

EP-100 Pump

Installation, Operation & Service Manual



⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the Installation, Operation and Service Manual thoroughly before installing or servicing this equipment.

Installation must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

Installer

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

Owner

Keep this manual in a safe place in order to provide your serviceman with necessary information.



Roberts-Gordon LLC
1250 William Street
P.O. Box 44
Buffalo, New York 14240-0044
Telephone: +1.716.852.4400
Fax: +1.716.852.0854
Toll Free: 800.828.7450

www.robertsgordon.com
www.rg-inc.com
www.radiantheaters.com
www.corayvac.com
www.greenhouse-heater.com

TABLE OF CONTENTS

SECTION 1: Heating System Safety	1	SECTION 13: The ROBERTS GORDON® EP-100 Series Pump Warranty	29
1.1 Manpower Requirements	1		
1.2 Safety Labels and Their Placement	1		
1.3 California Proposition 65	1		
SECTION 2: Installer Responsibility	3		
2.1 Corrosive Chemicals.....	3		
2.2 National Standards and Applicable Codes	3		
SECTION 3: Unpacking the Pump	4		
3.1 Open Shipping Cartons	4		
SECTION 4: Major Components	5		
4.1 Standard Parts List	6		
SECTION 5: Pump Installation	7		
5.1 Pump Assembly Instructions	7		
SECTION 6: Pressure Switch Mounting and Wiring	12		
SECTION 7: Pump Mounting Instructions	13		
7.1 Chain Suspension	13		
7.2 Wall Mounting.....	14		
SECTION 8: Motor Wiring	17		
8.1 Impeller Rotation Direction	17		
8.2 EP-100 Wiring	17		
SECTION 9: Venting	18		
9.1 General Venting Requirements.....	18		
9.2 Venting the Pump	18		
9.3 Vent Material Recommendations (in order of preferred use)	18		
9.4 Horizontal Venting.....	18		
9.5 Vertical Venting.....	20		
9.6 Condensate Trap and Condensate Tee	21		
SECTION 10: Servicing Instructions	24		
10.1 Pre-Season Maintenance and Annual Inspection	24		
10.2 To Change the Motor and/or the Impeller	24		
10.3 Maintenance Checklist.....	25		
SECTION 11: Replacement Parts and Accessories	26		
11.1 Replacement Parts	26		
11.2 Accessories	27		
SECTION 12: Specifications	28		
12.1 Material Specification	28		
12.2 Suspension Specifications	28		
12.3 Controls Specifications	28		

© 2012 Roberts-Gordon LLC

All rights reserved. No part of this work covered by the copyrights herein may be reproduced or copied in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping or information storage and retrieval systems - without the written permission of Roberts-Gordon LLC.

TABLE OF FIGURES

Figure 1: Label Placement	2
Figure 2: Major Component Descriptions	5
Figure 3: Pump Discharge Orientation	8
Figure 4: Pump Assembly	9
Figure 5: Damper Assembly	10
Figure 6: Motor Shaft Seal Installation	11
Figure 7: Pressure Switch Mounting Holes	12
Figure 8: Pressure Switch Mounting	12
Figure 9: Pump Pressure Switch	12
Figure 10: EP-100 Mounting - Chain Suspension	13
Figure 11: Wall Bracket Assembly	14
Figure 12: Wall Mounting Angle Assembly	15
Figure 13: Wall Mounting	15
Figure 14: Optional Platform Assembly Mounting	16
Figure 15: EP-100 Contactor Wiring Diagram	17
Figure 16: Horizontal Venting	19
Figure 17: Vertical Venting	20
Figure 18: Condensate Check Valve	21
Figure 19: Condensate Tee - Discharge Side	21
Figure 20: Condensate Neutralization Tube	23

LIST OF TABLES

Table 1: EP-100 Pump Package 4" (10 cm) (P/N 02719105)	6
---	---

SECTION 1: HEATING SYSTEM SAFETY



Your Safety is Important to Us! This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, service and annual inspection of heater and pump must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation or service of this equipment.

This heating system is designed for heating nonresidential indoor spaces. Do not install in residential spaces. These instructions, the layout drawing, local codes and ordinances, and applicable standards that apply to electrical wiring, venting, etc. must be thoroughly understood before proceeding with the installation.

Protective gear is to be worn during installation, operation and service. Thin sheet metal parts, such as the various venting components, have sharp edges. To prevent injury, the use of work gloves is recommended.

Do not attempt to operate the pump until all steps of the installation have been accomplished.

This pump must be applied and operated under the general concepts of reasonable use and installed using best building practices.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do no play with the appliance.

For additional copies of the Installation, Operation and Service Manual, please contact Roberts-Gordon LLC.

1.1 Manpower Requirements

To prevent personal injury and damage to the pump, two persons will be required for installation.

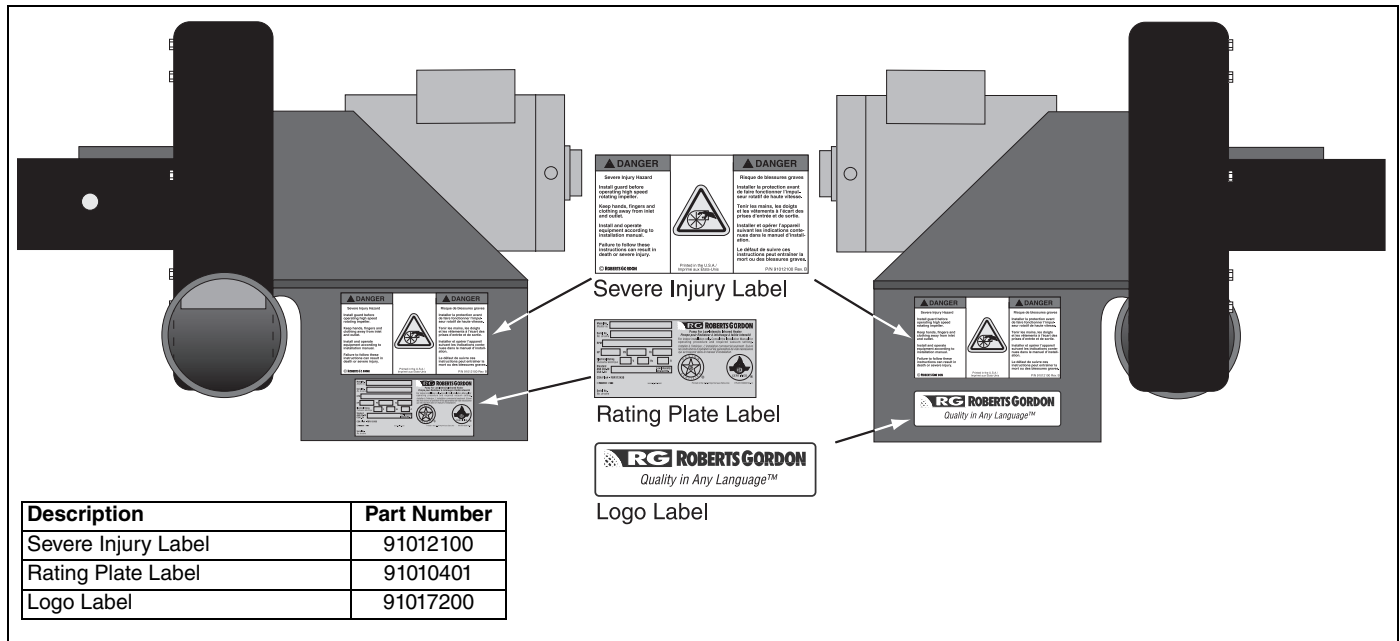
1.2 Safety Labels and Their Placement

Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. See *Page 2, Figure 1*.

1.3 California Proposition 65

In accordance with California Proposition 65 requirements, a warning label must be placed in a highly visible location on the outside of the equipment (i.e., near equipment's serial plate). See the heaters' Installation, Operation and Service Manual for label placement. Avoid placing label on areas with extreme heat, cold, corrosive chemicals or other elements. To order additional labels, please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor.

FIGURE 1: Label Placement



SECTION 2: INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- To install the pump and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon LLC recommends the installer contact a local building inspector or fire marshal for guidance.
- To use the information given in a layout drawing and in the manual together with the cited codes and regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports.
- To provide access to pump for servicing on all sides and for pump removal.
- To provide the owner with a copy of this installation, operation and service manual.
- To never use pump or pump platform as support for ladder or other access equipment and never hang or suspend anything from pump or pump platform.
- To ensure there is adequate air circulation around the heater and to supply air for combustion, ventilation and distribution in accordance with local codes.
- To safely and adequately install pump using materials with a minimal working load of 750 lb (340 kg).
- To ensure the pump is placed in an approved application.

2.1 Corrosive Chemicals


<p>Product Damage Hazard</p> <p>Do not use heater in area containing corrosive chemicals.</p> <p>Refer to appropriate Material Safety Data Sheets (MSDS).</p> <p>Failure to follow these instructions can result in product damage.</p>

Roberts-Gordon LLC cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons* anywhere in the premises.

* **Halogenated Hydrocarbons** are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the life span of the heater components will be greatly reduced. An outside air supply must be provided to the burners whenever the presence of these compounds is suspected. Warranty will be invalid if the heater is exposed to halogenated hydrocarbons.

2.2 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of the applicable standards and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in Public Garages, Aircraft Hangars, etc. may be applicable.

SECTION 3: UNPACKING THE PUMP

3.1 Open Shipping Cartons

! WARNING

<p>Cut/Pinch Hazard</p> <p>Wear protective gear during installation, operation and service.</p> <p>Edges are sharp.</p> <p>Failure to follow these instructions can result in injury.</p>

Open cartons and remove packing inserts. Carefully remove pump components from the cartons. Lift assembly by gripping metal pump frame. Two people are required (weight 62 lbs, 28.1 kg). This pump has been tested prior to packing. The impeller was dynamically balanced before assembly and requires care in handling to avoid damage.

