

English, Français (et Canada)

This instruction manual is for use by an authorized service technician to install an Atwood – *hydro flame*[™] furnace. Should you require further information, contact your dealer or Atwood Mobile Products LLC.

This furnace design has been certified for installation in recreation vehicles as a MSP Category III furnace. Follow this installation instruction to insure safe operation of the furnace. Failure to install furnace according to this installation instruction nullifies the furnace warranty.

TO THE INSTALLER: LEAVE THIS MANUAL WITH THE APPLIANCE.

TO THE CONSUMER: RETAIN THIS MANUAL FOR FUTURE REFERENCE.

SAFETY ALERT SYMBOLS

Safety Symbols alerting you to potential personal safety hazards obey all safety messages following these symbols



WARNING

Avoid possible injury or death



CAUTION

Avoid possible injury and/or property damage



WARNING
FIRE OR EXPLOSION

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.
- Contact the nearest gas supplier or qualified service technician for repairs.
- If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) have been repaired.

A qualified Service Technician Service Center or gas supplier must perform installation and service.

Effective 8/15



WARNING

Installation of this appliance must be made in accordance with the written instructions provided in this manual. No agent, representative or employee of Atwood or other person has the authority to change, modify or waive any provision of the instructions contained in this manual.



WARNING

Avoid possible injury or death

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/or owner's manual provided with this appliance. A qualified installer, service agency or the gas supplier must perform installation and service.



FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.



WARNING

Be sure the furnace and all ignition systems are "off" during any type of refueling and while vehicle is in motion or being towed.



CRITICAL INSTALLATION WARNINGS

- DO NOT install furnace on material that restricts return air, like carpet or any soft material such as vinyl.
- DO NOT install furnace where clearance to combustibles cannot be maintained.
- DO NOT modify furnace in any way.
- DO NOT alter furnace for a positive grounding system.
- DO NOT hi pot furnace unless electronic ignition system (circuit board) has been disconnected.
- DO NOT use a battery charger to supply power to a DC model furnace even when testing.
- DO NOT use 120-volt AC current with DC models.
- DO NOT use furnace cabinet area as a storage compartment.
- DO NOT vent furnace with venting system serving another appliance.
- DO NOT vent furnace to an outside enclosed porch area.
- DO NOT use for temporary heating of buildings or structures under construction.
- Protect building materials from degrading from flue gas exhaust.
- Protect furnace electrical components from water.
- Compartment must be closed when operating unit.
- Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.
- DO NOT use this furnace if any part has been under water.
- DO NOT use petroleum or citrus type cleaner on plastic parts, as damage may occur.



CAUTION
PERSONAL INJURY

All sheet metal edges are sharp care should be taken when handling or brushing up against them.

⚠ WARNING
CARBON MONOXIDE POISONING

Properly seal vent assembly to prevent carbon monoxide from entering coach.

- DO NOT draw combustion air from living area.
- DO NOT vent exhaust air into the living area or an enclosed porch.

⚠ WARNING
CARBON MONOXIDE POISONING

- Furnace must be installed and vented according to these instructions.
- Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Improper installation location may cause furnace to produce negative pressure, affecting combustion air or venting of other appliances.

⚠ WARNING
CARBON MONOXIDE POISONING

- Properly seal door to prevent carbon monoxide from entering coach.
- Properly adjust draft cap to prevent carbon monoxide from entering coach.

MODEL SPECIFICATIONS

Models	AFMD16	AFMD20	AFMD25	AFMD30	AFMD35
Type of Gas	LP Propane				
BTU Input	16,000	20,000	25,000	30,000	34,000
BTU Output	12,160	15,200	19,000	22,800	25,840
Duct Static Pressure	.20" WC	.10" WC	.10" WC	.10" WC	.10" WC
Amperage (AMPS)	4.2*	4.2*	7.5*	7.5*	11.1*
Watts	50	50	90	90	132
Power Supply (Volt DC)	12	12	12	12	12
Return Air	80 in ²				
Minimum Return Air	65 in ²				

(WC = WATER COLUMN)

* 15 AMP DECATATED CIRCUIT FOR FURNACE

MODEL NOMENCLATURE

AF	M	D	25	1	1	1	A
Atwood Furnace	Cabinet Size	Voltage	Input Btu/hr	Gas Type	Gas Location	Valve	Model Rev
AF	M=medium	D=12 VDC	16K	1=LP	1=door	1=Single	A
			20K		2=LD (small vent)		
			25K		3=door w/ rear gas fitting		
			30K		4=door w/pigtail		
			35K		5=door w/ pigtail & rear gas fitting		

DIMENSIONS

Approx.	Width	Height	Depth	Weight
Casing	16-1/2"	7"	20"	Furnace 26lbs. Boxed 29 lbs.
STD Door	19-1/4"	9-3/4"	3/4"	
FLUSH DOOR	19-3/8"	10-1/4"	7/32"	
Vent LD	5-1/2"	5-1/2"	1-1/16"	

INSTALLATION AND SAFETY CODES

- USA and Canada – follow all applicable state and local codes in the absence of local codes or regulations, refer to current standards of:
- ANSI/NFPA 1192 Recreational Vehicles Code and ANSI/RVIA LV Low Voltage Systems in Conversion and Recreational Vehicles
- CSA Z240.4, Gas-Equipped Recreational Vehicles and Mobile Housing
- National Fuel Gas Code ANSI Z223.1 and/or CAN/CGA B149
- This furnace must be installed in accordance with the manufacturer's instructions and the manufactured Home Construction and Safety Standard, Title 24 CFR, part 3280, or when such standard is not applicable, the Standard for Manufactured Home Installations. (Manufactured Home Sites, Communities and Set-Ups), ANSI A255.1 and/or CAN/CSA-Z240 MH Series M92 Canadian Standard for Mobile Homes."
- ANSI A 255.1 and/or CAN/CSA-Z240.6.2 MH Series, Mobile Homes
- Ground National Electrical Code ANSI/NFPA 70 and/or CSA C22.1, Part 1
- Park Trailers ANSI 1195

GENERAL FURNACE INSTALLATIONS

- All models can be installed in either a horizontal or vertical mounting position horizontal installed units have the gas line positioned on top or rear, vertical installed units must have the vent located at the floor and gas line at right side and rear.
- Always install furnace through an exterior wall.
- DO NOT install furnace near tilt-out rooms, slide-outs, doors or other projection that could obstruct furnace exhaust.
- Locate furnace near midpoint of coach for single furnace applications.
- Installation must provide accessibility if any repairs are necessary to the furnace. Failure to meet this requirement will create additional labor costs that will be the responsibility of the installer.

