local dealer for service.

✓Check the fuse on the circuit board.

NOTE: The ignitor should be bright orange in color. If not replace the ignitor.

9. Control settings (Heat Level) has no effect on the fire.

✓NOTE: If the system light is flashing the Control Board has complete control of the unit. When the units system light becomes solid then control of the unit is given back to the operator.

✓If there is no control of the Heat Level button make sure the thermostat is calling for heat.

✓Call your local dealer for service.

10. The stove keeps going out.

If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

✓Check to see that the Slider / Damper is in the correct position.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

✓Set the auger trim till the #1 and #5 lights are illuminated.

If the stove goes out and there are partially burned pellets left in the burn pot liner, the stove has shut down due to a lack of air, exhaust temperature, or power failure.

✓Adjust the Slider / Damper.

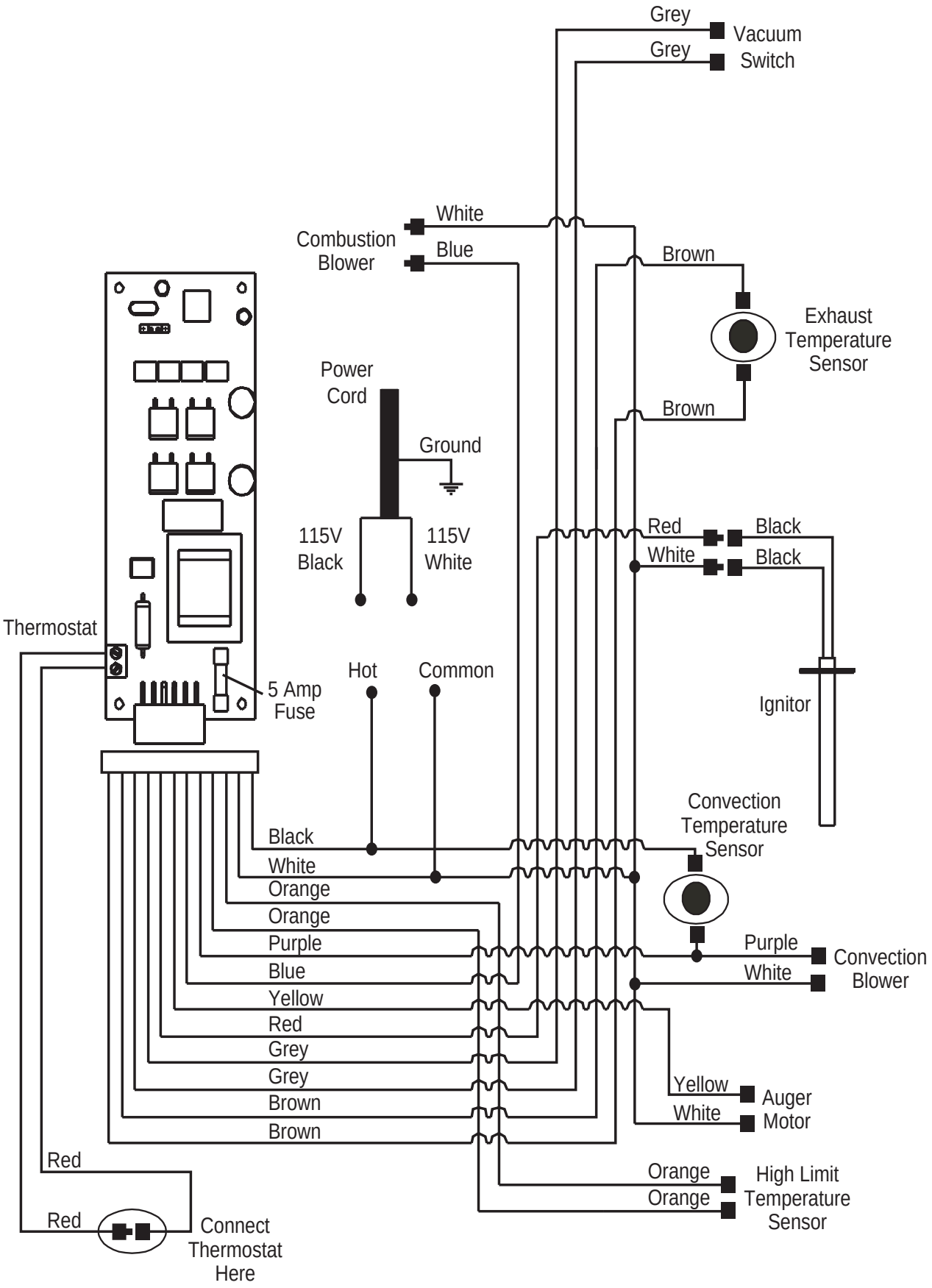
✓Check to see if the stove needs a more complete cleaning.

✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

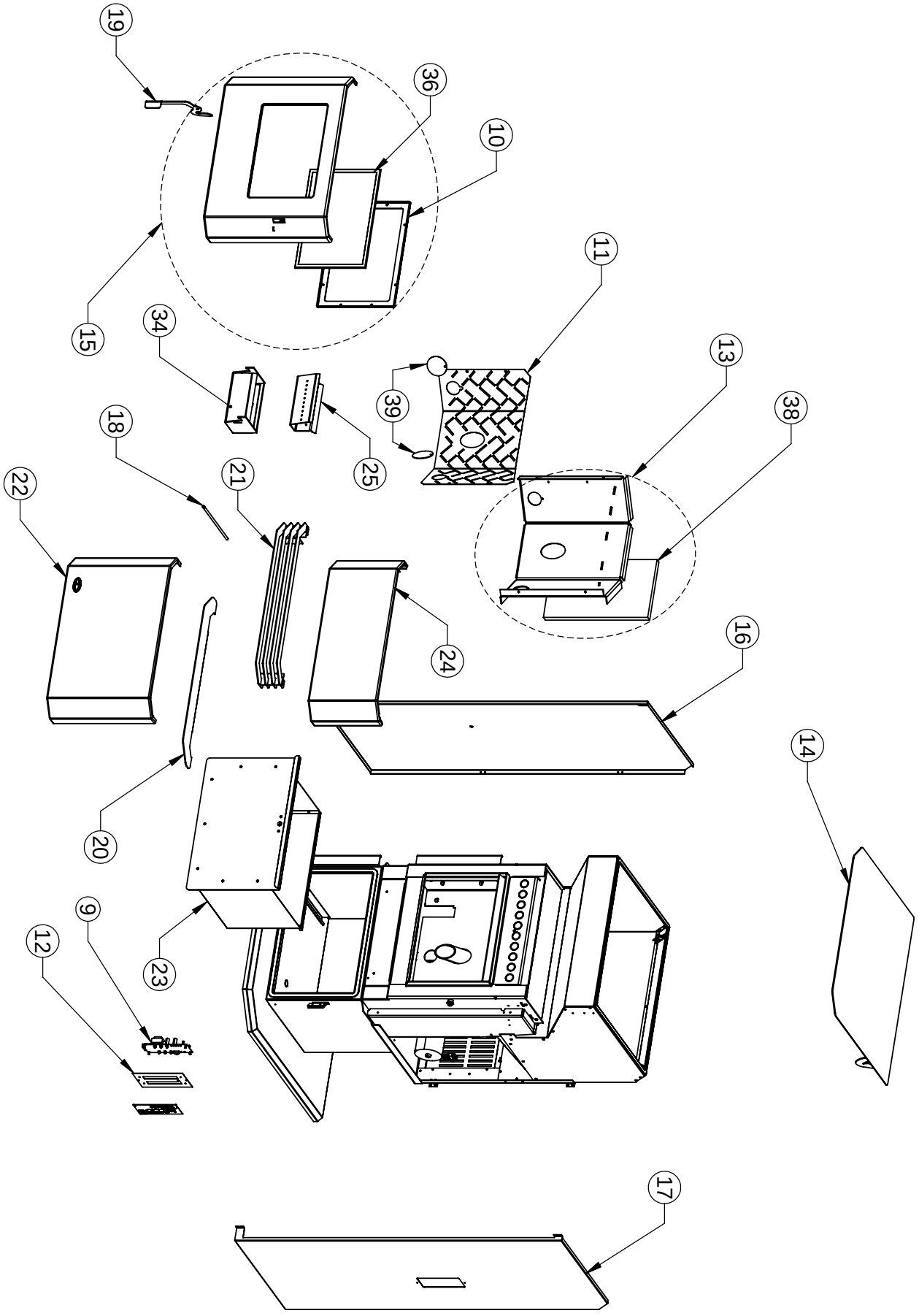
✓Did the power go out?