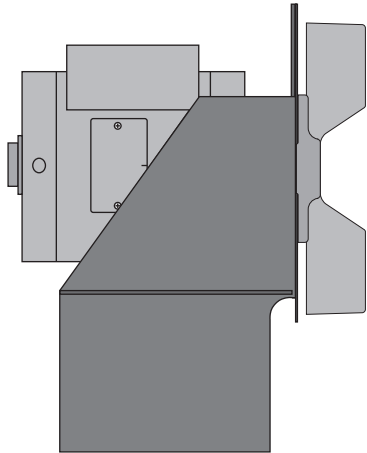
! DANGER

<p>Severe Injury Hazard</p> <p>Install pump scroll and inlet assembly before operating high speed rotating impeller.</p> <p>Keep hands, fingers and clothing away from inlet and outlet.</p> <p>Install and operate equipment according to installation manual.</p> <p>Failure to follow these instructions can result in death or severe injury.</p>

SECTION 4: MAJOR COMPONENTS

FIGURE 2: Major Component Descriptions

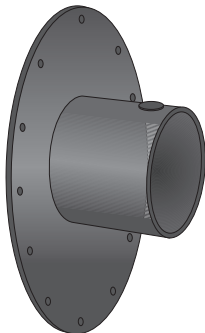
EP-100 Pump Assembly - P/N 02719100



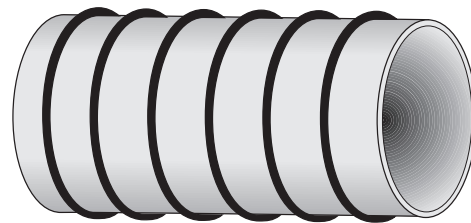
Pump Scroll - P/N 02757001



Pump Inlet Assembly - P/N 02724200



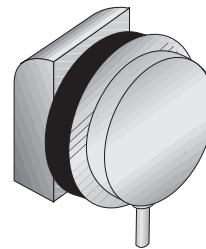
Pump Boot - P/N 91412800



Band Clamp 4" (10 cm) - P/N 91901300



Pressure Switch - P/N 90430600K



2 1/2" S-Hook - P/N 91907302



Bird Screen 4" (10 cm) P/N 01365400



4.1 Standard Parts List

Table 1: EP-100 Pump Package 4" (10 cm) (P/N 02719105)

Part No.	Description	Quantity
	Box 1 of 2	
02719100	Pump Frame, Motor and Impeller Assembly	1
127102NA	CORAYVAC® Installation, Operation and Service Manual	1
	Box 2 of 2	
02724700	EP-100 Accessory Package	1
127201NA	EP-100 Installation, Operation and Service Manual	1
02724200	Pump Inlet Assembly	1
02757001	Pump Scroll	1
91901300	Pump Boot Clamps 4" (10 cm)	5
91907302	2 1/2" S-Hooks	3
91412800	Pump Boots 4" (10 cm)	2
92311600	#10-24 Keps Locknuts	12
90430600K	Pressure Switch	1
02757500	Motor Shaft Seal	1
01365400	Bird Screen 4" (10 cm)	1
01327500	Damper Assembly	1
01329500	Damper Support Assembly	1
93413008	Bolt 1/4" - 20 x 1/2" Hex Head	1
95211600	5/16" Flat Washer	1
96211500	1/4" External Tooth Lockwasher	1

SECTION 5: PUMP INSTALLATION

⚠ DANGER**Severe Injury Hazard**

Install pump scroll and inlet assembly before operating high speed rotating impeller.

Keep hands, fingers and clothing away from inlet and outlet.

Install and operate equipment according to installation manual.

Failure to follow these instructions can result in death or severe injury.

⚠ WARNING**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

⚠ WARNING**Severe Injury Hazard**

Secure pump to tube.

Hang pump with materials with a minimum working load of 750 lbs (340 kg).

Failure to follow these instructions can result in death, injury or property damage.

5.1 Pump Assembly Instructions**5.1.1 Determine Orientation of Pump Discharge**

To ensure your safety and comply with the terms of the warranty, all units must be installed in accordance with these instructions.

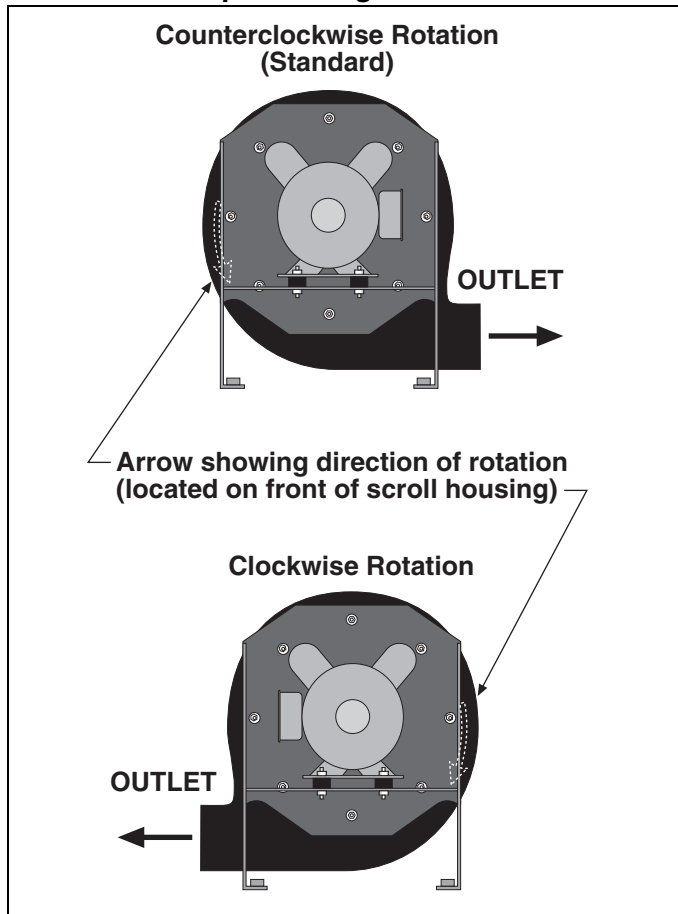
The pump must be installed in a location that it is readily accessible for servicing.

An arrow is affixed to the outside of the pump scroll to indicate the direction of rotation of the impeller.

The standard rotation of the impeller is in the counterclockwise direction.

Pump discharge orientation is viewed from the rear of the motor as shown on Page 8, Figure 3. Note that the pump scroll outlet must always be positioned at the bottom horizontal position.

FIGURE 3: Pump Discharge Orientation



5.1.2 Attaching Pump Scroll

After determining the correct orientation of the pump scroll outlet, attach the pump scroll to the pump frame using the #10 - 24 Keps locknuts provided.

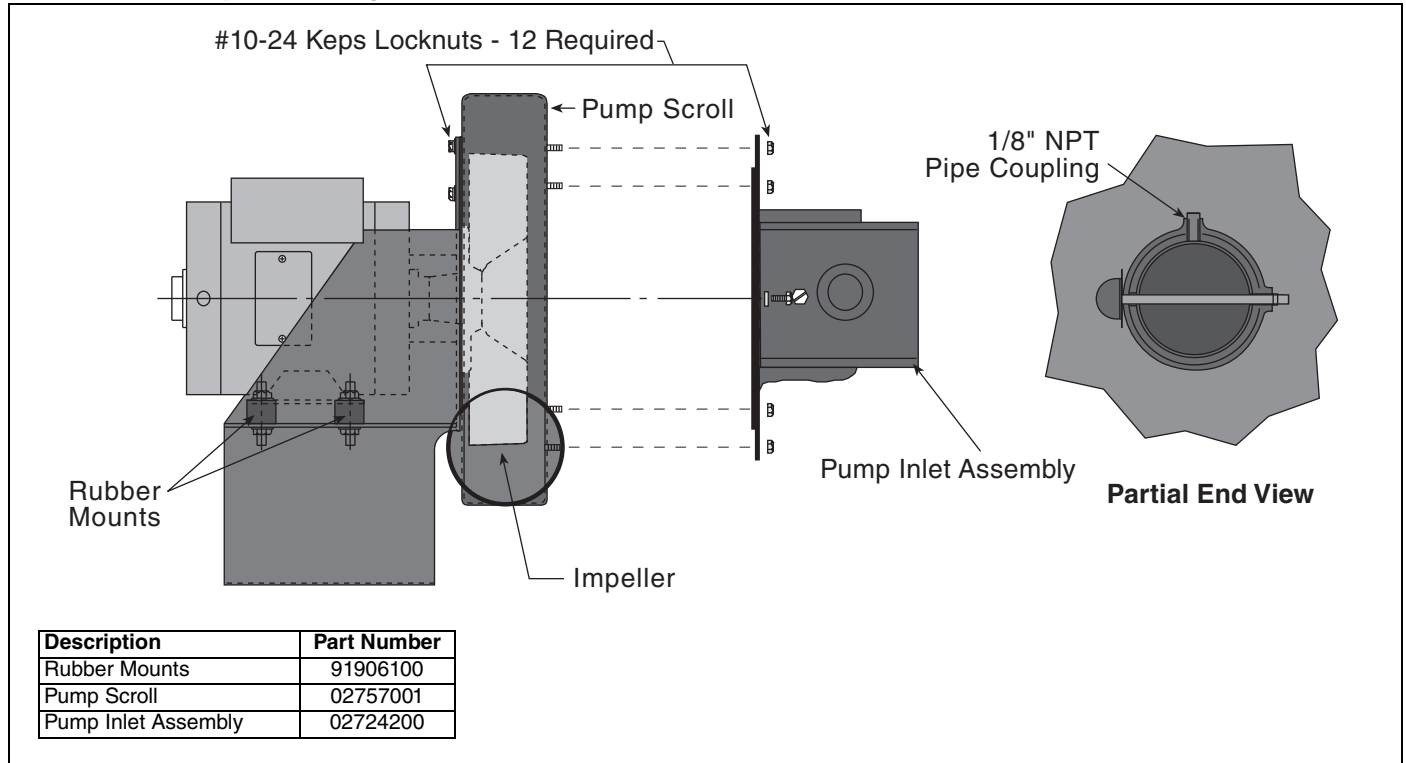
NOTE: Periodically spin the impeller to be sure that adequate clearance is maintained between the impeller blades and the body of the pump scroll.

5.1.3 Attaching the Pump Inlet Assembly

From the scroll assembly side of the pump, orient the inlet assembly so the threaded pipe coupling is on the top. See partial end view on Page 9, Figure 4.

- Attach inlet assembly onto the scroll assembly by using the #10 - 24 Keps locknuts provided.

FIGURE 4: Pump Assembly



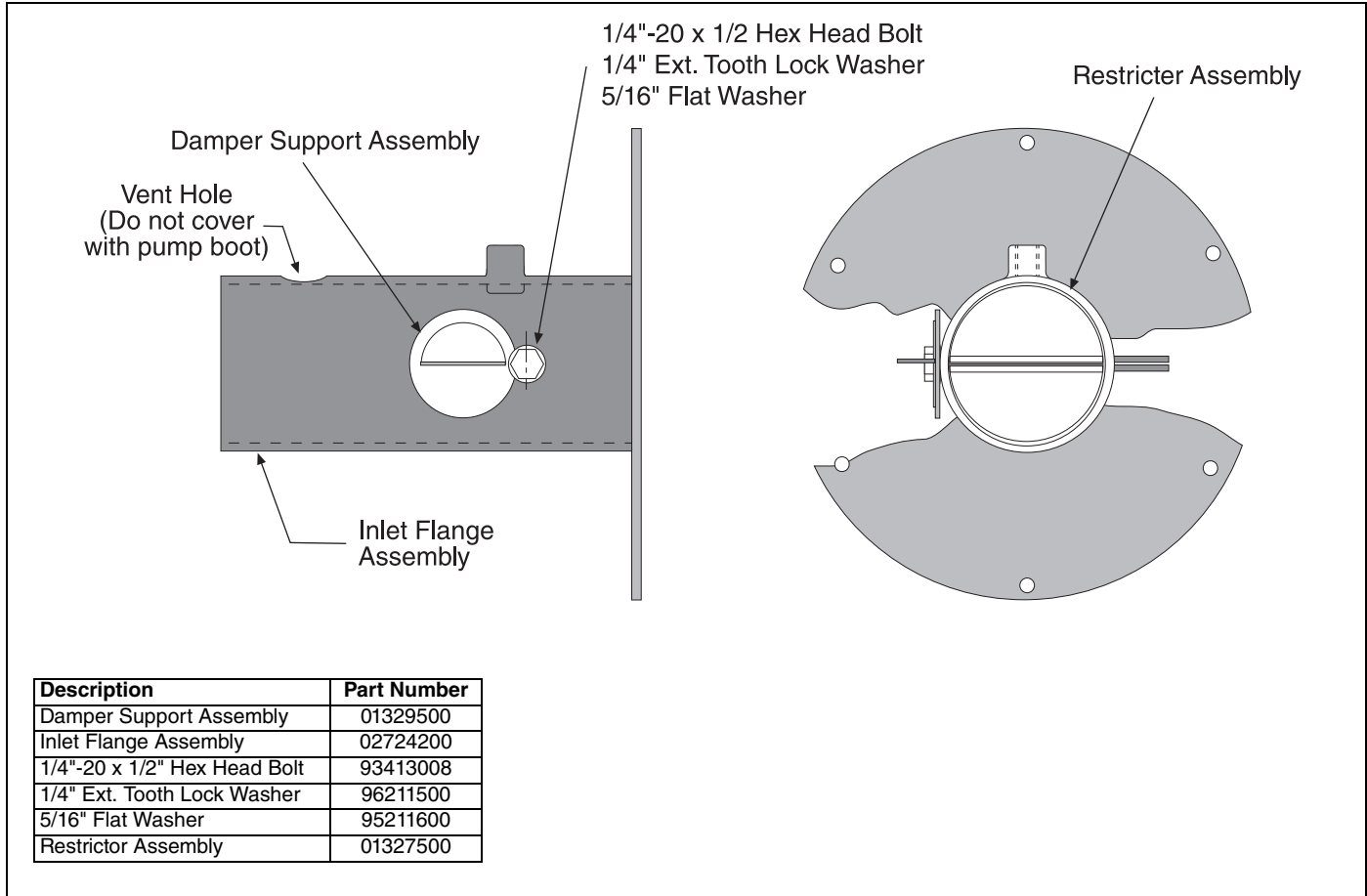
5.1.4 Damper Assembly

The pump is equipped with a damper assembly which is used as a means of setting the system vacuum. See the appropriate Installation, Operation and Service Manual for additional vacuum setting information.

