



MACH® Series Gas-Fired Boiler
Outdoor MACH Boiler Assembly Supplement

LMACH-09OK



PATTERSON-KELLEY

MACH GAS-FIRED BOILER

Mach C1500 & C2000

OUTDOOR BOILER KIT GUIDE

**This manual is to be used in conjunction
with the LMACH Installation & Owner's
Manual (latest edition) .**



C.S.A. Design-Certified
Complies with ANSI Z21.13/CSA 4.9
Gas-Fired Low Pressure Steam and Hot Water
Boilers



ASME Code, Section IV
Certified by Patterson-Kelley



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Complies with ANSI Z21.13/CSA 4.9
Gas-Fired Low Pressure Steam and Hot Water
Boilers



Patterson-Kelley

Harsco

Installation Date: _____

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The information contained in this document is subject to change without notice from Patterson Kelley.

The following words are used in this manual to denote the degree of seriousness of the individual hazards.

⚠ DANGER — Used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme conditions.

⚠ WARNING — Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



⚠ CAUTION — Used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE/NOTE - NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol is not used with this signal word.

⚠ AVERTISSEMENT Une installation, un réglage, un changement ou un entretien inappropriés peuvent causer des dommages matériels, des blessures corporelles ou la mort. Lire et bien comprendre le Manuel d'installation et du propriétaire fourni avec cette chaudière. L'installation et le service doivent être effectués par un personnel expérimenté et compétent qui a reçu une formation sur la chaudière de cette série.	 	⚠ WARNING Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Read and understand the Installation and Owner's manual provided with this boiler. Installation and service must be performed by experienced and knowledgeable personnel who have been trained on this series boiler.
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⚠ WARNING
Extensive safety information is contained in the LMACH Installation & Owner's Manual (latest edition) as well as warnings, installation requirements and diagrams.

The LMACH Installation & Owner's Manual (latest edition) must be used in conjunction with this manual for safe and proper installation of this boiler. The boiler and these instructions are for outdoor installation. Incorrect installation may result in injury or death.

⚠ AVERTISSEMENT Risque électrique. Un contact causera un choc électrique et des blessures. Suivre les procédures de verrouillage/signalisation lors de l'entretien.	 	⚠ WARNING Electrical hazard. Contact may cause electrical shock and injury. Follow lockout/tagout procedure when servicing.
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Shut off and lockout / tagout all utilities which may be hazardous, including electricity, gas, water, etc. before installing the Outdoor MACH Boiler. Improper use or failure to lockout / tagout hazards may result in injury.

⚠ WARNING
The boiler and these instructions are for outdoor installation. Do not install in any enclosure without proper venting. All exhaust venting must be outdoors. All installations of venting systems should be done only by qualified venting systems personnel. Venting must be installed in accordance with vent system manufacturer's installation instructions and this manual. Installing a boiler or vent system using improper installation methods or materials can result in serious injury or death due to fire or asphyxiation from carbon monoxide or other poisonous gases. Breathing exhaust fumes may cause serious personal injury or death.



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1.0 INTRODUCTION

1.1 COMPLETED MACH C1500/C2000 OUTDOOR BOILER



 AVERTISSEMENT Une installation, un réglage, un changement ou un entretien inappropriés peuvent causer des dommages matériels, des blessures corporelles ou la mort. Lire et bien comprendre le Manuel d'installation et du propriétaire fourni avec cette chaudière. L'installation et le service doivent être effectués par un personnel expérimenté et compétent qui a reçu une formation sur la chaudière de cette série.	 	 WARNING Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Read and understand the Installation and Owner's manual provided with this boiler. Installation and service must be performed by experienced and knowledgeable personnel who have been trained on this series boiler.
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The completed boiler is shown above. Prior to shipping, the boiler has been modified by the factory in order to function properly outdoors. Special field installation procedures are required to complete the outdoor installation of the boiler. These additional procedures are described in this manual. This manual is a supplement to the LMACH Installation & Owner's Manual (latest edition).

This and all boilers require proper installation, electrical connections, combustion air and flue vent installation, gas piping, water piping, as well as proper startup and service.

This boiler can be used indoors with proper venting to outdoors and standard default parameters. Call PK service technicians for assistance. Be sure to identify your boiler and its specific installation requirements.



2.0 Installation

Additional parts are supplied with the boiler requiring installation in the field. Additional outdoor specific customer supplied parts required as well.

2.1 REQUIRED TOOLS AND PARTS

2.1.1 Tools

The following tools are required for the completion of the MACH outdoor boiler kit.