✓Contact your local Dealer for service.

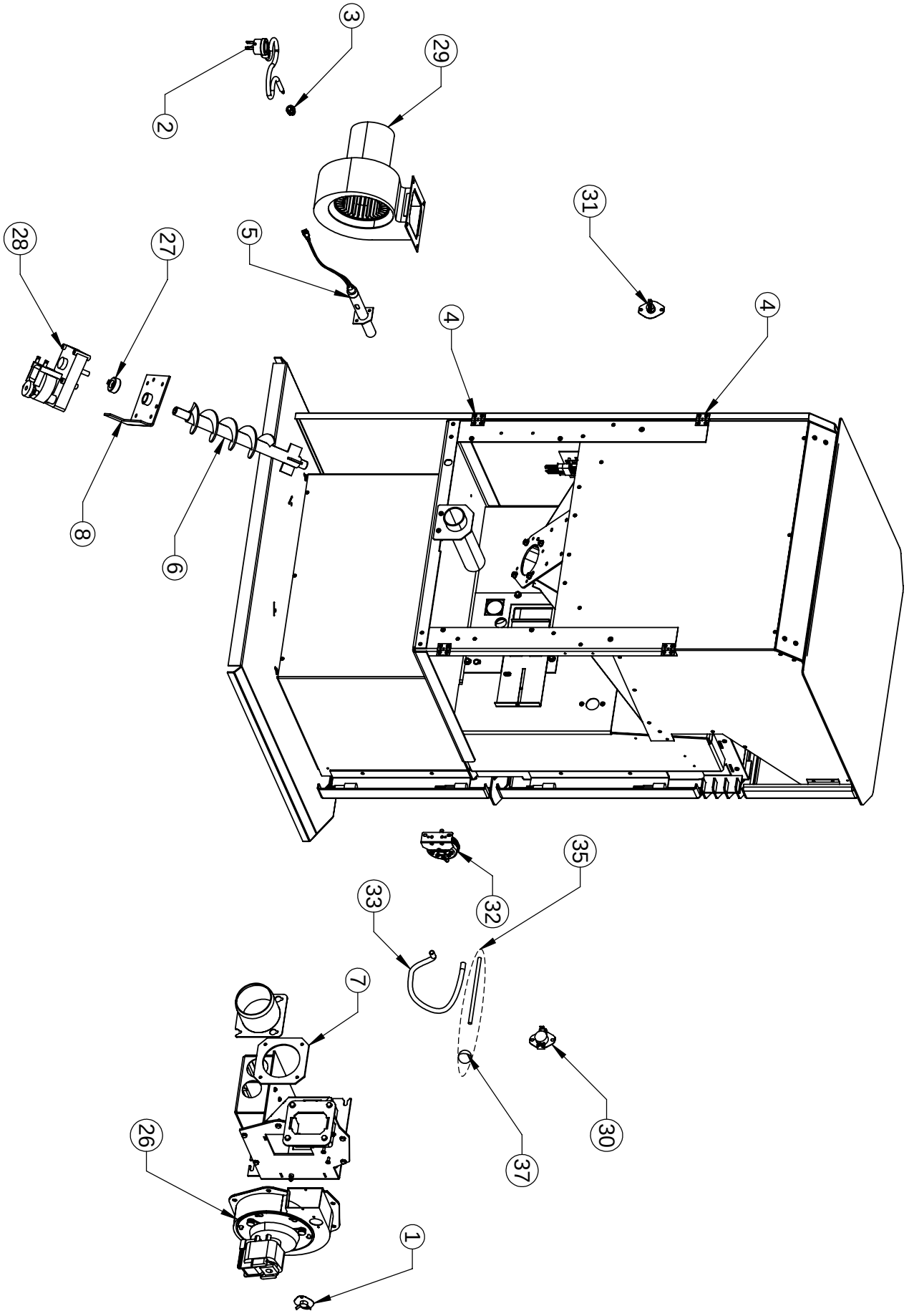
Wiring Diagram



PARTS DIAGRAMS



PARTS DIAGRAMS



PARTS LIST

Item	Part Number	Description
OPTION	20-036	EF2/3/4/SOLUS LOG SET (ONE PIECE)
	50-1380	MANUAL BAG - INCLUDING BOLTS AND SCREWS (? SPECIFY UNIT PLEASE)
	50-754	PELLET/GAS MECH. & ELEC. FASTENER BAG
1	EC-001	120 CERAMIC FAN TEMP SENSOR (ALL MODELS)
2	EC-042	DOMESTIC POWER CORD (115V)
3	EC-044	HEYCO STRAIN RELIEF
4	EC-054	1 x 1 SIDE CABINET HINGE
	EC-058	WINDOW CHANNEL TAPE -72”
5	50-1067	IGNITOR 300W
	50-1107	FORMED EXHAUST BLOWER HOUSING
	50-1254	BURN POT SCRAPER TOOL
6	50-1346	AUGER(POST JULY01/ 08)
	50-1410	AUGER TUBE COVER
7	50-1448	EXHAUST STARTER TUBE GASKET
	50-1730	ASH PAN LATCH (SCREWDRIVER TYPE)
8	50-1780	AUGER BRASS BUSHING 5/8” ID & PLATE (POSTJAN01/ 08)
	50-1806	5/8” I.D. AUGER BRASS BUSHINGS (SET OF 2) (POST JULY01/ 08)
9	50-1929	CIRCUIT BOARD C-11652
	50-1971	PELLET STOVE THERMOSTAT
10	50-2329	GLASS RETAINERS
11	50-2336	BRICK LINER
12	50-2337	CONTROL PANEL C/W DECAL
13	50-2342	FIREBOX LINER C/W INSULATION
	50-2465	KINDERHOOK OWNERS TECHNICAL MANUAL
14	50-2466	KINDERHOOK FS HOPPER LID (OLD SERIALIZED PART MUST BE RETURNED)
15	50-2467	KINDERHOOK DOOR ASSEMBLY COMPLETE
16	50-2468	KINDERHOOK CABINET SIDE LEFT
17	50-2469	KINDERHOOKCABINET SIDE RIGHT
18	50-2470	KINDERHOOK TUBE SCRAPER ROD