Contents

MODEL NOMENCLATURE 2

MODEL SPECIFICATIONS 2

DIMENSIONS 2

INSTALLATION AND SAFETY CODES **Error! Bookmark not defined.**

INSTALLATION CODES **Error! Bookmark not defined.**

GENERAL FURNACE INSTALLATIONS 2

CLEARANCE TO COMBUSTIBLES: 3

REQUIRED DUCTING 3

REQUIRED DISCHARGE 3

FLEXIBLE DUCTING 4

AIR FLOW CHECK 4

FURNACE INSTALLATION 4

SIDEWALL CUTOUT 4

SMALL VENT INSTALLATION 5

STANDARD DOOR INSTALLATION 5

FLUSH DOOR INSTALLATION 6

HARD DUCT SYSTEMS 6

FLOOR DISCHARGE CUTOUTS 6

GAS CONNECTION 6

ELECTRICAL CONNECTIONS 7

THERMOSTAT INSTALLATION 7

OPERATING INSTRUCTIONS 7

TO SHUT DOWN UNIT 8

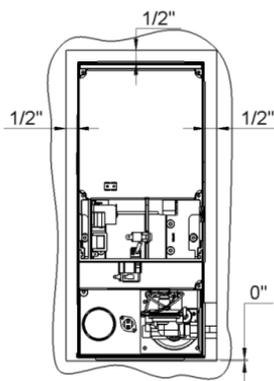
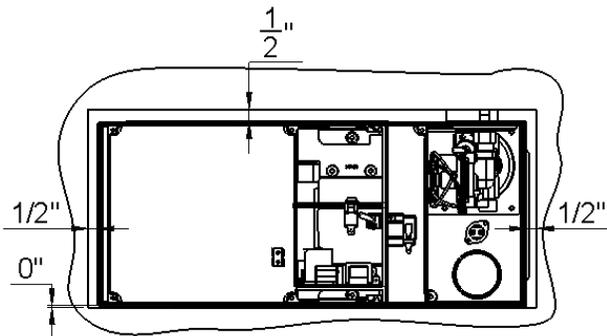
IGNITION CONTROL DIAGNOSTIC CODES 8

- DO NOT install vent in areas where projection or door openings come within 6" of vent opening.
- DO NOT install furnace in an area where wires, pipes or other objects will interfere with installation or operation of furnace.
- DO NOT install furnace on material that restricts return air, such as directly on carpet, or soft material (like vinyl). If you must install furnace on carpet or soft material, install furnace on cleats, or on a wood or metal panel extending the full width and depth of furnace plus minimum clearance to combustibles.
- DO NOT use petroleum or citrus type cleaner on plastic parts, as damage may occur.
- NOTE: The exhaust temperature of this furnace could discolor or warp some materials. You should verify that the material used on coach door, panel, or covers will not discolor, warp or burn from the exhaust temperature whenever placed directly in front of vent.
- CAUTION: Due to the differences in vinyl siding materials this appliance should not be installed without first consulting with the manufacturer of siding.
- A gas-fired furnace for installation in a residential garage must be installed so the burner(s) and the ignition source are located not less than 18 in (457mm) above the floor and the furnace must be located or protected to avoid physical damage by vehicles.

CLEARANCE TO COMBUSTIBLES:

Floorboards, walls & similar combustible building materials must be provided the full length and width of unit. Spacing is based on installed position when installed horizontally bottom is bottom. When installed vertically bottom becomes right side.

clearances	Top	Sides	Rear	Bottom (to screw heads)	Blower (side opening)
Vertical / Horizontal	1/2"	1/2"	1/2"	0"	36 sq. in.



- Spacing of 1/4" to ducting within 3 feet of furnace must be provided unless UL listed wire bound vinyl ducts are used. All ducting material used to be rated for continuous use at minimum of 200°F.
- Clearances are specifically for plywood or similar building materials surrounding the furnace (i.e. Furnace should not be located under furniture or in a closet space where clothing or other material could be located).
- To install without adding the 36 sq. in. cutout on the blower side supply the unit (blower side) with 2" clearance full length of the unit.

- Furnace efficiency rating is a thermal rating determined under continuous operating conditions, independent of any installation. Efficiency rate is given at 76% minimum; actual efficiency rating may be higher.
- Return air is supplied through openings in furnace casing. All return air passages must be kept clear for furnace to function properly. Refer to Minimum clearance to floorboards, walls & similar combustible building material.
- The total unobstructed return air opening size(s) must not be less than specified. Failure to meet minimum return air requirements nullifies furnace warranty.

REQUIRED DUCTING

All ducts in the table are four-inch ducts except for bottom discharge as noted. Two-inch ducts cannot be used in place of four inch. . A bottom discharge requires no additional ducting; one additional duct can be added if required. Vertically installed units can also be bottom discharge when right side cover panel has been removed one additional duct can be added if required.

FOR OPTIMAL PERFORMANCE use the following instructions for ducting. (Two top ducts are only to be used in addition to the below installations and are not allowed to be used until these requirements have been met). Additional ducting added will reduce the air flow and could cause poor heating.

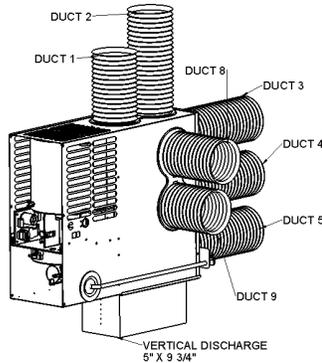
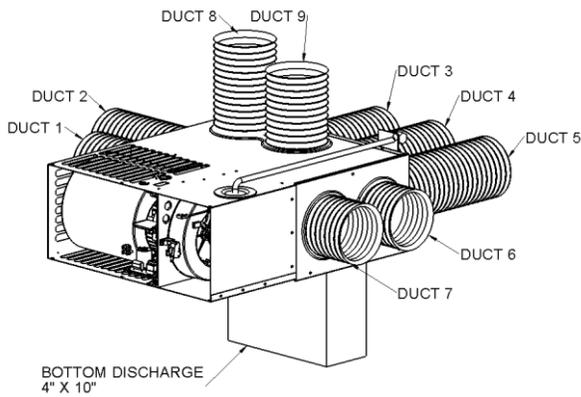
- **Horizontal or Vertical 4" Ducting:** when using 4" ducting one duct from each side must be used. When using side ducts, utilizing rear duct openings as the other duct will yield the best performance.
- **Horizontal Bottom Discharge:** This installation is for horizontally installed units and can be used with the addition of one duct any location except the top two.
- **Vertical Bottom Discharge:** Installation of the furnace in a vertical mounting position can be used with the addition of one duct any location except the casing top two ducts.

REQUIRED DISCHARGE

Models	Required Discharge Area
AFM (16)(20)	24 in ²
AFM (25)(30)(35)	36 in ²
Horizontal Bottom	48 in ²
Vertical Bottom	48 in ²

System	AFMD16	AFMD20	AFMD25 AFMD30 AFMD35
4" Ducts	2	2	3
Horizontal Bottom	4 x 10	4 x 10	4 x 10
Vertical Bottom	5 x 9-3/4	5 x 9-3/4	5 x 9-3/4

***Note the table is for minimum requirements and should in most cases allow the unit to operate correctly. If the burner cycles on and off on the high temperature limit. Extra ducting can be used to help correct this condition due to restriction or bends in duct work.**



16,000	20,000	25,000	30,000	35,000
3000 fpm	3000 fpm	3500 fpm	4000 fpm	5500 fpm

Total fpm= feet per minute readings

FURNACE INSTALLATION

- Remove furnace from box
- Remove vent assembly supplied with furnace
- DO NOT mix assemblies with other units, each model has a specific vent baffle size to operate correctly, see sticker on vent assembly.
- Remove knockouts in locations that will be used and install adapters.
- The furnace should always be installed level (front to back, side to side) to prevent water build up into the interior of the vent area.
- If units are installed using the small outside vent system, access to the inside of the coach must be provided directly in front of the unit to remove for servicing suggested opening size 17" wide by 8.5" height.
- Secure unit with two brackets and screws provided at the rear of the unit through holes provided.
- Attach flexible ducting over duct adapters and secure.
- Run ducting to locations keeping bends and excess ducting to a minimum and secure to registers.
- Connect wiring to furnace see wiring connection section.
- Connect gas line see gas connection section.

SIDEWALL CUTOUT

Maximum exterior wall thickness 0" to 2-1/2". Optional vent kit can be purchased to extend the vent to a 3" wall thickness on small vent installations.

WALL CUTOUTS

(Standard door square corner and Flush Door requires 3/4" radius corners)

Side Wall Cutout	A	B	D
Small Vent	-	-	3-1/2" Dia. Max
Standard Door (horizontal or vertical)	17" Max	7-1/2" Max	
Flush Door (horizontal or vertical)	18-1/4" Max	9-1/8" Max	

- Proper duct installation is critical to proper operation of the furnace. When installing ducts, use materials rated for continuous use at 200°F.
- Each 4-inch duct opening provides 12 in² of discharge area. Provide an extra 12 in² of non-closeable duct discharge area for each closeable register used.
- Ducting into dead air space with no return air, such as holding tank areas, does not count toward achieving minimum discharge requirements.
- Adjust ducting installation to obtain an air temperature rise of 100°F-130°F. Also see air flow check section.

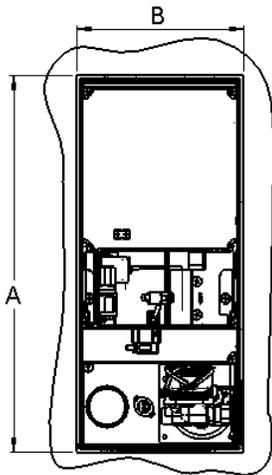
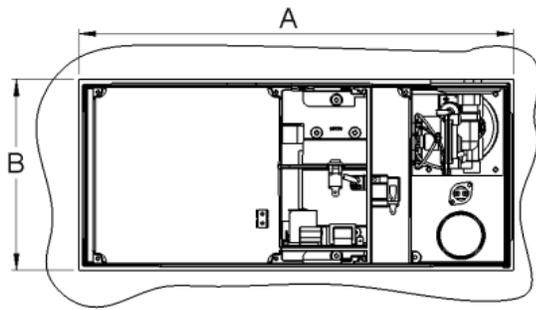
FLEXIBLE DUCTING

- Follow ducting configurations shown.
- Avoid sharp bends, deep sags or crushed ducts.
- Stretch all ducts thoroughly and run them directly to outlets, keeping number of angles of bends to a minimum.
- Remove knockout plate from desired outlets. If a knockout is removed accidentally cover plates can be purchased.
- Unused knockouts MUST be covered.
- Attach a duct adapter by inserting flange over casing hole, locking the tab into casing slot and turning adapter 90°
- Attach and secure four-inch flexible duct to adapter(s)
- Run duct(s) to desired location within RV, secure to register(s)

AIR FLOW CHECK

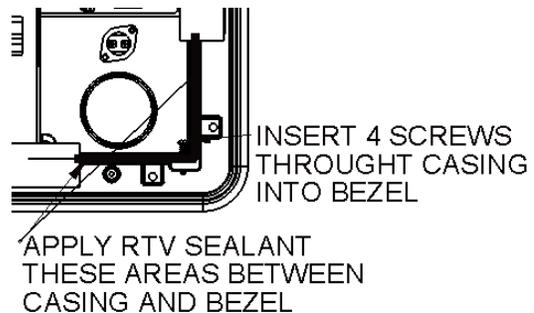
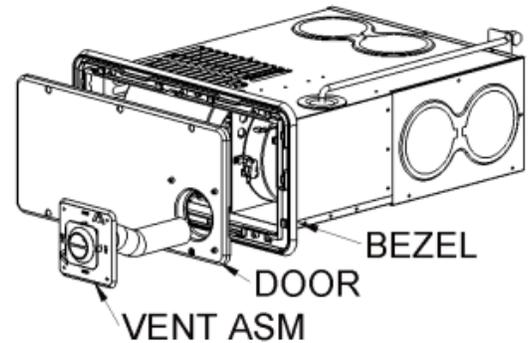
- Appliance is tested to a temperature rise as specified on the Rating Plate. After installation of the furnace and duct system is completed, adjustment to obtain proper temperature rise should be made.
- The table below is a reference to maintain maximum operation of the appliance when checking temperature rise is not possible. Airflow measurements made at each registers the total reading should not be less than what is shown in table below for each BTU size.
- If readings are below the table values airflow can be improved by adding ducts or reducing/eliminating restrictions in the system.

- DO NOT oversize hole – over sizing can result in water leakage.
- Zero clearance around air intake cutout for best sealing condition.



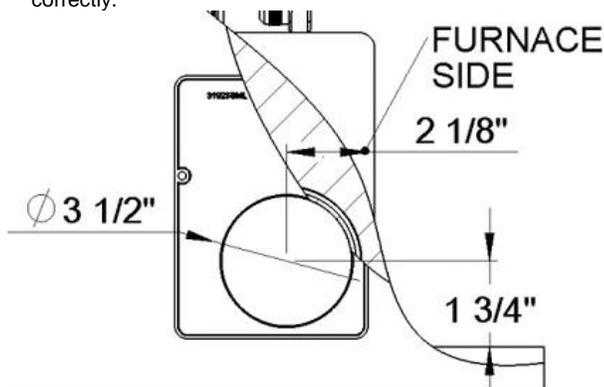
STANDARD DOOR INSTALLATION

- To prevent moisture from entering the inside of the coach, apply RTV type sealant to all sealing areas.
- The door bezel must fit tightly to sidewall to prevent water leakage.
- Doors are designed to allow water drainage in either horizontal or vertical installations. Proper location of vent assembly is important for proper exhausting of fumes and proper function of furnace.
- **NOTE:** RTV type sealant must be applied to the bezel and casing at the bottom right side to prevent possible water wicking into the coach. See drawing for areas that must be sealed once bezel is in place.
- Insert vent assembly through door making sure tube goes into the chamber tube. Proper overlap of the vent tube must be a minimum of 1-1/2" for proper function and exhausting of furnace.



SMALL VENT INSTALLATION

- To prevent moisture from entering inside of coach, apply RTV type sealant to the back of the bezel flange of the vent part.
- Vents are designed to allow water drainage when installed correctly.



1. Locate the furnace vent cutout location.
2. Drill a 3-1/2" diameter hole through sidewall of coach. Installer **MUST** protect the furnace and components from construction tools and debris during installation.
3. Insert furnace from inside of coach, lining up hole in wall with vent in furnace.
4. Install vent assembly, vent panel extension must be inserted into air intake tube. Secure vent to wall with 4 screws provided.
5. Vent assembly must maintain overlaps of 1-1/4" on exhaust tube and 1/2" on air tube. **DO NOT** exceed maximum wall thickness.
6. Secure furnace to floor with legs and screws (equivalent type screws can also be used) through holes provided at back of casing. For vertical units casing legs can be positioned by using alternate holes for placement to secure furnace.

Use of foil tape as alternate sealing method is acceptable



HARD DUCTING SYSTEM

1. Locate where furnace will be installed and cut an opening as shown through the side wall where unit will be installed. Furnace and components **MUST** be protected from construction tools and debris during installation.
2. Apply RTV type sealant to entire back flange of bezel creating a complete seal.
3. Pull furnace forward through cutout about 1" inch, slip bezel (note word TOP on bezel) around casing until flush with front edge of the casing.
4. Secure bezel to furnace casing with 6 screws provided or use equivalent type screws.
5. Push furnace and bezel back tight against side wall and secure with 14 screws, and remove excess caulking..
6. When installing bezel **DO NOT** deform bezel if cutout hole is too large as this will cause water-sealing issues.
7. Connect the gas line to the valve see section on gas connection.
8. Secure furnace to floor with mounting legs and screws provided or equivalent type.
9. Connect the electrical wiring see wiring section.

- Fasten door and vent with 10 screws provided or equivalent type.

FLUSH DOOR INSTALLATION

- To prevent moisture from entering inside of coach, apply RTV type sealant to all sealing areas.
- The door bezel must fit tightly, to prevent water leakage.
- Doors are designed to allow water drainage in either horizontal or vertical installations. Proper location of vent assembly is important for proper exhausting of fumes and proper function of furnace.
- NOTE:** RTV type sealant must be applied to the bezel and casing at the bottom right side to prevent possible water wicking into the coach. See drawing for areas that must be sealed once bezel is in place.

- Locate and cut opening in side wall where unit will be installed.
- Flush mounted door systems require that the furnace be installed on a 1" high platform for the door cutout to be level with the floor surface. If not the sidewall can be routed out across the bottom to the depth of the bezel to create a pocket area.
- Apply RTV type sealant to entire back flange of bezel creating a complete seal.
- Secure bezel by inserting bezel into wall cutout and securing through the 10 mounting tabs to the side wall framing. Make sure that the bezel is tight against the exterior side wall.
- Connect the gas line to the valve and push the gas line plug into casing opening.
- The door bezel must fit tightly against the exterior sidewall to prevent water leakage.
- Remove excess sealant from around bezel and visually inspect bezel to make sure it is completely sealed.
- Secure furnace with mounting legs provided.
- Connect the electrical wiring see wiring section.
- Fasten door and vent with 6 screws provided.

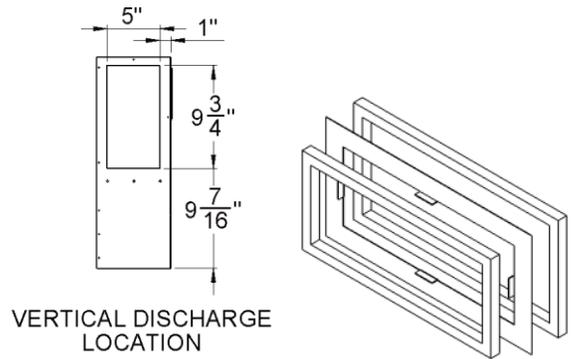
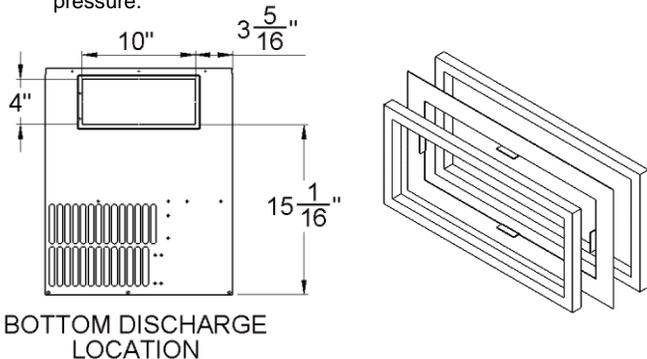
HARD DUCT SYSTEMS

When designing hard duct systems:

- Undersized ducting will cause high temperature limiting.
- Oversized ducting will cause inadequate air flow from registers.
- When hard ducting is 1-1/2" in depth, an additional flex duct may be needed to maintain air flow requirements.
- DO NOT install floor registers within 2 feet of return air openings. See ducting option from casing top and bottom areas. Hard ducting must be sealed to the furnace and floor to insure proper operation of the appliance.
- Units can be installed as bottom discharge systems in either horizontal or vertical position.

FLOOR DISCHARGE CUTOUTS

- Remove bottom discharge plate or side, these ducting option must be connected to a floor ducting system.
- The drawing shows the use of a gasket and plenum plate for attaching furnace to the flooring. See parts list for order number.
- Other methods of sealing furnace to the floor are acceptable as long as clearances and seals meet requirements of clearances and temperature.
- Fasten plenum plate bend tabs over floor cutout. (If a gasket and plenum plate is not used seal furnace to hard ducting system with approved tape making sure seal is airtight) Continue with step 5.
- Position gasket on plenum over opening.
- Set furnace on gasket; make sure gasket remains in position.
- Additional flex ducting can also be used to maintain correct static pressure.

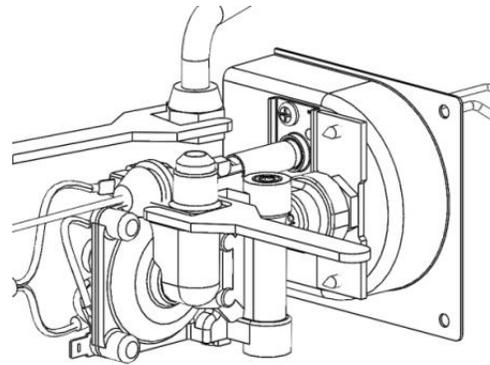


 WARNING FIRE OR EXPLOSION
<p>Never check for leaks with an open flame. Turn on the gas and apply soapy water to all joints to see if bubbles are formed.</p>

GAS CONNECTION

Propane Gas Pressure Test

- The furnace and any individual shut-off valve must be disconnected from gas supply piping system during pressure testing of system at test pressures of more than 1 1/2" PSI.
- Before furnace is connected, piping systems are to be tested to be leak free. The test must maintain air pressure of a least 6" of mercury or 3 PSI for at least 10 minutes.
- The entire piping system is to be adjusted to maintain a pressure of 10" to 13" W.C. when all appliances are in operation.
- Test gas connections for leakage with soapy water or a leak test solution.
- If local codes allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously serviced another gas appliance.



- Connect gas line to the fitting located on the valve through hole in top of casing, or if supplied with an extended manifold at the rear of the furnace.
- Be sure all male pipe threads, other than flare fittings, are treated with a sealing compound resistant to chemical reaction of propane (LP) gas. DO NOT put sealing compound on flare fittings.
- Remove grommet plug from furnace. After inserting gas line through grommet plug and connecting to valve re-install grommet plug, this is a required air seal. (DO NOT CUT)
- Connect gas line inside furnace casing immediately ahead of gas control valve or at the rear when extended manifold is supplied.
- Use two wrenches to hold brass fitting and flare nut when tightening gas line to brass fitting. DO NOT twist valve assembly, torque fitting to 20-22 ft. lbs.

ELECTRICAL CONNECTIONS

 **WARNING**
INJURY OR PROPERTY DAMAGE

- Disconnect electrical power before servicing.
- Label all wires before disconnecting for service. Wiring errors can cause improper and dangerous operation.
- Verify proper operation after servicing.

 **CAUTION**
PROPERTY DAMAGE

Units with 12 volt connection are for low-voltage battery or direct current only.
Do not connect to 120 or 240 volts AC.

 **CAUTION**
PROPERTY DAMAGE

This furnace is designed for negative ground 12 volts DC only. DO NOT attempt to alter furnace for a positive ground system or connect the furnace directly to 120 OR 240 volts AC.

INSTALLATION AND SAFETY CODES

- USA and Canada – follow all applicable state and local codes in the absence of local codes or regulations, refer to current standards of:
- ANSI/NFPA 1192 Recreational Vehicles Code and ANSI/RVIA LV Low Voltage Systems in Conversion and Recreational Vehicles

Conductor Sizing

Table 1
OVERCURRENT PROTECTION (No Wire Bundling Restrictions)

Wire Size	Ampacity	Wire Type
20	3	Stranded only
18	6	Stranded only
16	8	Stranded only
14	15	Stranded only
12	20	Stranded only
10	30	Stranded only
8	40	Stranded only
6	55	Stranded only
4	75	Stranded only
2	100	Stranded only

Table 2
OVERCURRENT PROTECTION

*Not More Than Seven Wires Per Harness
**Not More Than Three Wires Per Harness

AWG OR SAE Conductor Size (Gage)	Maximum Ampacity at Conductor Insulation Temperature Rating of 90°	Maximum Ampacity at Conductor Insulation Temperature Rating of: 105° C/125° C
20*	5	7.5
18*	7.5	10
16*	10	15
14*	17.5	20
12*	22.5	25
10**	40	50
8**	55	70
6**	75	100
4**	95	120
2**	130	150
1**	150	
1/0**	170	
2/0**	195	
3/0**	225	
4/0**	260	

1. This furnace is designed for negative ground 12 volts DC only. DO NOT attempt to alter furnace for a positive ground system or connect the furnace to 120 volts AC. Damage to furnace components will occur and warranty will be voided.
- Use the minimum wire size shown in the table above to minimize voltage drop. Furnace MUST be installed so electrical components are protected from water and other installation debris. To make electrical connections see wiring diagrams.
- For best furnace performance when power supply is from a converter equipped with a charging port, wire converter to furnace in parallel with battery. This provides consistent voltage to furnace, increasing component life, filtering power surges and AC spikes.
- All units are supplied with a power switch which is to be turned off during servicing removing power to the furnace wiring. Switch must be in the ON position for furnace to operate.

Route wiring to the furnace.

Furnace	Power Supply
Red Wire +12 Volt DC	+12 Volt DC
Black Wire -12 Volt DC	-12 Volts (Ground)
Blue Thermostat +12VDC	+12 Volts (Thermostat)
Blue Thermostat	-12 Volts (Thermostat)

1. Wiring for thermostat using 22 AWG minimum stranded wire.
2. All wiring must be installed so the electrical components and connection are protected from water.
3. If a unit is supplied with a connector block on the field connections the mating parts should be used.

Furnace Connector	Field Connector
AMP 1-480705-0	AMP 1-480704-0
Furnace Terminals	Field Terminals
AMP 7708496	AMP 770020-1

THERMOSTAT INSTALLATION

- Purchase a thermostat rated for 12 VDC or 24 VAC, Minimum 1 AMP rating.
 - Be sure all electrical power to the furnace is disconnected.
 - The thermostats are very sensitive, HANDLE WITH CARE AT ALL TIMES.
- Pick a dry area where air circulation is good.
1. Do not install the thermostat where there are other heating loads: such as direct sunlight, heat producing appliances (television, radio, wall lamp, etc.) furnace or air conditioner output registers.
 2. Locate thermostat 48" to 54" above main living area floor on an INTERIOR wall when possible.
 3. EXTERIOR wall location must have a 3/4" spacer between thermostat and exterior wall for proper room air sensing.
 4. Follow manufacture's installation instructions provided with thermostat.

OPERATING INSTRUCTIONS

 **WARNING**
FIRE OR EXPLOSION

Do not operate furnace while vehicle is in motion or being towed.

- During initial firing of this furnace, a burn-off of excess oils remaining from manufacturing process may cause smoking or fumes for 5-10 minutes.
- NOTE: if furnace should lock out, the blower will go off in 3 minutes and remain off until unit is reset by reactivating the thermostat.

STOP! Read Users Information Manual supplied with furnace.

1. Turn the manual valve (if so equipped) or the valve at the outside LP tank to the "OFF" position DO NOT force. NOTE: This furnace is equipped with a valve shut-off switch with switch in "OFF" position. Gas will not flow to burner nor will the furnace operate. Turn switch to "ON" position.

2. Set thermostat above room temperature to begin blower operation. A slight delay will occur before the blower comes on. Allow blower to run for 1 minute for combustion chamber purge cycle. If blower does not come on or stops before ignition cycle, shut down unit and contact your dealer or a local recreational vehicle service agency.
3. After 1 minute, the blower may not be running at this time, move thermostat lever below room temperature. Wait approximately 2 minutes for blower to go off.
4. Open manual shut-off valve (if so equipped) or the valve at the outside LP tank. Correct operation characteristics depend on the valve being positioned fully open. Never attempt to operate with a valve partially closed. Turn shut-off switch to "ON" position.
5. Set thermostat lever to desired setting. If set above room temperature, blower will come on.
6. Allow 30 seconds for main burner to light after blower comes on. This furnace is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
7. If burner does not light, repeat Steps 1 through 5.
8. If after three (3) attempts with no ignition, shut down the unit and contact your dealer or a local recreational vehicle service agency. Do not continue to cycle furnace through thermostat in an attempt to get ignition.

TO SHUT DOWN UNIT

1. Set the thermostat to lowest setting, move lever to "OFF" position.
2. Turn manual shut off valve (if so equipped) to the "OFF" position. Do not force.

IGNITION CONTROL DIAGNOSTIC CODES

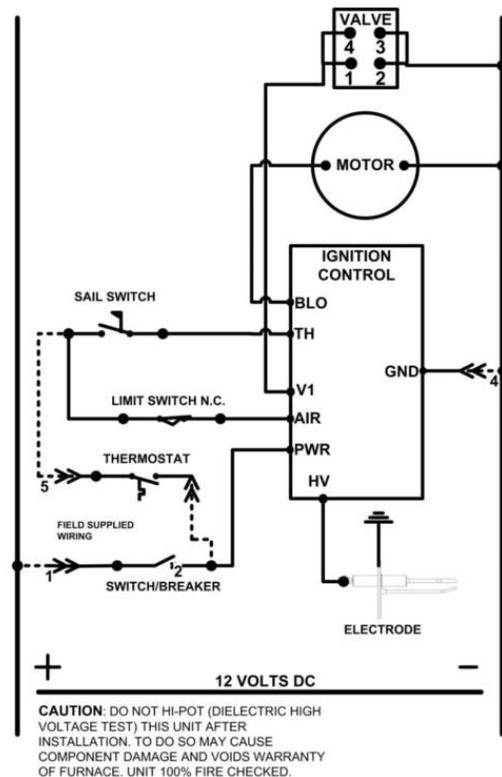
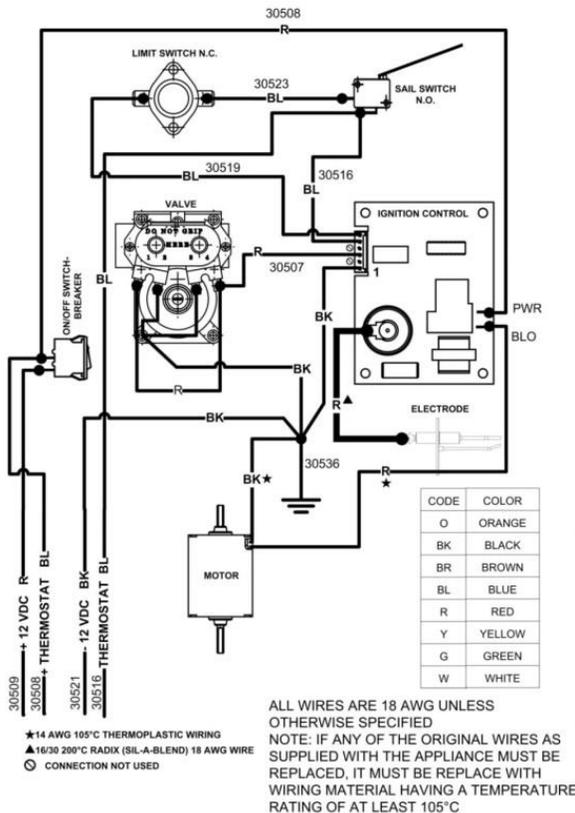
The following charts give the diagnostic codes given by the ignition control when faults are present.

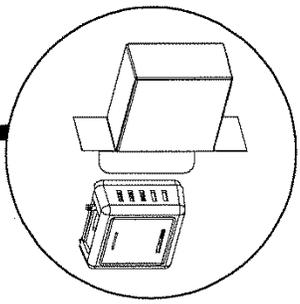
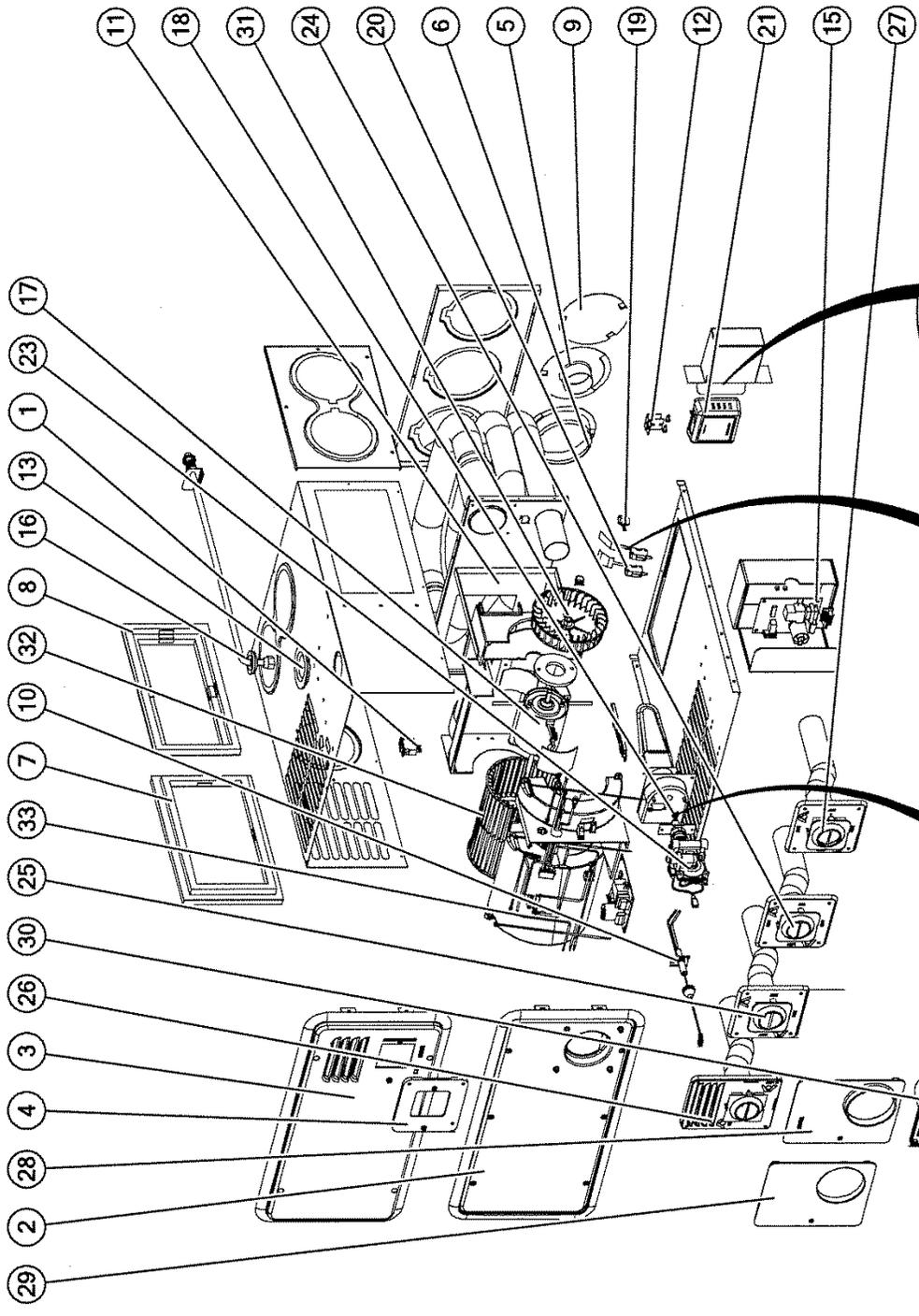
- A soft lockout is a condition that is timed and will make additional attempts to correct the problem. A hard lockout requires resetting of the thermostat or turning the power switch off, then back on.

STANDARD 3 TRIES FOR IGNITION CONTROLS

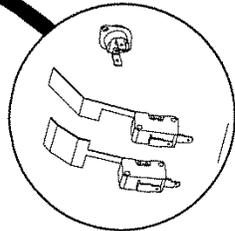
DIAGNOSTIC CHART		
FAULT	LED INDICATION	LOCKOUT
Internal Circuit Board Failure	Steady On, No Flashing	Hard
Limit Switch/Airflow Problems	1-Flash With 3-Second Pause	Soft
Flame Sense Fault	2-Flashes With 3-Second Pause	Hard
Ignition Lockout Fault	3-Flashes With 3-Second Pause	Soft (1hr. retry)

WIRING AND LADDER DIAGRAM

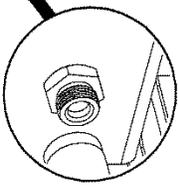




Specify Color



Limit/Sail Switches



Specify Size

AFM Service Parts

Category	P/N	Description	NS=PART NOT SHOWN												Ballon	NS
Motors																
	32349	KIT, MANIFOLD, INLET SML	<input checked="" type="checkbox"/>													
	30720	KIT, MOTOR L35-40 M35	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	30730	KIT, MOTOR M16-20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	30722	KIT, MOTOR M25-30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Orifices																
	31078	KIT, ORIFICE #50 LP	<input type="checkbox"/>													
	31081	KIT, ORIFICE #52 LP	<input type="checkbox"/>													
	31083	KIT, ORIFICE #56 LP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	30829	KIT, ORIFICE 1.30MM LP	<input type="checkbox"/>													
	30845	KIT, ORIFICE 1.45MM LP	<input type="checkbox"/>													
Switches, Limit																
	31091	KIT, LIMIT SWITCH 190	<input checked="" type="checkbox"/>													
Switches, Sail																
	31093	KIT, SAIL SWITCH SM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	31094	KIT, SAIL SWITCH SML	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thermostats																
	32300	THERMOSTAT,HEAT ONLY,BLACK	<input checked="" type="checkbox"/>													
	38452	THERMOSTAT,HEAT ONLY,BROWN	<input checked="" type="checkbox"/>													
	38453	THERMOSTAT,HEAT ONLY,WHITE	<input checked="" type="checkbox"/>													
Valves																
	31096	KIT, 12 DC VALVE V1 SML	<input type="checkbox"/>													
	31098	KIT, VALVE 12VDC TOP SML	<input checked="" type="checkbox"/>													
Vent, Exhaust																
	31777	KIT, DOOR VENT ASM .875 V4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	31809	KIT, DOOR VENT ASM 1.10 V4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	31722	KIT, DOOR VENT ASM NB V4	<input type="checkbox"/>													
	30582	KIT, LD VENT .875 V3	<input type="checkbox"/>													
	31271	KIT, LD VENT .875 V4	<input type="checkbox"/>													
	30937	KIT, LD VENT .875 V4 MW	<input type="checkbox"/>													
	30583	KIT, LD VENT 1.10 V3	<input type="checkbox"/>													
	31273	KIT, LD VENT 1.10 V4	<input type="checkbox"/>													
	30940	KIT, LD VENT 1.10 V4 MW	<input type="checkbox"/>													

AFM Service Parts

Category	P/N	Description	NS=PART NOT SHOWN										Ballon	
	30578	KIT, LD VENT NB V3	<input type="checkbox"/>	10										
	31813	KIT, LD VENT NB V4	<input type="checkbox"/>	25										
	32296	KIT, LD VENT NB V4 MW	<input type="checkbox"/>	27										
	30197	VENT COVER PANEL SM V2-W	<input type="checkbox"/>	29										
	30456	VENT COVER PANEL SM V3	<input type="checkbox"/>	29										
	31923	VENT PANEL EXTENSION SM V1	<input type="checkbox"/>	NS										
	30457	VENT PANEL EXTENSION SML V3	<input type="checkbox"/>	29										
	30611	VENT PANEL EXTENSION SML V4	<input type="checkbox"/>	30										
Wheels														
	33126	KIT, BLOWER WHEEL & CLAMP	<input checked="" type="checkbox"/>	32										
	33128	KIT, COMBUSTION WHEEL	<input checked="" type="checkbox"/>	31										
Wiring														
	31114	KIT, DC WIRING HARNESS	<input checked="" type="checkbox"/>	33										

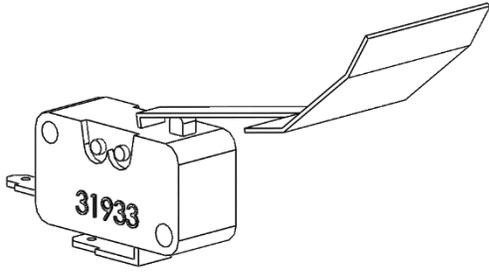


Figure 1 Large Paddle Kit 31093

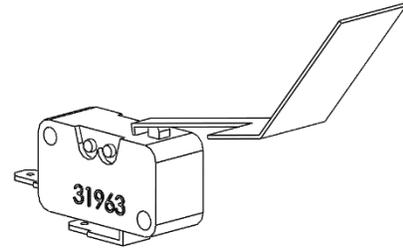


Figure 2 Small Paddle Kit 31094

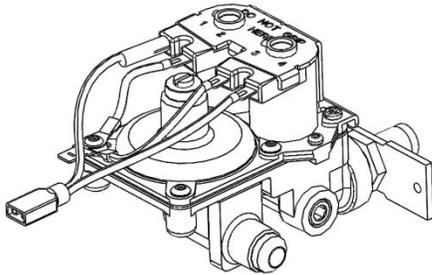


Figure 3 Valve Kit 31098

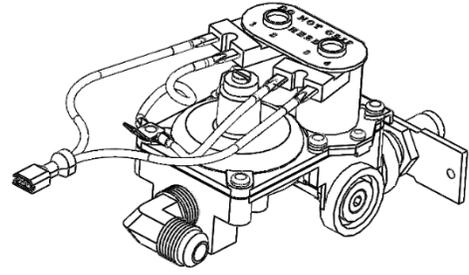


Figure 4 Valve Kit 31096

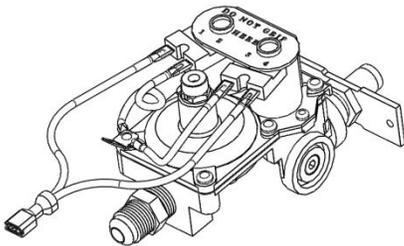


Figure 5 Valve Kit 31097

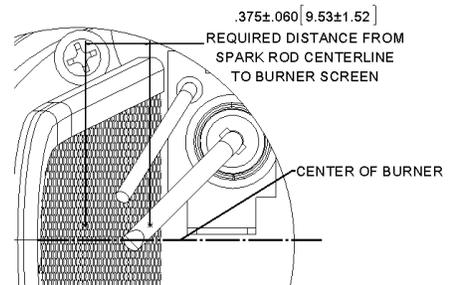


Figure 6 Electrode Adjustment