1. When the pump is installed, be certain to lock the damper in the full open position with the (1/4"-20) Hex Head bolt. See Page 10, Figure 5.

2. The pump inlet assembly is provided with a 1/8" N.P.T. tapping. This is to be located at the top and used for connection of the pressure switch (P/N 90430600K). See Page 12, Figure 8.

FIGURE 5: Damper Assembly

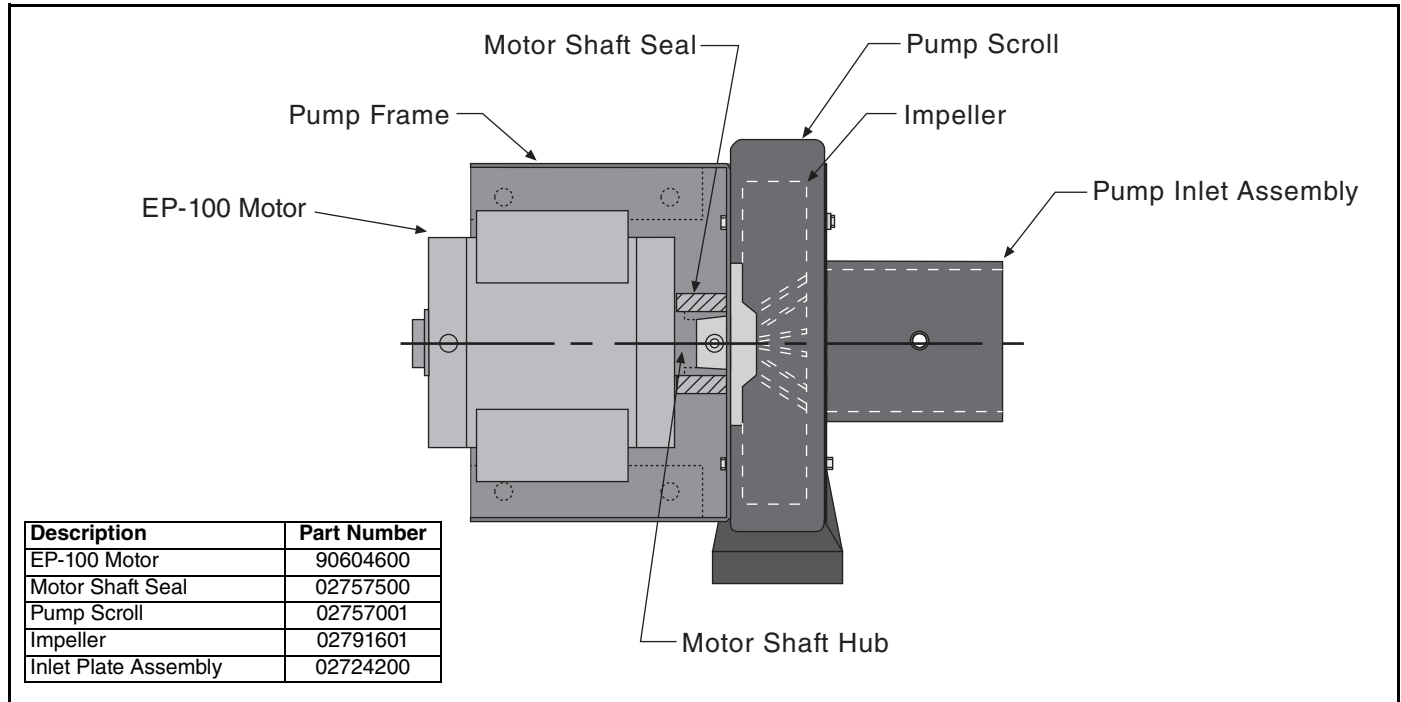


5.1.5 Installing the Motor Shaft Seal

The motor shaft seal (P/N 02757500) eliminates air leakage around the motor shaft and reduces the associated noise. Install the shaft seal as follows:

1. Separate the motor shaft seal at the pre-cut score line.
2. Wrap the shaft seal around the motor shaft hub as shown.
3. Secure the shaft seal in position with the adhesive strip provided.

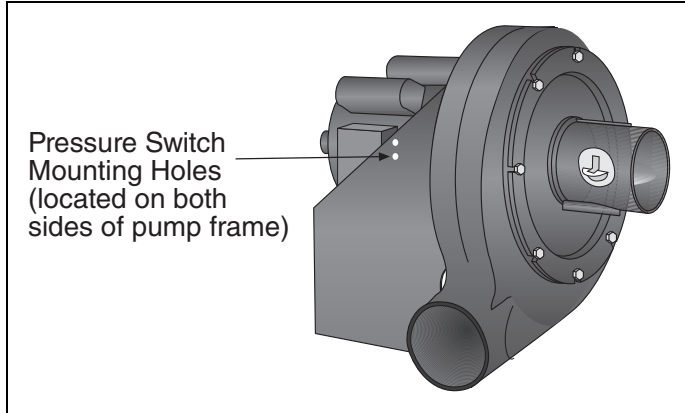
FIGURE 6: Motor Shaft Seal Installation



SECTION 6: PRESSURE SWITCH MOUNTING AND WIRING

For connection to a pump, locate the two pressure switch mounting holes on the pump frame. If replacing an old pressure switch, you may need to drill two holes in the pump frame (7/32" dia. approximately 13/16" apart).

FIGURE 7: Pressure Switch Mounting Holes



Using hardware included, mount the switch to the pump frame. Thread the barbed fitting into the threaded hole at the pump inlet. Cut the silicone tube to the appropriate length to eliminate the possibility of kinks and securely attach the hose to the pressure switch and the barbed fitting.

FIGURE 8: Pressure Switch Mounting

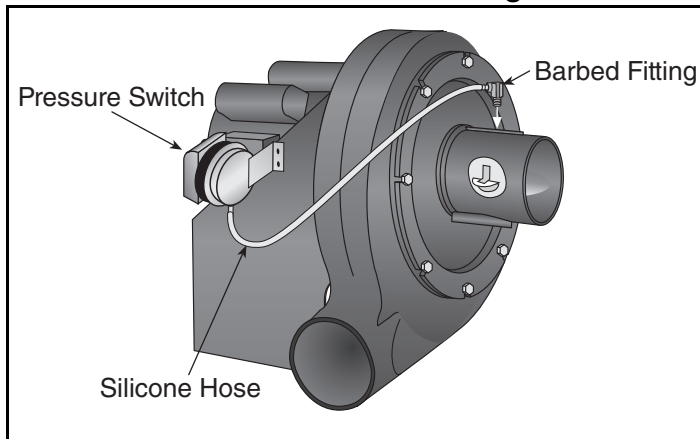
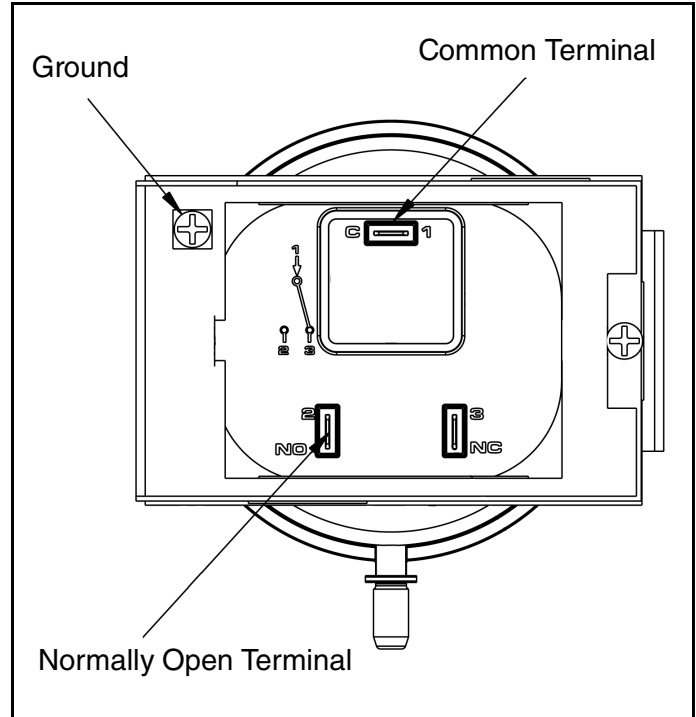
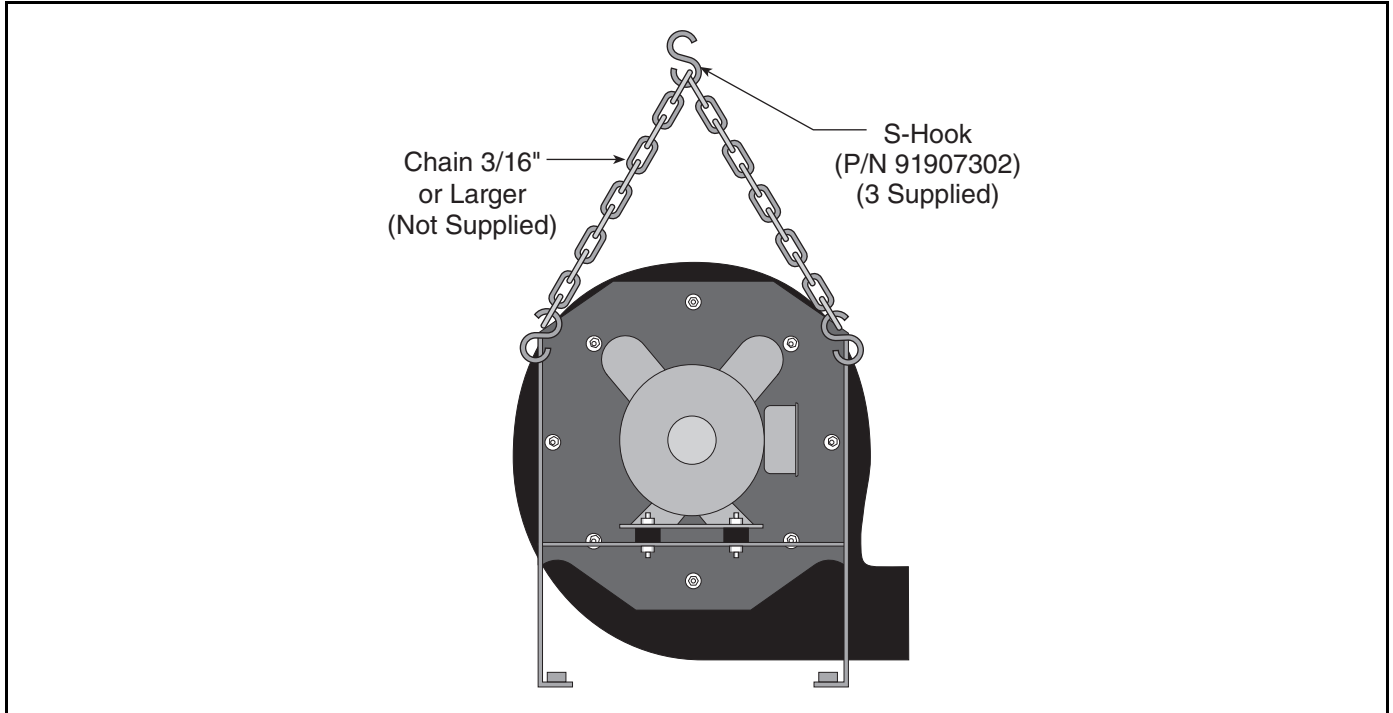


FIGURE 9: Pump Pressure Switch



SECTION 7: PUMP MOUNTING INSTRUCTIONS**7.1 Chain Suspension**

The standard method of mounting the EP-100 pump is suspending it from a chain and venting through the roof.

FIGURE 10: EP-100 Mounting - Chain Suspension

7.2 Wall Mounting

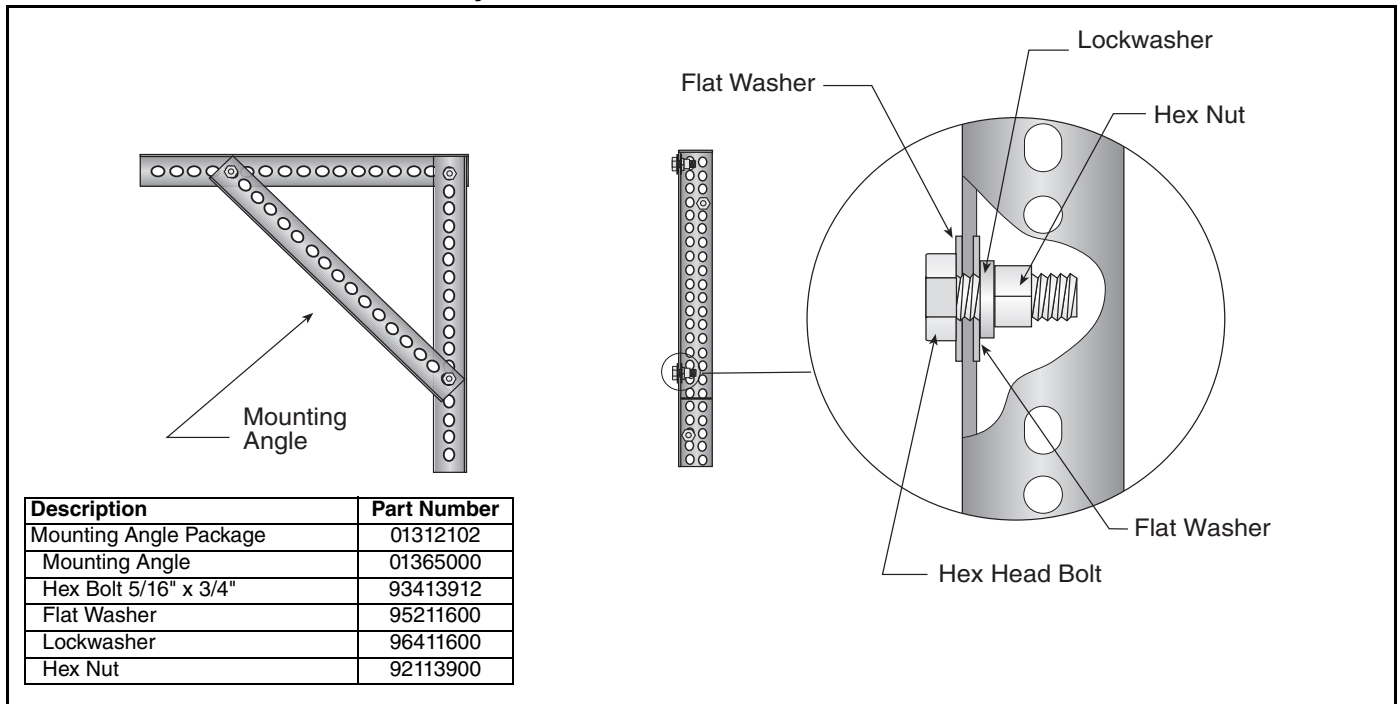
7.2.1 Wall Mounting Platform

The alternative method of mounting the pump is on an outside wall and venting directly through the wall. The optional mounting angle package (P/N 01312102) must be ordered if this method is used.

The pump may be mounted by using mounting angles as shown on *Page 14, Figure 11* and *Page 15, Figure 12*. The two mounting angles form a mounting platform to which the pump will be attached.

Fix the mounting frame to the wall using anchors. Select an anchor that will give equal to or greater than 2000 lbs ultimate pull-out strength.

FIGURE 11: Wall Bracket Assembly



7.2.2 Mounting Platform (Angle Assembly)

Pump may be mounted by using mounting angles as shown on Page 15, Figure 12.

FIGURE 12: Wall Mounting Angle Assembly

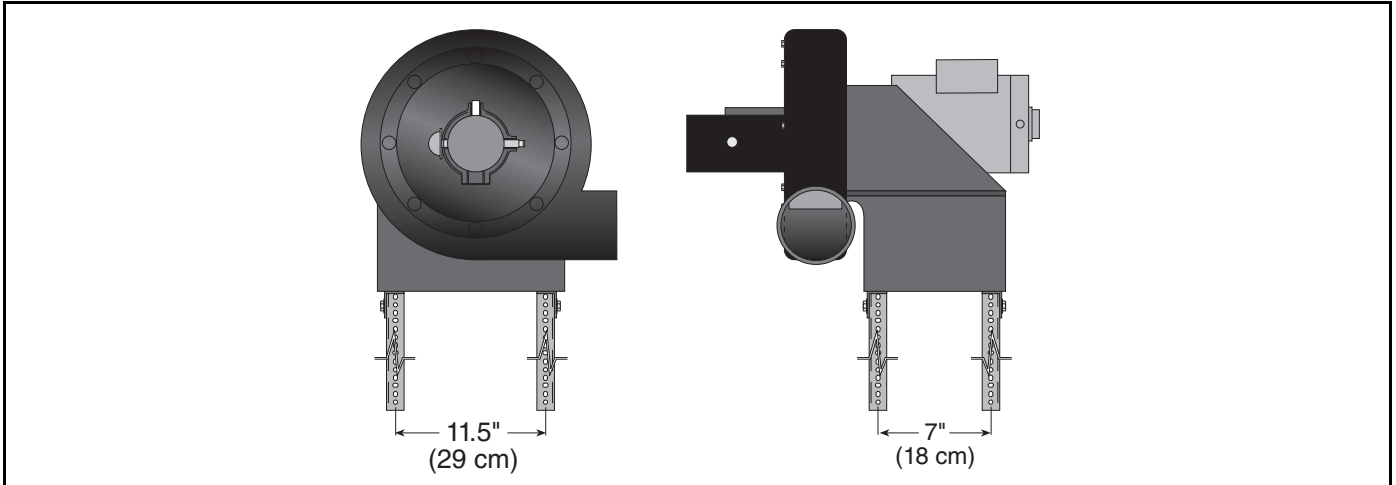
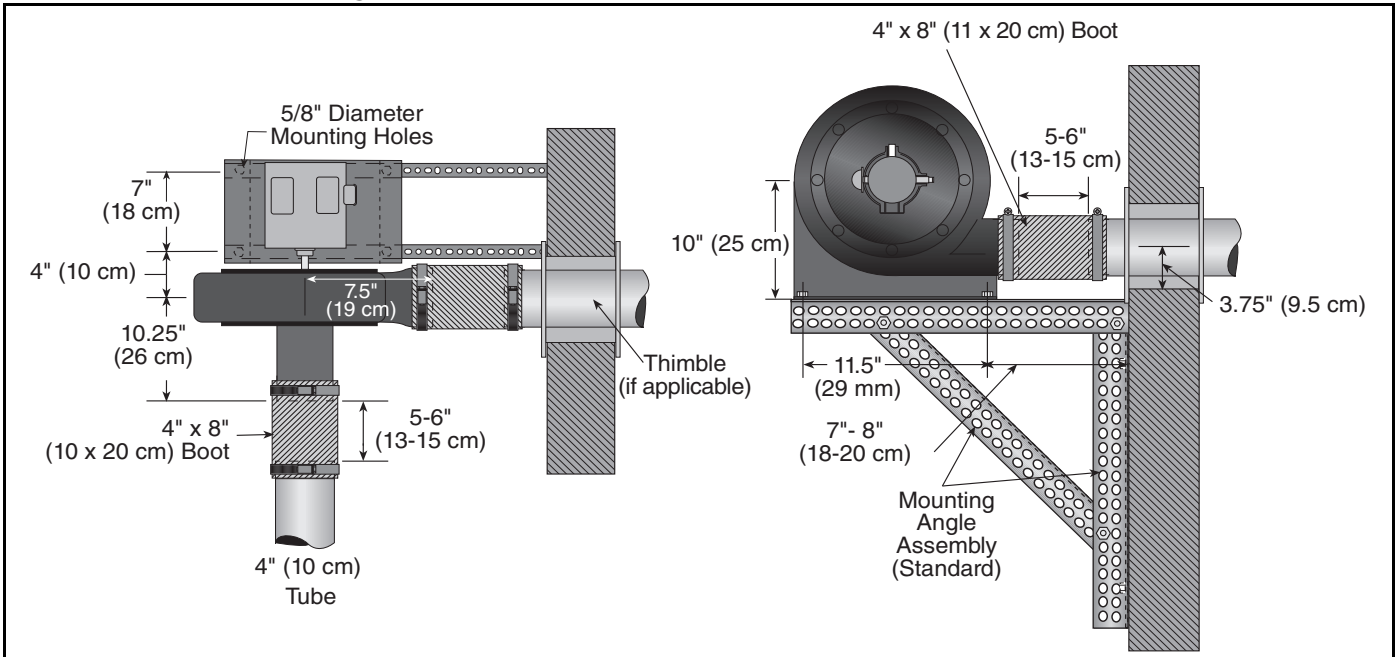


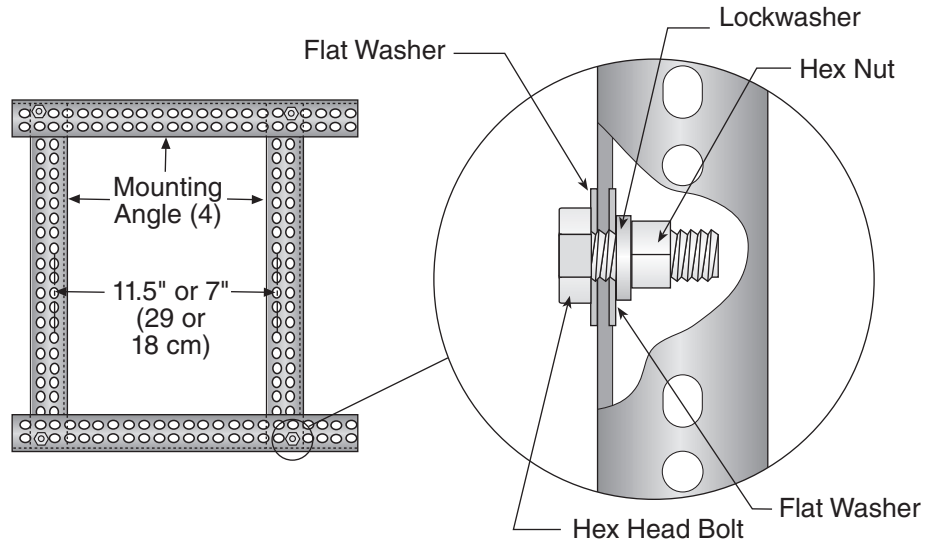
FIGURE 13: Wall Mounting



7.2.3 Mounting Platform (Optional Platform Assembly)

If mounting on an outside wall is not practical, it may be mounted on a platform suspended from the ceiling, or for noise reduction, in an enclosure.

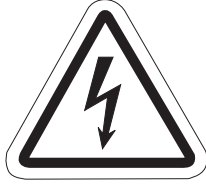
FIGURE 14: Optional Platform Assembly Mounting



Description	Part Number
Mounting Angle Package	01312102
Mounting Angle	01365000
Hex Bolt 5/16" x 3/4"	93413912
Flat Washer	95211600
Lockwasher	96411600
Hex Nut	92113900

SECTION 8: MOTOR WIRING

⚠ DANGER



Electrical Shock Hazard

Disconnect electric before service.

Appliance must be properly grounded.

Failure to follow these instructions can result in death or electrical shock.

All wiring must comply with current wiring regulations and any local regulations which may apply. Always switch off the supply and disconnect before servicing.

8.1 Impeller Rotation Direction

Prior to operation of the pump in the heating system, operation and proper rotation of the impeller must be verified. See impeller rotation direction arrow label on

the pump scroll for the correct rotation direction.

The motor must be wired for clockwise or counterclockwise rotation.

IMPORTANT: Improper rotation of the impeller can produce only half of the vacuum required for proper system operation.

8.2 EP-100 Wiring

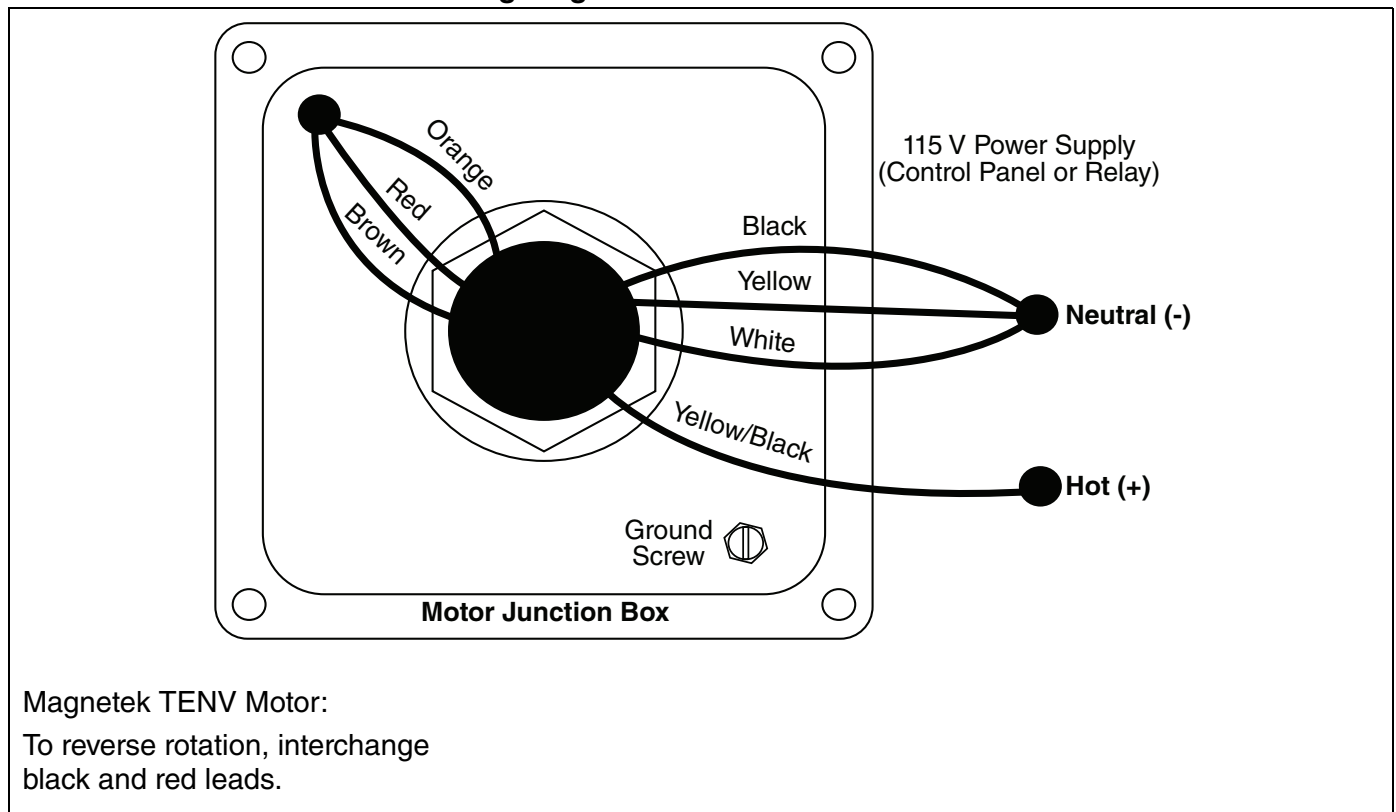
The EP-100 motor is wired for 1 Ø, 115 V, 60 Hz operation. However, the motor can be rewired for 230 V operation by changing the motor connections as indicated by the diagram on the motor connection box cover.

Motor operation can be changed from counterclockwise to clockwise as shown on *Page 8, Figure 3*.

When controlled by a system control, use contactor package 17A (P/N 10050011). See *Page 17, Figure 15*. See ROBERTS GORDON® System Control Manual (P/N 10091601NA) wiring details.


Wire the pressure switch per the CORAYVAC® (P/N 127102NA) or VANTAGE® NP (P/N 152101NA) Installation, Operation and Service Manual.

FIGURE 15: EP-100 Contactor Wiring Diagram



SECTION 9: VENTING

! WARNING



Carbon Monoxide Hazard
Pump must be vented to the outside.
Heaters must be installed according to the installation manual.
Failure to follow these instructions can result in death or injury.

! WARNING



Cut/Pinch Hazard
Wear protective gear during installation, operation and service.
Edges are sharp.
Failure to follow these instructions can result in injury.

9.1 General Venting Requirements

This pump must be vented in accordance with the rules contained in this manual and with the following national codes and any state, provincial or local codes which may apply:

United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

This section provides partial information about this specification with regard to size and configuration for venting requirements (see Page 19, Figure 16 and Page 20, Figure 17). However, to provide assurance of proper and safe operation, it is the responsibility of the installer to make sure the installation is in strict accordance with all local and national codes.

9.2 Venting the Pump

- The exhaust connection from the pump is 4" (10 cm) diameter.
- Connect the 4" (10 cm) pump boot (provided) to the 4" (10 cm) flue pipe, using the 4" (10 cm) band clamp provided. Connections to flue pipe larger than 4" (10 cm) require use of an appropriate taper pattern reducer (not supplied).
- Venting from the pump may discharge either horizontally or vertically. **Horizontal discharge is preferred.** See Page 19, Figure 16. Vertical discharge must be arranged as shown on Page 20, Figure 17. Corrosion resistant pipe is required.
- Both horizontal and vertical venting must be supported by suitable hangers.
- Vent lengths are allowed as follows:

VENT LENGTH	VENT SIZE
Up To 25' (8 m)	4" (10 cm) vent - 3 elbows
Up To 50' (15 m)	5" (12.5 cm) vent - 3 elbows

9.3 Vent Material Recommendations (in order of preferred use)

1. Porcelain coated tubing 4" (10 cm) O.D. (P/N 9141030D)
2. Heat treated aluminized tubing 4" (10 cm) O.D. (P/N 91409408)
3. Single wall flue pipe (corrosion resistant) - minimum 26 Ga. (Not suitable for modulating and condensing system designs)

9.4 Horizontal Venting

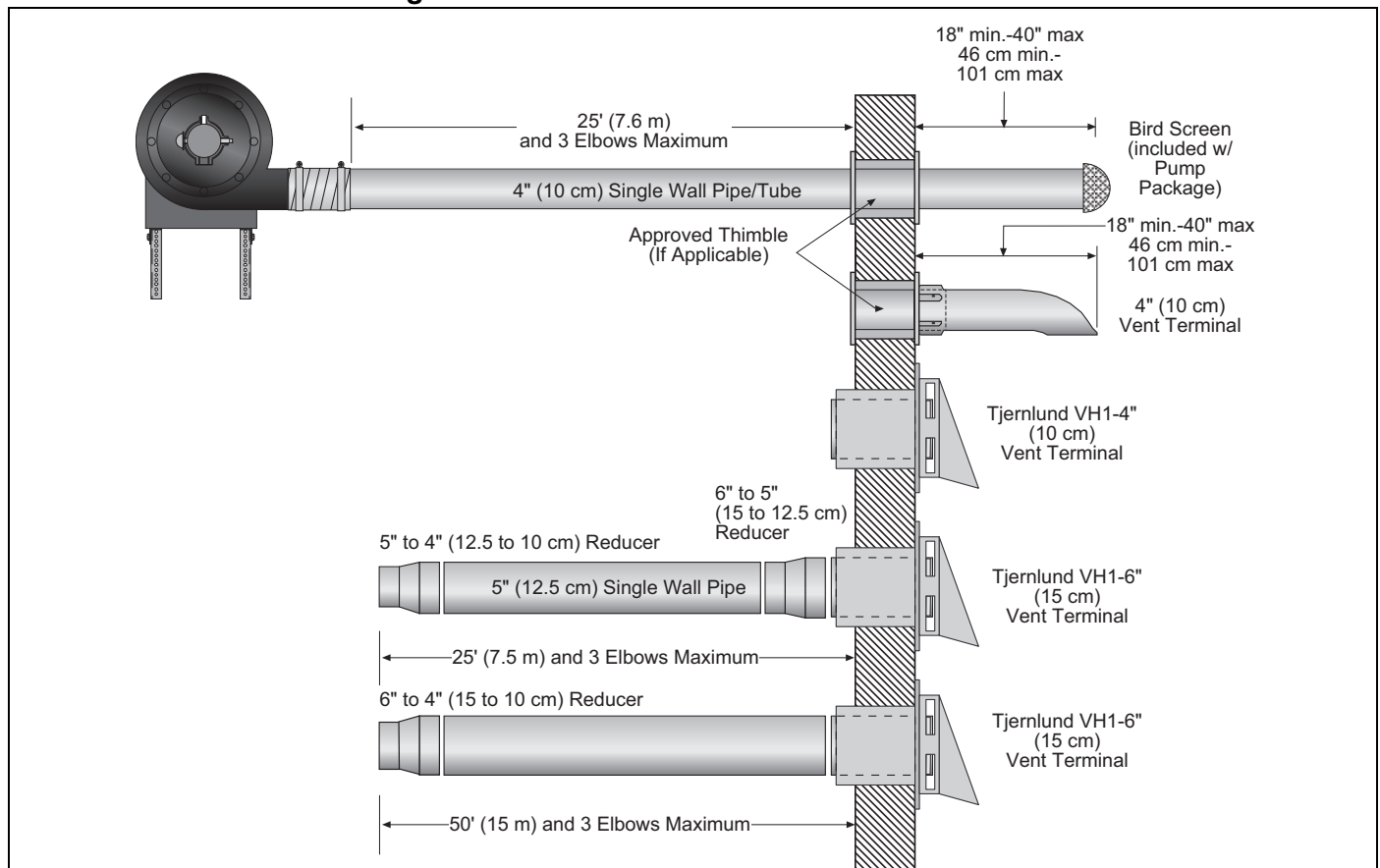
If using vent lengths greater than 30' (9 m), condensation will form in the vent pipe. Insulation and additional sealing measures will be required. Seal all discharge pipe joints with high temperature silicone adhesive.

9.4.1 Horizontal Venting Guidelines

- Vent must exit building not less than 7' (2 m) above grade when located adjacent to public walkways.
- Vent must terminate at least 3' (1 m) above any forced air inlet located within 10' (3 m).

- Vent must terminate at least 4' (1.2 m) below, 4' (1.2 m) horizontally from, or 12" (30 cm) above any door, window or gravity air inlet into building.
- Locate vent terminal at least 12" (30 cm) from any opening through which vent gases could enter a building.
- Use only corrosion resistant materials for the discharge line from the pump to the point of discharge.
- Vent terminal opening must extend beyond any combustible overhang.
- Install vent terminal at a height sufficient to prevent blockage by snow.
- Protect building materials from degradation by flue gases.
- Any portion of flue pipe passing through a combustible wall must be dual insulated and an approved thimble must be used.

FIGURE 16: Horizontal Venting



Description	Part Number
Bird Screen 4" (10 cm)	01365400
Bird Screen, 6" (15 cm)	01397400
Band Clamp, 4" (10 cm)	91901300
Band Clamp, 6" (15 cm)	91913703

Description	Part Number
Vent Terminal, 4" (10 cm)	02537801-IP
Vent Terminal, Tjernlund VH1-4	90502100
Vent Terminal, Tjernlund VH1-6	90502101

9.5 Vertical Venting

Vent length should be limited to less than 30' (9 m).
 If using vent lengths greater than 30' (9 m),
 condensation will form in the vent pipe. Insulation
 and additional sealing measures will be required.
 Length of flue pipe is equal to total of vertical and
 horizontal length.

FIGURE 17: Vertical Venting

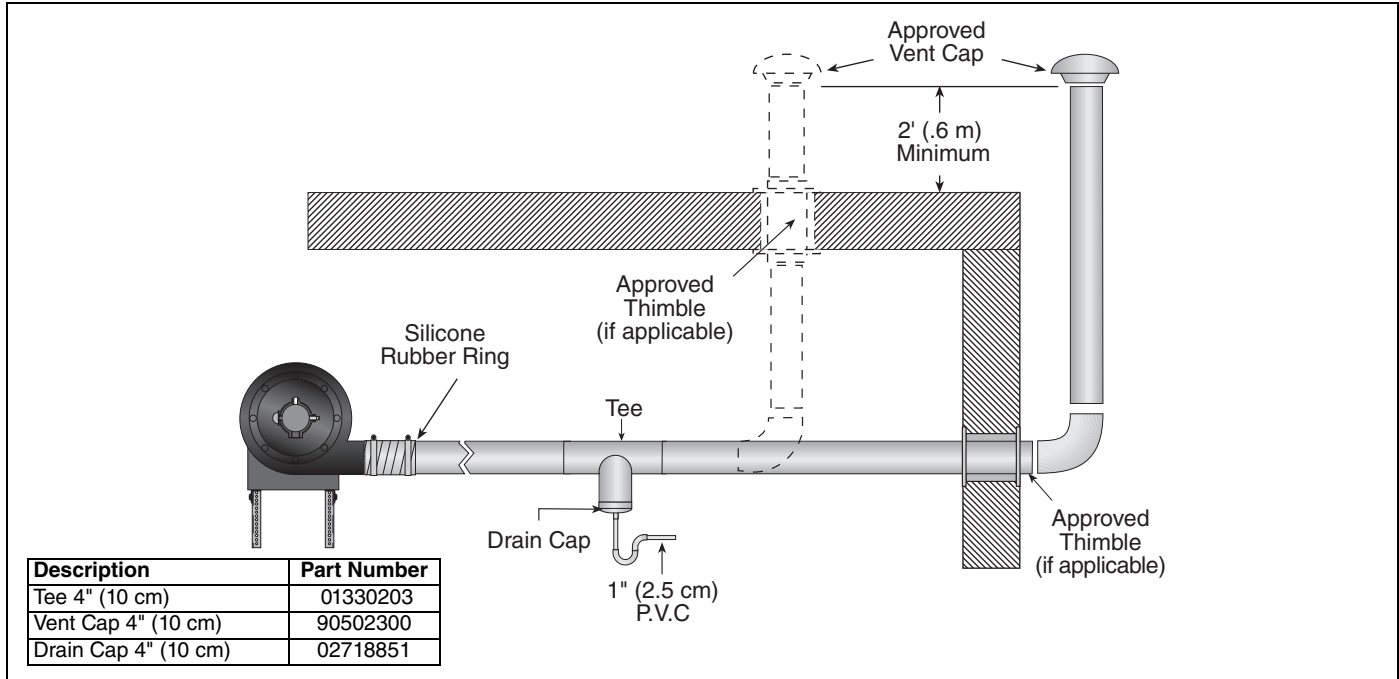
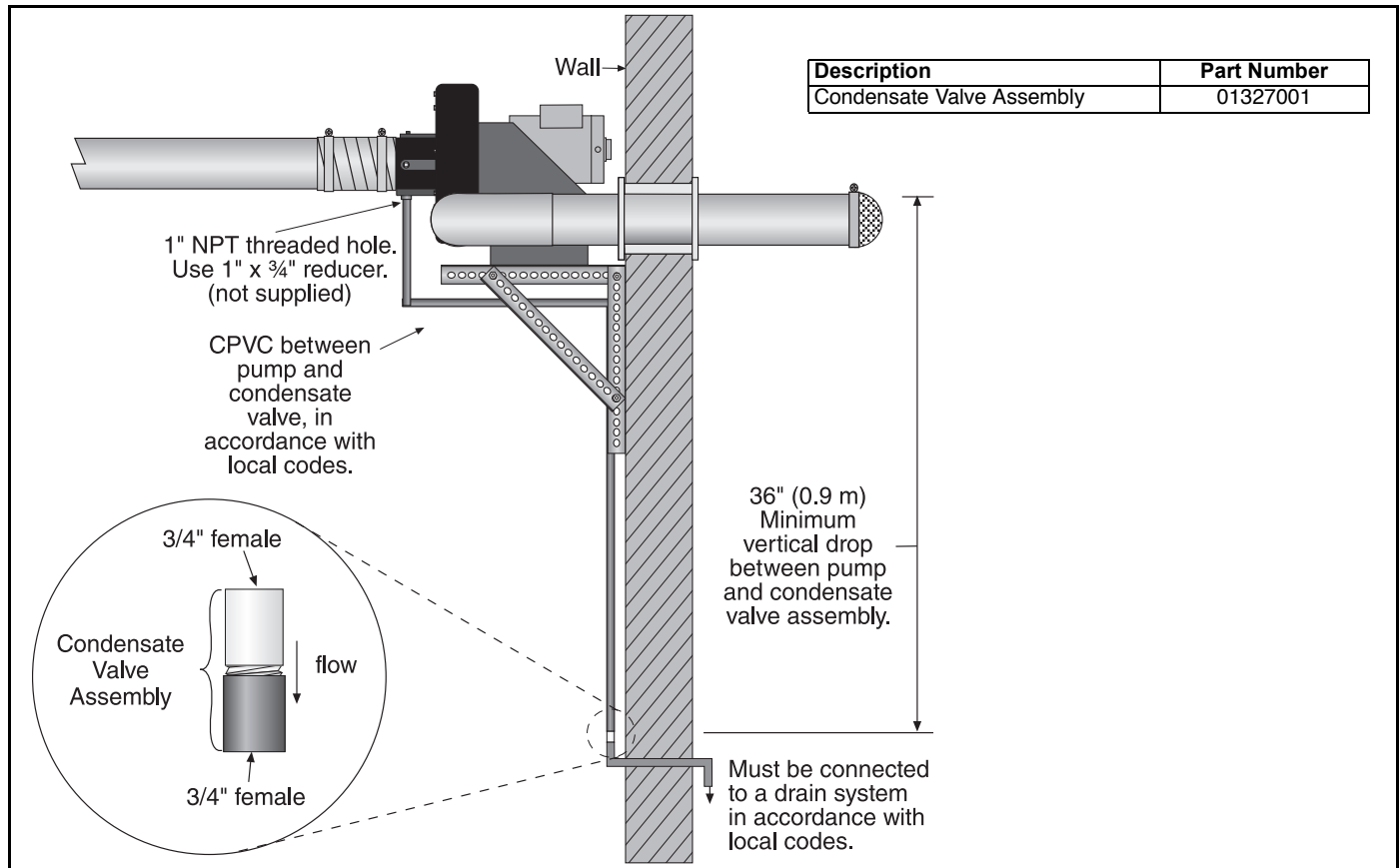
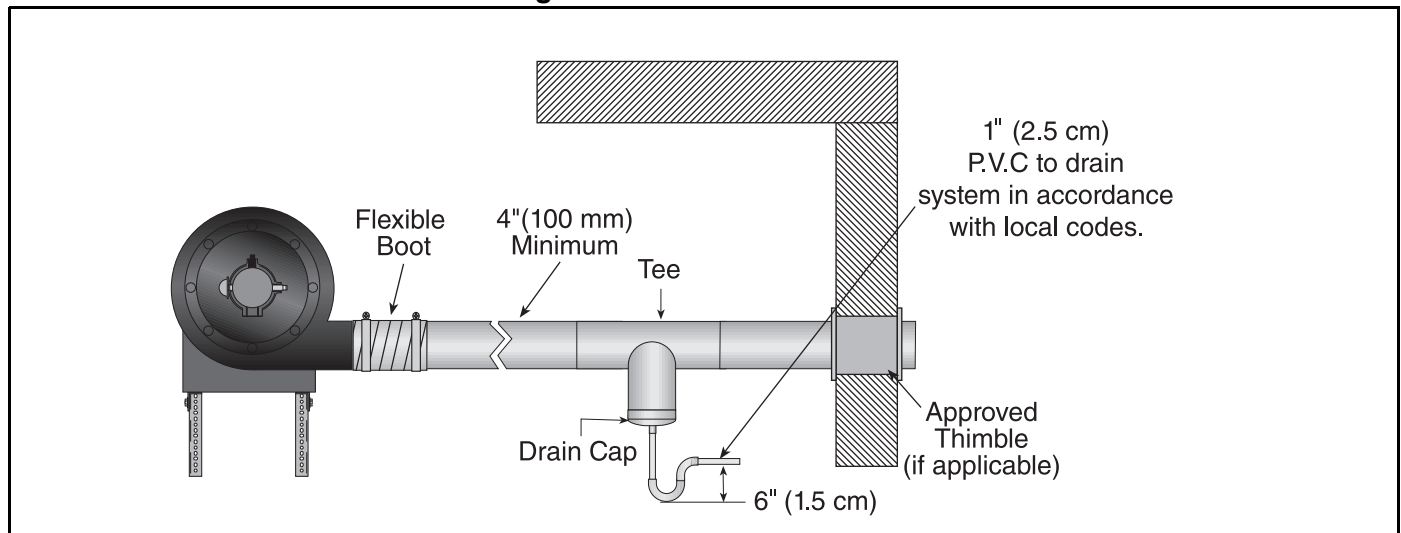


FIGURE 18: Condensate Check Valve**FIGURE 19: Condensate Tee - Discharge Side**

9.6 Condensate Trap and Condensate Tee

The condensate trap assembly (optional) (P/N 01327001), should be installed on the inlet side of the EP-200 Series pump assembly, See Page 21, Figure 18.

It is possible to eliminate the condensate trap assembly on the pump if the one-inch threaded hole is plugged. This arrangement will permit drainage of

condensate through the pump and outside via horizontal (pitched) discharge line.

The condensate trap assembly in the discharge line can be eliminated if the discharge line is horizontal through the wall and pitched down at least one inch per foot. A condensate trap on the discharge side is required if there is a vertical rise in the discharge line.

9.6.1 Condensate Neutralization Tube (optional)

If a condensate neutralization tube is specified to be used with the heating system, follow the steps below to choose the proper condensate neutralization tube. See Page 23, Figure 20.

Step 1: Condensate flow (gal/h) per 100,000 Btu/h installed

You will need to know the tailpipe length per flow unit and the total input (Btu/h) on the heating system. Please refer to the following chart to determine the condensate flow (gal/h) per 100,000 Btu/h installed:

Radiant Tube Length (average distance between burners)	Tailpipe Length per Flow Unit			
	Minimum	Recommended	1.7 ft/flow unit	Maximum
Minimum	N/A	0.1	0.3	0.6
Recommended	0.1	0.3	0.6	0.8
Maximum	0.3	0.6	0.8	0.8

Step 2: Total condensate

Determine the total condensate (gal/h) using the follow calculation:

$$\text{Total condensate (gal/h)} = \text{Total Input (Btu/h)} / 100,000 \text{ (Btu/h)} \times \text{condensate flow (gal/h)}$$

Step 3: Choose the condensate neutralization tube

Choose the condensate neutralization tube which is closest to and higher than the calculated gal/h value.

Calculated gal/h	Description	Part Number
Less than 2	Condensate Neutralization Tube 200	01327002
Less than 6	Condensate Neutralization Tube 600	01327003
Less than 10	Condensate Neutralization Tube 1000	01327004
Less than 20	Condensate Neutralization Tube 2000	01327005

Example:

CORAYVAC® system has a total input of 600,000 Btu/h. The radiant tube length and tailpipe are set-up according to the RECOMMENDED specifications.

Step 1: Condensate flow (gal/h) per 100,000 Btu/h installed

Select 0.3 from the Condensate flow chart.

Radiant Tube Length (average distance between burners)	Tailpipe Length per Flow Unit			
	Minimum	Recommended	1.7 ft/flow unit	Maximum
Minimum	N/A	0.1	0.3	0.6
Recommended	0.1	0.3	0.6	0.8
Maximum	0.3	0.6	0.8	0.8

Step 2: Total condensate

Multiply the total input Btu/h / 100,000 by the condensate flow (gal/h) per 100,000 (Btu/h) (600,000/100,000) x 0.3 = 1.8 (gal/h)

Step 3: Choose the condensate neutralization tube

Choose the condensate neutralization tube which is closest to and higher than the calculated gal/h value. For this example, the total condensate is 1.8 (gal/h), the condensate neutralization tube which is closest to and higher than the calculated gal/h value is P/N 01327002.

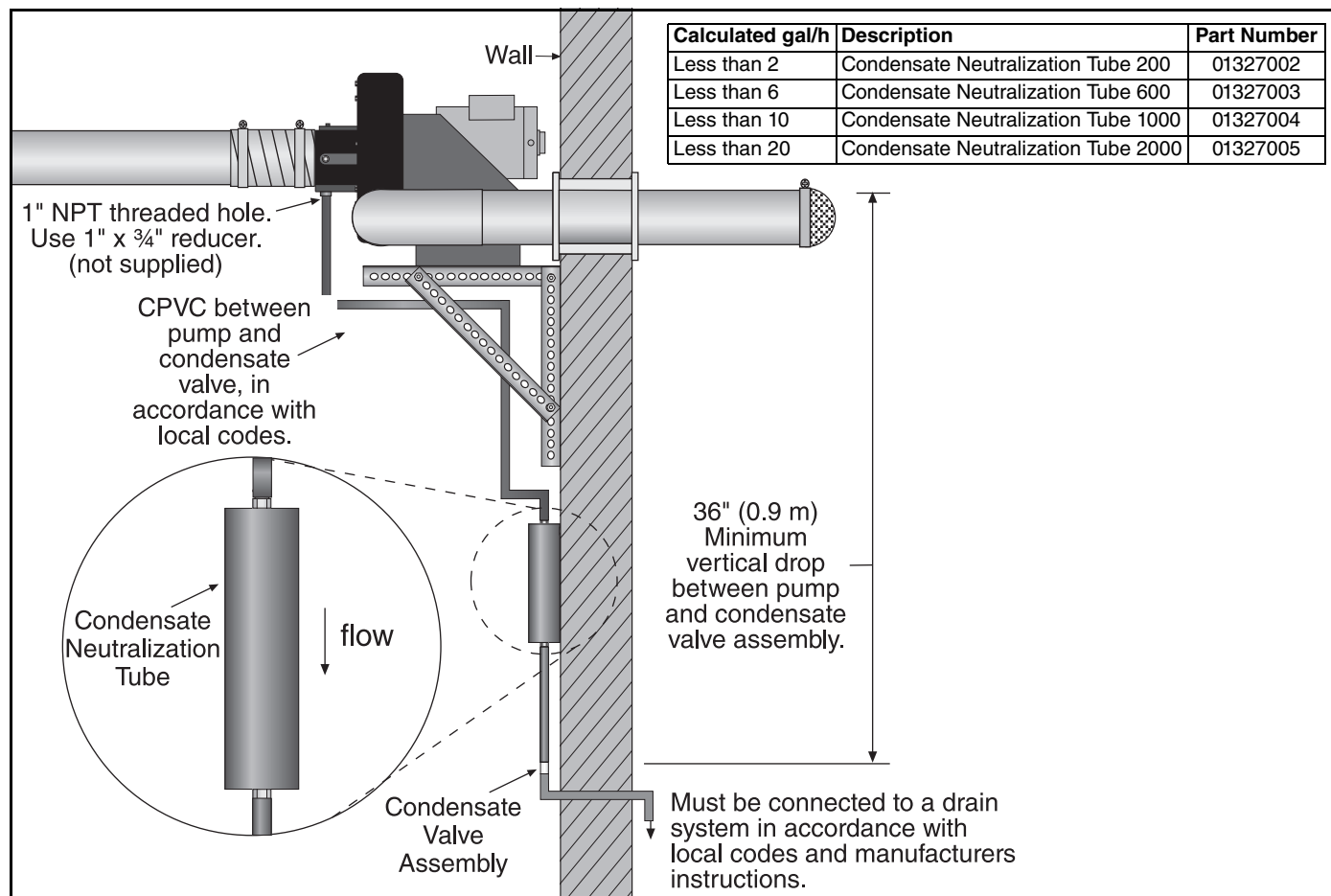
Calculated gal/h	Description	Part Number
Less than 2	Condensate Neutralization Tube 200	01327002
Less than 6	Condensate Neutralization Tube 600	01327003
Less than 10	Condensate Neutralization Tube 1000	01327004
Less than 20	Condensate Neutralization Tube 2000	01327005

NOTE: Condensate neutralization tubes must be replaced yearly (every 2000 operating hours) or check condensate water pH level. If it is below pH 6, replace tube.





To order replacement, see the chart below:

Description	Part Number
Condensate Neutralization Tube 200	01327002
Condensate Neutralization Tube 600	01327003
Condensate Neutralization Tube 1000	01327004
Condensate Neutralization Tube 2000	01327005
Refill, Condensate Neutralization Tube 600	01327007
Refill, Condensate Neutralization Tube 1000	01327008
Refill, Condensate Neutralization Tube 2000	01327009

FIGURE 20: Condensate Neutralization Tube



SECTION 10: SERVICING INSTRUCTIONS

⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard Disconnect electric before service. Heater and pump must be connected to a properly grounded electrical source.	Explosion Hazard Turn off gas supply to heater before service.	Burn Hazard Allow heater and pump to cool before service. Tubing may still be hot after operation.	Cut/Pinch Hazard Wear protective gear during installation, operation and service. Edges are sharp.
Failure to follow these instructions can result in death, electric shock, injury or property damage.			

⚠ DANGER



Severe Injury Hazard

Install pump scroll and inlet assembly before operating high speed rotating impeller.

Keep hands, fingers and clothing away from inlet and outlet.

Install and operate equipment according to installation manual.

Failure to follow these instructions can result in death or severe injury.

Disassembly and removal or replacement of any pump components must be done by a service contractor or electrician qualified in the installation and service of gas-fired heating equipment. Overtorquing can result in a failure of components. Failure to follow these instructions can compromise pump operation and void warranty.

10.1 Pre-Season Maintenance and Annual Inspection

To ensure your safety and years of trouble-free

operation of the pump, service and annual inspections must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Disconnect electric and gas supplies before performing service or maintenance.

Before every heating season, a contractor qualified in the installation and service of gas-fired heating equipment must perform a thorough safety inspection of the pump.

For safety and best performance, the electrical, venting, suspensions and overall pump condition are some of the areas requiring inspection.

Please see *Page 25, Section 10.3* for suggested items to inspect.

10.2 To Change the Motor and/or the Impeller

1. Disconnect electrical before servicing.
2. Remove the pump boots from the inlet and outlet of the scroll assembly, disconnecting the pump from tailpipe and vent pipe.
3. To remove the motor or impeller, the scroll and inlet plate must be detached. Remove the six nuts attaching the scroll to the pump frame.
4. Remove the scroll assembly and inlet assembly from the frame as one piece.
5. The impeller can be removed by loosening the two 3/8"-24 set screws. With an appropriate wheel puller, remove the impeller.

6. The motor can now be detached, if necessary, by removing the attachment hardware.
7. Re-assembly of motor/impeller combination requires proper alignment. Make sure the impeller has a 1/4" (6 mm) clearance off the inside wall of the scroll. Be certain of the proper motor alignment and free rotation.
8. The two impeller set screws should be reinstalled with a drop of thread locking sealant and remain unseated during initial re-assembly.
9. Slide the impeller onto the motor shaft end.
10. Seat the two impeller set screws. Torque to 100 in/lbs.
11. Re-attach the scroll and inlet. Secure with all six nuts. Torque to 150 in/lbs.

