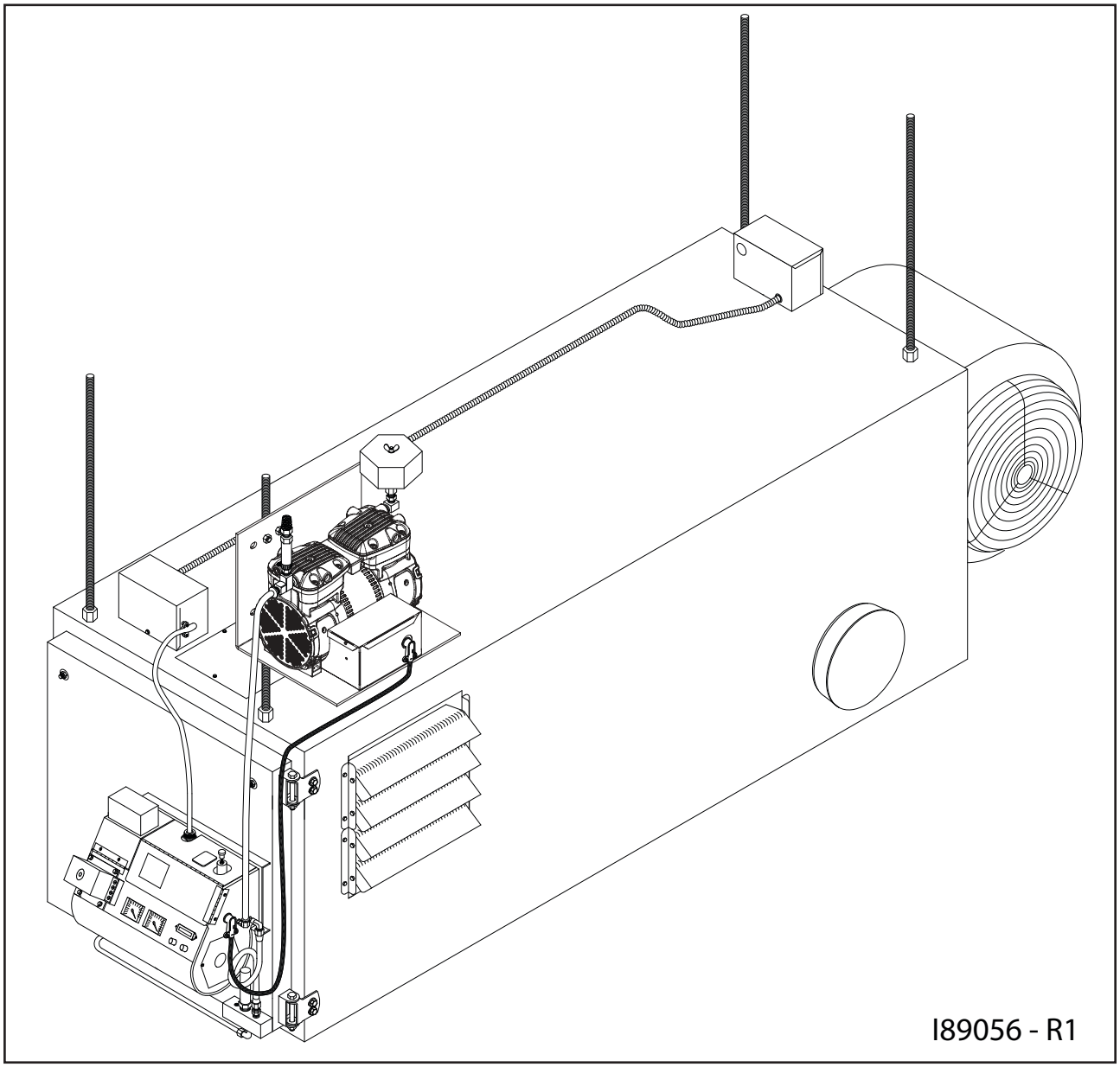
CLEAN BURN®

ENERGY SYSTEMS

INSTALLER'S MANUAL

CLEAN BURN MODEL: DOUBLE-PISTON AIR COMPRESSOR

Optional Accessories for Clean Burn Furnaces/Boilers



PUBLICATION DATE: 12/14/16, Rev. 17 **CLEAN BURN PART # 43142**

IMPORTANT FOR U.S. INSTALLATIONS: All installations must be made in accordance with state and local codes which may differ from the information provided in this manual. Save these instructions for reference.
IMPORTANT FOR CANADIAN INSTALLATIONS: The installation of this equipment is to be accomplished by qualified personnel and in accordance with the regulation of authorities having jurisdiction and CSA Standard B 139, Installation Code for Oil Burning Equipment.

WARRANTY INFORMATION

Clean Burn, LLC., MANUFACTURER, hereby warrants that MANUFACTURER's products shall be free from defect in material and workmanship under normal use according to the provisions and limitations herein set forth.

MANUFACTURER warrants the **heat exchanger/combustion chamber** for a period of **ten (10) years (or 15,000 hours, whichever comes first)**, from the date of purchase by the purchaser, as follows:

MANUFACTURER warrants **all other Clean Burn component parts, including the energy retention disk**, for a period of **one (1) year** from the date of purchase by the purchaser.

LIMITATIONS:

The obligation of MANUFACTURER for breach of warranty shall be limited to products manufactured by MANUFACTURER (1) that are installed, operated and maintained according to MANUFACTURER's instructions furnished and/or available to the purchaser upon request; (2) that are installed according to all other applicable Federal, State and local codes or regulations; and (3) that the purchaser substantiates were defective in material and workmanship notwithstanding that they were properly installed and correctly maintained as set forth above and were not abused or misused.

The obligation of MANUFACTURER shall be limited to replacing or repairing the defective product, at the option of the MANUFACTURER. MANUFACTURER shall not be responsible for any labor or costs of removal or reinstallation of its products and shall not be liable for transportation costs to and from its plant at Janesville, Wisconsin.

Use of parts for modification or repair of the product or any component part thereof not authorized or manufactured by MANUFACTURER specifically for such product shall void this warranty.

This warranty shall not apply to any damage to or defect in any of MANUFACTURER's products that is directly or indirectly caused by (1) *force majeure*, Act of God or other accident not related to an inherent product defect; or (2) abuse, misuse or neglect of such product, including any damage caused by improper assembly, installation, adjustment, service, maintenance or faulty instruction of the purchaser.

Other than as expressly set forth hereinabove, MANUFACTURER makes no other warranty, express or implied, with respect to any of MANUFACTURER's products, including but not limited to any warranty of merchantability or fitness for a particular purpose.

And in no event shall MANUFACTURER be responsible for any incidental or consequential damages of any nature suffered by purchaser or any other person or entity caused in whole or in part by any defect in any of MANUFACTURER's products. Any person or entity to whom this warranty extends and who claims breach of warranty against MANUFACTURER must bring suit thereon within one year from the date of occurrence of such breach of warranty or be forever barred from any and all legal or other remedies for such breach of warranty.

MANUFACTURER is not responsible for and hereby disclaims any undertaking, representation or warranty made by any dealer, distributor or other person that is inconsistent with or in any way more expansive than the provisions of this limited warranty.

This warranty grants specific legal rights and shall be read in conformity with applicable state law. In some jurisdictions, the applicable law mandates warranty provisions that provide greater legal rights than those provided for herein. In such case, this limited warranty shall be read to include such mandated provisions; and any provision herein that is prohibited or unenforceable in any such jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining provisions and without affecting the validity or enforceability of such provision in any other jurisdiction(s).

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SPECIAL BULLETIN

IMPORTANT INFORMATION CONCERNING THE SERVICE RATING OF THE AIR COMPRESSOR

Air compressor model #14336 has a service rating of approximately 75%. This means that the air compressor can operate continuously for approximately 45 minutes (75% of one hour), and then it must not operate for approximately 15 minutes (25% of one hour) to allow the air compressor to "cool down." This works well for most furnace/boiler installations where the unit will cycle on and off a few times during an hour.

CAUTION: ***If the furnace/boiler will run continuously (without cycling on and off a few times during an hour), you must use an air compressor with a tank.*** (Refer to the air compressor specifications for your furnace/boiler when purchasing an air compressor with a tank.) ***DO NOT use air compressor model #14336 if your furnace/boiler will run continuously for periods which exceed the 75% service rating.*** This will overheat the air compressor and severely damage the teflon rings and teflon skirt in the air compressor, resulting in poor air pressure output from the compressor.

IMPORTANT INFORMATION CONCERNING ADJUSTMENT OF THE AIR COMPRESSOR

It is very important to follow the instructions **"Adjusting the Air Compressor During Operation"** in this manual. This procedure involves the adjustment of the pressure relief on the air compressor so that the precise air pressure (12 to 18 psi) required for proper burner operation is provided to the burner. Excess air pressure is bled off through the pressure relief.

CAUTION: DO NOT run the air compressor without properly adjusting the pressure relief. This will overheat the air compressor and severely damage the teflon rings and teflon skirt in the air compressor, resulting in poor air pressure output from the compressor.

IMPORTANT INFORMATION CONCERNING YOUR AIR COMPRESSOR MODEL

Clean Burn Model #14336 is a double-piston air compressor which can be installed on ALL Clean Burn furnace and boiler models.

SECTION 1: INTRODUCTION

Guide to this Manual

IMPORTANT! This manual provides all the instructions necessary to install the Clean Burn air compressor on your Clean Burn furnace or boiler. Refer to your equipment Operator's Manual for instructions on assembling, installing, operating, and maintaining your furnace or boiler.

Consult the Table of Contents for a detailed list of topics covered in this manual. You'll find the step-by-step procedures easy to follow and understand. Should questions arise, please contact your Clean Burn dealer before starting any of the procedures in this manual.

