

Installation, Operation & Maintenance Manual

AMRI Water Heaters

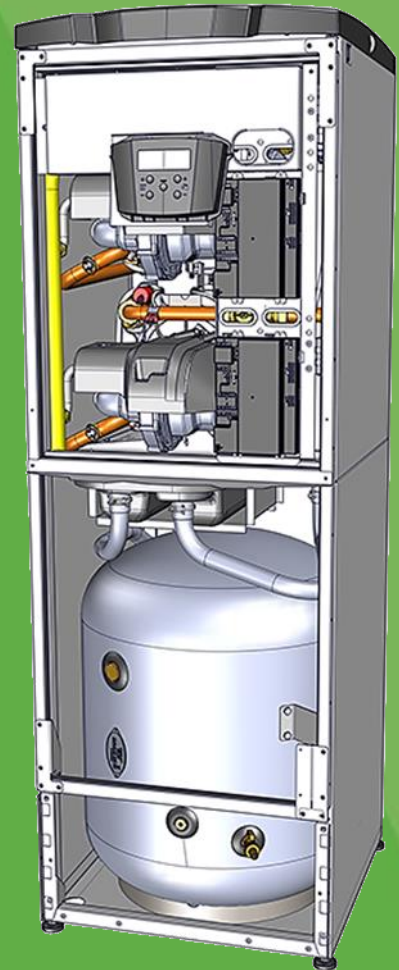
This supplement pertains to the following
AM Series Rapid Recovery – Integrated (AMRI) water
heater models:

- AM 199RI
- AM 250RI
- AM 399RI
- AM 500RI

This document applies only to units with serial number 15270000 and
above.

Supplement to User Manual:

- OMM-0100 GF-146



Disclaimer

The information contained in this manual is subject to change without notice from AERCO International, Inc. AERCO makes no warranty of any kind with respect to this material, including, but not limited to, implied warranties of merchantability and fitness for a particular application. AERCO International is not liable for errors appearing in this manual, not for incidental or consequential damages occurring in connection with the furnishing, performance, or use of these materials

Heating and Hot Water Solutions

AERCO International, Inc. • 100 Oritani Drive • Blauvelt, NY 10913
USA: T: (845) 580-8000 • Toll Free: (800) 526-0288 • AERCO.com
Technical Support • (800) 526-0288 • Mon-Fri, 8 am - 5 pm EST

© 2019 AERCO

TABLE OF CONTENTS

FOREWORD	5
CHAPTER 1: GENERAL INFORMATION	6
1.1 WARNINGS & CAUTIONS	6
1.2 EMERGENCY SHUTDOWN	9
CHAPTER 2: FUNCTIONAL OVERVIEW	10
2.1 INTRODUCTION	10
2.2 INTENDED USE AND FUNCTIONS	11
2.3 AMRI INTEGRATED SERIES FUNCTIONAL SCHEMATICS	11
2.3.1 AM 199RI / 250RI Functional Schematic	11
2.3.2 AM 399RI / 500RI Functional Schematic	12
CHAPTER 3: INSTALLATION – SITE	13
3.1 CHOOSING THE INSTALLATION LOCATION	13
3.2 WATER HEATER INSTALLATION LOCATION FACTORS	14
3.3 SAFETY CONCERNS	15
3.4 CLOSET AND ALCOVE INSTALLATION	15
3.5 CLEARANCES FOR INSTALLATION AND SERVICING	15
3.6 CLEARANCES TO COMBUSTIBLE MATERIAL	15
3.7 VENT AND COMBUSTION AIR PIPING	16
3.8 PREVENTION OF COMBUSTION AIR CONTAMINATION	16
3.9 TRANSPORTATION REQUIREMENTS	16
3.10 TRANSPORTING THE WATER HEATER	16
3.11 AMRI SUPPLY AND RETURN PIPING DIMENSIONS	18
CHAPTER 4: INSTALLATION - PIPING	19
4.1 AMRI WATER CONNECTIONS	19
4.2 SAFETY RELIEF VALVE	19
4.3 LOW WATER CUTOFF (LWCO)	20
4.4 EXPANSION TANK AND MAKEUP WATER	20
4.5 RECIRCULATOR HEATING PUMP SIZING AND INSTALLATION	21
4.5.1 Recirculator Pump Sizing	21
4.5.2 Recirculation Pump Selection	21
4.5.3 Recirculator Pump Mechanical Installation	22
4.5.4 Recirculator Pump Electrical Connections	22
4.6 DOMESTIC HOT WATER SYSTEM PIPING WITH DIRECT WATER HEATER	23
4.7 SCALDING	24
4.8 CONDENSATE DISPOSAL	26
CHAPTER 5: INSTALLATION – ELECTRICAL	28
5.1 ELECTRICAL CONNECTIONS	28
5.1.1 Power Supply Cable Connection	28
5.1.2 Connecting Units in Cascade	29
Figure 5-4: Cascading AM Units Electrical Connections	29
5.1.3 0-10 VDC Input Connections – 500RI Model (Option for 500RI)	30
5.1.4 MODBUS Interface Connections – 500RI Model Only	31

CHAPTER 6: INSTALLATION – VENTING AND COMBUSTION AIR PIPING.....	32
CHAPTER 7: INSTALLATION – NATURAL GAS	33
CHAPTER 8: UNIT START-UP	34
CHAPTER 9: OPERATION.....	35
CHAPTER 10: MAINTENANCE.....	36
10.1 ACCESSING BOILER INTERIOR	36
10.2 BURNER AND OTHER MAINTENANCE	36
10.3 MAINTENANCE SPECIFIC TO AMRI WATER HEATERS.....	36
10.3.1 Components and Piping Maintenance	36
10.3.2 Buffer Tank Anode Rods	36
CHAPTER 11: TECHNICAL DATA	38
CHAPTER 12: SPARE PARTS DRAWINGS & LISTS	39
12.1 AMRI SPARE PARTS DRAWINGS.....	39
12.2 199RI/250RI SPARE PARTS LIST.....	42
APPENDIX A: CONTROL PANEL OPERATION CHART	50
APPENDIX B: FACTORY MENU	51
STANDARD WARRANTY.....	52
STANDARD WARRANTY.....	53

FOREWORD

This supplement provides information regarding the AM Series Rapid Recovery (AMRI) water heaters with integrated buffer tank. For information concerning skid mounted units featuring a selection of exterior mounted buffer tanks and descaling systems, Refer to the main AM Series User Manual, OMM-0100 (GF-146).

NOTE: In this supplement, Chapters 1 through 5 may be used without having to reference the main manual, **OMM-0100 (GF-146)**. However, the installer and user will be referred to the main manual for venting, combustion air, and gas installation, as well as operation, maintenance, and appendices. Technical specifications and parts information specific to the AMRI integrated units are at the end of this supplement.

The Advanced Modular Integrated Rapid Recovery water heaters from AERCO provide a complete water heating solution in one convenient package. With integrated thermal buffer, pump, and required piping, the integrated AMRI series is the easiest solution for domestic water heating from 199 to 500 MBTUs. All of the great features of the AM Series remain, from the built-in redundancy to the small footprint. The AMRI units are ready for fast installation to get your domestic water heating plant up and running quickly. Multiple units can be located with near-zero side clearance for even larger installations.

The AMR Series also includes skid mounted units with selectable exterior mounted tanks. For information concerning skid mounted units see the main AM Series manual, OMM-0100 (GF146).

The AMRI ships ready to be piped into a domestic water heating system to provide hot water immediately. A mixing valve can be supplied as an accessory for a complete water heating solution. The AMRI is great for new construction to save space as well as for replacement of existing equipment; all sizes fit through a standard doorway. As with all AERCO boilers and water heaters, high efficiency and low emissions are hallmark features to provide the best performance for your system.

Features:

- High Efficiency Condensing
- Natural Gas or Propane
- Superior Turndown
- Complete heating plant in one package
- Direct or Conventional Vent with PVC, CPVC, Polypropylene, or AL29-4C materials
- Concentric Vent Capability
- Common Vent Capability
- Side wall common venting with no additional check valve
- Small, Doorway-Size Footprint
- Unparalleled reliability
- Minimal Maintenance
- Low NOx <20ppm
- Easy Front Access for Serviceability
- Zero Side Clearance
- Supports Integration to BAS System
- Modbus Communication Standard

CHAPTER 1: GENERAL INFORMATION

1.1 Warnings & Cautions

In addition to all the requirements included in this AERCO Instruction Manual, the installation of units MUST conform with local building codes, or, in the absence of local codes, ANSI Z223.1 (National Fuel Gas Code Publication No. NFPA-54) for gas-fired boilers and ANSI/NFPA-58 for LP gas-fired boilers. Where applicable, the equipment shall be installed in accordance with the current Installation Code for Gas Burning Appliances and Equipment, CSA B149.1, and applicable Provincial regulations for the class; which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

IMPORTANT!

This Instruction Manual is an integral part of the product and must be maintained in legible condition. It must be given to the user by the installer and kept in a safe place for future reference.

WARNING!

Failure to comply with provisions, warnings, and cautions provided in this manual can lead to extensive property damage and/or personal injury or death.

In the event of a breakdown and/or malfunction of the water heater, turn off the unit and do not make any attempt to repair it. The water heater must be serviced exclusively by a Qualified installer using original spare parts. Failure to comply with this requirement may compromise the safety of the unit.

WARNING!

Installer: Read all instructions including this manual, before installing. Perform steps in the order given.

User: The installation and maintenance sections of this manual are for use only by a qualified heating installer. Refer to Chapter 9: Operation for user information.

Installation and Alterations: Only a Qualified installer must carry out the installation and calibration of the water heater. Never modify the water heater or its components in any way.

Overheating: Should overheating occur or the gas supply fail; to shut off, do not turn off or disconnect electrical supply to circulator. Instead, turn off the manual gas shut-off valve external to the appliance.

Water Contamination: Do not use this appliance if any part has been under water. Immediately call a licensed authorized technician to inspect the appliance and to replace any part of the control system and any gas control, which has been under water.

Ensure the water heater and its controls are protected from dripping or spraying water during normal operation or service.

Spare Parts: Only use the water heater with the accessories and spares listed in this manual. Failure to do so can cause equipment damage or dangerous conditions.

NOTE: When calling or writing about the water heater, have the unit model and serial number as seen on the unit rating plate.

CAUTION!

Do not use petroleum-based cleaning or sealing compounds in the water heater system. Gaskets and seals in the system may be damaged. This can result in substantial property damage.

The manufacturer declines all liability, contractual or otherwise (warranty included), for any damage to people, animals property or this same appliance, caused by:

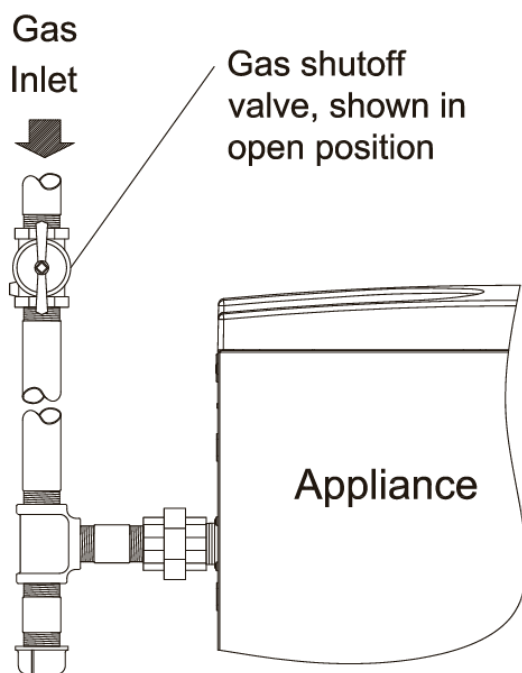
- Incorrect installation or failure to comply with this or any other instruction provided by the manufacturer
- Failure to comply with the applicable local and/or national regulations in force
- Incorrect use of this appliance
- Inadequate or incorrect service
- Inadequate or incorrect maintenance

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
 - If you cannot reach your gas supplier, call the fire department.
 - B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
 - If you cannot reach your gas supplier, call the fire department.
 - C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
 - D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch;
 - Do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

OPERATING INSTRUCTIONS



1. STOP! Read the safety information above (to the left) on this label.
2. Turn off all electric power to the appliance.
3. Set the main switch to **OFF**.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Close the manual gas shutoff valve turning the knob clockwise . Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step.
7. Open the manual gas shutoff valve turning the knob counterclockwise .
8. Turn on all electric power to the appliance, and set the main switch to the on position.
9. Set an heating request following the installation manual.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Set the main switch to **OFF**.
3. Close the manual gas shutoff valve turning the knob clockwise . Do not force.

62408200

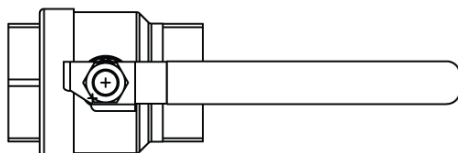
1.2 Emergency Shutdown

If overheating occurs or the gas supply fails to shut off, close the manual gas shutoff valve (Figure 1-1) located external to the unit.

--NOTE--

The Installer must identify and indicate the location of the emergency shutdown manual gas valve to operating personnel.

VALVE OPEN



VALVE CLOSED

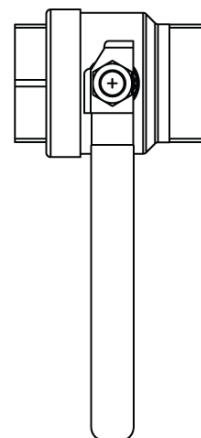


Figure 1-1: Manual Gas Shutoff Valve

IMPORTANT – FOR MASSACHUSETTS INSTALLATIONS

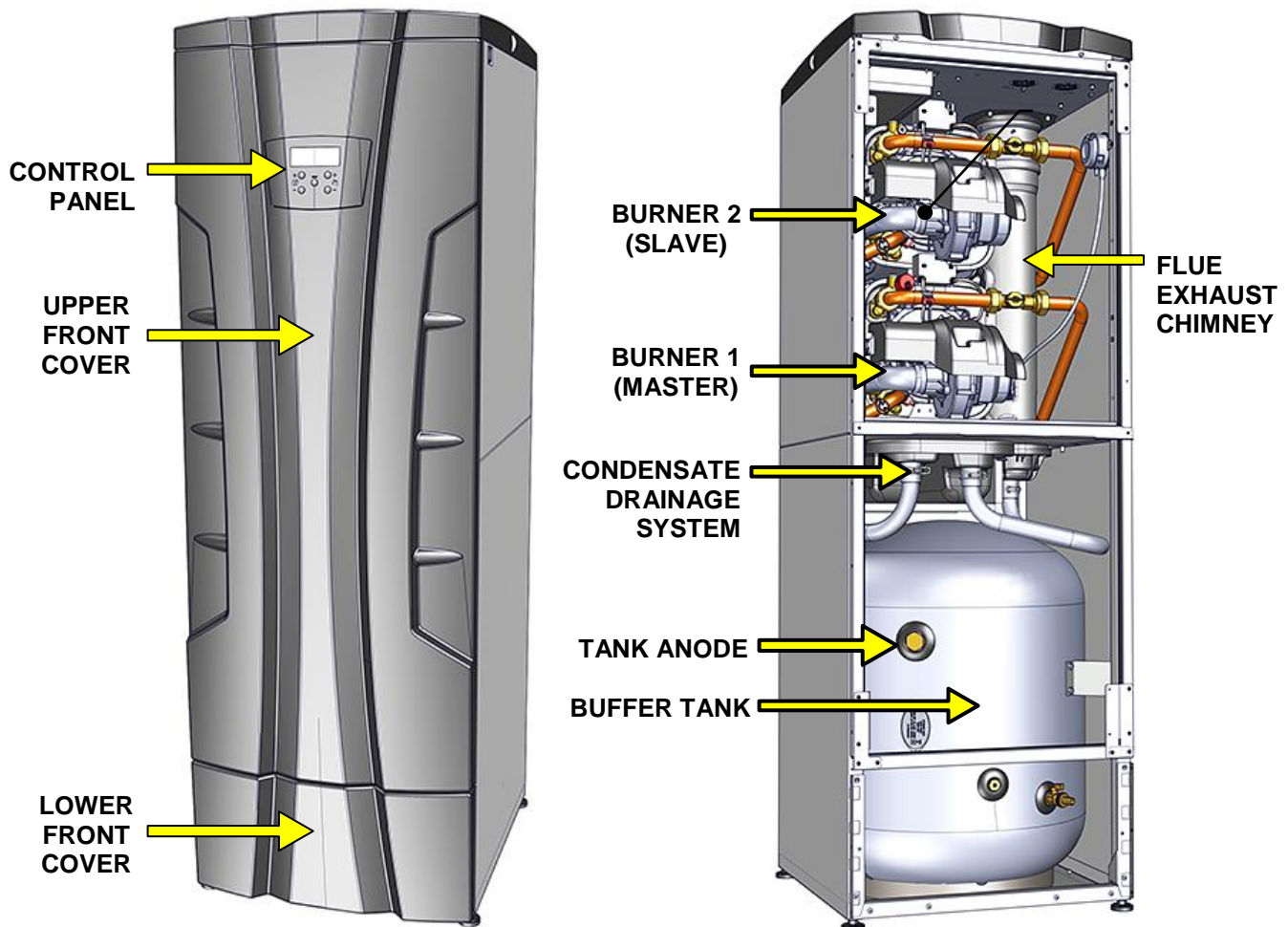
Water heater Installations within the Commonwealth of Massachusetts must conform to the following requirements:

- Water heater must be installed by a plumber or a gas fitter who is licensed within the Commonwealth of Massachusetts.
- Prior to unit operation, the complete gas train and all connections must be leak tested using a non-corrosive soap.
- The vent termination must be located a minimum of 4 feet above grade level. If side-wall venting is used, the installation must conform to the requirements in **248 CMR 5.08 (2)**.
- Must be installed according to all local codes.