10.3 Maintenance Checklist





Installation Code and Annual Inspections:

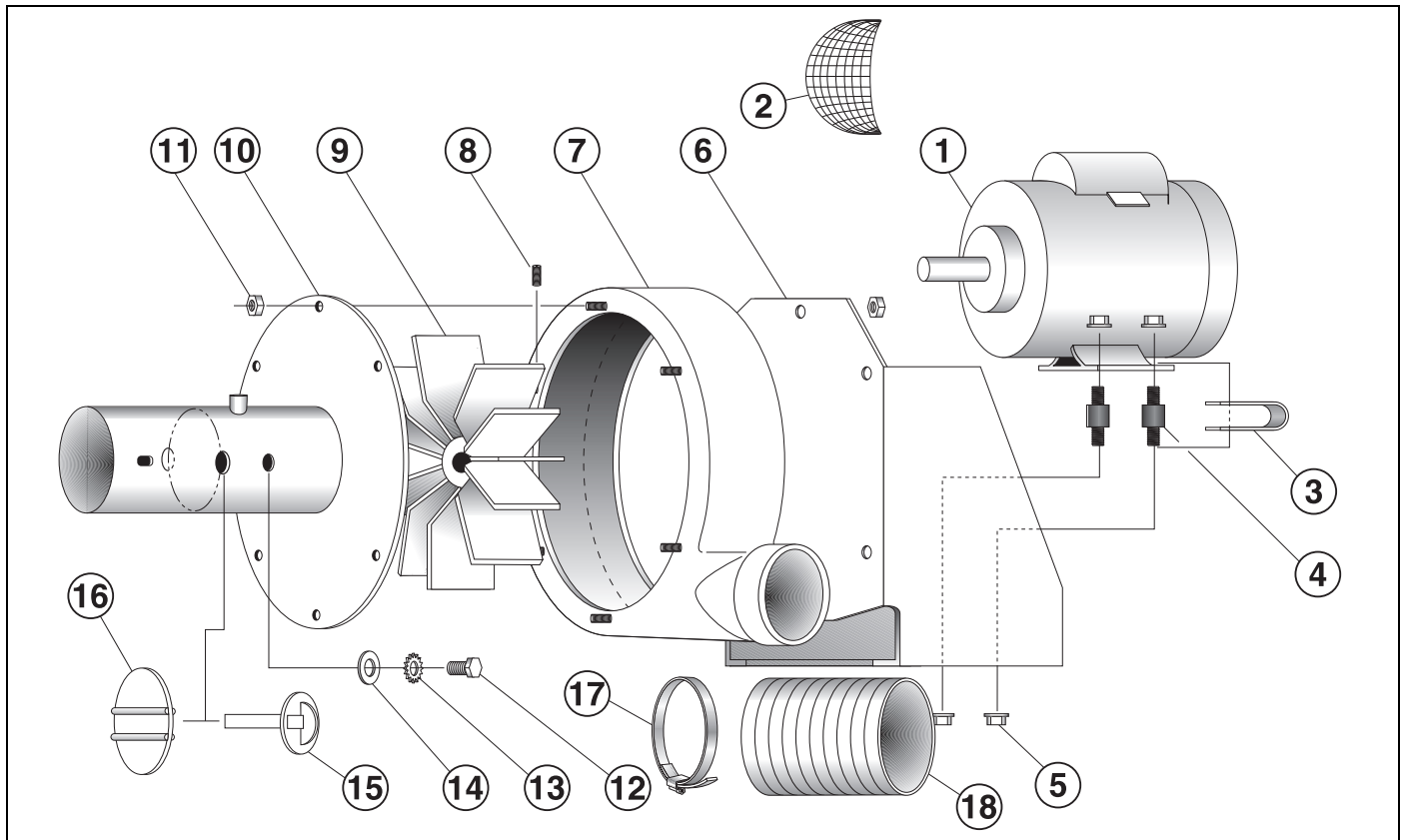
All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon LLC and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service,

operation and labeling of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon LLC.

System Tubing and Vent Pipe	<p>Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust or blockage.</p> <p>Remove any carbon deposits or scale using a wire brush.</p> <p>Replace pipe if there are any holes due to corrosion. Seal any gaps in venting to prevent condensate leakage.</p>
Pump Scroll, Impeller and Motor	<p>Compressed air or a vacuum cleaner may be used to clean dust and dirt.</p> <p>Check for corrosion, if any parts have corroded through, replace as necessary.</p> <p>Ensure all hex nuts are tight for proper seal.</p>
Suspension Points	<p>Make sure the pump is hanging securely.</p> <p>Look for signs of wear on the mounting angles, wall mounting points or ceiling mounting points.</p>
Pump Boot	<p>Inspect pump boot at pump inlet and outlet for cracking or deterioration.</p> <p>Replace if cracks are found.</p> <p>Ensure band clamps are tight at all connection points.</p>
Condensate Trap, Drain Cap	<p>Check connection of tee to drain cap and between tee and condensate trap.</p> <p>Seal connections between tee and drain cap to prevent condensate leakage.</p> <p>Screw condensate trap tightly into drain cap to prevent leakage.</p> <p>Condensate trap should be filled with water.</p>
Pressure Switch	<p>Ensure that wiring is intact. Check silicone hose for cracks.</p> <p>Ensure secure connection between pressure switch and barbed fitting.</p>
Safety Labels	<p>Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. See <i>Page 2, Figure 1</i>.</p>

SECTION 11: REPLACEMENT PARTS AND ACCESSORIES

⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard	Explosion Hazard	Fire Hazard	Carbon Monoxide Hazard
<p>Use only genuine ROBERTS GORDON® replacement parts per this installation, operation and service manual.</p> <p>Failure to follow these instructions can result in death, electric shock, injury or property damage.</p>			



11.1 Replacement Parts

Call Out #	Description	Part Number
1	Motor (1/3 H.P.)	90604600
2	Bird Screen with Clamp	01312200
3	Ground Strap	01370200
4	Rubber Mount for Motor	91906100
5	5/16" - 18 Hex Nut	92113900
5	5/16" Flat Washer	95211600
5	5/16" Helical Spring Washer	96411600
6	Pump Frame Assembly	01362500
7	Blower Housing (Scroll)	02757001
8	3/8" - 24 x 1/2" Set Screw	91118008

Call Out #	Description	Part Number
9	Impeller	02791601
10	Inlet Flange Assembly	02724200
11	#10 - 24 Keps Nut	92311600
12	1/4" - 20 x 1/2" Hex Head Screw	93413008
13	1/4" External Tooth Washer	96211500
14	5/16" Flat Washer	95211600
15	Damper Support Assembly	01329500
16	Restrictor Assembly	01327500
17	Pump Boot Clamp	91901300
18	Pump Boot	91412800
	Pressure Switch (not shown)	90430600K

11.2 Accessories

Description	Part Number	Description	Part Number
4" Plain Coupling	01312700	4" Aluminized 90° Elbow	01335801
6" Plain Coupling	01312706	6" Aluminized 90° Elbow	T0100320
4" Lined Coupling	01312701	4" Coated 90° Elbow	0133580D
4" Damper Coupling	01331900	6" Coated 90° Elbow	0133660D
4" Aluminized Tee	01330203	4" Aluminized Non Heat Treated 10' Tube	91409403
6" Aluminized Tee	01330204	6" Aluminized Non Heat Treated 10' Tube	91409420
4" Coated Tee	0133022D	4" Coated 10' Tube	9141030D
6" Coated Tee	0133025D	Aluminized Tube adapter (6" dia. x 4" dia.)	91418200
4" Aluminized Cross	01330903	6" Tube Hanger	91240010
4" Coated Cross	0133092D	4" Drain Cap	02718851
4" (10 cm) Band Clamp	91901300	6" Drain Cap	02718852
6" (15 cm) Band Clamp	91913703	Condensate Trap	01327001

SECTION 12: SPECIFICATIONS

12.1 Material Specifications

12.1.1 Pump Frame, Inlet, Scroll and Impeller

12 Gauge Stamped Steel Construction

12.1.2 Impeller Materials

319 Cast Aluminum

12.2 Suspension Specifications

Hang pump with materials with a minimum working load of 750 lbs (340 kg). See Page 11, Figure 6.

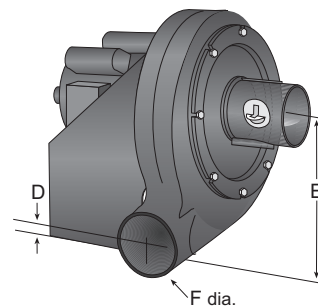
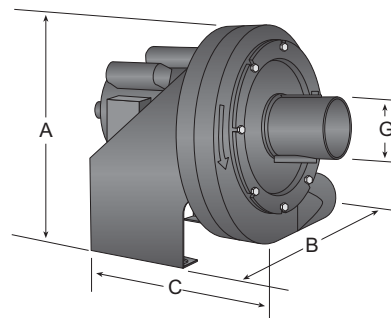
12.3 Controls Specifications

Time switches, thermostats, etc. can be wired into the electrical supply. External controls supplied as an optional extra. See the heaters' Installation, Operation and Service Manual for details.

Pump Dimensional Data (in)							
Model	A	B	C	D	E	F	G
EP-100	17	14.5	21	3.75	10	4	4

Pump Specifications

Model	EP-100
Horsepower (Hp)	1/3
Phase (Ø)	1
Hertz (Hz)	60
Voltage (V)	4.8/2.4
Full Load Amp (A)	6.6/3.3
R.P.M.	3450
Motor Frame	56
Motor Enclosure	TENV
Noise Level @ 5' (DBA)	-
Inlet/Outlet (In.)	4/4
Weight (lbs.)	62



SECTION 13: THE ROBERTS GORDON® EP-100 SERIES PUMP WARRANTY

ROBERTS-GORDON LLC WILL PAY FOR:

Within 36 months from date of purchase by buyer or 42 months from date of shipment by Roberts-Gordon LLC (whichever occurs first), replacement parts will be provided free of charge for any part of the product which fails due to a manufacturing or material defect.

Roberts-Gordon LLC will require the part in question to be returned to the factory. Roberts-Gordon LLC will, at its sole discretion, repair or replace after determining the nature of the defect and disposition of part in question.

ROBERTS GORDON® Replacement Parts are warranted for a period of 12 months from date of shipment from Roberts-Gordon LLC or the remaining EP-100 PUMP warranty.

ROBERTS-GORDON LLC WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipment of replacement parts.

Claims where the total price of the goods have not been paid.

Damage due to:

- Improper installation, operation or maintenance.
- Misuse, abuse, neglect, or modification of the EP-100 PUMP in any way.
- Use of the EP-100 PUMP for other than its intended purpose.
- Incorrect gas or electrical supply, accident, fire, floods, acts of God, war, terrorism, or other casualty.
- Improper service, use of replacement parts or accessories not specified by Roberts-Gordon.
- Failure to install or maintain the EP-100 PUMP as directed in the Installation, Operation and Service Manual.
- Relocation of the EP-100 PUMP after initial installation
- Use of the EP-100 PUMP in a corrosive atmosphere containing contaminants.
- Use of the EP-100 PUMP in the vicinity of a combustible or explosive material.
- Any defect in the EP-100 PUMP arising from a drawing, design, or specification supplied by or on behalf of the consumer.
- Damage incurred during shipment. Claim must be filed with carrier.

WARRANTY IS VOID IF:

The EP-100 PUMP is not installed by an contractor qualified in the installation and service of gas fired heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The ownership of the EP-100 PUMP is moved or transferred. This warranty is non-transferable.

Roberts-Gordon LLC is not permitted to inspect the damaged equipment and/or component parts.

READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL.

If you have questions about your equipment, contact your installing professional. Should you need Replacement Parts or have additional questions, call or write:

Roberts-Gordon LLC

1250 William Street

P.O. Box 44

Buffalo, New York 14240-0044

Telephone: +1.716.852.4400

Fax: +1.716.852.0854

Toll Free: 800.828.7450

www.rg-inc.com

www.radiantheaters.com

www.robertsgordon.com

www.corayvac.com

Roberts-Gordon LLC's liability, and your exclusive remedy, under this warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this warranty. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this warranty.

Roberts-Gordon LLC shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the EP-100 PUMP. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

Roberts-Gordon LLC shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to war, fire, flood, strike, government or court orders, acts of God, terrorism, unavailability of supplies, parts or power. No person is authorized to assume for Roberts-Gordon LLC any other warranty, obligation or liability.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Roberts-Gordon LLC, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Roberts-Gordon LLC's duly authorized Executive Officer.