Following is an outline of the air compressor installation process:

- **UNPACKING**
- **INSTALLING THE AIR COMPRESSOR**
    - Installing the Air Compressor Components
    - Preparing the Furnace Cabinet
    - Mounting the Air Compressor (Furnaces)
    - Mounting the Air Compressor (Boilers)
    - Preparing the Burner for use with the Air Compressor
    - Connecting the Air Compressor to the Burner
    - Wiring the Air Compressor

Procedures are also provided for adjusting the air compressor during furnace/boiler operation and for maintaining the air compressor.

Please read all sections carefully--including the following safety information--before beginning any installation procedures; doing so ensures your safety and the optimal performance of your Clean Burn air compressor.

Please read all sections in this manual carefully--including the following safety information--before beginning any installation procedures; doing so ensures your safety and the optimal performance of your Clean Burn air compressor and furnace/boiler.

For Your Safety...

For your safety, Clean Burn documentation contains the following types of safety statements (listed here in order of increasing intensity):

- **NOTE:** A clarification of previous information or additional pertinent information.
- **ATTENTION:** A safety statement indicating that potential equipment damage may occur if instructions are not followed.

CAUTION: A safety statement that reminds of safety practices or directs attention to unsafe practices which could result in personal injury if proper precautions are not taken.

WARNING: A *strong* safety statement indicating that a hazard exists which can result in injury or death if proper precautions are not taken.

DANGER! *The utmost levels of safety must be observed;* an extreme hazard exists which would result in high probability of death or irreparable serious personal injury if proper precautions are not taken.

IMPORTANT! Review the list of general safety precautions provided in Section 1 of your Furnace/ Boiler Operator's Manual. These precautions *must be heeded* to ensure proper, safe air compressor and furnace/boiler operation.



SECTION 2: UNPACKING

Before installing the air compressor on your furnace/boiler, you should take some time to carefully unpack your shipment from Clean Burn.

Unpacking and Inspecting All Components

Carefully open all shipping containers and inspect all components. Immediately notify the freight company and your Clean Burn dealer in case of shipping damage or shortage(s). Keep all components together so you will have them as needed for assembly and installation.

For your convenience, air compressor components are listed in Section 3 (in related groupings) throughout the installation process. Detailed illustrations with labelled components should enable easy assembly/installation.

SECTION 3: INSTALLING THE AIR COMPRESSOR

IMPORTANT! ***If you are installing your furnace/boiler and air compressor at the same time,*** Clean Burn recommends the following sequence of activities:

1. Assembly of Furnace/Boiler (for furnace - through the installation of mounting/stabilizer brackets).
2. Installation of Air Compressor on Furnace/Boiler
3. Installation of Furnace/Boiler (including oil pump, wiring, oil/air lines, stack, thermostat)

Keep the Furnace/Boiler Operator's Manual handy for quick reference as specified throughout the installation of the air compressor.



WARNING: ***If you have already installed your furnace/boiler and power has been connected to the unit,*** ensure that the power is turned OFF before proceeding with the installation of the air compressor to avoid electrical shock hazards.

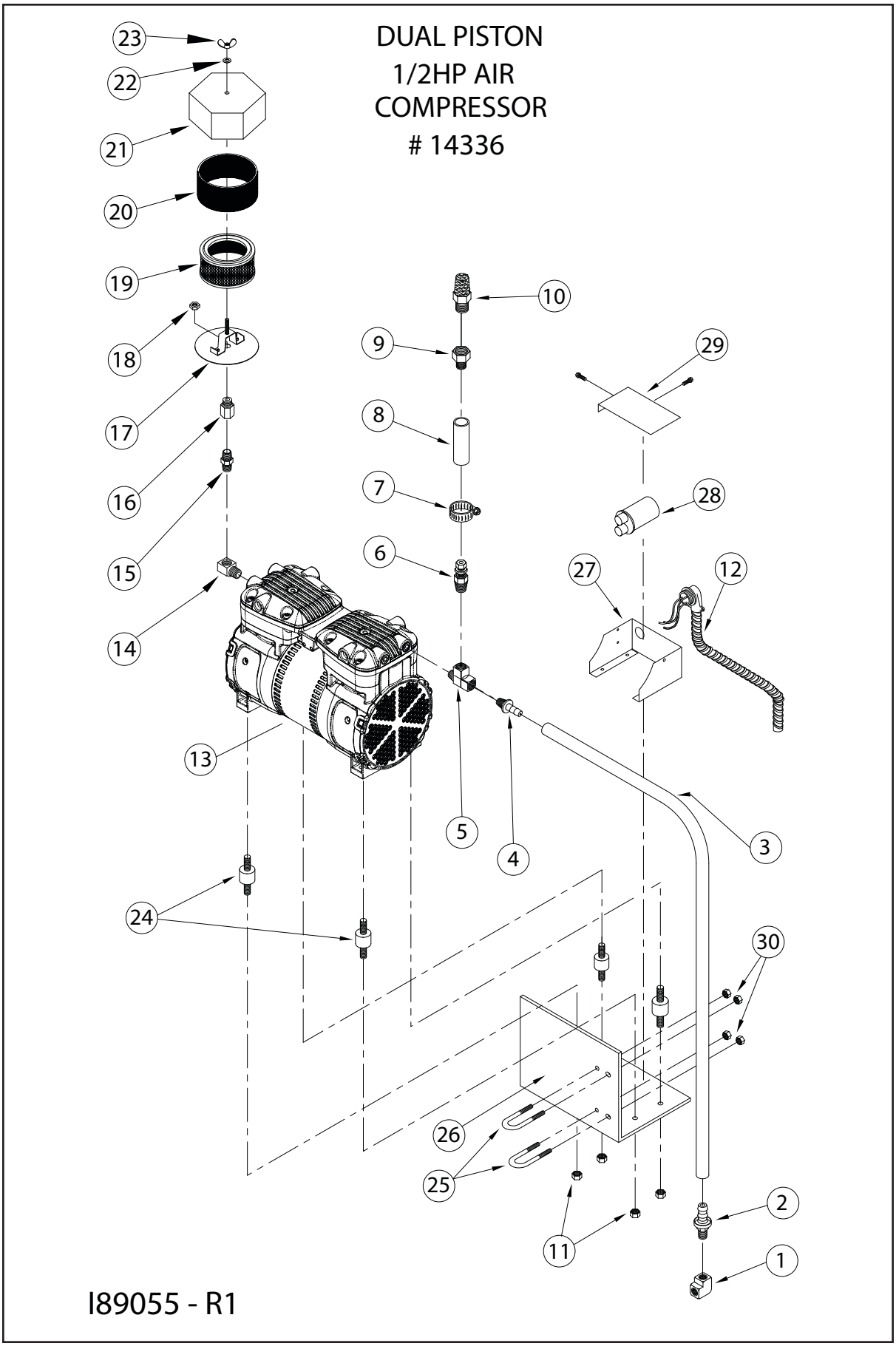


Figure 3A - Air Compressor Exploded View

C77013 - R1

ITEM	QTY	PART#	DESCRIPTION
1	1	32280	1/8" ELBOW 90°
2	1	32234	HOSE BARB (3/8" H x 1/8"NPT)
3	1	54063	AIR HOSE (3/8",42" LONG)
4	1	32236	HOSE BARB(3/8"H x 1/4" NPT)
5	1	32233	BRASS STREET TEE (1/4" NPT)
6	1	32146	RELIEF VALVE
7	1	32091	HOSE CLAMP
8	1	13063	AIR HOSE (3/8" ID, 3" LONG)
9	1	32147	PIPE ADAPTER (1/2" x 3/8")
11	1	32157	MUFFLER
11	4	34092	1/4-20 NUT
12	1	12177	POWER CABLE
13	1	32518	AIR COMPRESSOR- DUAL PISTON (75R)
14	1	32210	1/4 BRASS STREET ELBOW
15	1	32150	1/4 BRASS NIPPLE
16	1	32411	1/4NPT F TO 3/8NPS BULKHEAD FITTING
17	1	70341	BASE PLATE
18	1	32412	3/8 NPS BULKHEAD NUT
19	1	32409	FILTER ELEMENT
20	1	N/A	PART OF 32409
21	1	21130	FILTER HOUSING
22	1	34182	1/4" VINYL WASHER
23	1	34181	1/4" WING NUT
24	4	31104	VIBRATION INSULATOR
25	2	21075	"U" BOLT
26	1	25120	MOUNTING PLATE
27	1	21190	ELECTRICAL BOX
28	1	---	CAPACITOR (call service for part information)
29	1	21191	ELECTRICAL BOX COVER
30	4	34009	3/8-16 NUT

Installing the Air Compressor Components

1. Refer to Figure 3A.
2. Install the air intake filter in the inlet port on the compressor head (notice the directional arrow).
3. Install the 1/4" street tee in the outlet port of the compressor head (notice the directional arrow).
4. Install the relief valve on the street tee.
5. Install the hose clamp and 3/8" x 3" air hose. Then install the 3/8" x 1/2" bushing and muffler on the relief valve.
6. Leave the hose clamp loose to allow for initial adjustment of the relief valve (Section 4).
7. Install the 3/8" H x 1/4" NPT hose barb on the street tee.