CHAPTER 2: FUNCTIONAL OVERVIEW

2.1 INTRODUCTION

Figure 2-1 shows the exterior appearance of the AMRI (left), and with covers/panels open showing the interior features (right). The AMRI Series comes in four functionally sized models; the 199RI and 250RI, which feature one burner and an integrated tank, and the 399RI, and 500RI, which feature two burners and an integrated tank. The AM 399RI/500RI are shown in Figure 2-1.



**Figure 2-1: AMRI Integrated water Heater
with Front Covers (Left) and Without Covers and Open Panel (Right)
(AM 399RI / 500RI Shown)**

2.2 Intended Use and Functions

The AMRI Integrated water heater is designed to warm domestic water (potable) for civil uses. Any other use is prohibited. The water heater can be installed with a Direct Venting system or with a one pipe vent system and getting combustion air from room.

The quality of the system water is very important. Poor water quality can damage the water heater due to scale formation and corrosion.

The heater must be connected to a domestic hot water supply with compatible specifications, performance and power rating.

Functional diagrams for all models are shown in the following section.

2.3 AMRI Integrated Series Functional Schematics

2.3.1 AM 199RI / 250RI Functional Schematic

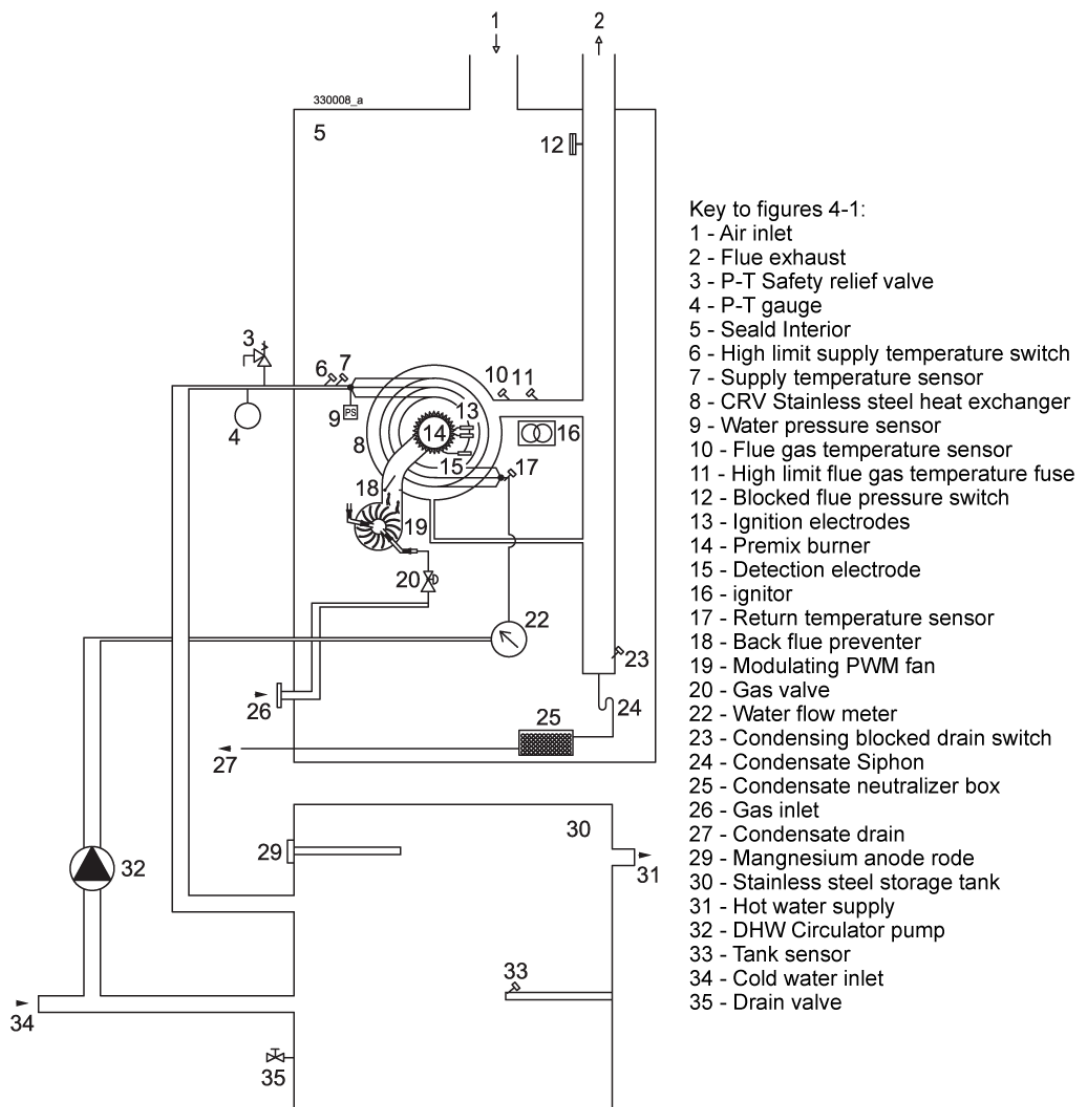


Figure 2-2: AM 199RI / 250RI Functional Schematic

2.3.2 AM 399RI / 500RI Functional Schematic

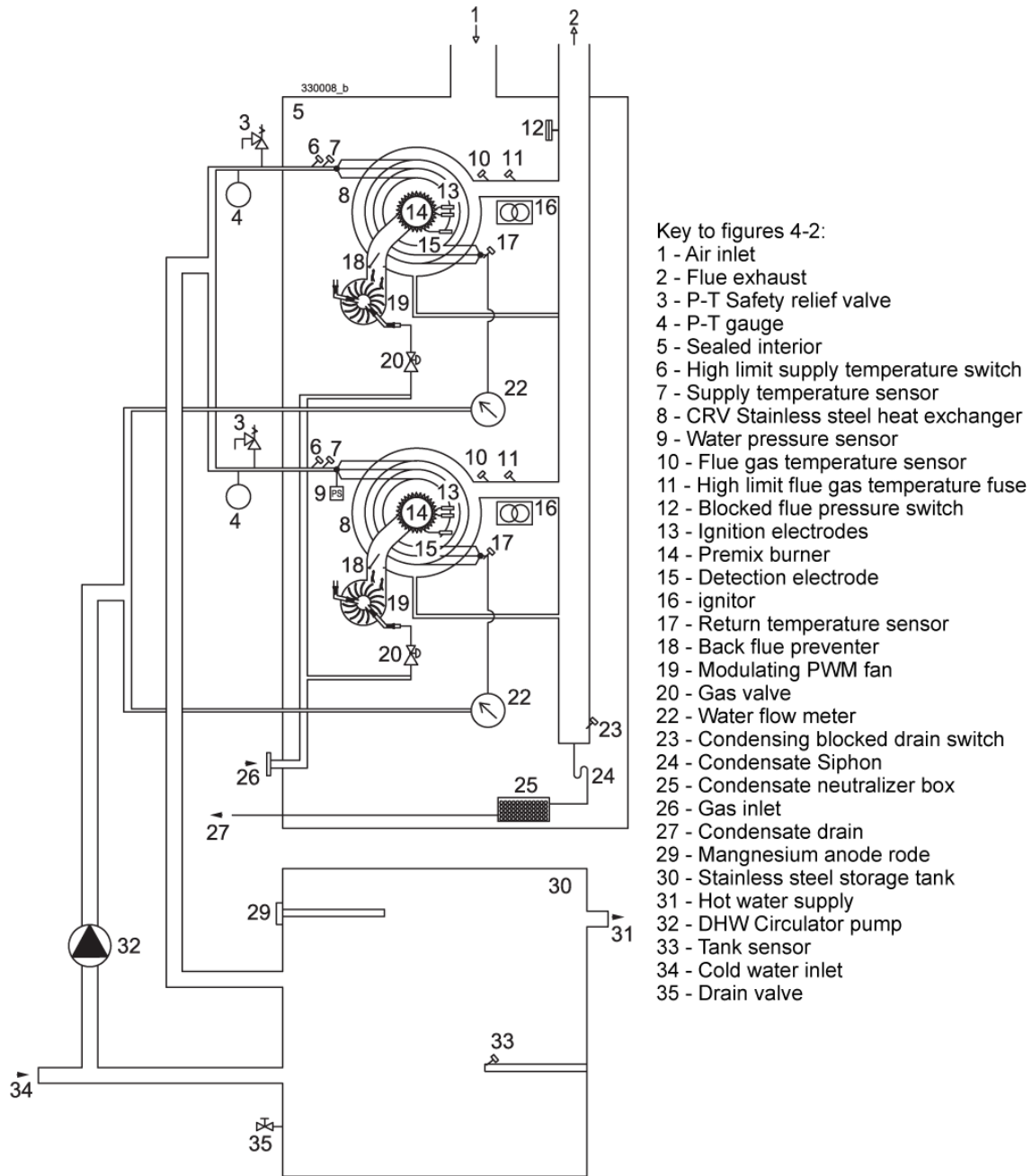


Figure 2-3: AM 399RI / 500RI Functional Schematic

CHAPTER 3: INSTALLATION – SITE

3.1 Choosing the Installation Location

This section describes the general installation considerations for the AM Series units.

WARNING!

Provisions for combustion air and ventilation of the water heater room are always required, regardless whether the combustion air is taken from the outside (Direct Vent, sealed combustion) or inside (room air for combustion). Insufficient ventilation of the water heater room can lead to high air temperatures. Make sure that intake and exhaust openings are sufficiently sized and no reduction or closure of openings takes place. If these are not provided, do not operate the water heater.

WARNING!

LIQUEFIED PETROLEUM (L.P.) PROPANE GAS-FIRED WATER HEATER LOCATION REQUIRES SPECIAL ATTENTION: 1994 UNIFORM MECHANICAL CODE, section 304.6: “LPG Appliances. Liquefied petroleum gas-burning appliances shall not be installed in a pit, basement or similar location where heavier-than-air-gas might collect. Appliances so fueled shall not be installed in an above grade under-floor space or basement unless such location is provided with an approved means for removal of unburned gas.”

This appliance is not designed for direct outdoor installation. If installed outside of the structure, it must be sheltered so it is protected from rain, wind, sun and frost. NEVER place this appliance in a location that would subject it to temperatures at or near freezing or temperature that exceed 100°F (38°C). Failure to properly locate this unit can result in premature failure.

The unit must NOT be installed on carpeting.

This appliance must be installed in a location so that any water leaking from the unit or piping connections or relief valve openings will not cause damage to the area surrounding the unit or any lower floors in the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the water heater. The pan must not restrict combustion air flow.

When installed in a room with thin flooring, resonating noises may occur. Install noise reducing parts if required.

Do not allow excessive dust to collect on the appliance.

WARNING!

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

WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in the building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot contact your gas supplier, call the fire department.

3.2 Water Heater Installation Location Factors

When locating the water heater, the following factors must be considered:

- location of vent/air intakes;
- connection to the gas supply;
- connection to the water supply;
- connection to the heating system;
- connection to the electrical supply;
- disposal of the condensation produced by the water heater;
- connection to the room thermostat, building automation system, or equivalent device;
- piping of the safety relief valve discharge;
- connection of the outdoor temperature sensor;
- possible connection of an indirect water heater;
- If flooding is possible, elevate the water heater sufficiently to prevent water from reaching the unit;
- The location of vent/air intakes;
- connection to the gas supply;
- connection to the water supply;
- connection to the electrical supply;
- disposal of the condensation produced by the water heater;
- piping of the safety relief valve discharge;
- connection of a storage tank;
- If flooding is possible, elevate the water heater sufficiently to prevent water from reaching the unit;

3.3 Safety Concerns

WARNING!

Do not store any flammable materials or liquids in the immediate vicinity of the water heater.

3.4 Closet and Alcove Installation

AM water heaters are not approved for installation in a closet or in an alcove site.

3.5 Clearances for Installation and Servicing

Figure 3-1 shows the minimum clearances required for installation and servicing.

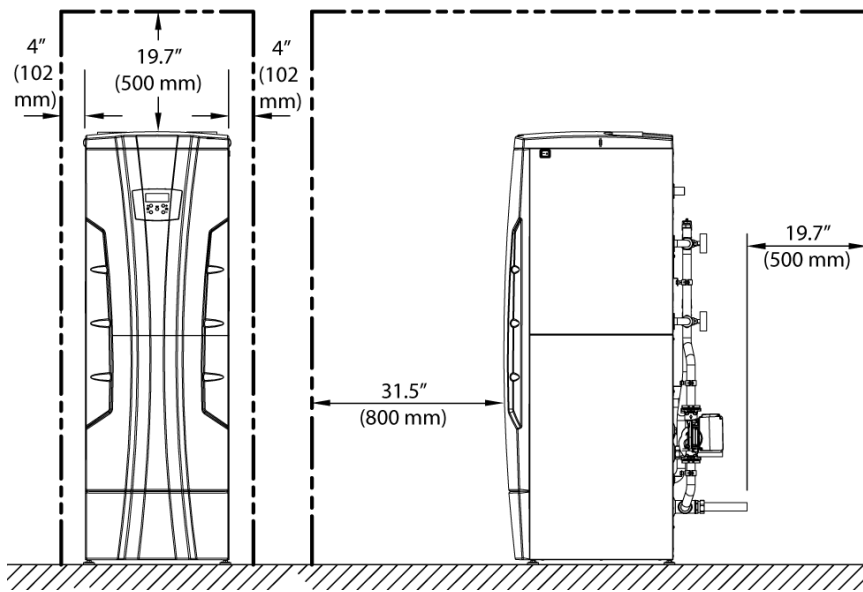


Figure 3-1: AMRI Recommended Minimum Service Clearances

--NOTE--

Service clearances are minimum required clearances for ease of access, but larger service clearances are always preferred.

3.6 Clearances to Combustible Material

This unit may be installed directly onto a floor of combustible material with the following clearances:

Table 3-1: Unit Installation Clearance Dimensions	
COMPONENT	CLEARANCE DISTANCE
Ceiling	2 inches (51 mm)
Front	2 inches (51 mm)
Rear	2 inches (51 mm)
Sides	2 inches (51 mm)
Floor	0 inches (0 mm)
Concentric vent	0 inches (0 mm)
Split vent (two pipes) first 3 feet from the water heater	1 inch (25 mm)
Split vent (two pipes) after 3 feet from the water heater	0 inches (0 mm)
Water heater piping	¼ inch (7 mm)

3.7 Vent and Combustion Air Piping

This water heater requires a special vent system, designed for pressurized venting.

The water heater is to be configured for either direct vent installation or for installation using room combustion air. When room combustion air is considered, see Chapter 6 of the AM Series User Manual, **OMM-0100 (GF-146)**.

Vent and air may be vented vertically through the roof or out a side wall, unless otherwise specified. You may use any of the vent/air piping methods covered in Chapter 6 of the AM Series User Manual, **OMM-0100 (GF-146)**.

Be sure to locate the unit such that the vent and air piping can be routed through the building and properly terminated.

The vent/air piping lengths, routing and termination method must all comply with the methods and limits given in Chapter 6 of the AM Series User Manual, **OMM-0100 (GF-146)**.

3.8 Prevention of Combustion Air Contamination

Install air inlet piping for the appliance as described in Chapter 6 of the AM Series User Manual, **OMM-0100 (GF-146)**. Do not terminate vent/air in locations that can allow contamination of combustion air.

WARNING!

Ensure that the combustion air will not contain any contaminants. Contaminated combustion air will damage the unit, resulting in possible personal injury, death or substantial property damage.

3.9 Transportation Requirements

- Only transport the unit using the correct transportation equipment, such as a hand truck with a fastening belt or special equipment for maneuvering steps.
- During transportation, the unit must be secured on the transportation equipment to prevent it from falling off.
- Protect all parts against impacts during transport.
- Observe the transportation markings on the packaging.
- Leave the protective covers on the connections until ready to install.
- During transportation, cover the flue gas and air intake connections at the top of the unit with plastic or other material to avoid contamination.

WARNING!

When transporting an AMRI water heater that has been in previous operation, ensure that the integrated buffer tank is either drained or that the extra weight of the filled tank is properly accounted for when selecting the appropriate transportation equipment.

3.10 Transporting the Water Heater

After removing the shipping carton from the unit, it may be moved as described in next section.

Transport the water heater to its installation location as follows.

Transporting the Water Heater

1. Remove the lower and upper covers "A" at front of the AM unit by pulling them off.
2. Remove the six screws (B) to remove cover plate (C) to access and remove the two screws (D) from the floor of the unit fastening the unit front to the pallet. Replace all covers.

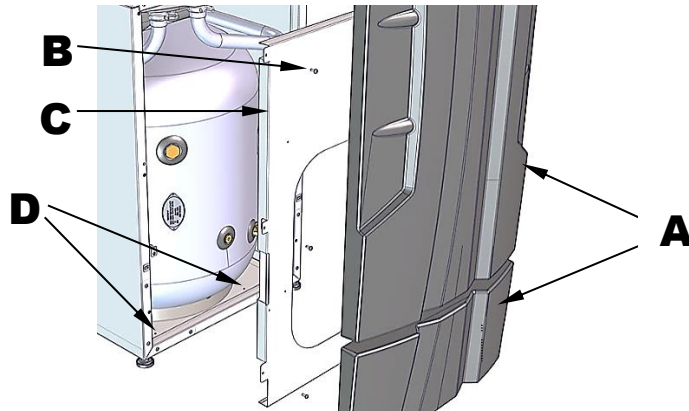


Figure 3-2: Removing the Front from Wood Pallet

3. Remove two screws (E) from the shipping brackets to remove unit from pallet rear.

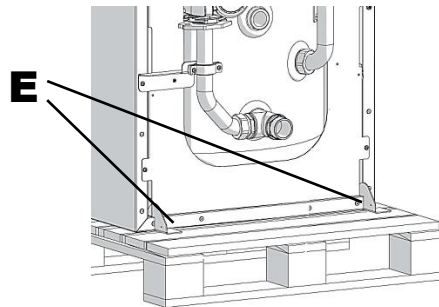


Figure 3-3: Removing the Rear from Wood Pallet

4. Install the two factory supplied eyebolts "F" on the upper side of the unit and attach chains or straps to lifting ring/hook "G".

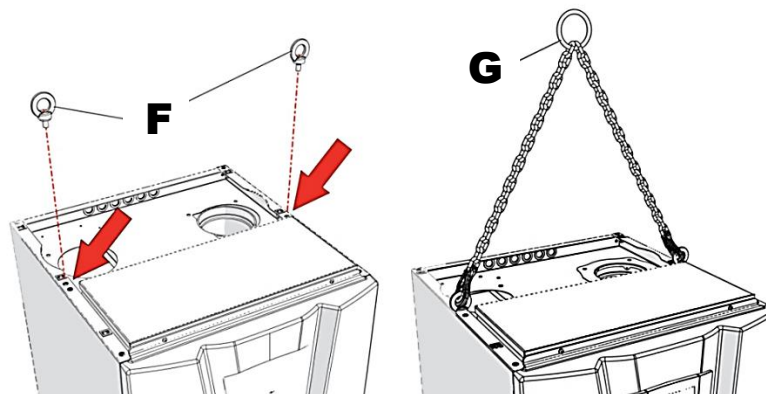


Figure 3-4: Removing the Unit from Wood Pallet (Lifting)

Transporting the Water Heater - Continued

5. Install the leveling feet, and then plumb the unit and adjust feet appropriately per Figure 3-5.

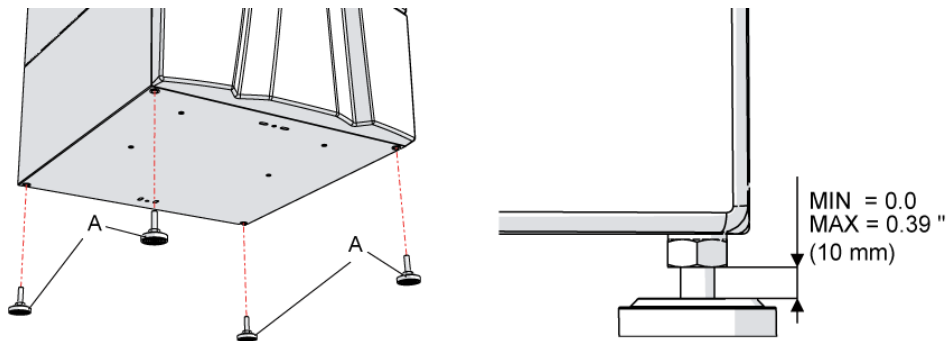
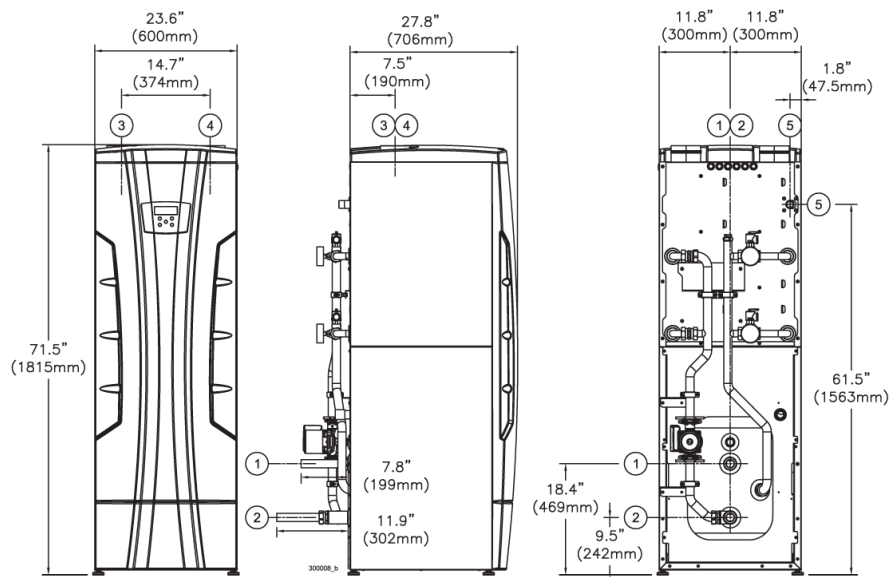


Figure 3-5: Installing the Unit Feet

3.11 AMRI Supply and Return Piping Dimensions

Standard connections and dimensions for AMRI Series units are shown in Figure 3-6.



ITEM	CONNECTION/ITEM	SIZE
①	Water Supply Connection	1-1/4"
②	Water Return Connection	1-1/4"
③	Air Intake Connection	<ul style="list-style-type: none"> • Models 199 / 250 = 3" • Models 399 / 500 = 4"
④	Flue Exhaust Connection	<ul style="list-style-type: none"> • Models 199 / 250 = 3" • Models 399 / 500 = 4"
⑤	Gas Connection	1"
⑥	Condensate Hose	-

Figure 3-6: AMRI - Installation Connection Dimensions

CHAPTER 4: INSTALLATION - PIPING

4.1 AMRI Water Connections

The AMRI units come with water connections as shown in Figures 3-5 and 4-1.

Water heater system piping **MUST** be sized considering the pressure drops of the water heater (see figure 4-2), piping and storage tank.

Reducing the pipe size can restrict the flow rate through the water heater, causing poor system performance. Basic steps are listed below along with illustrations on Figures 4-5 and 4-7, which will guide you through the installation of the water heater piping.

- Connect the cold water supply to the Cold Water Inlet of the water heater (Figure 4-1).
- Connect the hot water supply to the Hot Water Outlet of the water heater (Figure 4-1).
- Install a backflow preventer (field supplied) on the cold feed make-up water line.
- Install a field supplied expansion tank on the cold water inlet. Consult the tank manufacturer's instruction for specific information relating to tank installation. Size the expansion tank for the required system volume and capacity.
- Install a drain valve at the lowest point of the system.
- **Water heater isolation valves:** Field supplied. Install isolation valves as shown in Figures 4-5 and 4-7. Full port ball valves are required. Failure to use full port ball valves could result in a restricted flow rate through the water heater.
- **Anti-scald mixing valve:** Field supplied. Install an anti-scald mixing valve as shown on Figures 4-5 and 4-7. An Anti-scald mixing valve is recommended when storing domestic hot water above 115°F. An anti-scald mixing valve **MUST** always be installed on an AMR system.
- **Unions:** Field supplied. Install Unions as shown on Figures 4-5 and 4-7, recommended for unit serviceability.
- **Tank sensor:** Factory supplied on water heater. The tank sensor **MUST** be installed in the lower 1/3 of the storage tank to achieve proper operation.
- **Pump:** The recirculation pump used in the loop on the rear of the unit should be sized and installed according to Section 4.3.
- **Filter:** Field supplied. Install a filter or equivalent multipurpose strainer at the cold water inlet connection of the water heater to remove system particles from older hydronic systems and protect newer systems.
- **LWCO (Low Water Cut-Off):** Factory Supplied.

Install the heater so the gas ignition system components are protected from water (dripping, spraying, etc.), during appliance operation for basic service of circulator replacement, valves, and others.

4.2 Safety Relief Valve

AMRI units come equipped with a 125 PSI T&P safety relief valves on each factory installed module. If a higher or lower rated PRV is required it must be field supplied and installed.

Pipe the discharge of the safety relief valve(s) (Figure 4-1) to a suitable drain to prevent injury in the event of pressure relief. Each relief valve must have its own discharge piping, be piped to within 18" of the ground, and not be combined with any other piping all the way to the point of discharge into a drain. Provide piping that is the same size as the safety relief valve outlet.

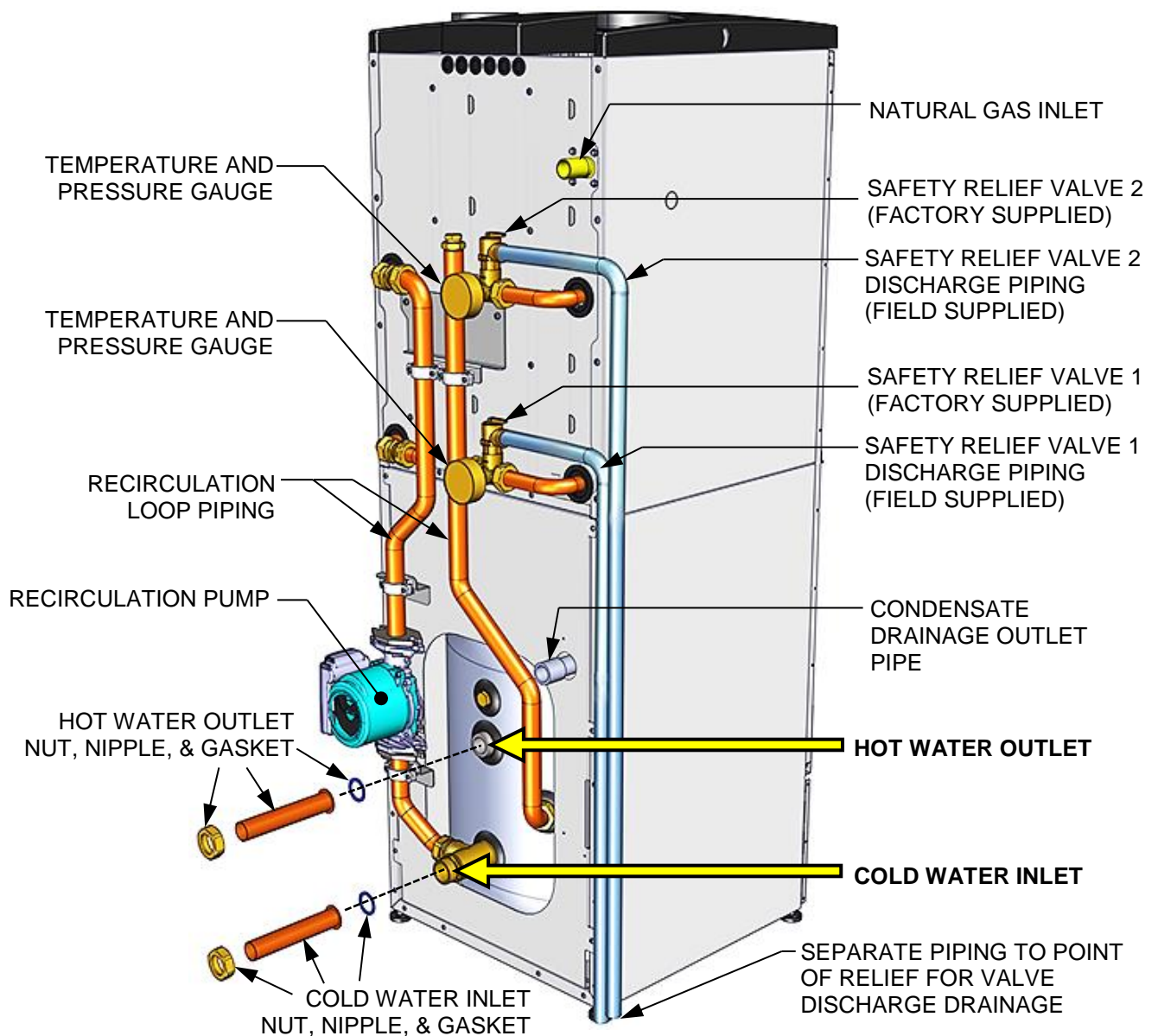


Figure 4-1: Inlets, Outlets, Safety Relief Valves, and Discharge Piping

4.3 Low Water Cutoff (LWCO)

A low water cutoff (LWCO) (Figure 4-2) is factory supplied and must be installed on the outlet piping of the boiler, and before any intervening valves, as shown in Figures 4-5 and 4-7. When installing such a device, you must consult and abide by all local codes and regulations in force.

NOTE: Use Teflon tape or a suitable pipe joint compound for component and piping connections.

4.4 Expansion Tank and Makeup Water

Install an expansion tank. Ensure the expansion tank is properly sized for the boiler volume and the system volume, temperature and pressure. See figures 4-5 and 4-7 for suggested tank location.

CAUTION!

Undersized expansion tanks will cause system water to be lost through the pressure relief valve and cause additional makeup water to be added to the system. Eventual boiler failure can result due to this excessive makeup water addition, compromising the functionality of the unit.

Refer to the expansion tank manufacturer instructions for additional installation details. Connect the expansion tank to an air separator only if the air separator is located on the suction side (inlet) of the system circulator. Always locate and install the system fill connection at the same location as the expansion tank connection to the system

4.5 Recirculator Heating Pump Sizing and Installation

This water heater must be fitted with a circulator pump for domestic potable hot water.

4.5.1 Recirculator Pump Sizing

The water resistance to size the recirculator pump to supply flow through the heating system at the AMR Integral unit’s connections is shown in graph form in Figure 4-2.

It is up to the installer to ensure the minimum system flow is not less than 4 GPM at any time. If the flow is lower, the unit automatically stops the burner.

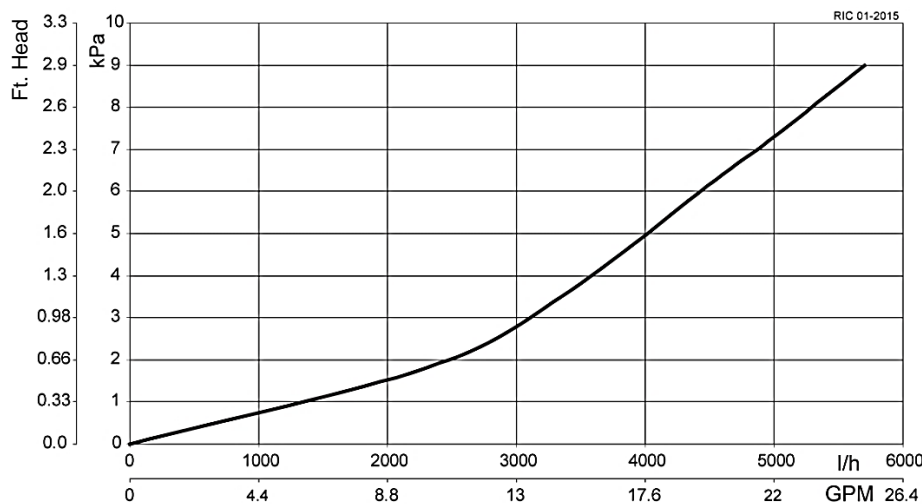


Figure 4-2: AMRI Series Water Side Head Pressure Loss Graph

4.5.2 Recirculation Pump Selection

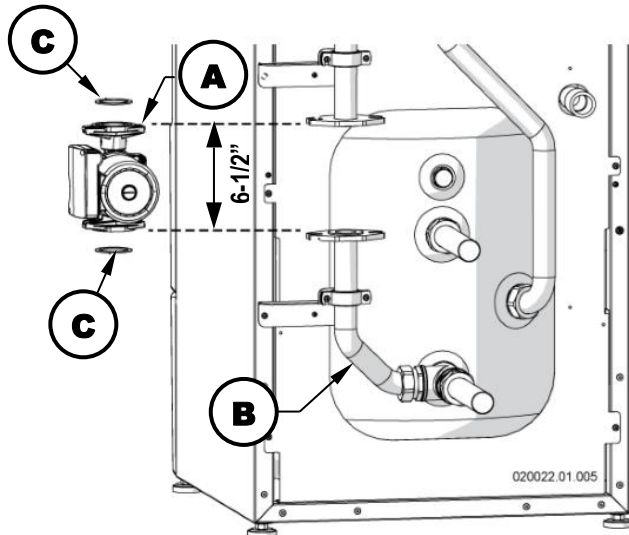
Table 4-1 shows a selection of recirculation pump kits available from AERCO specified for each model and for use with normal and hard water supplies.

Table 4-1: Recommended AMRI Recirculation Pump Kits		
HEATER MODEL	NORMAL WATER (UP TO 16 GRAIN/GAL)	HARD WATER (OVER 16 GRAIN/GAL)
	AERCO KIT P/N	AERCO KIT P/N
199RI	58144-1	58144-2
250RI	58144-1	58144-2
399RI	58144-2	58144-4
500RI	58144-2	58144-4

4.5.3 Recirculator Pump Mechanical Installation

A field supplied pump relay must be installed if the pump current draw is greater than 2.5 amps. This is included with the larger pumps from AERCO.

The pump (A, 6-1/2" length), is installed between the flanges indicated in Figure 4-3 using the longer pipe/flange fitting (B). Gaskets (C) are installed at pump connections.



RECIRCULATION PUMP PART LEGEND*

A = PUMP, 6-1/2"

B = PIPE/FLANGE FOR 6-1/2" PUMP

C = GASKETS, PUMPS

* ALL PARTS FACTORY SUPPLIED

Figure 4-3: AMRI Recirculation Pump Size Installation Options

4.5.4 Recirculator Pump Electrical Connections

The recirculator pump electrical connections are accessed and wired as follows. If using Recirculator kit 58144-4, a 230V supply is required to be externally supplied.

Recirculator Pump Electrical Connections

- 1) Remove the unit top cover by pulling up, than access inside of electrical junction box by removing screw at rear top of junction box cover and lifting up, as shown in Figure 4-4.

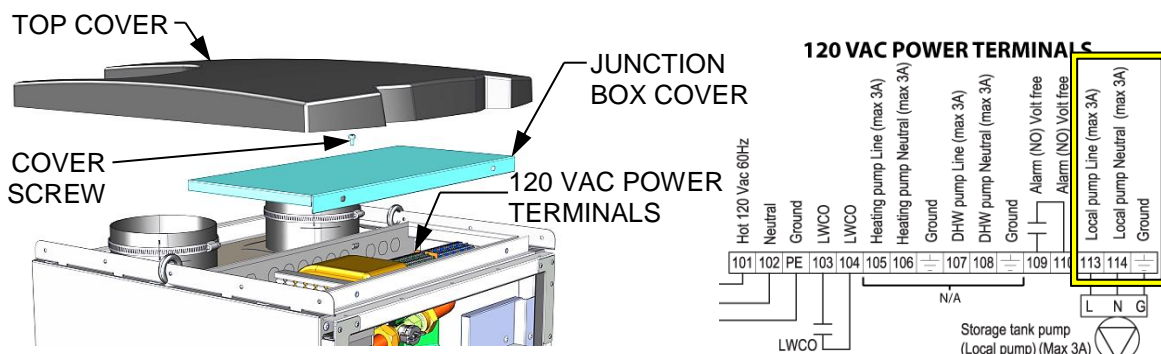


Figure 4-4: Recirculator Pump Wiring to AMR Electrical Power Terminals

- 2) Use a three conductor cable (minimum cross section of #18 AWG) and run out of the power box conduit opening and between the water heater terminals and the recirculation pump.
- 3) Locate the left-side set of 120 VAC power terminals, as shown in Figure 4-4 or 5-2, and connect the cable leads to terminals **113**, **114** and **Ground**, and then wire the other end of the cable to the pump per the manufacturer's instructions.
- 4) If pump current draw is greater than 2.5A, a pump relay must be installed. This is included

with the larger pumps from AERCO.

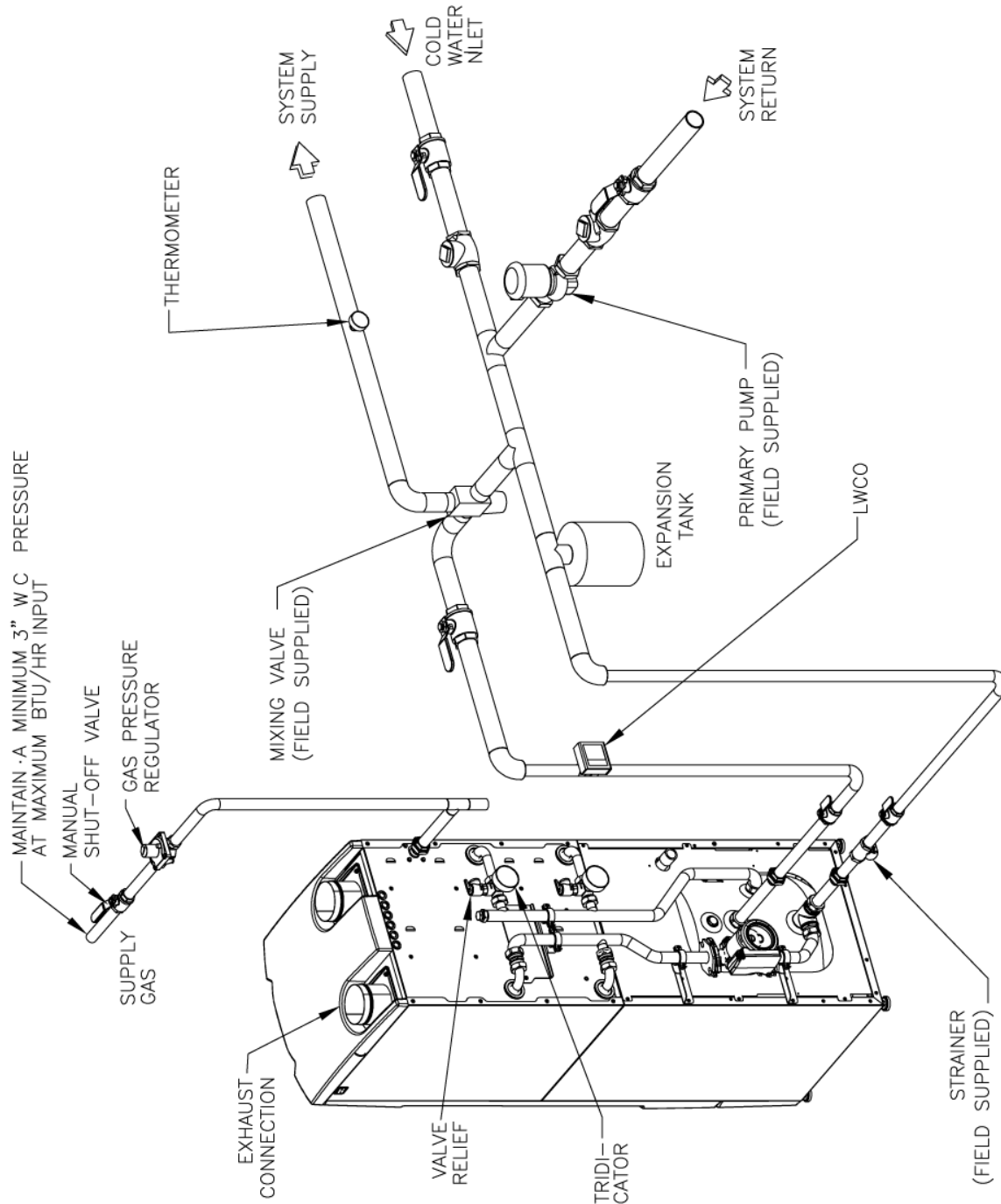


Figure 4-5: AMRI - Single-Unit Installation Piping Example

4.6 Domestic Hot Water System Piping with Direct Water Heater

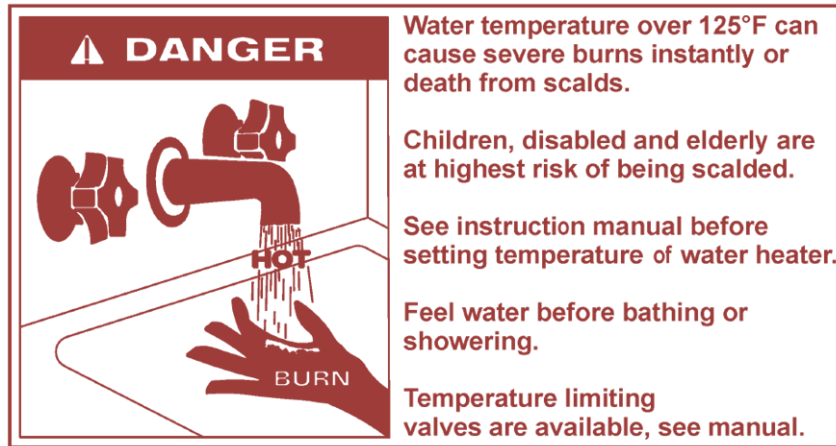
See Figure 4-5 for recommended piping for AM Series water heater *single unit* installations, and Figure 4-7 for *multiple unit* installations. Refer to section 4.3.4 to wire the water heater pump.

An anti-scald mixing valve is field supplied and is mandatory on the domestic hot water outlet of the water heater.

4.7 Scalding

This water heater can deliver scalding temperature water at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. Certain appliances such as dishwashers and automatic clothes washers may require increased temperature water. By setting the water temperature control on this water heater to obtain the increased temperature water required by these appliances, you may create the potential for scald injury. To protect against injury, you should install a mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines.

Figure 4-6 details the relationship of water temperature and time with regard to scald injury and may be used as a guide in determining the safest water temperature for your applications.



120°F (49°C)	More than 5 minutes
125°F (51°C)	1,5 to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (65°C)	About 1,5 seconds
155°F (68°C)	About 1 second

Figure 4-6: Approximate Time / Temperature Relationships for Scalding

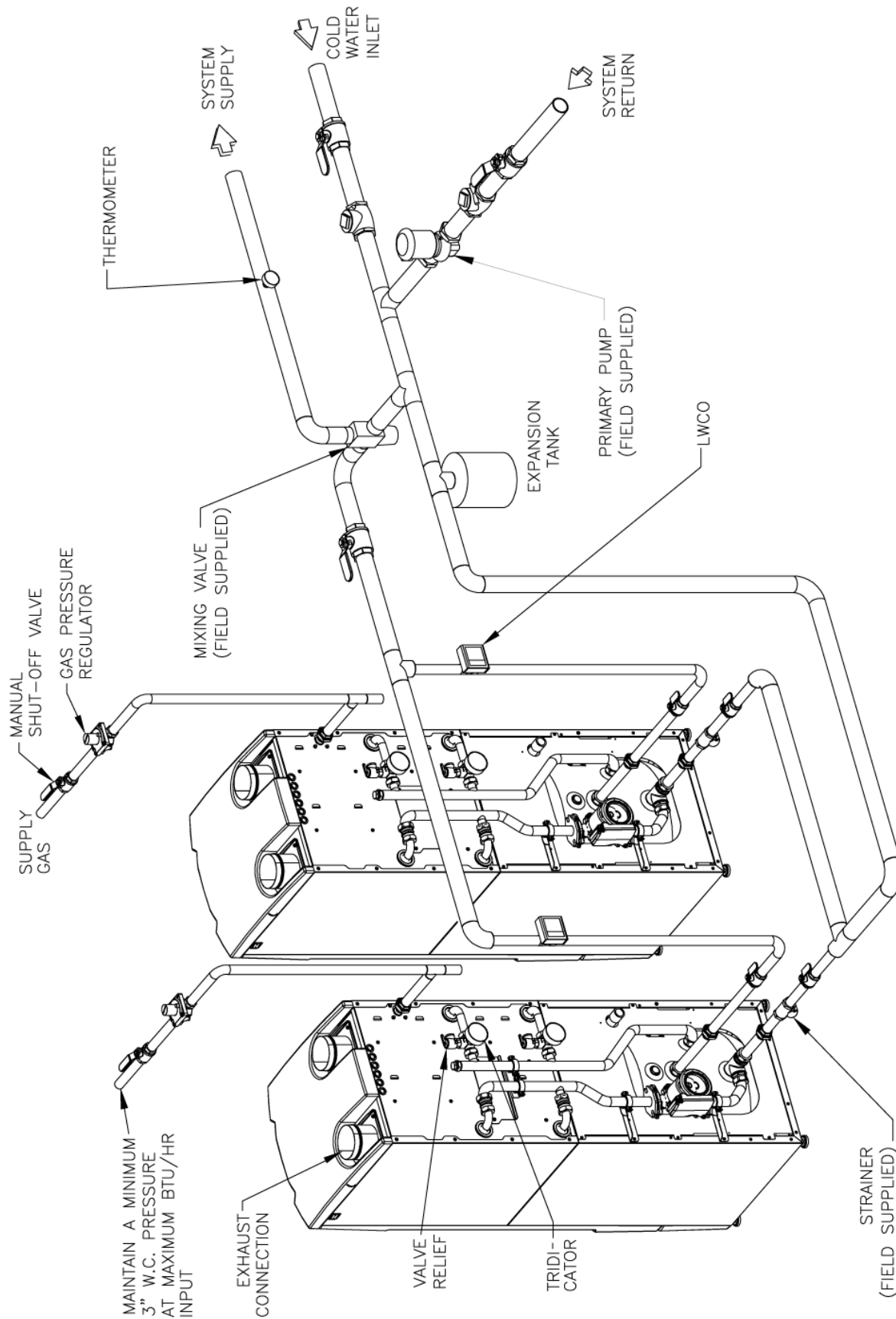


Figure 4-7: AMRI - Multi-Unit Installation Piping Example

4.8 Condensate Disposal

WARNING!

The condensate trap, as shown in Figure 4-8, item “B”, MUST be filled with water or combustion gases will enter the room. The condensate neutralizer tank must be installed into the unit, exactly as shown in Figure 4-8. Do NOT remove the condensate neutralizer tank from its position while the unit is in operation, as this will result in combustion gases entering the room, which can result in excessive levels of carbon monoxide.

The unit is equipped with a condensate neutralizer tank for the evacuation of condensate and to prevent the leakage of combustion products. The condensate drains from the flue exhaust outlet “A” (Figure 4-8) through pipe to condensate neutralizer tank, drains through hose “C” and then out the drain pipe (Figure 4-9), and empties into the floor drain or drain pan (Figure 4-9). The condensation disposal system must:

- slope the condensate tubing down and away from the water heater, without any subsequent elevation, into a drain or drain pan (See Figure 4-9). Condensate from the water heater will be slightly acidic (around pH 4). The neutralizing tank (see Figure 4-8, item “B”) is built into the water heater and will neutralize the condensate products;
- be carried out with a pipe with an internal diameter equal to or greater than 3/4 inches (19 mm);
- be installed in such a way so as to avoid the freezing of the liquid;
- never discharge into gutters or rain collectors;
- be properly pitched towards the point of discharge avoiding high points (Figure 4-9), which could place the condensate system under pressure;

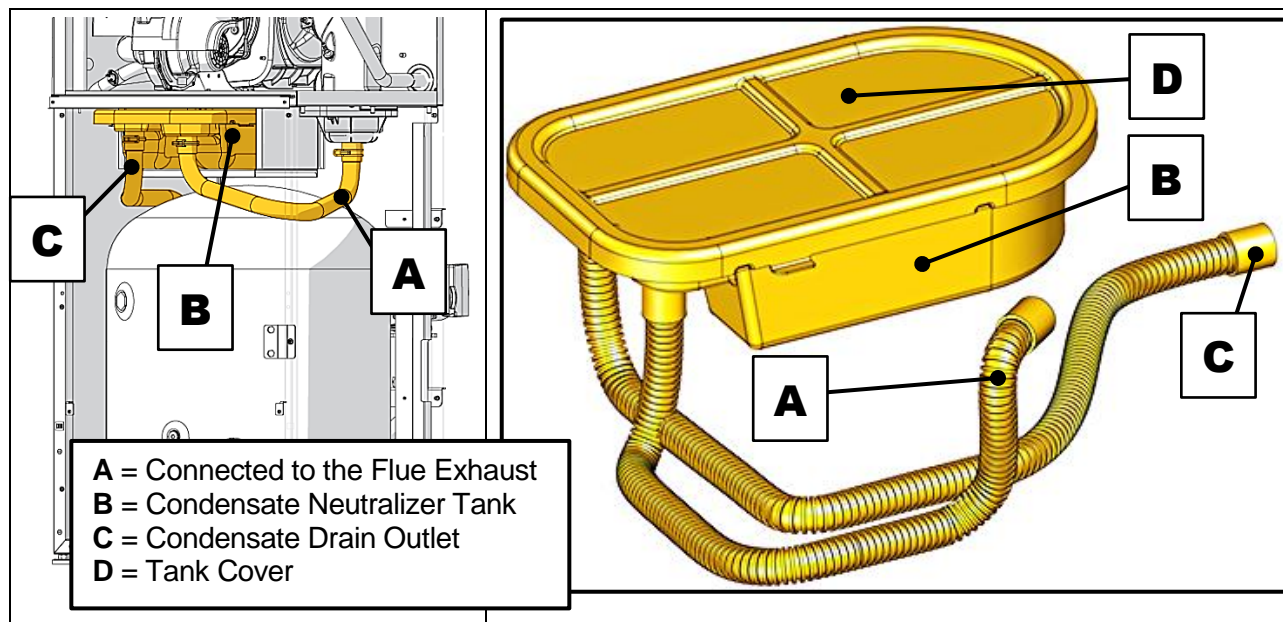


Figure 4-8: Condensate Neutralizer Tank

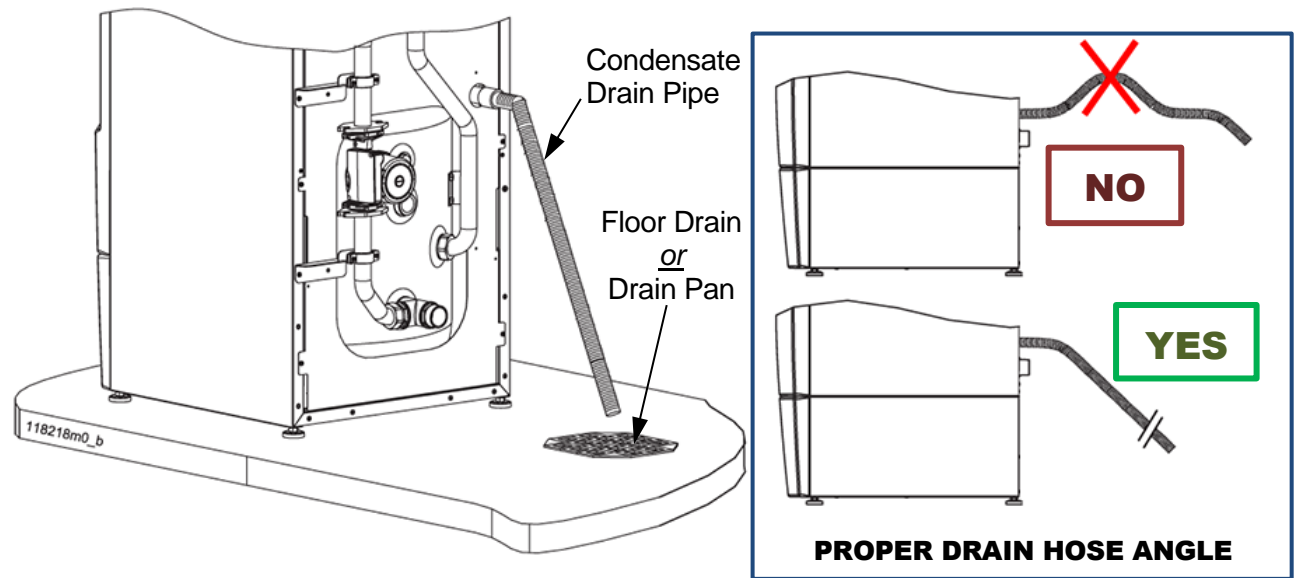


Figure 4-9: Condensate Tank Drainage

A condensate removal pump is required if the water heater is below the drain. When installing a condensate pump, select one approved for use with condensing water heaters and furnaces. The pump should have an overflow switch to prevent property damage from condensate spillage.

CHAPTER 5: INSTALLATION – ELECTRICAL

5.1 Electrical Connections

5.1.1 Power Supply Cable Connection

Provide and install a fused disconnect or service switch (15 amp recommended) as required by prevailing codes. To connect the electrical line voltage power supply cable, refer to Figure 5-1.

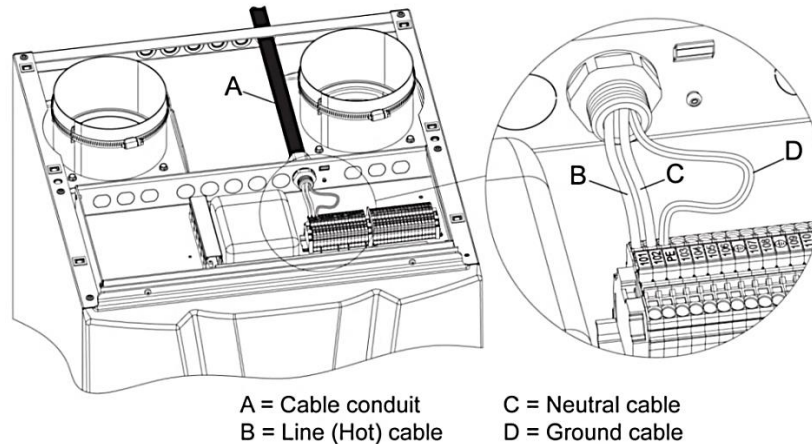


Figure 5-1: Line Voltage Connection

- | | |
|--|---|
| Terminal "12" - Tank Sensor - (NOT APPLICABLE) | Terminal "105" - Heating pump Line (max 3A) - (NOT APPLICABLE) |
| Terminal "13" - Tank Sensor - (NOT APPLICABLE) | Terminal "106" - Heating pump Neutral (max 3A) - (NOT APPLICABLE) |
| Terminal "14" - Outdoor Sensor (OS) - (NOT APPLICABLE) | Terminal "Ground" (between "106" and "107") - (NOT APPLICABLE) |
| Terminal "15" - Outdoor Sensor (OS) - (NOT APPLICABLE) | Terminal "107" - DHW pump Line (max 3A) - (NOT APPLICABLE) |
| Terminal "24" - Cascade header Sensor - (NOT APPLICABLE) | Terminal "108" - DHW pump Neutral (max 3A) - (NOT APPLICABLE) |
| Terminal "25" - Cascade header Sensor - (NOT APPLICABLE) | Terminal "Ground" (between "108" and "109") - (NOT APPLICABLE) |
| Terminal "28" - Bus (cascade) - (NOT APPLICABLE) | |
| Terminal "29" - Bus (cascade) - (NOT APPLICABLE) | |
| Terminal "30" - Bus (Master) - (NOT APPLICABLE) | |
| Terminal "31" - Bus (Master) - (NOT APPLICABLE) | |

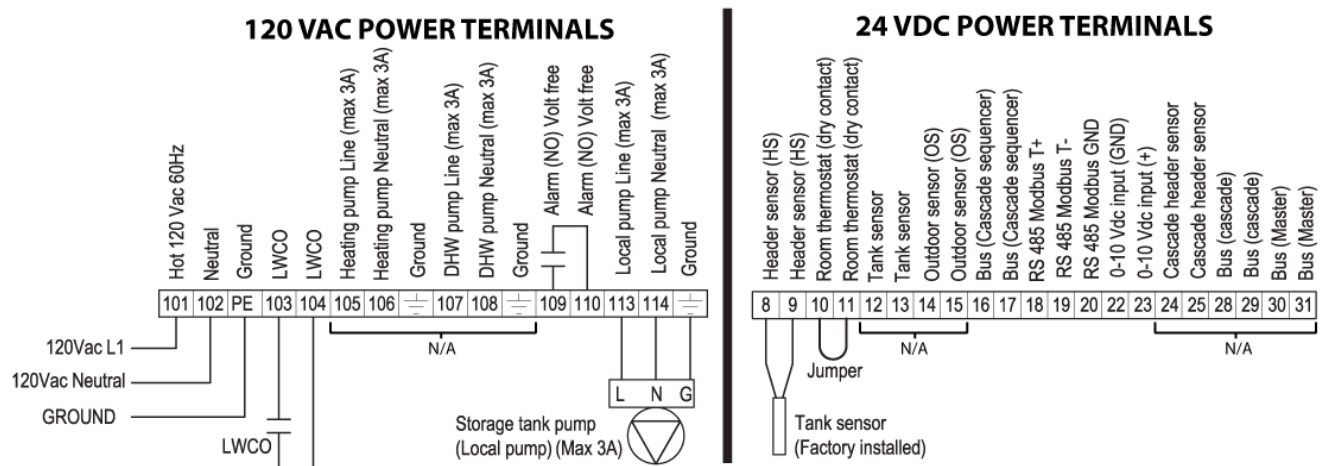


Figure 5-2: AMRI Electrical Junction Box Connections

5.1.2 Connecting Units in Cascade

AM Series water heaters may be combined in a cascading system using the optional Cascade Sequencer. To connect the heater in cascade using the Cascade Sequencer, one must follow the electrical connections as per Figure 5-4. A maximum of eight heaters can be connected in a cascade. Refer to the AERCO Cascade Sequencer user manual, OMM-0101 (GF-146-CS) for information on how to set up and use a cascade system using AM water heaters.

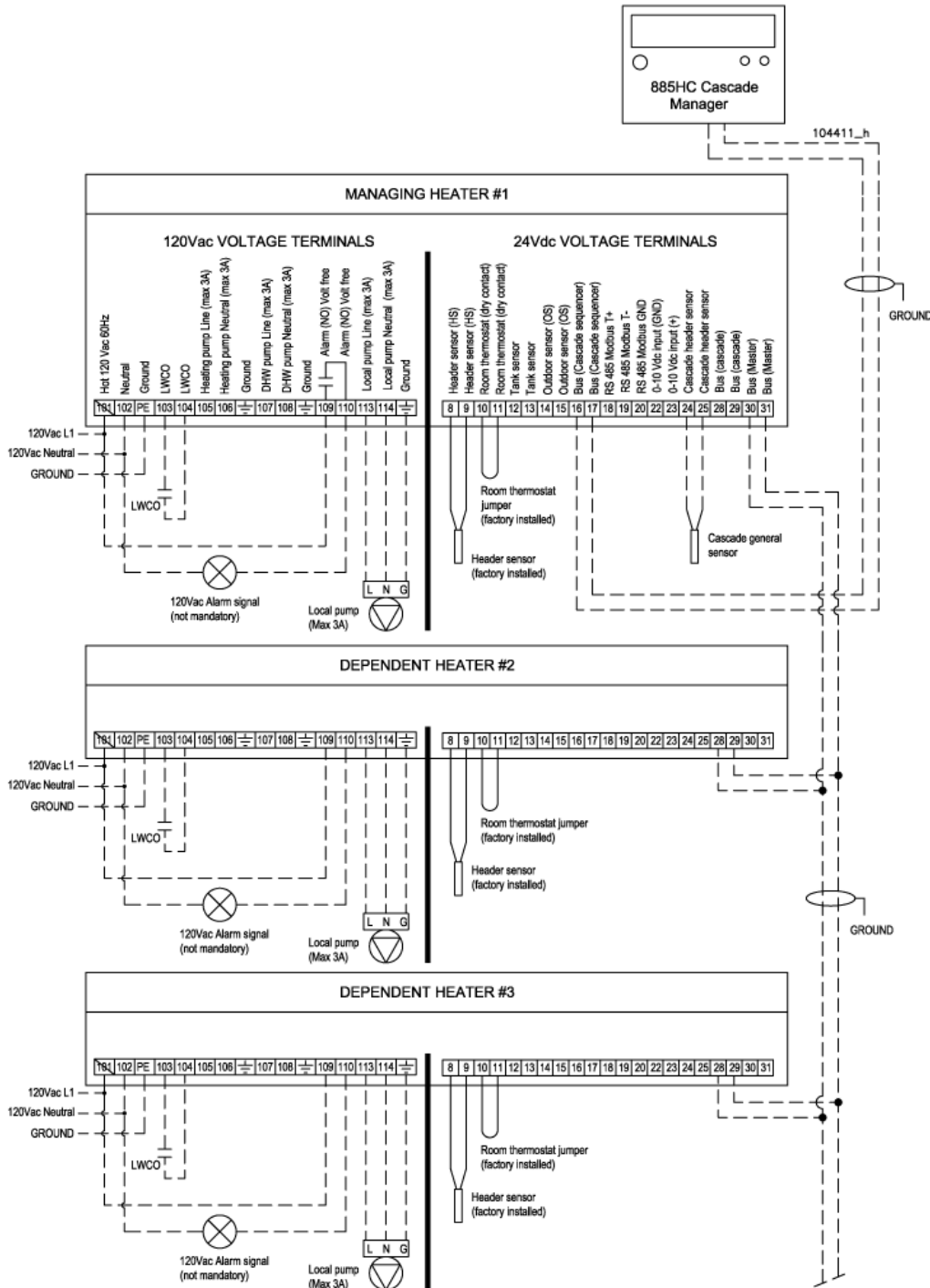


Figure 5-4: Cascading AM Units Electrical Connections

5.1.3 0-10 VDC Input Connections – 500RI Model (Option for 500RI)

The AMRI model 500RI is factory supplied with a Communications Module (the 399 model can be equipped with one as an option). This allows driving the appliance via a 0-10 VDC analog input. To do this, you must connect the 0-10 VDC supply between terminals 22 and 23 (see Figure 5-3) in the electrical junction box, and the CH mode (parameter 2003 in the Installer Menu per Section 9.16 in AM user manual **OMM-0100** (GF-146) must be set to 4 (four). When configured this way, the heater supply temperature is controlled by the analog input 0-10 VDC as shown in Figure 5-5 where:

- If the input voltage stays below 1.5V, the heater stays OFF.
- If the input voltage increases to between 1.5V and 2.0V, the heater start to operate and the supply temperature stays at the value set for the Minimum CH setpoint (parameter 3018 in the Factory menu per Appendix B).
- As the input voltage changes between 2V and 10V, the supply temperature will change proportionally between the Minimum CH setpoint (parameter 3018 in the Factory menu per Appendix B) and the Maximum CH setpoint (parameter 3017, in the Factory menu per Appendix B).

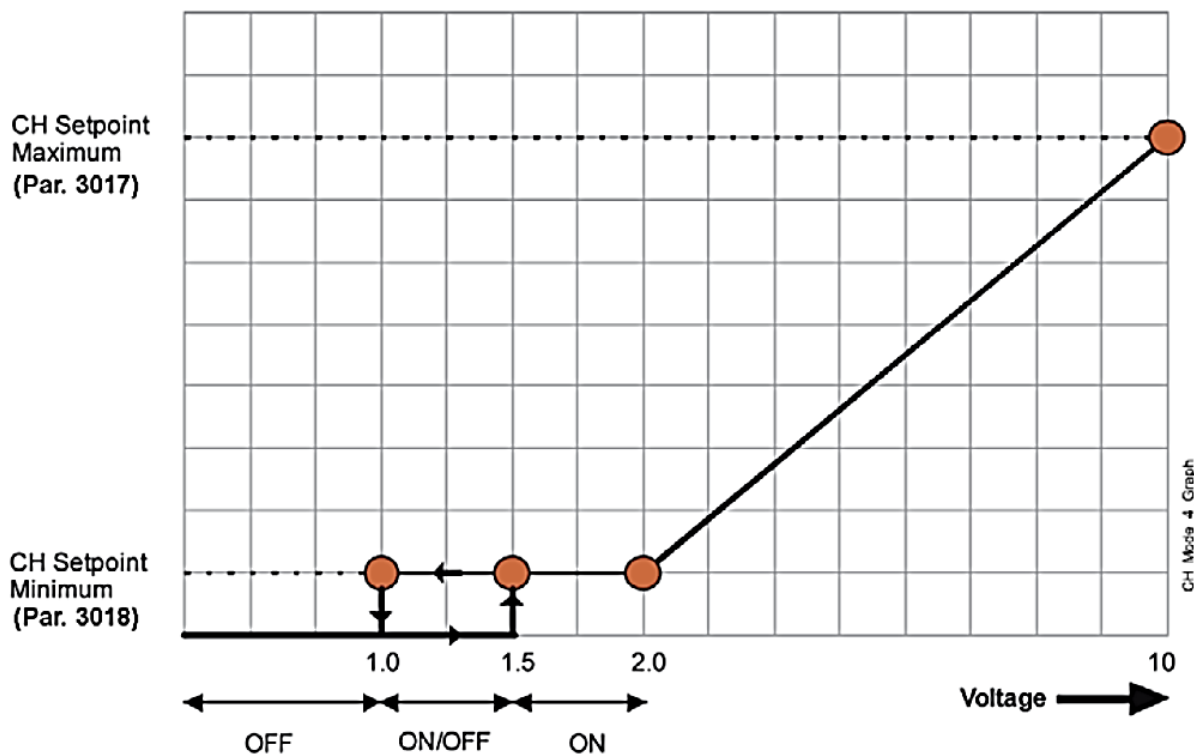


Figure 5-5: 0-10 VDC Analog Input Algorithm

5.1.4 MODBUS Interface Connections – 500RI Model Only

The AMRI 500RI model is factory supplied with a Communications Module (the 399 model can be equipped with one as an option). This MODBUS interface can be connected to drive the unit from a building management device. Refer to the AM Series MODBUS User Manual, OMM-0102 (GF-146-MB), which is available from AERCO technical support and the AERCO website (www.aerco.com).

CHAPTER 6: INSTALLATION – VENTING AND COMBUSTION AIR PIPING

NOTE: Refer to Chapter 6 in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to the installation of the exhaust venting and combustion air piping for the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Chapter 6 to prevent a dangerous situation, harm to persons, and damage to equipment.

CHAPTER 7: INSTALLATION – NATURAL GAS

NOTE: Refer to Chapter 7 in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to the installation of the natural gas inlet piping for the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Chapter 7 to prevent a dangerous situation, harm to persons, and damage to equipment.

CHAPTER 8: UNIT START-UP

NOTE: Refer to Chapter 8 in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to unit start up procedures for the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Chapter 8 to prevent a dangerous situation, harm to persons, and damage to equipment.

CHAPTER 9: OPERATION

NOTE: Refer to Chapter 9 in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to unit operation of the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Chapter 9 to prevent a dangerous situation, harm to persons, and damage to equipment.

CHAPTER 10: MAINTENANCE

NOTE: This chapter contains only maintenance procedures applicable specifically to the AMRI units. Refer to Chapter 10 in the Main AM Series User Manual, **OMM-0100** (GF-146), for the maintenance schedule, as well as all other maintenance procedures applicable to all AM series units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in Chapter 10 of the main AM Series user manual, OMM-0100 (GF-146), to prevent a dangerous situation, harm to persons, and damage to equipment.

10.1 Accessing Boiler Interior

Refer to Chapter 10 of AM Series main user manual, **OMM-0100** (GF-146), for all instructions for accessing the units interior.

10.2 Burner and Other Maintenance

Refer to Chapter 10 of AM Series main user manual, **OMM-0100** (GF-146), for all maintenance procedures concerning the burner, as well as all other maintenance procedures applicable to the all models of AM Series models.

CAUTION!

Servicing, inspection and adjustment must be done by a trained technician in accordance with all applicable local and national codes. Improper servicing or adjustment could damage the water heater and result in equipment damage or a dangerous condition!

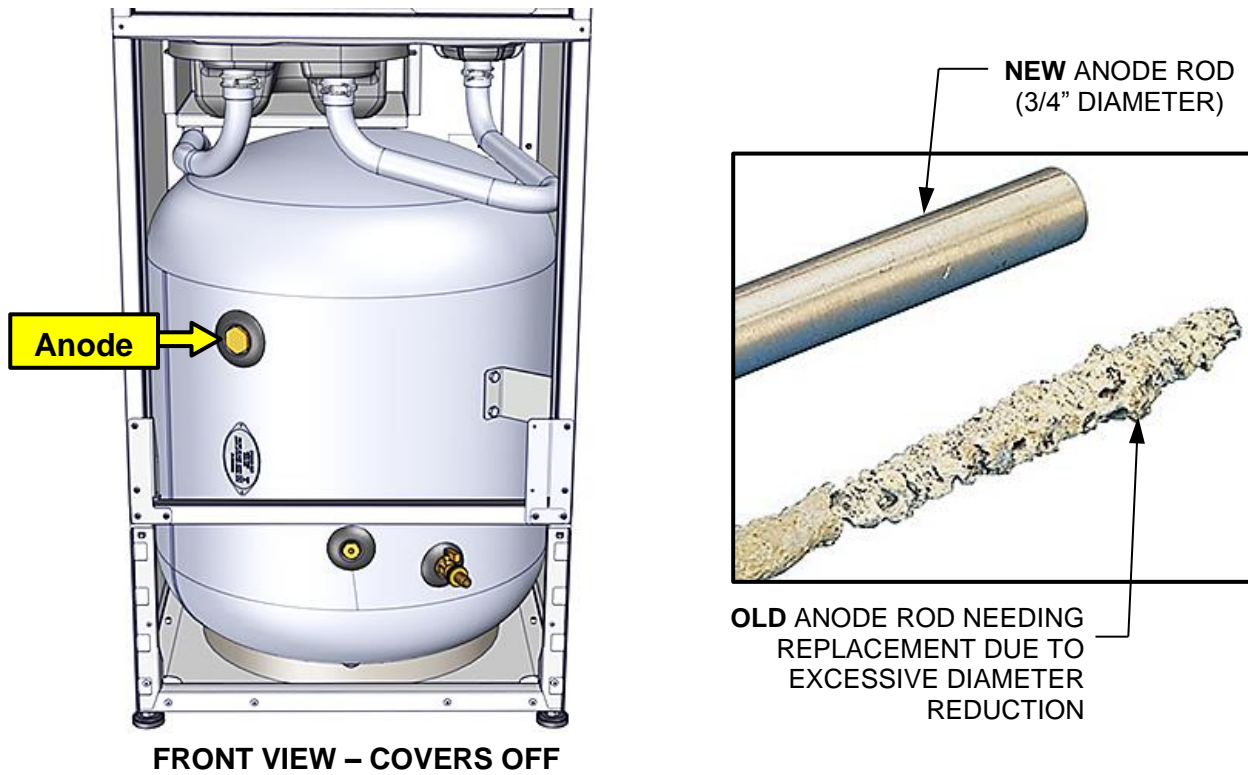
10.3 Maintenance Specific to AMRI Water Heaters

10.3.1 Components and Piping Maintenance

The external circulator pump, piping, parts, and low water cut-off specific to the AMR option are designed to provide years of trouble-free service. However, periodic inspection and routine maintenance are recommended for all hydronic systems and mechanical equipment. If any evidence of leakage or damage is present, take preventive measures and shut down the system immediately, then contact AERCO technical support for information about repair or replacement of any parts or components. See Chapter 12 for a diagram and parts list of all AMR option spare parts.

10.3.2 Buffer Tank Anode Rods

The buffer tank anode, located as shown in Figure 10-14, should be checked every six months, and replaced once a year.



FRONT VIEW – COVERS OFF

Figure 10-14: Buffer Tank Anode Location and Diameter Inspection

At the 6 month inspection, unscrew the anode from its port and check the reduction in anode diameter. Original anode rod diameter is 3/4" (0.75"), and anode should be replaced if diameter is reduced by 20% to 3/5" (0.60") diameter or less. Figure 10-14 shows a comparison of an old anode needing replacement, and a new anode.

Contact AERCO Technical Support for replacement anodes.

CHAPTER 11: TECHNICAL DATA

AMRI Water Heater Technical Data

DESCRIPTION		MODEL			
		199	250	399	500
Category of discharge chimney		II and IV	II and IV	II and IV	II and IV
Maximum heat input	Btu/hr	199,500	250,000	399,000	500,000
Minimum heat input	Btu/hr	50,000	50,000	50,000	50,000
Turndown ratio		4:1	5:1	8:1	10:1
Number of burners		1	1	2	2
Gas flow rate (Natural gas)	ft ³ /hr	199.5	250	399	500
Gas flow rate (LP gas)	ft ³ /hr	80	100	160	200
Min / Max gas pressure (Nat. and LP)	In.W.C.	3 / 13	3 / 13	3 / 13	3 / 13
Min / Max water temperature	°F	68 / 180	68 / 180	68 / 180	68 / 180
Min / Max water pressure	PSI	8 / 160	8 / 160	8 / 160	8 / 160
Minimum water flow	GPM	0	0	0	0
Content of water	gal	33.7	34	35.4	36
Supply voltage / Frequency		120Vac 60Hz	120Vac 60Hz	120Vac 60Hz	120Vac 60Hz
Absorbed electric power (pump)	W	110	150	220	300
Air intake / Flue gas pipes diameter	inch	3	3	4	4
Max. length venting system	ft	120	120	120	120
CO (Carbon monoxide) with natural	ppm	<150	<150	<150	<150
CO (Carbon monoxide) with LP gas	ppm	<250	<250	<250	<250
NOx (0% O ₂ with natural gas)	ppm	<30	<30	<30	<30
CO ₂ (Carbon dioxide) for Natural gas	%	8.4 to 8.7	8.8 to 9.1	8.4 to 8.7	8.8 to 9.1
CO ₂ (Carbon dioxide) for Natural gas	%	8.4 to 8.7	8.8 to 9.1	8.4 to 8.7	8.8 to 9.1
CO ₂ (Carbon dioxide) for LP gas at	%	9.5 to 10	9.5 to 10	9.5 to 10	9.5 to 10
CO ₂ (Carbon dioxide) for LP gas at	%	10.5 to 11.5	10.5 to 11.5	10.5 to 11.5	10.5 to 11.5
O ₂ (Oxygen) for Natural gas at high fi	%	5.9 to 5.4	5.2 to 4.7	5.9 to 5.4	5.2 to 4.7
O ₂ (Oxygen) for Natural gas at low fi	%	5.9 to 5.4	5.2 to 4.7	5.9 to 5.4	5.2 to 4.7
O ₂ (Oxygen) for LP gas at high fi re	%	6.4 to 5.6	6.4 to 5.6	6.4 to 5.6	6.4 to 5.6
O ₂ (Oxygen) for LP gas at low fi re	%	4.8 to 3.4	4.8 to 3.4	4.8 to 3.4	4.8 to 3.4
Ionization current	uA (Micro Amps)	4 to 7	4 to 7	4 to 7	4 to 7
Maximum flue gas temperature	°F	203	203	203	203
Maximum water condensate flow	GPM	0.032	0.039	0.064	0.077
Average acidity of condensation	PH	4	4	4	4
Heater weight - Empty of water / Full	lb	211 / 411	216 / 428	312 / 607	323 / 623
Recovery Rating (100°F rise)	Gal/hr	227	285	455	570
DHW delivery (75°F rise)	GPM	5	6.3	10.1	12.7

CHAPTER 12: SPARE PARTS DRAWINGS & LISTS

12.1 AMRI Spare Parts Drawings

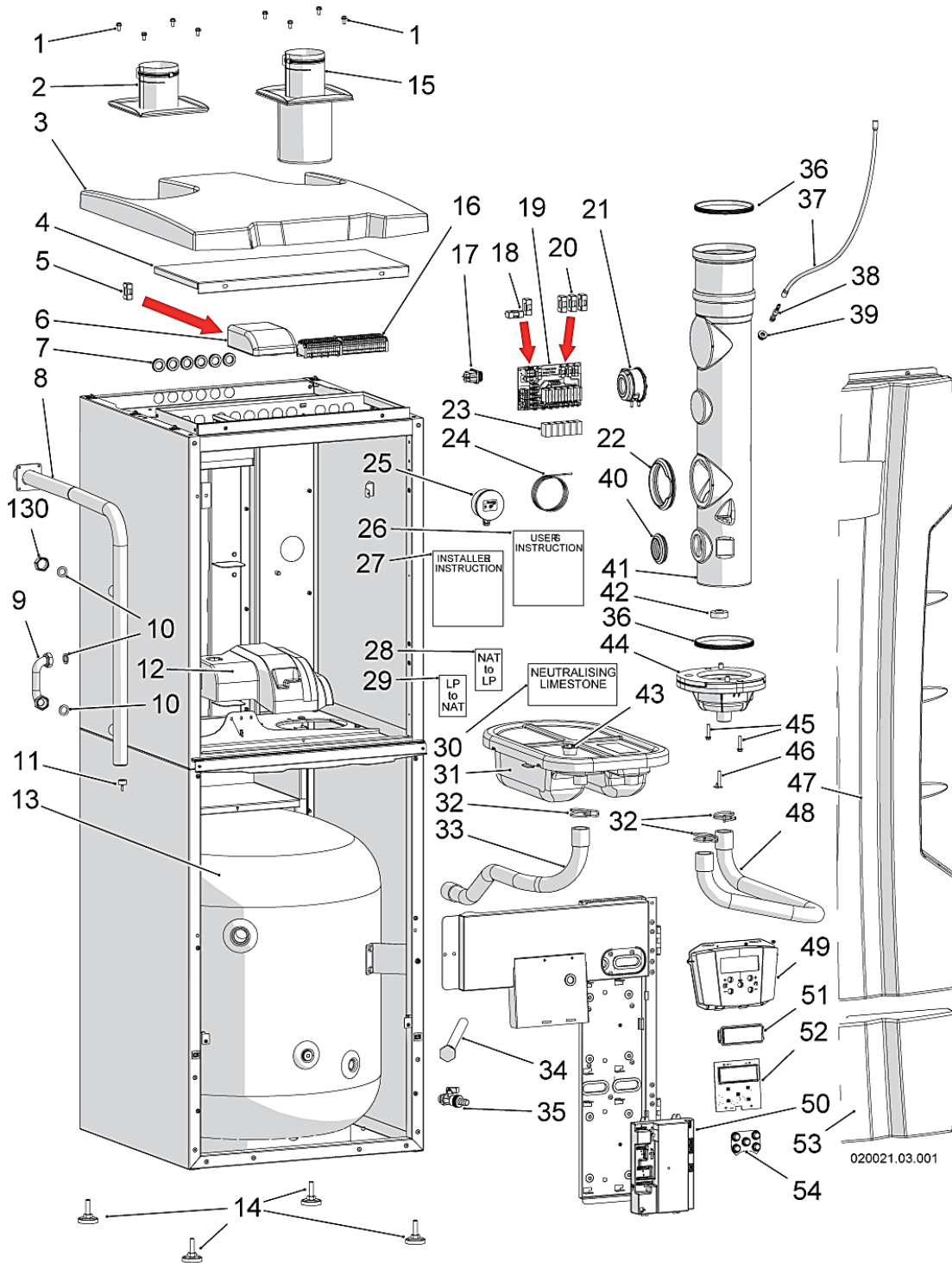


Figure 12-1: 199RI-250RI Spare Parts Drawing (1 of 2)

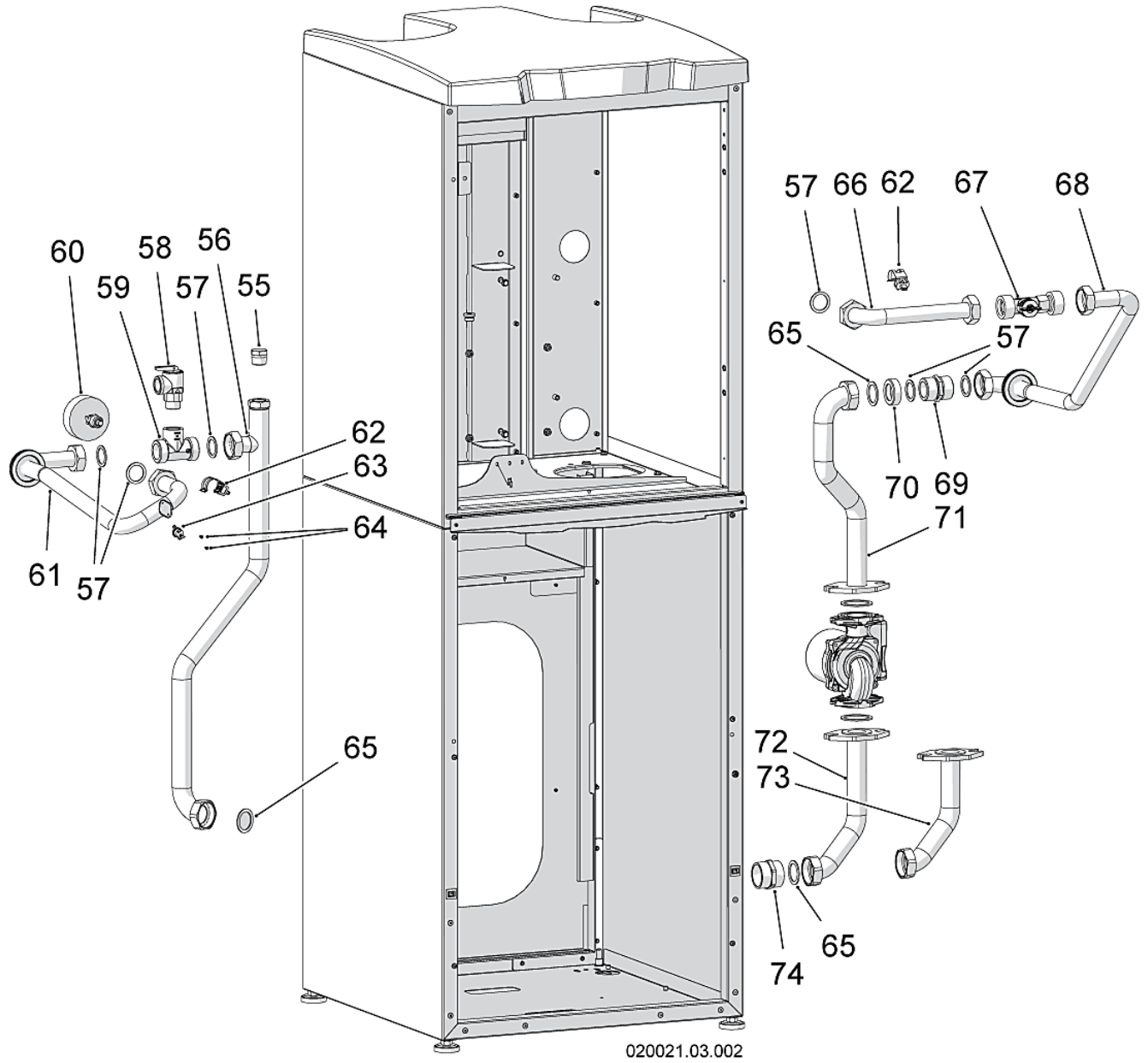


Figure 12-2: AMRI Integrated General Assembly Parts drawing (2 of 2)

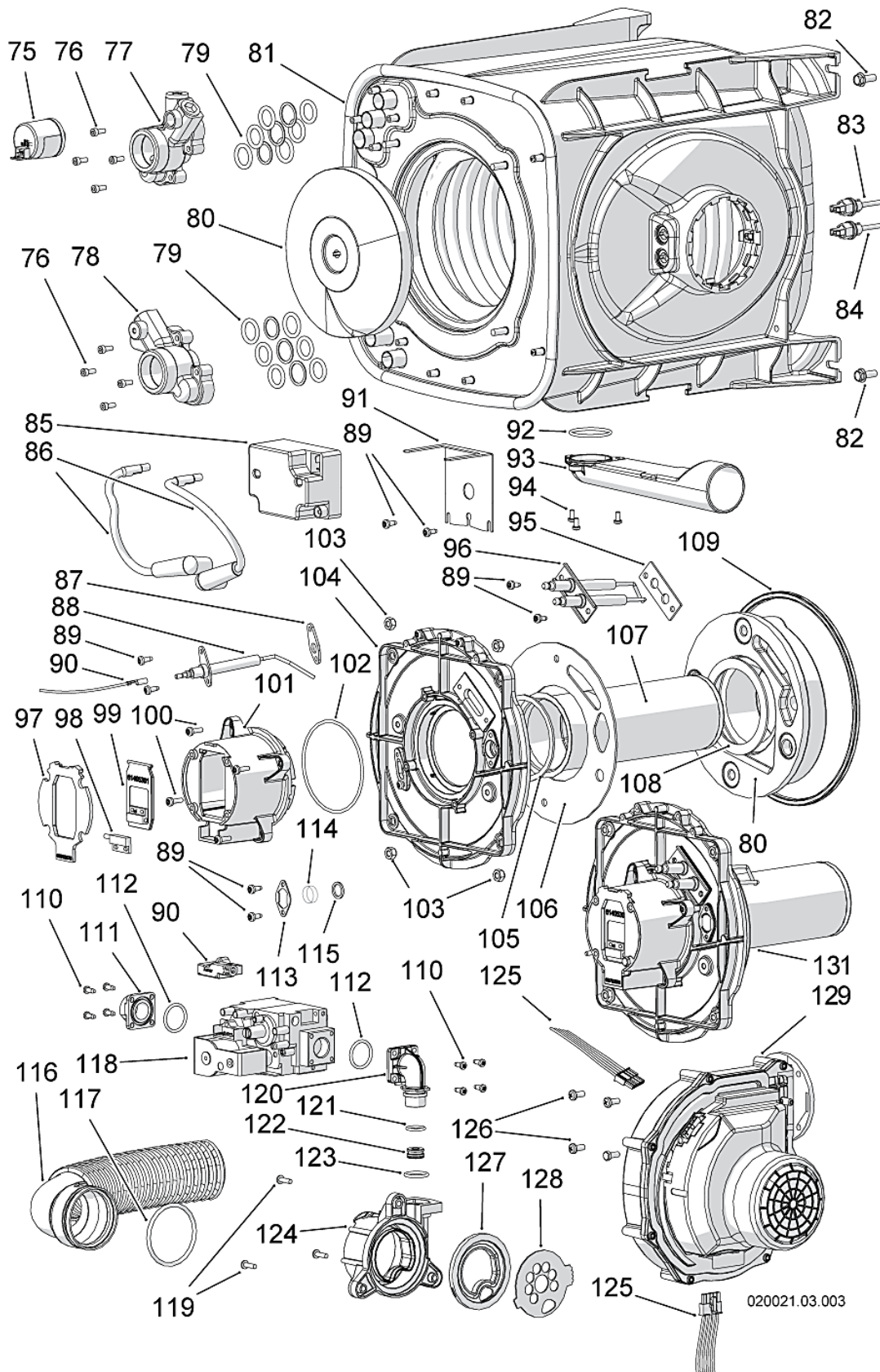


Figure 12-3: 199RI/250RI/399RI/500RI Burner/Fan Spare Parts Drawing

12.2 199RI/250RI Spare Parts List

199RI/250RI Spare Parts List		
Item#	Part#	Description
1	60801066	6X12 SCREW WITH WASHER
2	62617330	3" COMPLETE AIR INLET CONNECTION
3	62610091	BLACK UPPER COVER
3	62610098	GREY UPPER COVER
4	60404391	BENT BOX COVER
5	60503026	FUSE 3A DELAYED GLASS
6	62118027	885IF BOARD INTERFACE
7	61103015	PVC CLAMPER INTERNAL DIAM. 22
8	60338042	GAS COLLECTOR 1P NPT 4 HOLE FLANGE
9	62626008	GAS VALVE PIPE
10	60701006	GASKET 3/4P 24X15X2 KLINSIL
11	61405019	SILICONE FIXING FOR FAN KIT
12	61405347	WATER PROTECTION COVER FAN GROUP
13	62501021	ASME STORAGE TANK
14	60805006	ADJUSTABLE FOOT
15	62617327	4" COMPLETE AIR INLET CONNECTION
16	60502085	SINGLE GREY BOARD CLAMP
16	60502086	ON FLOOR YELLOW-GREEN BOARD CLAMP
16	60502101	SINGLE BLUE BOARD CLAMP
17	60506031	BLACK 2 POLES SWITCH
18	60503065	FUSE 10 A DELAYED GLASS
19	60507059	CONNECTION BOARD 160X100
20	60503026	FUSE 3A DELAYED GLASS
21	62113046	PRESSURE SWITCH ON 3,2 INWC
22	60702097	GASKET D.119 H.18 I.94
23	60503064	RELAY 115V 16A EXCHANGE
24	62110071	SENSOR 10K D6X45 L=2500 T
25	62110067	OUTDOOR SENSOR
26	62417028	AM SERIES USER MANUAL, OMM-0100 (GF-146) (all models)
27	62403631	AMRI INSTALLATION INSTRUCTIONS, OMM-0106. GF-146-RI (all models)
28	62630212	NAT-LP CONVERSION KIT (all models)
29	62630213	LP-NAT CONVERSION KIT, 199RI
29	62630214	LP-NAT CONVERSION KIT, 250RI
30	62801022	NEUTRALIZING LIMESTONE 10 KG
31	62801023	CONDENSE ACIDITY NEUTRALIZER UNTIL 280 KW BOX
32	60806026	FIXING SPRING
33	60322020	CORRUGATED TUBE DIAM 28 L 800
34	61406001	MAGNESIUM ANODE ROD FOR B70
35	61204011	DISCHARGE VALVE
36	60703034	GASKET EPDM D.125
37	60320001	SILICONE PIPE D.4X8
38	61405339	RIGHT REDUCED TAP 1/4"-3/8"
39	60702059	EPDM CLAMPER
40	60702096	GASKET D.66 H.16 I.45
41	61405316	D.125 H.809 COLLECTOR-2 EXCHANGERS
42	62111052	FLOAT D40X16X8,6
41	61405316	D.125 H.809 COLLECTOR-2 EXCHANGERS

199RI/250RI Spare Parts List

Item#	Part#	Description
43	61405348	CONICAL PLUG TAB D.29.2-32,7
44	62651066	CONDENSATE BLOCKED DRAIN SWITCH
45	60801106	SCREW 6X25 GALVANIZED
46	62111051	MAGNETIC SENSOR D5,8X38
47	62610093	COMPLETE PLASTIC FRONT COVER BLACK
47	62610096	COMPLETE PLASTIC FRONT COVER GREY
48	60322021	CORRUGATED TUBE DIAM 28 L 1250
49	61405320	NO LOGO FRONT COVER
50	62110088	CONTROL BOARD 885MN10 110 V
51	61405264	DISPLAY GLASS
52	62110089	DISPLAY TYPE 885LB01
53	62610100	ABS 287X600 BASE BLACK
53	62610099	ABS 287X600 BASE GREY
54	61405254	6 BUTTONS SWITCH
55	60107022	PLUG BRASS 3/4P NPT MALE
56	62621200	SUPPLY PIPE STORAGE TANK
57	60701007	1"1/4 GASKET
58	61205024	SAFETY VALVE 3/4P M ASME NPT 125 PSI
59	60113011	BRASS FITTING 1P1/4 MM 3/4P F 1/2P F
60	62115005	THERMOMANOM. D.80 0-200 PSI 60-320°F
61	62621151	COPPER TUBE D28 F/F 1'1/4 H=550
62	62111026	CLIP SENSOR NTC 10 KOHM D. 28
63	62101079	AUTOMATIC SAFETY THERMOSTAT 95°C
64	60801100	SCREW SELF-TAPPING 2.9 X 6.5 CROSS HEAD
65	60701008	1"1/2 GASKET
66	62621154	COPPER TUBE D28 F/F 1'1/4 1'1/4
67	61212014	VORTEX FLOW SENSOR
68	62621187	COPPER TUBE D28 F/F 1'1/4 1'1/4 NO VALV
69	60110048	BRASS NIPPLE 1"1/4 F.29 H=52
70	60101268	REDUCTION 1"1/4 - 1"1/2 F.31
71	62621204	RETURN PIPE BOILER PUMP
72	62621205	RETURN PIPE TANK-PUMP 6 1-2
73	62621206	RETURN PIPE TANK-PUMP 8 1-2
74	60110034	BRASS NIPPLE DOUBLE 1" 1/2
75	62113045	PRESSURE GAUGE 0-10 BAR
76	60801151	SCREW 4X10 GALVANIZED
77	61408013	BRASS CONNECTION 1"1/4 RETURN
78	61408014	BRASS CONNECTION 1"1/4 SUPPLY
79	62616111	KIT FOR 6 OR AND 3 WASHERS
80	62632006	KIT THERMAL INSULATIONS
81	62649088	CONDENSING HEAT EXCHANGER 58KW 12T ASME HLW (199RI Only)
81	62649089	CONDENSING HEAT EXCHANGER 70KW 15T ASME HLV (250RI Only)
82	60801093	SCREW 6X16 8.8 WITH WASHER UNI 6921
83	62111042	BAYONETTE FUSE 102°C 2P MOLEX
84	62111041	BAYONETTE SENSOR NTC 10K 2P MOLEX
85	60510022	SPARK GENERATOR
86	60504206	CABLE UL IGNITOR CONN 90° L155
87	60701023	GASKET KERASIL 325R SQ 38X17X2
88	62632007	GRP SPARK DETECTION

199RI/250RI Spare Parts List

Item#	Part#	Description
89	60801080	SCREW SELF-TAPPING 4X10 TC S-TT UNI-8112
90	60504266	MASTER GAS CABLE UL 885
91	60406137	SHAPED BRACKET 67X54X36
92	60702083	OR RING 3137 EPDM 2,62 X 34,60
93	61405300	CONDENSATION DISCHARGE PIPE D.46.7
94	60801138	SCREW 4X8 ZINC TC-CR DIN4042
95	60701022	GASKET KERASIL 325R SQ 56X22X2
96	62632008	GRP IGNITION PLUG
97	60702078	GASKET SHAPED FOR FAN
98	62111044	REED MAGNETIC POSITION SENSOR
99	62651043	MAGNET CLAP GROUP
100	60801108	SELF-TAPPING SCREW 4X14 TCC-NP UNI-8112
101	61404123	AXIAL FAN COLLECTOR H.69
102	60702077	OR RING 3325 SIL 2,62 X 82,22
103	60802005	NUT ZINC COATED 6MA
104	61404122	FAN COLLECTOR BASE
105	60701019	KERASIL GASKET 325R SQ ϕ 80.5 MM
106	60701032	GASKET S.WOLL PLUS D.170 F90 SP.2
107	62629045	FIBER BURNER D.70 H200
108	60701021	GASKET S.WOLL PLUS D.100 SP.2
109	60703047	SIL. GASKET D.200 F.188 H.7,2
110	60801014	SCREW 4X10 ZINC TC-CR
111	60101224	FLANGE GAS 32X32 3/4P
112	60702029	O-RING 130 2,62 X 22,22
113	60404253	FLANGE L21,2 H34 SP1
114	60815013	PIREX GLASS D15,5 SP5
115	60701013	GASKET FRIZITE D15,5 F11,5 SP1,5
116	62651054	HIGH POWER SILENCER GROUP
117	60702072	O-RING 156 NBR 3,53 X 52,39
118	62632024	GRP SPARE GAS VALVE AIR
119	60801159	SCREW 4X14 GALVANIZED
120	61404121	90° INTERNAL ELBOW
121	60702052	O-RING 2050 EPDM 1,78 X 12,42
122	60114100	GAS DIAPHRAGM D.15,5 H8 HOLE D.9,3 (199RI Only)
122	60114093	GAS DIAPHRAGM D.15,5 H8 HOLE D.7 (LP Gas Only)
123	60702065	O-RING 2,62 X 17,86
124	61404120	COSMOMIX GAS MIXER
125	60504265	FAN CABLE UL 885
126	60801021	BOLT 5X12 CROSS HEAD
127	60702064	SHAPED GASKET DIAM. 71,2 H. 9,2
128	60406142	AIR MIXER DIAPHRAGM 7 D.10-1 D.17
129	61901036	BOILER FAN 135 KW 115V
130	60701014	2 GASKETS KIT DN65
131	62632018	GRP GAS AND BURNER 12/15 LAPS

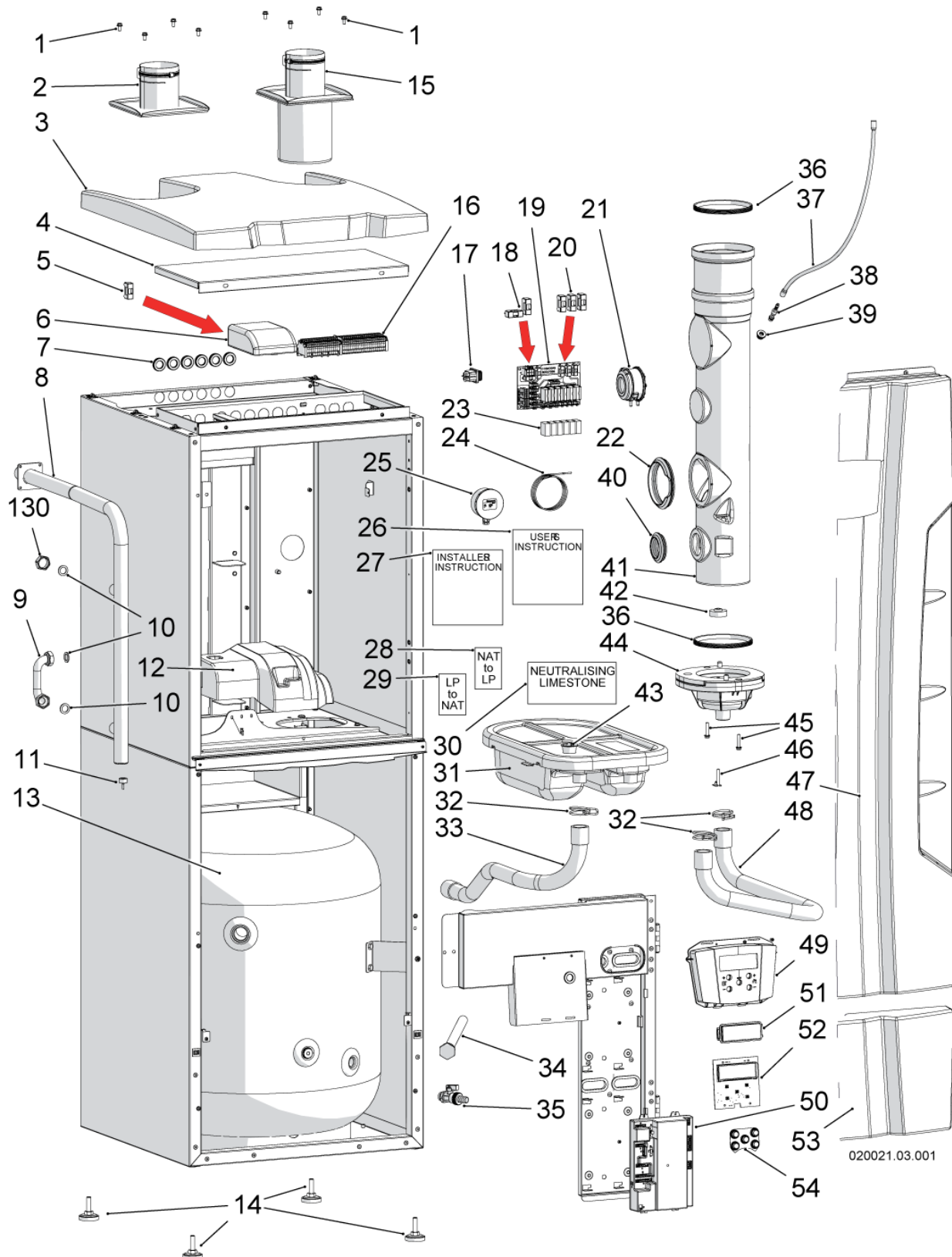


Figure 12-4: 399RI-500RI Spare Parts Drawing (1 of 2)

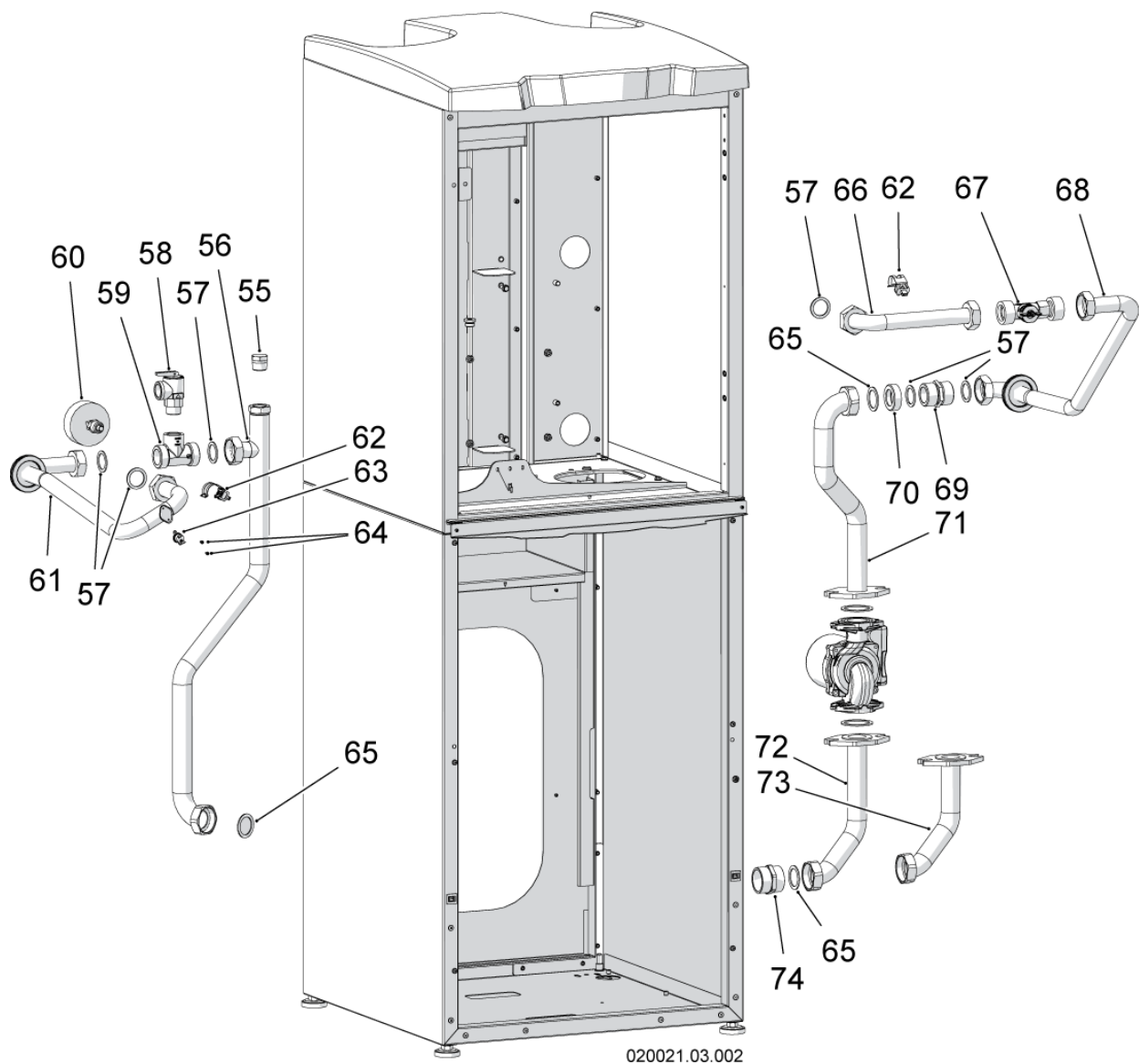


Figure 12-5: 399RI-500RI Spare Parts Drawing (1 of 2)

NOTE: See Figure 12-3 for the burner assembly part drawings, as the parts and item numbers are identical for all models of AM series units.

399RI/500RI Spare Parts List

Item#	Part#	Description
1	60801066	6X12 SCREW WITH WASHER
2	62617330	3" COMPLETE AIR INLET CONNECTION
3	62610091	BLACK UPPER COVER
3	62610098	GREY UPPER COVER
4	60404391	BENT BOX COVER
5	60503026	FUSE 3A DELAYED GLASS
6	62118027	885IF BOARD INTERFACE
7	61103015	PVC CLAMPER INTERNAL DIAM. 22
8	60338042	GAS COLLECTOR 1P NPT 4 HOLE FLANGE
9	62626008	GAS VALVE PIPE
10	60701006	GASKET 3/4P 24X15X2 KLINSIL
11	61405019	SILICONE FIXING FOR FAN KIT
12	61405347	WATER PROTECTION COVER FAN GROUP
13	62501021	ASME STORAGE TANK
14	60805006	ADJUSTABLE FOOT
15	62617327	4" COMPLETE AIR INLET CONNECTION
16	60502085	SINGLE GREY BOARD CLAMP
16	60502086	ON FLOOR YELLOW-GREEN BOARD CLAMP
16	60502101	SINGLE BLUE BOARD CLAMP
17	60506031	BLACK 2 POLES SWITCH
18	60503065	FUSE 10 A DELAYED GLASS
19	60507059	CONNECTION BOARD 160 X 100
20	60503026	FUSE 3A DELAYED GLASS
21	62113046	PRESSURE SWITCH ON 3,2 INWC
22	60702097	GASKET D.119 H.18 I.94
23	60503064	RELAY 115V 16A EXCHANGE
24	62110071	SENSOR 10K D6X45 L=2500 T
25	62110067	OUTDOOR SENSOR
26	62417028	AM SERIES USER MANUAL, GF-146 (all models)
27	62403631	AMRI INSTALLATION INSTRUCTIONS, GF-146-RI (all models)
28	62630212	NAT-LP CONVERSION KIT (all models)
29	62630213	LP-NAT CONVERSION KIT, 399RI
29	62630214	LP-NAT CONVERSION KIT, 500RI
30	62801022	NEUTRALIZING LIMESTONE 10 KG
31	62801023	CONDENSE ACIDITY NEUTRALIZER UNTIL 280 KW BOX
32	60806026	FIXING SPRING
33	60322020	CORRUGATED TUBE DIAM 28 L 800
34	61406001	MAGNESIUM ANODE ROD FOR B70
35	61204011	DISCHARGE VALVE
36	60703034	GASKET EPDM D.125
37	60320001	SILICONE PIPE D.4X8
38	61405339	RIGHT REDUCED TAP 1/4"-3/8"
39	60702059	EPDM CLAMPER
40	60702096	GASKET D.66 H.16 I.45
41	61405316	D.125 H.809 COLLECTOR-1 EXCHANGER
42	62111052	FLOAT D40X16X8,6
43	61405348	CONICAL PLUG TAB D.29.2-32,7
44	62651066	CONDENSATE BLOCKED DRAIN SWITCH
45	60801106	SCREW 6X25 GALVANIZED

399RI/500RI Spare Parts List		
Item#	Part#	Description
46	62111051	MAGNETIC SENSOR D5,8X38
47	62610093	COMPLETE PLASTIC FRONT COVER BLACK
47	62610096	COMPLETE PLASTIC FRONT COVER GREY
48	60322021	CORRUGATED TUBE DIAM 28 L 1250
49	61405320	NO LOGO FRONT COVER
50	62110088	CONTROL BOARD 885MN10 110 V
51	61405264	DISPLAY GLASS
52	62110089	DISPLAY TYPE 885LB01
53	62610100	ABS 287X600 BASE BLACK
53	62610099	ABS 287X600 BASE GREY
54	61405254	6 BUTTONS SWITCH
55	60107022	PLUG BRASS 3/4P NPT MALE
56	62621199	SUPPLY PIPE STORAGETANK
57	60701007	1"1/4 GASKET
58	61205024	SAFETY VALVE 3/4P M ASME NPT 125 PSI
59	60113011	BRASS FITTING 1P1/4 MM 3/4P F 1/2P F
60	62115005	THERMOMANOM. D.80 0-200 PSI 60-320°F
61	62621151	COPPER TUBE D28 F/F 1'1/4 H=550
62	62111026	CLIP SENSOR NTC 10 KOHM D. 28
63	62101079	AUTOMATIC SAFETY THERMOSTAT 95°C
64	60801100	SCREW SELFTAPPING 2.9 X 6.5 CROSS HEAD
65	60701008	1"1/2 GASKET
66	62621154	COPPER TUBE D28 F/F 1'1/4 1'1/4
67	61212014	VORTEX FLOW SENSOR
68	62621187	COPPER TUBE D28 F/F 1'1/4 1'1/4 NO VALV
69	60110048	BRASS NIPPLE 1"1/4 F.29 H=52
70	60101268	REDUCTION 1"1/4 - 1"1/2 F.31
71	62621203	RETURN PIPE HEATER-PUMP
72	62621205	RETURN PIPE TANK-PUMP 6 1-2
73	62621206	RETURN PIPE TANK-PUMP 8 1-2
74	60110034	BRASS NIPPLE DOUBLE 1" 1/2
75	62113045	PRESSURE GAUGE 0-10 BAR
76	60801151	SCREW 4X10 GALVANIZED
77	61408013	BRASS CONNECTION 1"1/4 RETURN
78	61408014	BRASS CONNECTION 1"1/4 SUPPLY
79	62616111	KIT FOR 6 OR AND 3 WASHERS
80	62632006	KIT THERMAL INSULATIONS
81	62649088	CONDENSING HEAT EXCHANGER 58KW 12T ASME HLW (399RI Only)
81	62649089	CONDENSING HEAT EXCHANGER 70KW 15T ASME HLV (500RI Only)
82	60801093	SCREW 6X16 8.8 WITH WASHER UNI 6921
83	62111042	BAYONETTE FUSE 102°C 2P MOLEX
84	62111041	BAYONETTE SENSOR NTC 10K 2P MOLEX
85	60510022	SPARK GENERATOR
86	60504206	CABLE UL IGNITOR CONN 90° L155
87	60701023	GASKET KERASIL 325R SQ 38X17X2
88	62632007	GRP SPARK DETECTION
89	60801080	SCREW SELFTAPPING 4X10 TC S-TT UNI-8112
90	60504266	MASTER GAS CABLE UL 885
91	60406137	SHAPED BRACKET 67X54X36

399RI/500RI Spare Parts List		
Item#	Part#	Description
92	60702083	OR RING 3137 EPDM 2,62 X 34,60
93	61405300	CONDENSATION DISCHARGE PIPE D.46.7
94	60801138	SCREW 4X8 ZINC TC-CR DIN4042
95	60701022	GASKET KERASIL 325R SQ 56X22X2
96	62632008	GRP IGNITION PLUG
97	60702078	GASKET SHAPED FOR FAN
98	62111044	REED MAGNETIC POSITION SENSOR
99	62651043	MAGNET CLAP GROUP
100	60801108	SELFTAPPING SCREW 4X14 TCC-NP UNI-8112
101	61404123	AXIAL FAN COLLECTOR H.69
102	60702077	OR RING 3325 SIL 2,62 X 82,22
103	60802005	NUT ZINC COATED 6MA
104	61404122	FAN COLLECTOR BASE
105	60701019	KERASIL GASKET 325R SQ ϕ 80.5 MM
106	60701032	GASKET S.WOLL PLUS D.170 F90 SP.2
107	62629045	FIBER BURNER D.70 H200
108	60701021	GASKET S.WOLL PLUS D.100 SP.2
109	60703047	SIL. GASKET D.200 F.188 H.7,2
110	60801014	SCREW 4X10 ZINC TC-CR
111	60101224	FLANGE GAS 32X32 3/4P
112	60702029	O-RING 130 2,62 X 22,22
113	60404253	FLANGE L21,2 H34 SP1
114	60815013	PIREX GLASS D15,5 SP5
115	60701013	GASKET FRIZITE D15,5 F11,5 SP1,5
116	62651054	HIGH POWER SILENCER GROUP
117	60702072	O-RING 156 NBR 3,53 X 52,39
118	62632024	GRP SPARE GAS VALVE AIR
119	60801159	SCREW 4X14 GALVANIZED
120	61404121	90° INTERNAL ELBOW
121	60702052	O-RING 2050 EPDM 1,78 X 12,42
122	60114100	GAS DIAPHRAGM D.15,5 H8 HOLE D.9,3 (500RI Only)
122	60114093	GAS DIAPHRAGM D.15,5 H8 HOLE D.7 (LP Gas Only)
123	60702065	O-RING 2,62 X 17,86
124	61404120	COSMOMIX GAS MIXER
125	60504265	FAN CABLE UL 885
126	60801021	BOLT 5X12 CROSS HEAD
127	60702064	SHAPED GASKET DIAM. 71,2 H. 9,2
128	60406142	AIR MIXER DIAPHRAGM 7 D.10-1 D.17
129	61901036	BOILER FAN 135 KW 115V
130	60701014	2 GASKETS KIT DN65
131	62632018	GRP GAS AND BURNER 12/15 LAPS

APPENDIX A: CONTROL PANEL OPERATION CHART

NOTE: Refer to Appendix A in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to unit operation of the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Appendix A to prevent a dangerous situation, harm to persons, and damage to equipment.

APPENDIX B: FACTORY MENU

NOTE: Refer to Appendix B in the Main AM Series User Manual, **OMM-0100** (GF-146), for all information and instructions pertaining to unit operation of the AM series of units.

WARNING!

You **MUST** refer to, and comply with, all instructions, warnings, cautions, notes, and other information in the main AM Series user manual, OMM-0100 (GF-146), pertaining to Appendix B to prevent a dangerous situation, harm to persons, and damage to equipment.

STANDARD WARRANTY

AM Series Gas Fired Hydronic Boilers and Water Heaters

BOILER PRESSURE VESSEL/HEAT EXCHANGER: 7 YEARS NON-PRORATED

The pressure vessel/heat exchanger shall carry a (7) seven year non-prorated warranty from shipment against any failure due to condensate corrosion, thermal stress, mechanical defects or workmanship. Operation of the boiler using contaminated air will void the warranty. The pressure vessel/heat exchanger shall not be warranted from failure due to scaling, liming, corrosion, or erosion due to water or installation conditions. **AERCO** will repair, rebuild or exchange, at its option the heat exchanger/combustion chamber within this warranted time period.

WATER HEATER PRESSURE VESSEL/HEAT EXCHANGER: 7 YEARS PRORATED

The pressure vessel/heat exchanger shall carry a (7) seven year prorated warranty from shipment against any failure due to condensate corrosion, thermal stress, mechanical defects or workmanship. Years 1-5 will be non-prorated, year 6 **AERCO** will cover 75% of the vessel/heat exchanger cost, and year 7 **AERCO** will cover at 50% the vessel/heat exchanger cost. Operation of the boiler using contaminated air will void the warranty. The pressure vessel/heat exchanger shall not be warranted from failure due to scaling, liming, corrosion, or erosion due to water or installation conditions. **AERCO** will repair, rebuild or exchange, at its option the heat exchanger/combustion chamber within this warranted time period.

THERMAL BUFFER: 5 YEARS

This warranty runs from date of installation (or without proof of installation, from three months after the date of manufacture) for a period of 5 years. All replacement tanks carry the balance of the original warranty. This warranty does not cover leakage or other malfunction caused by defective installation or adverse local conditions, specifically sediment or lime precipitate in the tank or corrosive elements in the atmosphere. This warranty also does not cover misuse, including lack of maintenance removal of magnesium anode(s), disconnection, alteration or addition of non-approved components or apparatus, operation with fuels or at settings other than those set forth on the rating plate, or accidental or other exterior damage.

OTHER COMPONENTS: 18 MONTHS FROM SHIPMENT

All other components, with the exception of the ignitor and flame detector, are conditionally guaranteed against any failure for 18 months from shipment.

AERCO shall accept no responsibility if such item has been improperly installed, operated, or maintained or if the buyer has permitted any unauthorized modification, adjustment, and/or repairs to the item.

The warranty as set forth on the back page of the Operations & Maintenance Manual is in lieu of and not in addition to any other express or implied warranties in any documents, or under any law. No salesman or other representative of **AERCO** has any authority to expand warranties beyond the face of the said warranty and purchaser shall not rely on any oral statement except as stated in the said warranty. An Officer of **AERCO** must do any modifications to this warranty in writing. **AERCO MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTIES.** **AERCO** disclaims all responsibility for any special, incidental or consequential damages. Any claim relating to the product must be filed with **AERCO** not later than 14 days after the event-giving rise to such claim. Any claims relating to this product shall be limited to the sale price of the product at the time of sale. The sale of the product is specifically conditioned upon acceptance of these terms.

(Continued)

STANDARD WARRANTY

AM Series Gas Fired Hydronic Boilers and Water Heaters (Cont.)

CONDITIONS OF WARRANTY

Should an AERCO gas-fired Hydronic boiler fail for any of the above reasons within the specified time period from the date of original shipment(s), AERCO shall, at its option, modify, repair or exchange the defective item. AERCO shall have the option of having the item returned, FOB to its factory, or to make field replacements at the point of installation. In no event shall AERCO be held liable for replacement labor charges or for freight or handling charges.

AERCO shall accept no responsibility if such item has been improperly installed, operated, or maintained or if the buyer has permitted any unauthorized modification, adjustment, and/or repairs to the item. The use of replacement parts not manufactured or sold by AERCO will void any warranty, express or limited.

In order to process a warranty claim a formal purchase order number is required prior to shipment of any warranty item. In addition, the returned item must include a Returned Goods Authorization (RGA) label, attached to the shipping carton, which identifies the item's return address, register number and factory authorized RGA number.

Warranty coverage for all components and equipment mentioned in said warranty are not valid unless the boiler/water heater is started up by an AERCO certified Technician and an AERCO start-up sheet is completed.

This warranty coverage is only applicable within the United States and Canada. All other geographical areas carry a standard warranty of 18 months from date of shipment or 12 months from startup, whichever comes first.

Change Log:

Date	Description	Changed By
07/22/2015	Rev A: Initial release	Curtis Harvey
11/30/2016	Rev B: Update parts list in Chapter 12 (reference DIR 352) Updated kit numbers in section 4.5.1 (DIR 400)	Chris Blair
11/20/2019	Rev B: Updated part numbers in Chapter 12 (DIR 19-70)	Linley Thobourne