Large screwdriver (slotted)

Drill power driver

3/8" hex driver bit

5/16" hex driver bit

Pliers

2.1.2 Parts

(Supplied by PK)

Air Inlet Box Cover

Front Hood

6) 1/4"-20 x 1" self drilling screws

4) #10 self drilling screws

Exhaust adapter for C1500 (only)

(Customer required)

Exhaust venting

Approved exhaust vent sealant

Seal tight electrical connector

Waterproof conduit

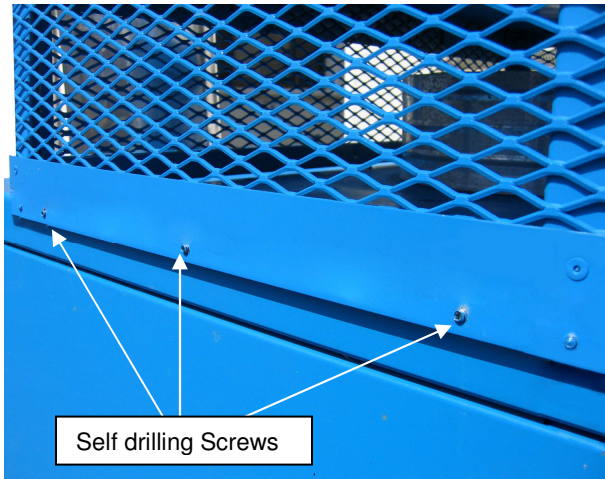
Tube of clear RTV silicone



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2.2 AIR INLET BOX COVER INSTALLATION

Center the box cover over the air Inlet and secure the cover with the (3) $\frac{1}{4}$ "-20 X 1" self drilling screws on the right and left side.



View of inlet box installation. Install (3) $\frac{1}{4}$ "-20 X 1" screws per side on both sides.

2.3 FRONT HOOD INSTALLATION

1. Silicone caulk along the complete underside length of the 1" wide lip on the front hood.
2. Install the hood along the front edge of the top of the cabinet using (4) #10 self-tapping screws. Drill the screws through the hood into the cabinet at evenly spaced intervals along the hood.

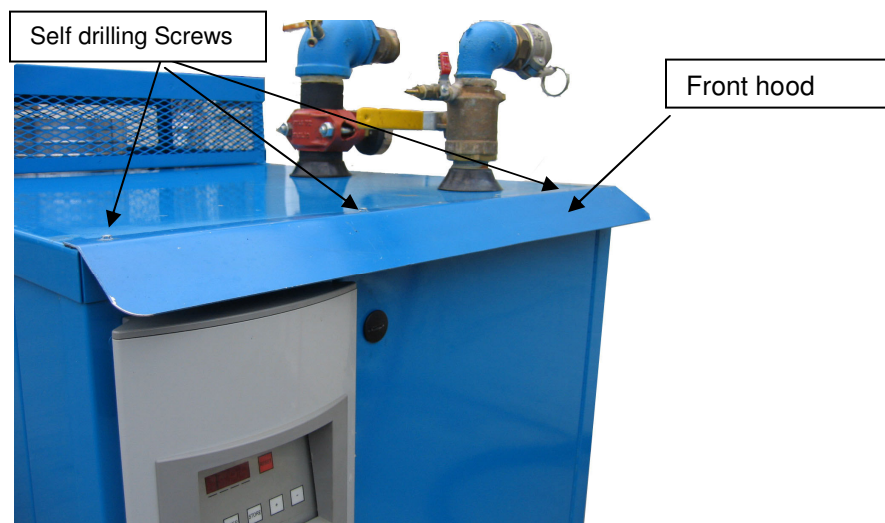


Image 6: Front Hood attached.



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2.4 EXHAUST VENT SYSTEM INSTALLATION

WARNING

The boiler vent should be installed per this manual's instruction. The information contained herein should be used as a guide only and is not intended to be used in lieu of qualified technical expertise. Failure to comply may result in injury or death.

 AVERTISSEMENT Une installation, un réglage, un changement ou un entretien inappropriés peuvent causer des dommages matériels, des blessures corporelles ou la mort. Lire et bien comprendre le Manuel d'installation et du propriétaire fourni avec cette chaudière. L'installation et le service doivent être effectués par un personnel expérimenté et compétent qui a reçu une formation sur la chaudière de cette série.	 	 WARNING Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Read and understand the Installation and Owner's manual provided with this boiler. Installation and service must be performed by experienced and knowledgeable personnel who have been trained on this series boiler.
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See MACH-##VG Air and Venting Supplement Manual (latest edition) for additional venting requirements.

Do not use CPVC venting.