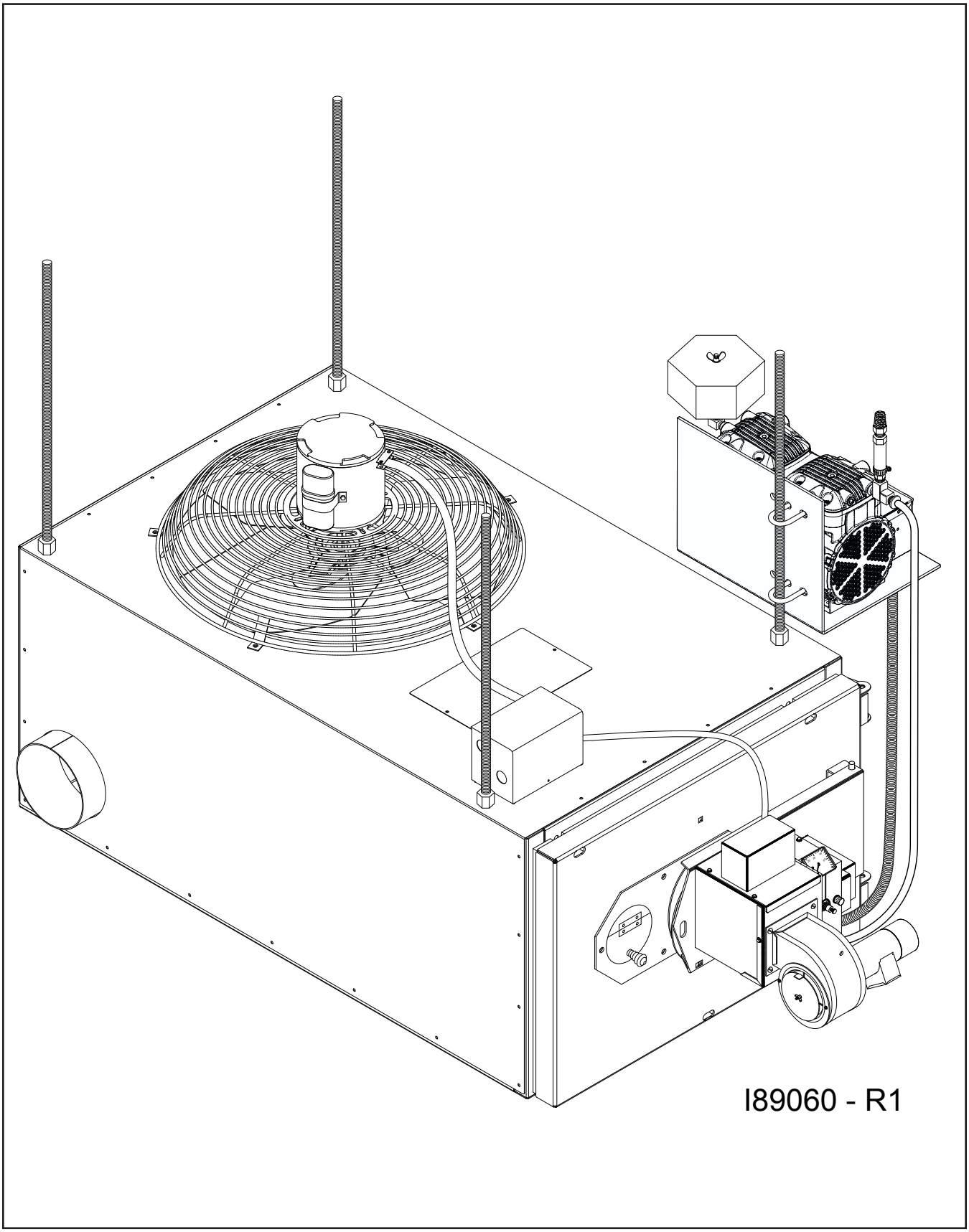


Figure 3B - Air Compressor Installed on the Saturn 140 / Saturn 230

Preparing the Furnace Cabinet *(Furnace Models Saturn 140 / 230)*

1. Refer to Figures 3A and 3B.
2. Install all-thread rods through the mounting holes in the base and top of the furnace cabinet. Use double nuts to securely lock the all-thread rods in position.

Mounting the Air Compressor *(Furnace Models Saturn 140 / 230)*

CAUTION: The compressor must be securely mounted as described in this section. Ensure that all nuts and bolts are firmly tightened.

1. Refer to Figure 3A and 3B.
2. While facing the burner side of the furnace, install the air compressor on the front right all-thread rod using the two U-bolts and nuts provided. Position the mounting bracket approximately two inches above the top of the furnace cabinet.

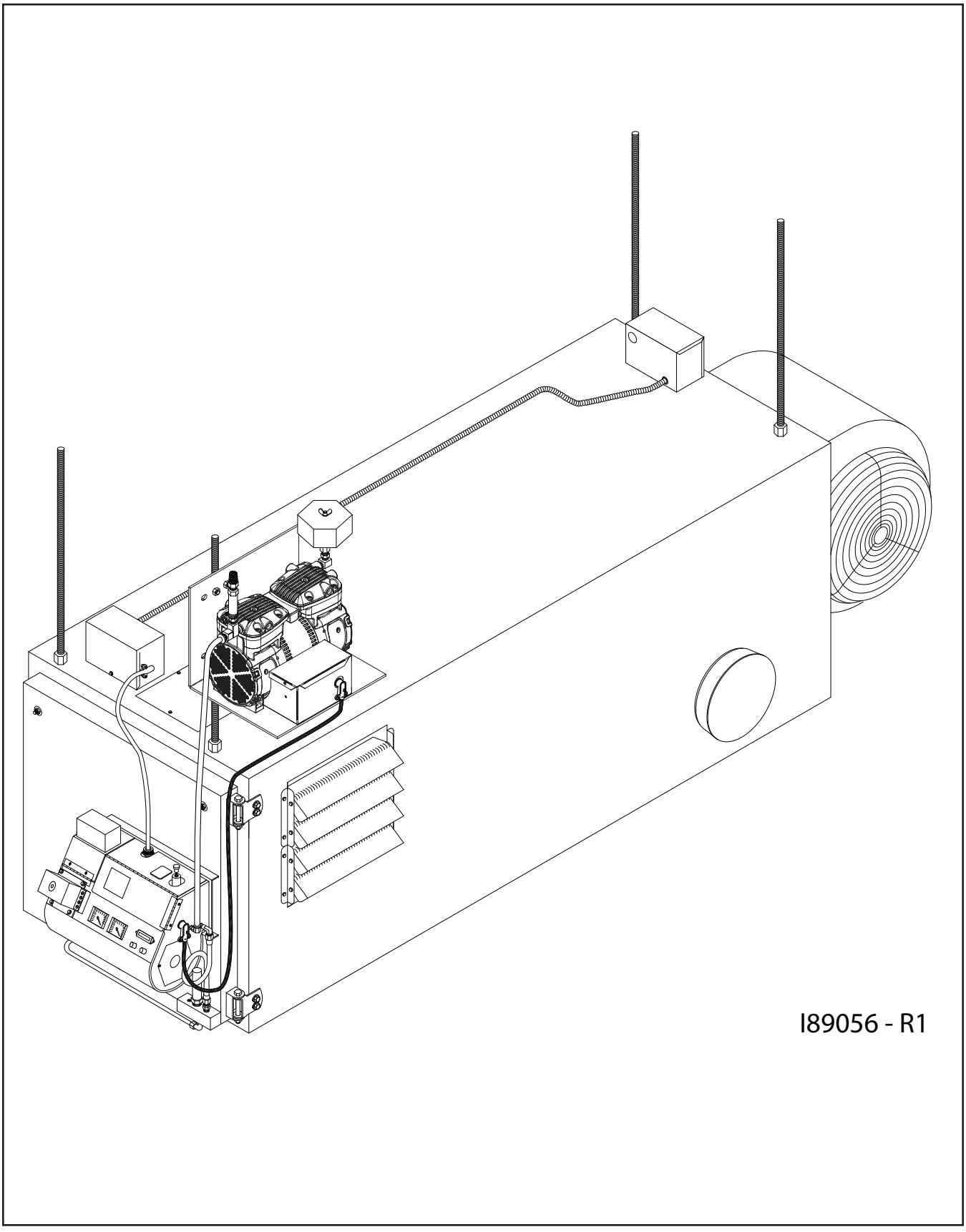


Figure 3C - Air Compressor Installed on the CB-1750 / CB-2500 / CB-3250

Preparing the Furnace Cabinet *(Furnace Models CB-1750/2500/3250)*

1. Refer to Figures 3A and 3C.
2. Install all-thread rods in the mounting lugs on top of the furnace cabinet. Use double nuts to securely lock the all-thread rods in position.

Mounting the Air Compressor *(Furnace Models CB-1750/2500/3250)*

CAUTION: The compressor must be securely mounted as described in this section. Ensure that all nuts and bolts are firmly tightened.

1. Refer to Figure 3A and 3C.
2. While facing the burner side of the furnace, install the air compressor on the front right all-thread rod using the two U-bolts and nuts provided. Position the mounting bracket approximately two inches above the top of the furnace cabinet.

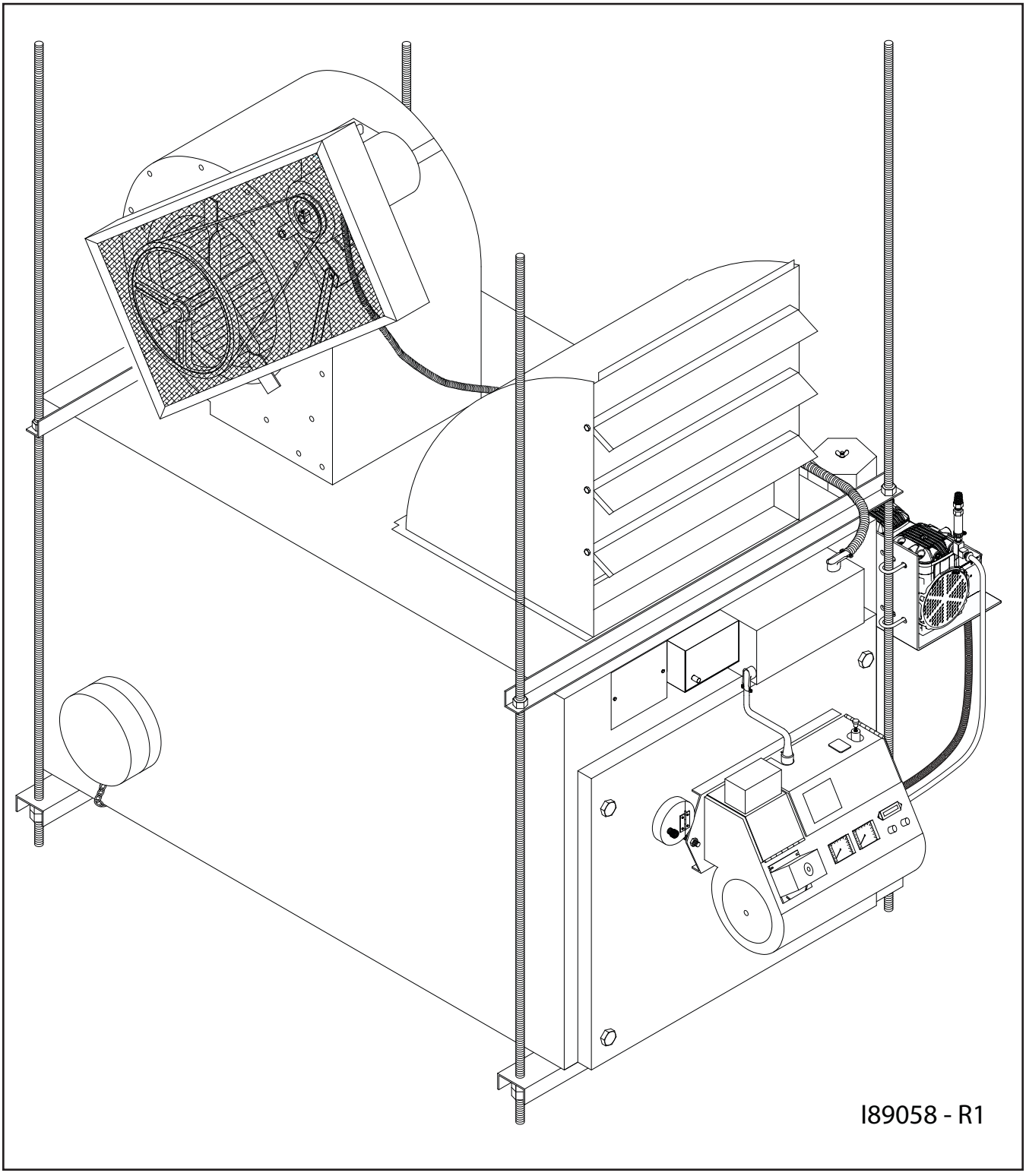


Figure 3D - Air Compressor Installed on the CB-3500 / CB-5000

Preparing the Furnace Cabinet *(Furnace Models CB-3500 and CB-5000)*

1. Refer to Figures 3A/3D and your Furnace Operator's Manual for an overview of furnace assembly *(refer specifically to information on the installation of the mounting/stabilizer brackets and the all-thread rods)*.
2. According to the Furnace Operator's Manual, install the mounting and stabilizer brackets which hold the all-thread rods in place.
3. Install all-thread rods through the channels in the furnace cabinet as described in the Furnace Operator's Manual. Use washers and double nuts to securely lock the all-thread rods in position.

NOTE: The air compressor will be installed on one of the forward all-thread rods as illustrated in Figure 3D.

Mounting the Air Compressor *(Furnace Models CB-3500 and CB-5000)*

CAUTION: The compressor must be securely mounted as described in this section. Ensure that all nuts and bolts are firmly tightened.

1. Refer to Figures 3A and 3D.
2. While facing the burner side of the furnace, install the air compressor on the front right all-thread rod using the two U-bolts and nuts provided. Position the mounting bracket a few inches below the stabilizer bracket as shown in Figure 3D.

Mounting the Air Compressor *(Boiler Models CB-200-CTB / CB-350-CTB / CB-500-CTB)*

CAUTION: The compressor must be securely mounted as described in this section. Ensure that all nuts and bolts are firmly tightened.

1. Refer to the previous illustrations. The air compressor configuration on a boiler is similar to that shown on the furnace illustrations.
2. Install the air compressor on an adjacent wall at least (2) two feet from the boiler (due to temperature requirements).

Preparing the CB-500 Series Burner for use with the Air Compressor

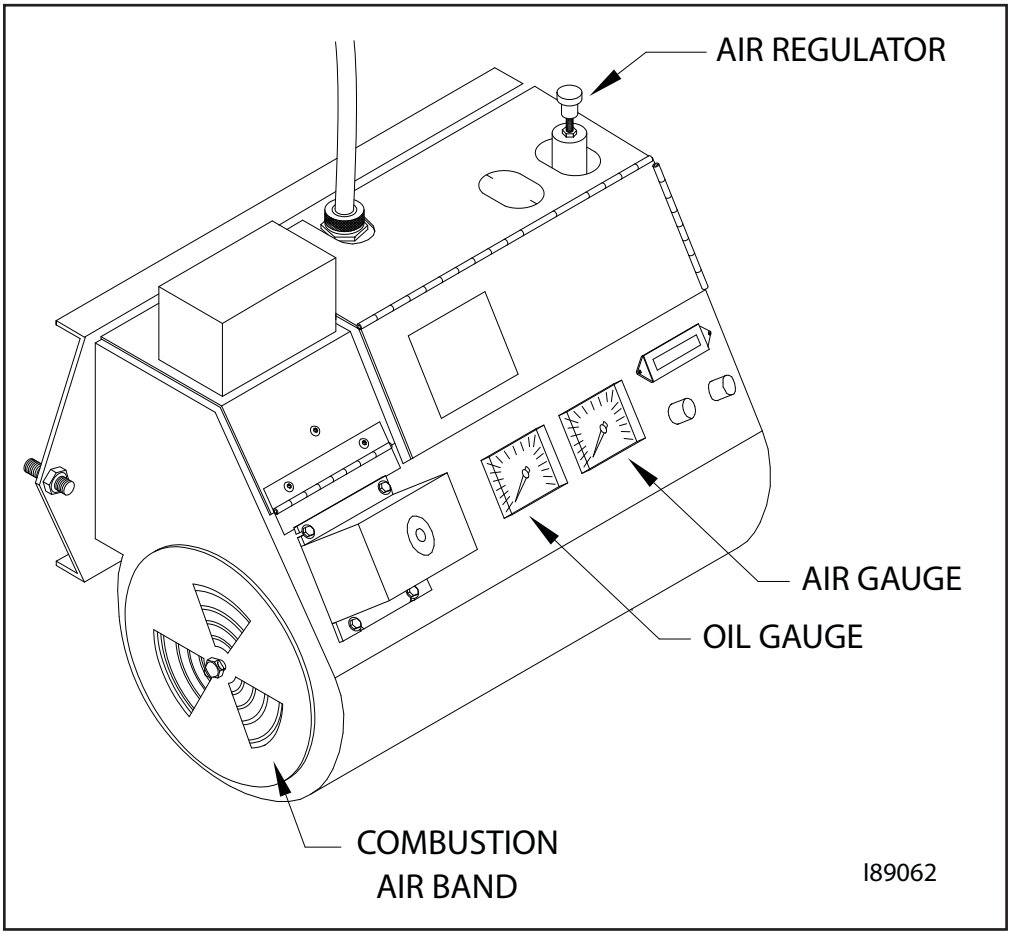


Figure 3E - Component Detail of the CB-500 Series Burner

WARNING: To avoid electrical shock hazards, turn off all power to the furnace, and unplug the burner before proceeding.

1. Figure 3E shows an exterior view of the CB-500 series burner components. In this procedure, you will be removing the air regulator from the preheater block assembly to prepare the CB-500 series burner for use with the air compressor assembly #14336.
2. Remove the self-tapping screw with a 1/4" nut driver and swing open the double-hinged lid to expose the heater block assembly.
3. Refer to Figure 3F. Use a 1/8" Allen wrench to loosen the locking bolt on the locking bar.
4. Remove the locking bar.
5. Use a 5/32" Allen wrench to remove the four (4) bolts and washers holding the surface-mounted air regulator in place, then carefully remove the air regulator.
6. DO NOT allow any debris to fall into the air passageways which have been exposed by the removal of the air regulator.
7. Install the square cap with the o-ring using the four (4) bolts and washers. Tighten the four bolts firmly in a *crisscross pattern* to ensure that there are no leaks.

Preparing the CB-500 Series Burner for use with the Air Compressor (continued)

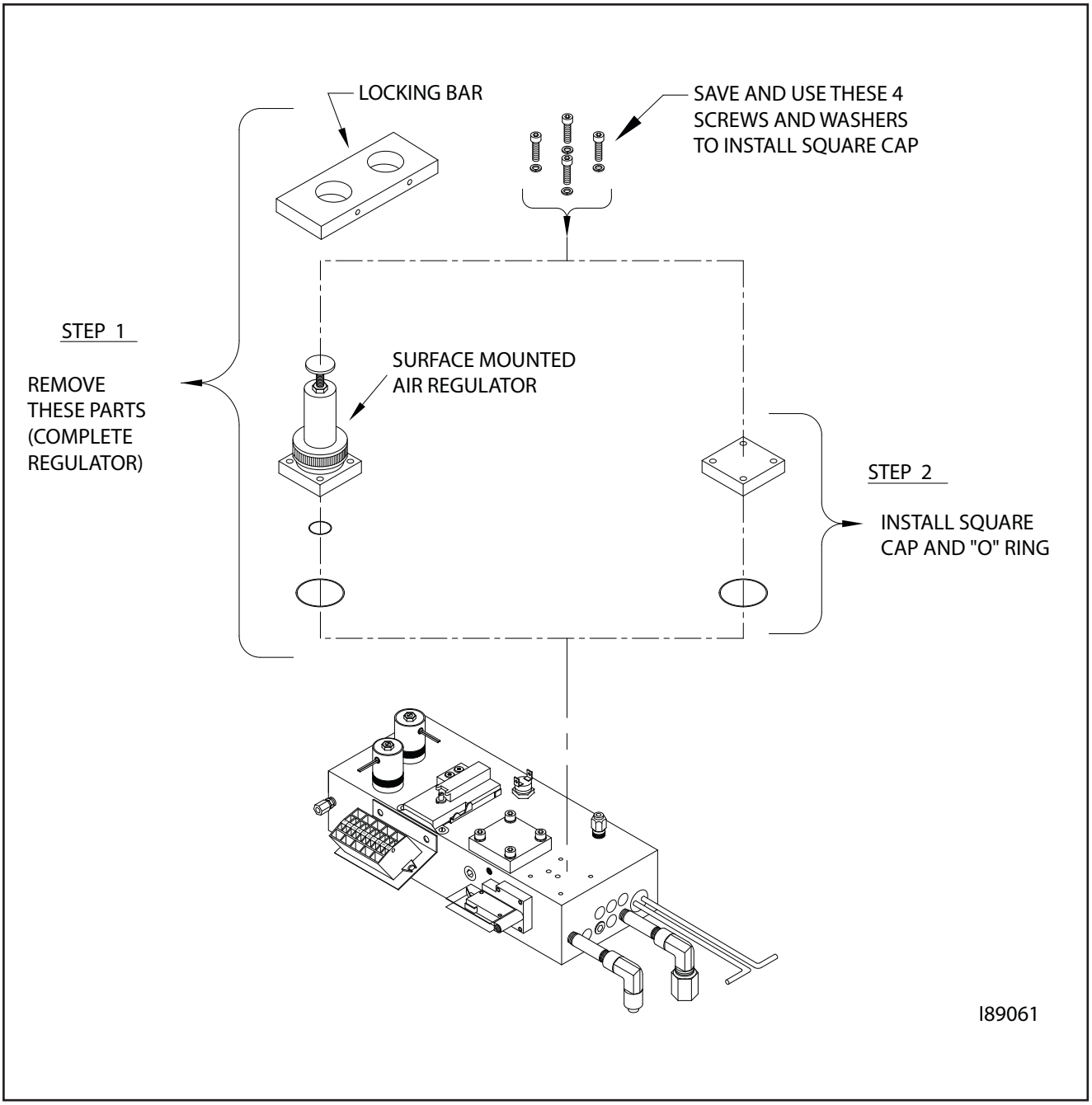


Figure 3F - Removing the Air Regulator from the Heater Block on the CB-500 Series Burner

Connecting the Air Compressor to the CB-500 Series Burner

IMPORTANT: ***Run the 3/8" air hose directly from the air compressor to the burner. Do not use the connector block.***

1. Refer to Figure 3G.
2. Remove the female elbow 1/4" tube push fitting from the air pressure inlet port on the burner.
3. Install the supplied 1/8" elbow on the air pressure inlet port of the burner.
4. Install the 3/8" H x 1/8" NPT hose barb in the elbow on the air pressure inlet port of the burner.
5. Push the hose onto the hose barbs at the air compressor and the burner inlet port.

CAUTION: To prevent possible injury during operation, ensure that the hose is fully inserted over the stems of the hose barbs so that it does not come loose during operation.

Wiring the Air Compressor to the CB-500 Series Burner

CAUTION: The installation of the air compressor will increase the total amperage draw by approximately 3.5 amps. Ensure that your furnace/boiler wiring can safely accommodate this addition.

1. Refer to Figure 3G.
2. Install the electrical power cable into the electrical junction box beside the compressor on the mounting bracket.
3. Connect the wires according to the label on the electrical box lid and the illustration in Appendix A of this manual.
4. Connect the electrical cable to the 7/8" electrical access on the side of the burner.
5. Connect the wires at the terminal strip in the burner box according to the burner wiring schematic provided in Appendix A of this manual.

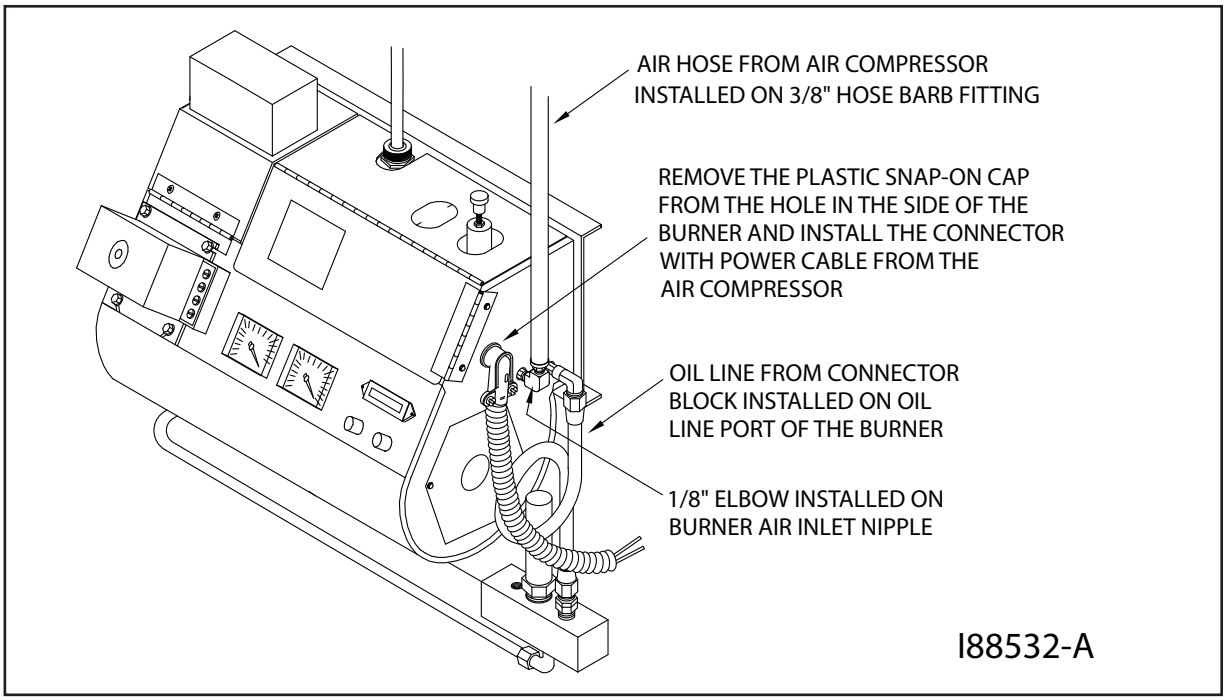


Figure 3G - Connecting the Air Compressor Hose and Electrical Cable to the Burner

Preparing the Saturn Burner for use with the Air Compressor

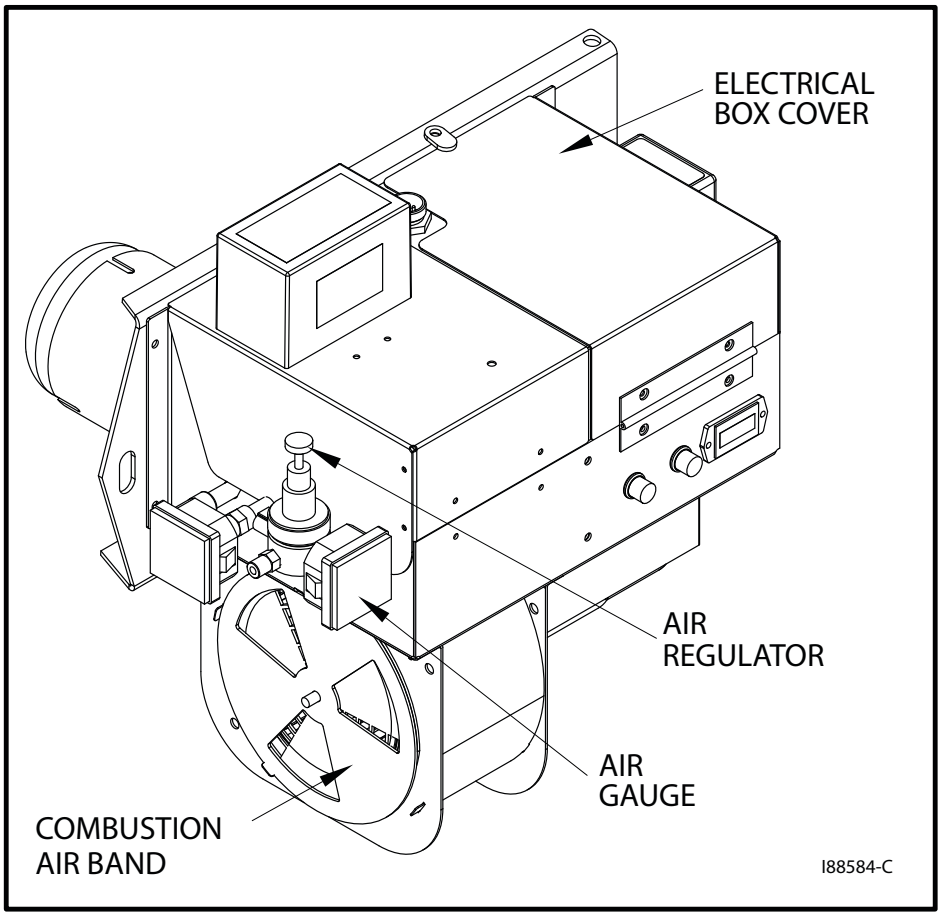


Figure 3H - Component Detail of the Saturn Burner

WARNING: To avoid electrical shock hazards, turn off all power to the furnace, and unplug the burner before proceeding.

1. Figure 3H shows an exterior view of the Saturn burner components. In this procedure, you will be removing the internal air regulator components to prepare the Saturn burner for use with the air compressor assembly #14336.
2. Remove the self-tapping screws with a 1/4" nut driver and open the electrical box cover to expose the air regulator assembly.
3. Refer to Figure 3I. Loosen the 3/4" nut on the air regulator bonnet and slide the air regulator assembly out of the electrical box.
4. Unscrew the air regulator bonnet from the body.
5. Use a 1/2" nut driver to remove the brass poppet seat and o-ring from the air regulator body. Also remove the poppet valve and poppet spring.
6. Reinstall the bonnet on the regulator body with the diaphram in place to make an air tight seal.
7. Reinstall the air regulator assembly and electrical box cover.

ITEM #	PART#	DESCRIPTION
1	32221	POPPET SPRING
2	32222	POPPET VALVE
3	32223	POPPET O-RING
4	32305	BRASS SEAT
5	32225	DIAPHRAM
6	32226	DIAPHRAM RING
7	33308	BONNET
8	34145	3/4" PANEL NUT
9	32202	1/4T PUSH X 1/8 NPT FEM ELBOW

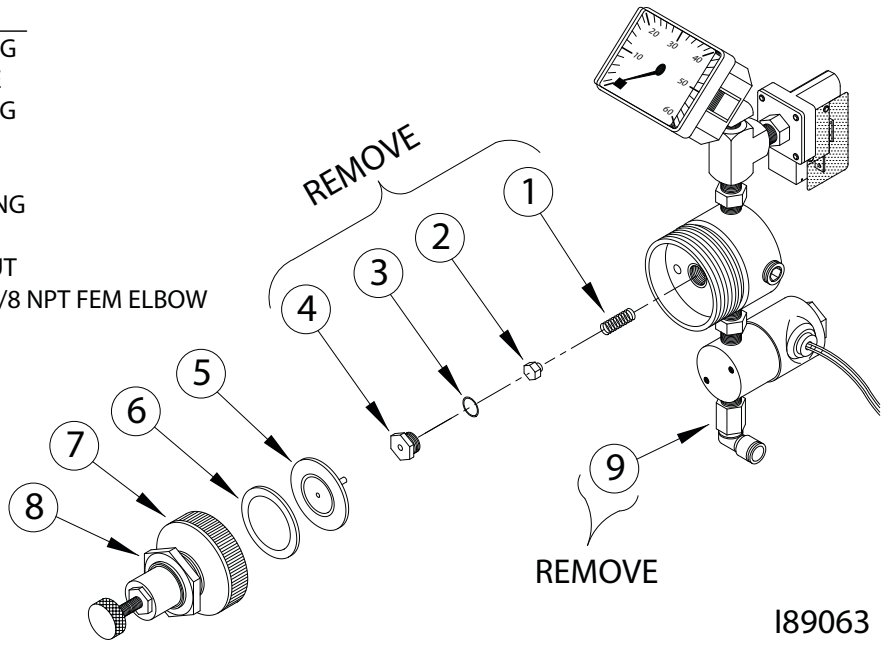


Figure 3I - Removing the Air Regulator Components on the Saturn Burner

Connecting the Air Compressor to the Saturn Burner

IMPORTANT: ***Run the 3/8" air hose directly from the air compressor to the burner. Do not use the connector block.***

1. Refer to Figure 3I.
2. Remove the female elbow 1/4" tube push fitting from the air pressure inlet port on the burner.
3. Install the supplied 1/8" elbow on the air pressure inlet port of the burner.
4. Install the 3/8" H x 1/8" NPT hose barb in the elbow on the air pressure inlet port of the burner.
5. Push the hose onto the hose barbs at the air compressor and the burner inlet port.

CAUTION: To prevent possible injury during operation, ensure that the hose is fully inserted over the stems of the hose barbs so that it does not come loose during operation.

Wiring the Air Compressor to the Saturn Burner

CAUTION: The installation of the air compressor will increase the total amperage draw by approximately 3.5 amps. Ensure that your furnace/boiler wiring can safely accommodate this addition.

1. Install the electrical power cable into the electrical junction box beside the compressor on the mounting bracket.
2. Connect the wires according to the label on the electrical box lid and the illustration in Appendix A of this manual.
3. Connect the electrical cable to the 7/8" electrical access hole on the bottom side of the Saturn burner.
4. Connect the wires at the terminal strip in the burner box according to the burner wiring schematic provided in Appendix A of this manual.

SECTION 4: OPERATING & MAINTAINING THE AIR COMPRESSOR

Adjusting the Air Compressor During Operation

It is very important to adjust the pressure relief on the air compressor to provide the burner with the precise air pressure (12 to 18 psi) required for proper burner operation. Excess air pressure is bled off through the pressure relief.

ATTENTION: DO NOT run the air compressor with the air regulator installed (see section 3 - Preparing the Burner For Operation With the Air Compressor). This may cause the compressor to overheat and severely damage the teflon rings and teflon skirt in the air compressor, resulting in poor air pressure output from the compressor.

1. Refer to your heating equipment's **Operator's Manual, Section 6 "Burner Start Up and Adjustment".** Note the proper air pressure setting. (e.g. CB-2500 furnace requires an air pressure setting of 12 - 18 psi.)
2. Follow the directions in Section 6 of your heating equipment's Operator's Manual to start the burner.
3. Loosen the locking nut and slowly back out the adjustment on the pressure relief valve on the air compressor to supply proper air pressure to the burner.

   NOTE: The air gauge on the burner may "bounce" slightly when compressed air is being supplied by a piston air compressor.
4. Firmly tighten the lock-down nut on the pressure relief.
5. Be sure to install the sound dampening assembly over the pressure relief. This will "muffle" the sound of the air pressure escaping through the pressure relief.

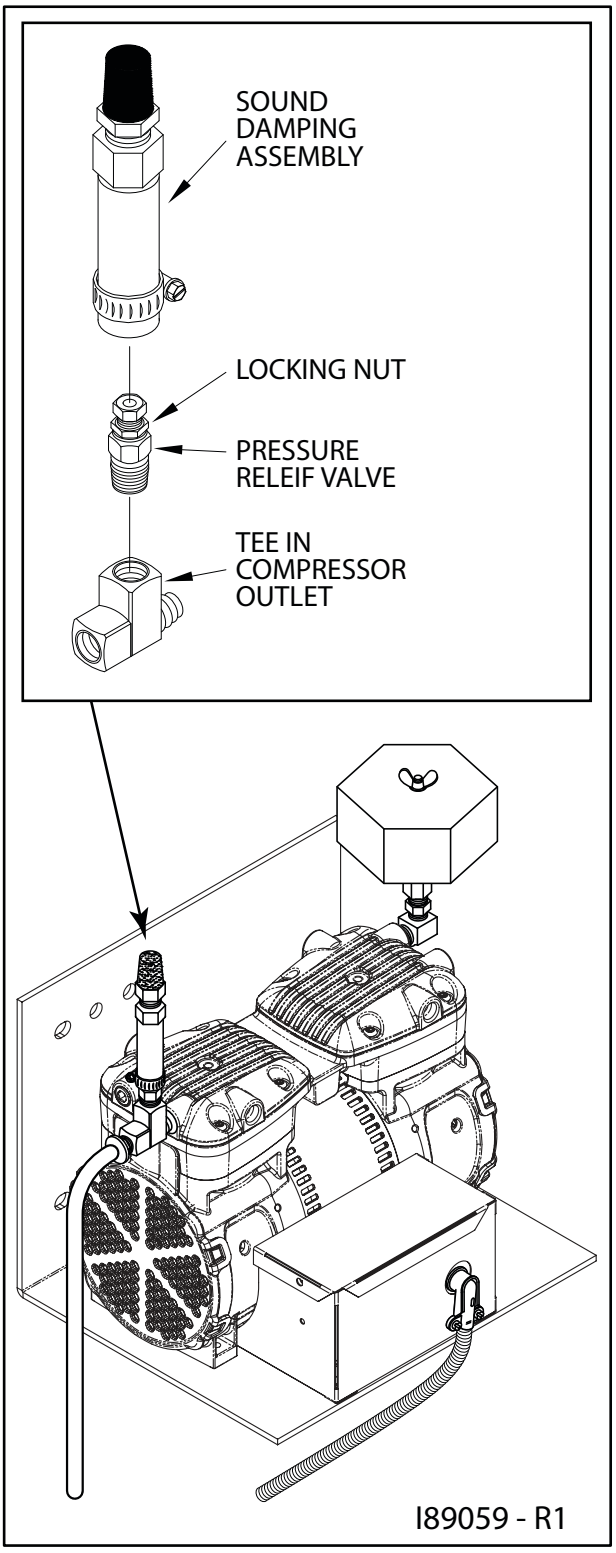


Figure 4A - Pressure Relief Valve Assembly

Maintaining the Air Compressor

ATTENTION: Never introduce oil into the head of the air compressor. Oil will damage the teflon seals of the air compressor and will void your warranty.

1. Clean the air intake filter element at least monthly according to the manufacturer's instructions included with the filter.
2. Replace the air intake filter element annually.
   ATTENTION: DO NOT operate the air compressor with a dirty air intake filter; doing so may seriously damage the air compressor.

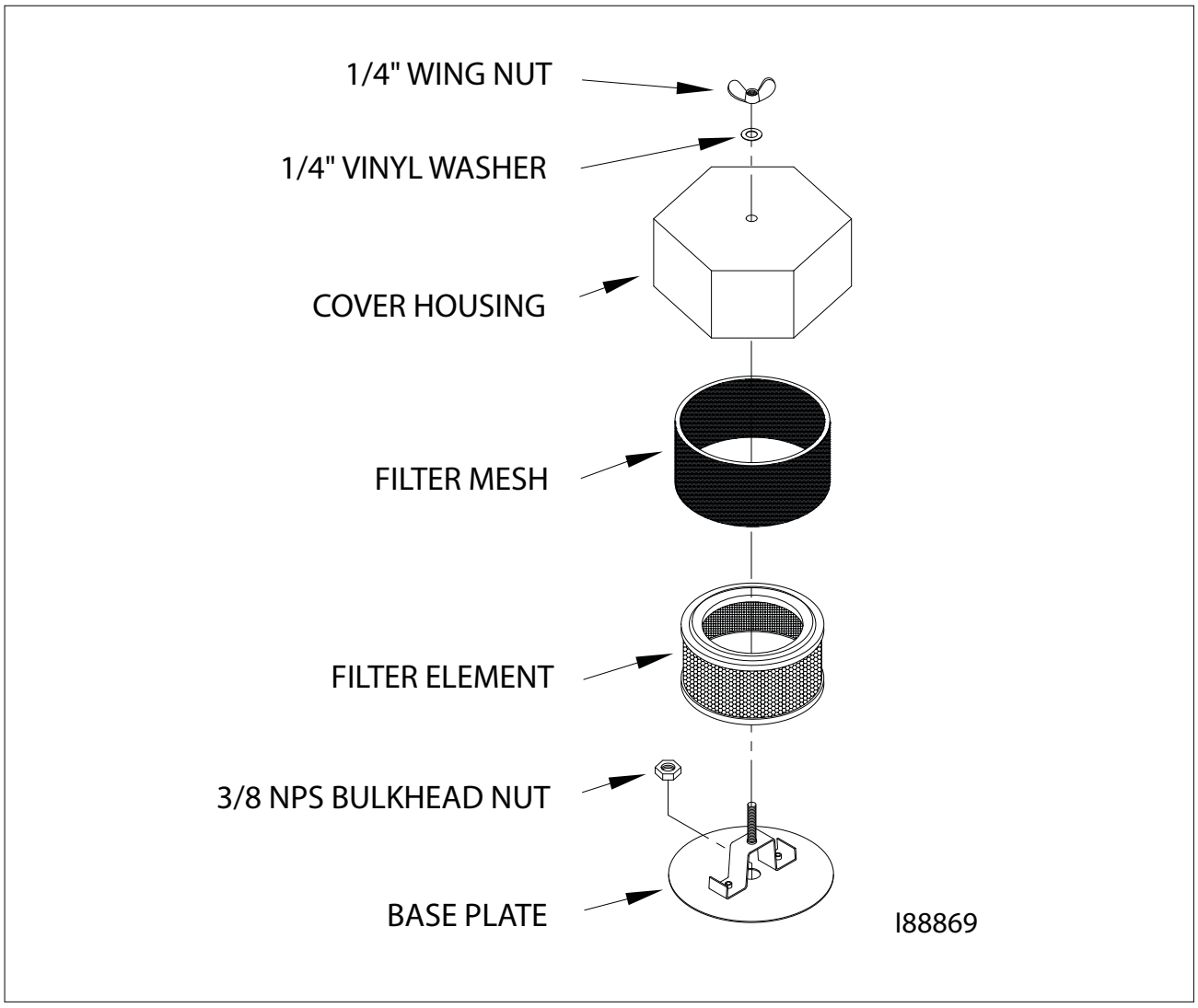


Figure 4B -Air Intake Filter Assembly

APPENDIX A

Technical Reference Materials

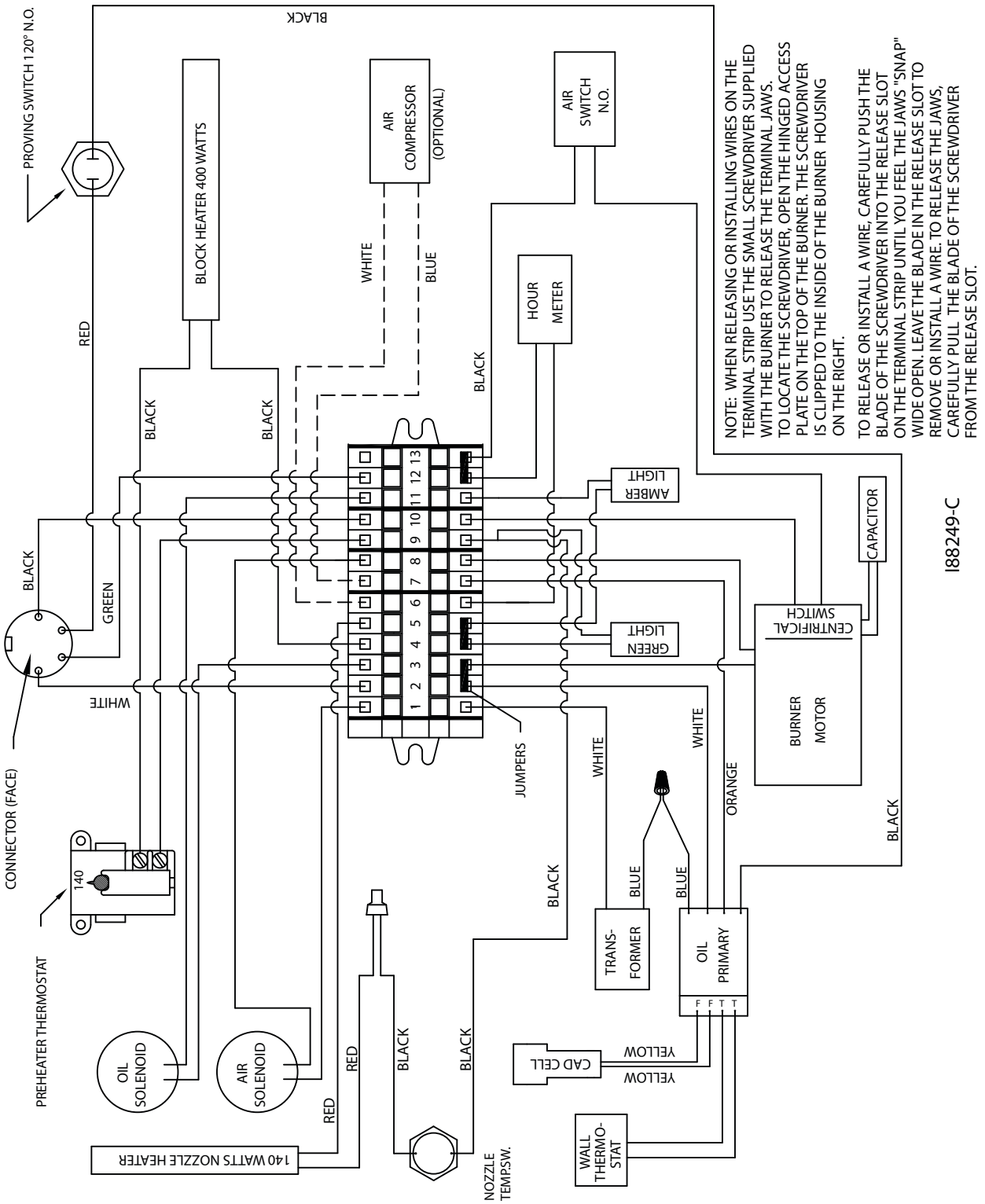


FIGURE A1 - Burner Wiring Schematic (Similar for all CB-500 Series burners)

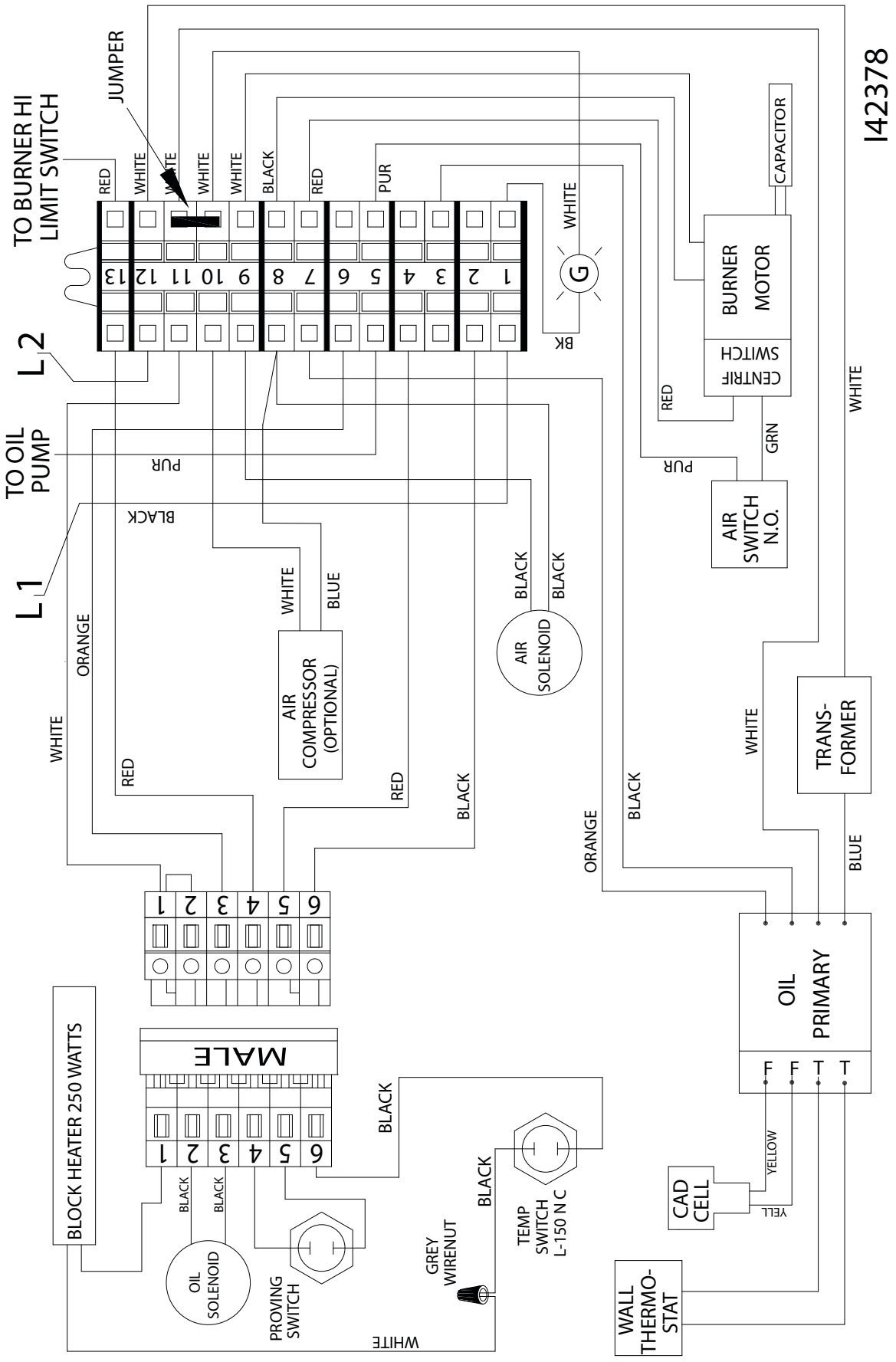


FIGURE A2 - Saturn Burner Wiring Schematic

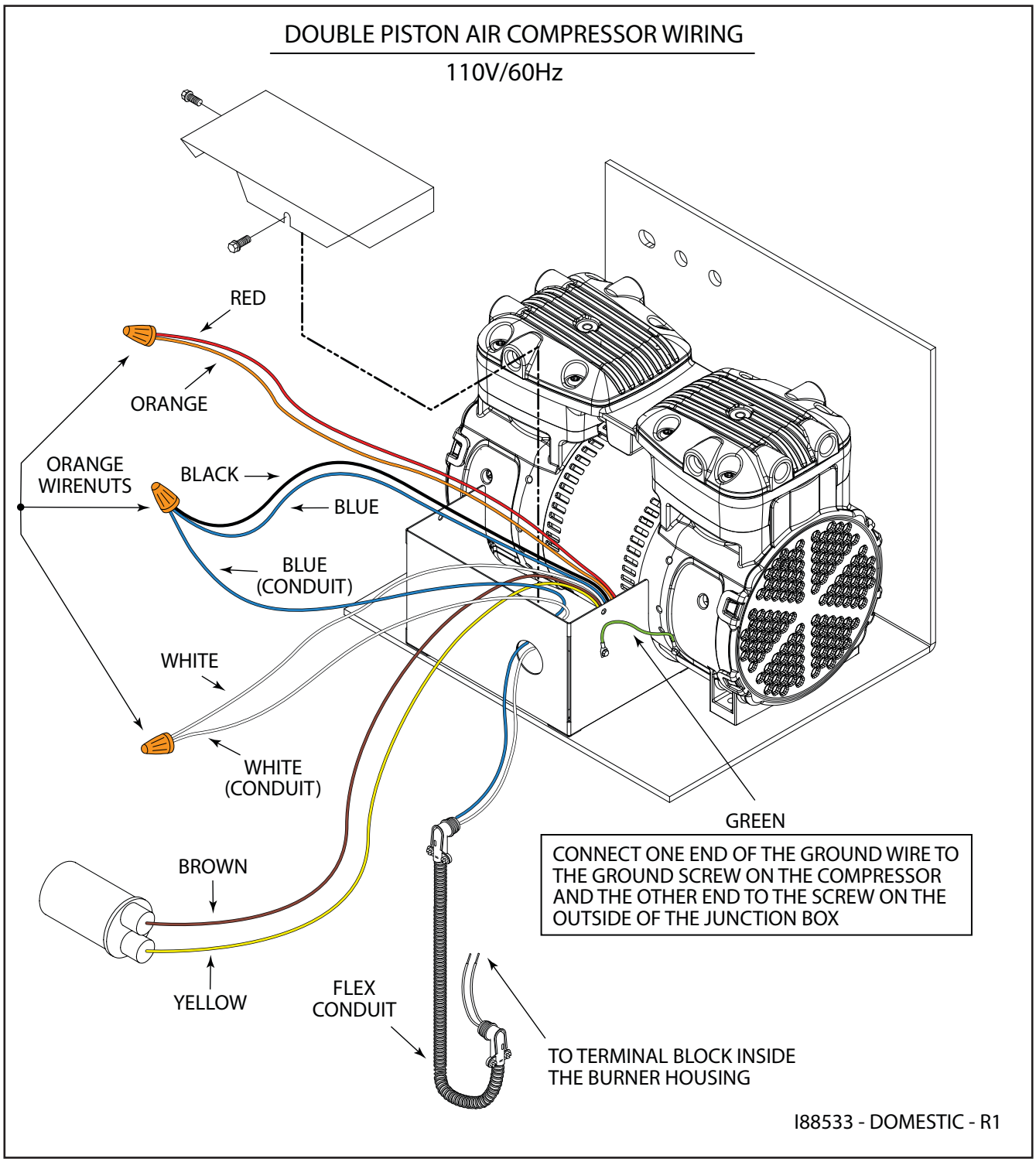


FIGURE A3 - Double-Piston Air Compressor 110V/60Hz Domestic Wiring

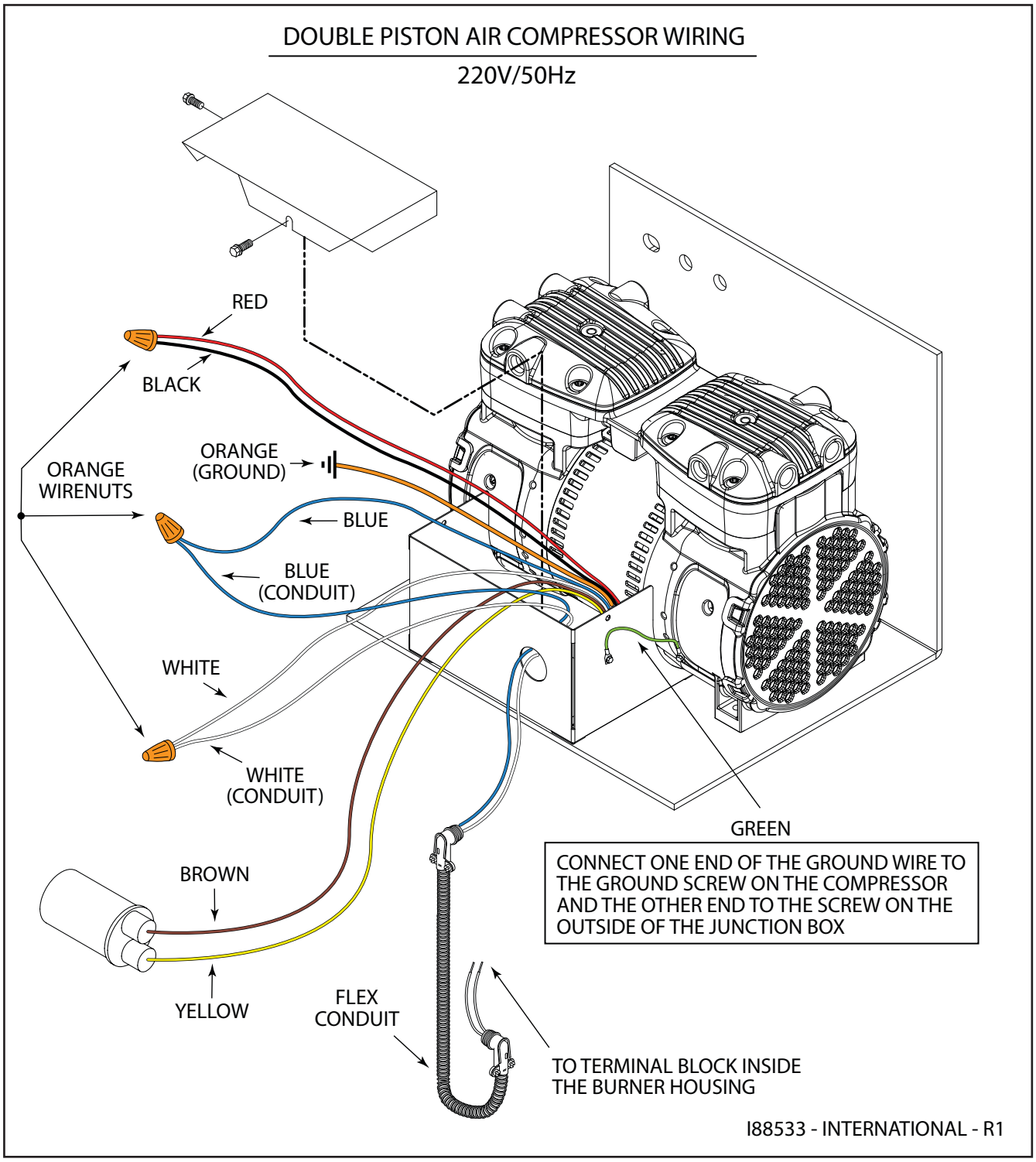


FIGURE A4 - Double-Piston Air Compressor 220V/50Hz International Wiring

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