19	50-2471	KINDERHOOK DOOR HANDLE
20	50-2472	KINDERHOOK ASH SHELF
21	50-2473	KINDERHOOK LOUVER SET

PARTS LIST

22	50-2474	KINDERHOOK ASH DOOR C/W DECAL
23	50-2475	KINDERHOOK ASH PAN
24	50-2476	KINDERHOOK HOPPER COVER
	50-554	MAGNAHELIC GAUGE & KIT (FOR TESTING PELLET STOVES)
25	50-587	SS BURN POT LINER, HIGH ASH
26	50-901	COMBUSTION / EXHAUST BLOWER ASSEM. 115V (FORMED)(POST 10-03)
27	50-968	5/8 ID AUGER COLLAR W SCREW
28	EF-001	AUGER MOTOR 115V (1 RPM)
29	EF-002	CONVECTION BLOWER 115V
	EF-004	CONVECTION BLOWER IMPELLER
	EF-006	CONVECTION BLOWER INSULATOR (GASKET)
	EF-008	COMBUSTION MAIN IMPELLER 1” x 4 1/2”
	EF-011	COMBUSTION BLOWER MOUNTING GASKET
	EF-012	COMBUSTION BLOWER HOUSING GASKET(CIRCULAR)
30	EF-013	EF2/3/4/SOLUS/WIN/MER FAN TEMP SENSOR 160F
31	EF-016	HIGH LIMIT TEMP SENSOR 200 MANUAL RESET (ALL PELLET)
32	EF-017	VACUUM SWITCH 115V
33	EF-018	SILICONE HOSE (ALL PELLET)(RED)
	EF-019	ALUMINUM HOSE BARB (ALL PELLET)
34	EF-021	EF2/EF3/WIN/MER IGNITION BURN POT
35	EF-050	SLIDER DAMPER ROD W/KNOB
	50-2058	9/16” ROUND DOOR GASKET(10FT)
36	EF-061	GLASS W/TAPE (13” W X 9” H)
37	EF-068	1” KNOB
	EF-125	EF2 SHOULDER BOLT & NUT
38	EF-126	FIREBOX CERAMIC WOOL INSULATION
	EF-156	PELLET STOVE CLEANING BRUSH
	EF-161-A	COMBUSTION BLOWER MOTOR W/IMPELLER ONLY (INCREASED RPM ALL PELLET)
39	EF-194A	EF2/3 FIREBOX CLEANING PORT COVERS - PD
	EF-208	PED & ASH PAN GASKET 10’ (ALL PELLET)

Warranty

Limited Lifetime Warranty:

Under this warranty, Hudson River Stove Works covers the body of the stove including all exterior metals. This warranty covers: Firebox, Heat Exchanger, Pedestals, Legs, and Door Assembly. Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

Limited Two Year Warranty:

Under this warranty, Hudson River Stove Works covers electrical components against defects in materials and workmanship for part repair and replacement for the first two years and labor for the first year only to the original purchaser. (Glass and all gaskets are not included under any part of this warranty.) Please see the exclusions and limitations section below as certain restrictions and exclusions apply to this warranty.

There is no written or implied performance warranty on the stove, as the manufacturer has no control over the installation, daily operations, maintenance or the type of fuel burned.

This warranty does will not apply if the stove has not been installed, operated and maintained in strict accordance with the manufacturer's instructions.
This warranty does not cover damage or breakage due to misuse, improper handling or modifications.

All Claims under this warranty must be made through the dealer in which the stove was originally purchased from. If an inspection by the dealer indicated that a warranty claim is justified, and that all conditions of this warranty have been met, the manufacturer's total responsibilities and liabilities shall be to repair or replace the defective part(s). All costs of removal, shipment to and from the dealer of manufacturer, any losses during shipment and reinstallation and any other losses due to the stove being removed shall be covered by the owner of the stove.

Here is how our Warranty works
If you have any concerns with your Hudson River product please contact the dealer where you purchased the fireplace or stove. Your dealer shall make all claims under this warranty in writing.

To the Dealer
When filling out a warranty claim please complete the following information on an official warranty claim form:

Customer information: Name, address and telephone number of purchaser and date of purchase.

Dealer information: Date of installation, name of installer and dealer, serial number of the appliance, nature of complaint, defects or malfunction, description and part numbers of any parts replaced.

To the Distributor
Sign and verify that work and information are correct.

Installation Data Sheet

The following information must be recorded by the installer for warranty purposes and future reference.

NAME OF OWNER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

NAME OF DEALER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MODEL: Kinderhook

SERIAL NUMBER:_____

DATE OF PURCHASE: _____ (dd/mm/yyyy)

DATE OF INSTALLATION:_____(dd/mm/yyyy)

MAGNEHELIC AT INSTALL:_____

INSTALLER'S SIGNATURE:

_____

NAME OF INSTALLER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MANUFACTURED FOR HUDSON RIVER STOVE WORKS BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
Winter, 2022
C-14967

Appendix A
Revision History

Date	Project No.	Tech. & Evaluator	Report Sect.	Summary of Changes
8/3/16	0268PS024E.REV001	Bruce Davis	All	Original report was generated.
7/3/19	0268PS024E.REV001 Edition 001	Bruce Davis	All	Updated for new emissions limit from 2015 requirements.
11/9/21	0268PS024E.REV001 Edition 002	Bruce Davis	Preface	Updated for Edition 002
			1	Sample procedure on page 5 updated to include CSA B415.1 and ambient filter information. Negative filter information and the word appropriate added to Run discussion. CO emissions added to Summary of results. Table 1.2 was updated by changing CO emissions from g/hr. to g/min.
			2	Model similarity added to page 13.
			3	Train precision data added to page 80.
			5	All manuals and labels were updated.
			Appendix A	Revision history table was added.
02/10/22	0268PS024E.REV001 Edition 003	Bruce Davis	Section 3	Explanation of appliance operation during testing was added to page 15. Efficiency data added to pages 33 through 44,
			Section 5	Use of Carbon Monoxide detectors added to pages 146, 187, and 228. A required statement regarding periodic inspection was added to pages 144, 185, 226.