 ATTENTION Risque de brûlures. Certains composants sont chauds et peuvent causer des brûlures. Ne pas toucher durant le fonctionnement. Laisser refroidir suffisamment après l'arrêt de l'appareil.	 	 CAUTION Burn hazard. Some components are hot and may cause burns. Do not touch during operation. Allow time to cool after shutdown.
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The **Mach C1500 Outdoor Boiler** requires an 8" diameter exhaust. PK supplies a **10" to 8" reducer** with the boiler.

MACH Boiler Size	Nominal Stack Size	Supplier / Part Number
C1500	8"	Heat-Fab / 91002PK08 or equivalent

The **Mach C2000 Outdoor Boiler** requires an 10" diameter exhaust, no reducer is required.

The exhaust vent must extend at least three (3) feet above the air intake or at least two (2) feet above the highest part of any independent structure within ten (10) feet of the vent.

Boiler clearance for combustibles / non-combustibles should be maintained per LMACH Installation & Owner's Manual (latest edition).

The Vent should have seals or gaskets present to contain the positive pressure exhaust. These seals must be installed properly. When the vent manufacturer requires the use of a silicone sealant, only an approved high temperature RTV silicone shall be used.







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2.5 ELECTRICAL CONNECTIONS

Use water proof conduit and seal tight connectors to the boiler. Electrical access plugs are located on both sides of the boiler for convenience. Before starting the boiler, check to ensure that the proper electrical service is connected to the boiler.



 AVERTISSEMENT		 WARNING
Risque électrique. Un contact causera un choc électrique et des blessures. Suivre les procédures de verrouillage/signalisation lors de l'entretien.		Electrical hazard. Contact may cause electrical shock and injury. Follow lockout/tagout procedure when servicing.

See LMACH Installation & Owner's Manual (latest edition) for specific electrical requirements and diagrams. Incorrect electrical connections may result in severe injury or death.



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3.0 Maintenance

 AVERTISSEMENT Une installation, un réglage, un changement ou un entretien inappropriés peuvent causer des dommages matériels, des blessures corporelles ou la mort. Lire et bien comprendre le Manuel d'installation et du propriétaire fourni avec cette chaudière. L'installation et le service doivent être effectués par un personnel expérimenté et compétent qui a reçu une formation sur la chaudière de cette série.		 WARNING Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Read and understand the Installation and Owner's manual provided with this boiler. Installation and service must be performed by experienced and knowledgeable personnel who have been trained on this series boiler.
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The MACH outdoor boiler requires all of the maintenance as described in LMACH Installation & Owner's Manual (latest edition) as well as the additional maintenance listed below.

 ATTENTION Risque de brûlures. Certains composants sont chauds et peuvent causer des brûlures. Ne pas toucher durant le fonctionnement. Laisser refroidir suffisamment après l'arrêt de l'appareil.		 CAUTION Burn hazard. Some components are hot and may cause burns. Do not touch during operation. Allow time to cool after shutdown.
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These additional maintenance items should be performed monthly.

- 1) Check for flue gas recirculation into the air inlet. Flue gas recirculation indicates that the vent is not installed properly for local conditions.
- 2) Check for freezing of the condensate lines. Frozen lines will result in boiler malfunction. Operation of the boiler in cold temperatures may require the use of heat trace lines for the boiler condensate trap and drain.
- 3) Check for inlet air box, stack and safety relief valve obstructions due to outdoor debris such as but not limited to leaves, insects, snow, branches and other blockages.



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4.2 ASSEMBLY DRAWING C2000

ITEM NO.	QTY	UNIT	DESCRIPTION
1	1	EACH	BOILER ASSEMBLY - C2000
2	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
3	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
4	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
5	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
6	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
7	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
8	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
9	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
10	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
11	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
12	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR
13	1	EACH	STAINLESS STEEL EXHAUST CONNECTOR

NOTE:
1) SEE OUTDOOR MACH FIELD MANUAL, LMACH-0K (LATEST EDITION) FOR INSTALLATION INSTRUCTIONS.
2) ITEMS REQUIRED TO BE SUPPLIED BY CUSTOMER:
A) STAINLESS STEEL CATEGORY IV EXHAUST VENTING.
B) WATERPROOF ELECTRICAL CONNECTOR AND CONDUIT.

REV	DESCRIPTION	BY	DATE	CHKD	DATE	APP'D	DATE	REV	DESCRIPTION
1	2630000217								

NOTE: SEE OUTDOOR MACH FIELD MANUAL, LMACH-0K (LATEST EDITION) FOR INSTALLATION INSTRUCTIONS.
2) ITEMS REQUIRED TO BE SUPPLIED BY CUSTOMER:
A) STAINLESS STEEL CATEGORY IV EXHAUST VENTING.
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NOTES: