

## High Pressure Fluid Heater **VISCON HP**

309524P

EN

***Used for variable heating of fluids.***

*7250 psi (50 MPa, 500 bar) Maximum Working Pressure*

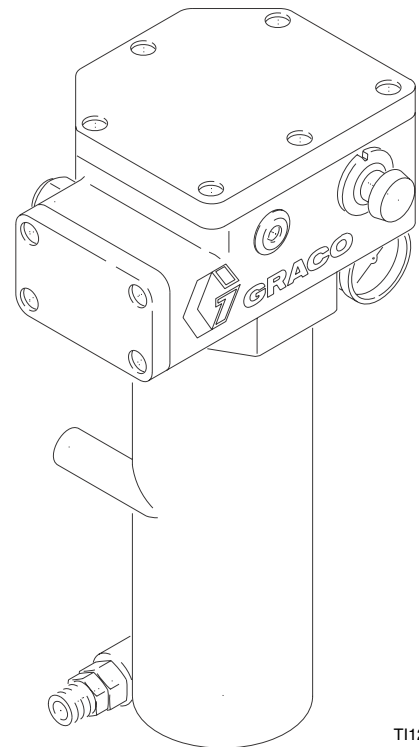


### **Important Safety Instructions**

Read all warnings and instructions in this manual.  
Save these instructions.

See page 2 for model numbers, descriptions, and approvals information.

See page 3 for Table of Contents.







T112338A

**Hazardous Location Heater shown**




# Models

## Hazardous Location Heaters

See Special Conditions for Safe Use on page in Warnings Section.

Part No.	Series	VAC (50/60 Hz single phase) / Watts / Amps	Approvals
245848	A	120 / 2300 / 19.2	    <p>Approved Exd IIB T2 482°F (250°C) Certificate No. ISSeP 07ATEX034X Approved to EN 60079-0:2006 (IEC 60079-0:2004) and EN 60079-1:2007 (IEC 60079-1:2007) for Hazardous Locations, Temp Code T2 482°F (250°C). See <b>Technical Data</b>, page 28, for additional information.</p> <p>For US/CAN: FM Approved as explosionproof for Class I, Division 1, Groups CD Hazardous Locations, Temp Code 250°C (T2) Ta = -20°C to +57°C</p> <p>For US Only: FM Approved for Class I, Zone 1, Group IIB, 250°C (T2) Hazardous (Classified) Locations. Ta = -20°C to +57°C</p> <p>See <b>Technical Data</b>, page 28, for additional information.</p>
245863	A	240 / 4000 / 16.7	
245864	A	480 / 4000 / 8.30	
245862	A	200 / 4000 / 20.0	
246254	A	380 / 4000 / 10.5	

## Non-hazardous Location Heaters

Model No.	Series	VAC (50/60 Hz single phase) / Watts / Amps	Approvals
245867	A	120 / 2300 / 19.2	   <p>9902471 Conforms to UL Std. 61010-1 CSA Std. 22.2 No. 1010-1-92</p>
245868	A	200 / 4000 / 20.0	
245869	A	240 / 4000 / 16.7	
245870	A	480 / 4000 / 8.30	
246276	A	380 / 4000 / 10.5	

# Contents

<b>Models</b> .....	<b>2</b>	<b>Troubleshooting</b> .....	<b>17</b>
<b>Manual Conventions</b> .....	<b>3</b>	<b>Repair</b> .....	<b>18</b>
<b>Warning</b> .....	<b>4</b>	Primary Thermostat & Probe .....	18
<b>Installation</b> .....	<b>6</b>	Backup Thermostat .....	18
Selecting Tubing .....	7	Thermal Limit Sensor .....	20
Mounting Heater .....	8	Control Knob .....	20
Fluid Connections & Accessories .....	9	Heater Block .....	20
Electrical Connections .....	10	<b>Parts</b> .....	<b>22</b>
Determining Proper Fluid Temperature .....	12	Hazardous Location Heaters .....	22
<b>Operation</b> .....	<b>14</b>	Non-Hazardous Location Heaters .....	24
Pressure Relief Procedure .....	14	<b>Accessories</b> .....	<b>26</b>
Initial Flushing .....	14	<b>Technical Data</b> .....	<b>28</b>
Priming System .....	14	<b>Dimensions</b> .....	<b>29</b>
Setting Heater Control .....	15	<b>Graco Standard Warranty</b> .....	<b>30</b>
Adjusting for Spraying .....	15	<b>Graco Information</b> .....	<b>30</b>
<b>Maintenance</b> .....	<b>16</b>		
Flushing .....	16		
Draining Heater .....	16		
Unclogging Fluid Passages .....	16		

# Manual Conventions

## Warning

**WARNING**

A warning alerts you to possible serious injury or death if you do not follow instructions.

Symbols, such as fire and explosion (shown), alert you to a specific hazard and direct you to read the indicated hazard warnings (pages 4-5).

## Caution

**CAUTION**

A caution alerts you to possible equipment damage or destruction if you do not follow instructions.





## Note

A note indicates additional helpful information.

## Important

An arrow indicates important information.


**WARNING**

	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point the gun at anyone or at any part of the body.</li> <li>• Do not put your hand or fingers over the gun fluid nozzle.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Do not “blow back” fluid; this is not an air spray system.</li> <li>• Follow <b>Pressure Relief Procedure</b>, page 14, when you stop spraying and before cleaning, checking, or servicing equipment.</li> <li>• Use lowest possible pressure when flushing, priming, or troubleshooting.</li> <li>• Never spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. High pressure hose cannot be recoupled; replace the entire hose.</li> </ul>
	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Solvent and paint fumes in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources, such as pilot lights, cigarettes and plastic drop cloths (potential static arc).</li> <li>• Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.</li> <li>• Keep the work area free of debris, including solvent, rags, and gasoline.</li> <li>• Ground equipment and conductive objects. See <b>Grounding</b>, page 11.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail.</li> <li>• Ensure main power is off and heater is cool before flushing or servicing heater. Do not turn on heater until fluid lines are clear of solvent.</li> <li>• Use only grounded hoses.</li> <li>• If there is static sparking or you feel an electric shock, <b>stop operation immediately</b>. Do not use equipment until you identify and correct the problem.</li> </ul>
	<p><b>SPECIAL CONDITIONS FOR SAFE USE</b></p> <ul style="list-style-type: none"> <li>• All flameproof joints are critical to the integrity of the heater as approved for hazardous locations and are not repairable if damaged. Damaged parts must be replaced only with genuine Graco parts with no substitutions.</li> </ul>
	<p><b>ELECTRIC SHOCK HAZARD</b></p> <p>Improper grounding, wiring, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> <li>• Connect only to grounded power source.</li> <li>• Turn off and disconnect power at the main switch before disconnecting any cables and before servicing equipment.</li> </ul>


**WARNING**
**EQUIPMENT MISUSE HAZARD**

Misuse can cause serious injury or death.

- For professional use only.
- Use equipment only for its intended purpose. Call your Graco distributor for information.
- Read manuals, warnings, tags, and labels before operating equipment. Follow instructions.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not alter or modify equipment. Use only Graco parts and accessories.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data in all** equipment manuals. Read fluid and solvent manufacturer's warnings.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not use hoses to pull equipment.
- Comply with all applicable safety regulations.

**BURN HAZARD**

This equipment is used with heated fluid, which can cause equipment surfaces to become very hot. To avoid severe burns:

- Do not touch hot fluid or equipment.
- Allow equipment to cool completely before touching it.
- Wear heat protective gloves and take special care if fluid temperature exceeds 110°F (43°C).

**TOXIC FLUID OR FUMES HAZARD**

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Material Safety Data Sheets (MSDS) to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

**PERSONAL PROTECTIVE EQUIPMENT**

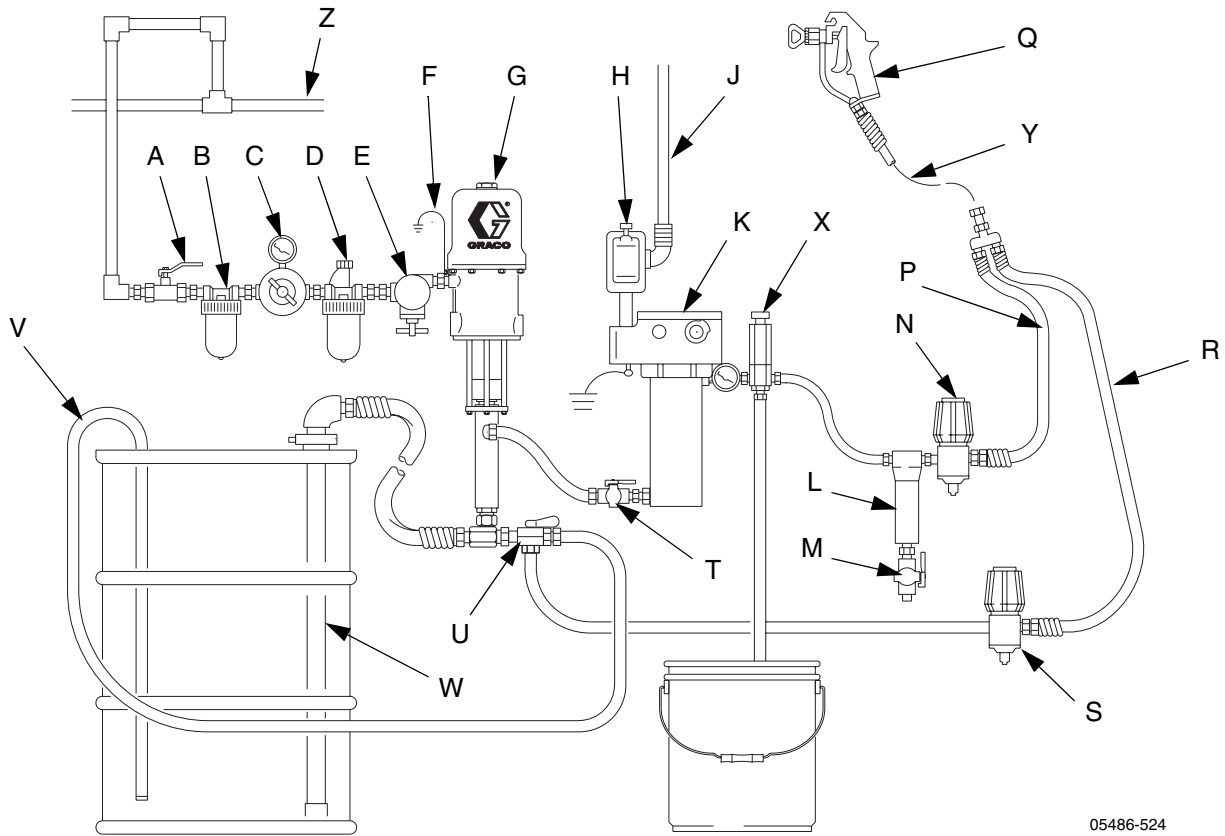
You must wear proper protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury; inhalation of toxic fumes, and hearing loss. This equipment includes but is not limited to:

- Protective eyewear
- Gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer
- Hearing protection

# Installation

## Typical Installation Drawing

The typical installation drawing is only a guide. Your Graco distributor can assist in designing your system.



05486-524

**Key:**

- |                                |                            |                         |
|--------------------------------|----------------------------|-------------------------|
| A Bleed-type Master Air Valve  | J Power Cable              | S Back Pressure Valve   |
| B Air Filter                   | K Heater                   | T Fluid Shutoff Valve   |
| C Air Regulator and Gauge      | L Fluid Filter             | U Director Valve        |
| D Air Line Lubricator          | M Drain Valve              | V Drain Back Tube       |
| E Pump Runaway Valve           | N Fluid Pressure Regulator | W Suction Tube          |
| F Ground Wire                  | P Fluid Supply Line        | X Pressure Relief Valve |
| G Pump                         | Q Spray Gun                | Y Whip End Hose         |
| H Explosion Proof Power Switch | R Fluid Return Line        | Z Air Supply Line       |

**FIG. 1: Typical Installation – Heated Circulating System**

**WARNING**

Read warnings, pages 4-5.

## Selecting Tubing

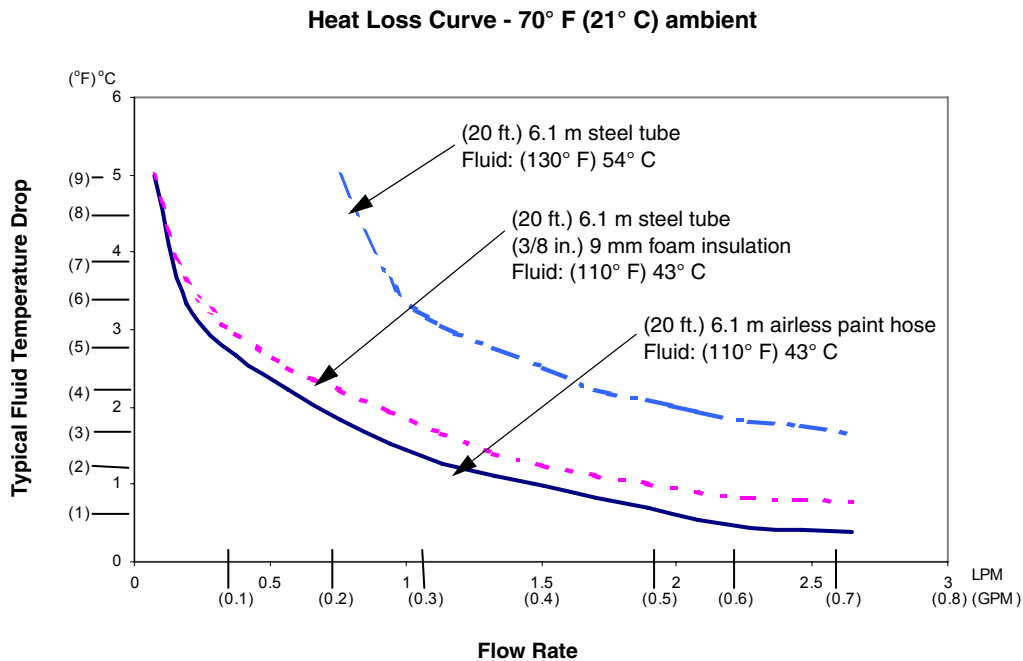
Fluid loses some heat through the tubing or hose between the heater and spray gun. Locate heater close to the spray area to minimize heat loss through plumbing.

The chart in FIG. 2 shows a heat loss curve for 3 common types of tubing.

- Select system components that meet temperature and pressure ratings listed in **Technical Data**, page 28. The heater's normal output range is adjustable from 84-220°F (29-104°C).
- Locate heater away from all flammable materials and where operators will not come in contact with hot metal surfaces.
- Insulate and/or label lines and components exiting heater that may become hot.

**Chart Notes:**

- The greater the flow rate, the less the heat loss.
- Foam-insulated steel tubing and high pressure airless paint hose retain heat best. Insulated tubing and hose are more expensive, but higher costs are commonly offset by lower operating costs.
- Locate heater close to spray area to minimize heat loss through plumbing.



**FIG. 2: Typical Temperature Drop**

## Mounting Heater

- The heater has a surface temperature of T2 (482°F, 250°C). Follow temperature code when locating heater. See **Technical Data**, page 28, for more temperature code information.
- Heater controls must be easily accessible.
- The mounting surface must be able to support the weight of the heater and fluid, and any stress caused during operation.

### Wall Mounting

- Need wall bracket 192585 or 183982. See **Accessories**, page 26.

Use wall bracket as a template to mark bolt holes.

#### Bracket 192585

(FIG. 3)

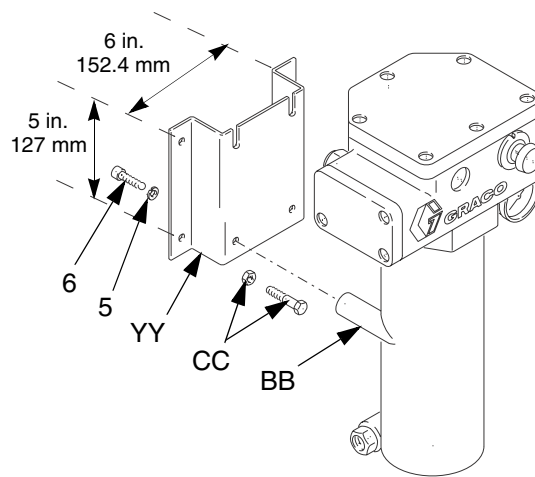
- Bracket depth provides required solid object clearance to comply with European flame proof standards.

1. Use M8 bolts of appropriate length and lockwasher (CC), not supplied, to mount bracket.
2. Install two screws (6) and washers (5) into top 2 heater mounting posts (BB) until they are about 1/8 in. (3 mm) from fully installed.
3. Lift heater and slide two screw heads into bracket slots. Install remaining 2 screws and tighten all 4.

#### Bracket 183982

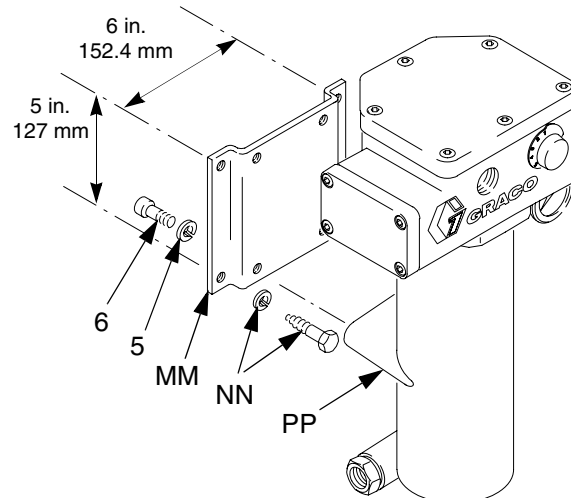
(FIG. 4)

1. Mount bracket (MM) to heater with screws (6) and lockwashers (5) supplied.
2. Use M8 bolts of the appropriate length and lockwasher (NN), not supplied, to secure the bracket to the wall.



05442

FIG. 3: Bracket 192585



8631A

FIG. 4: Bracket 183982



## Cart Mounting

(FIG. 5)



You need to have 2 each of cart mounting bar 183485 and clamp 183484. See **Accessories**, page 26, to order.

1. Place clamps (AA) around the cart vertical post (DD) and secure to the heater mounting bars (ZZ) with M8 x 1.25 x 30 mm bolts (6) and lockwasher (5).
2. Observe temperature ratings for the power cable to the terminal junction. Cable H07RN **does not** meet the required 221°F (105°C). An intermediate Type “e” junction may be required. Also see FIG. 7.

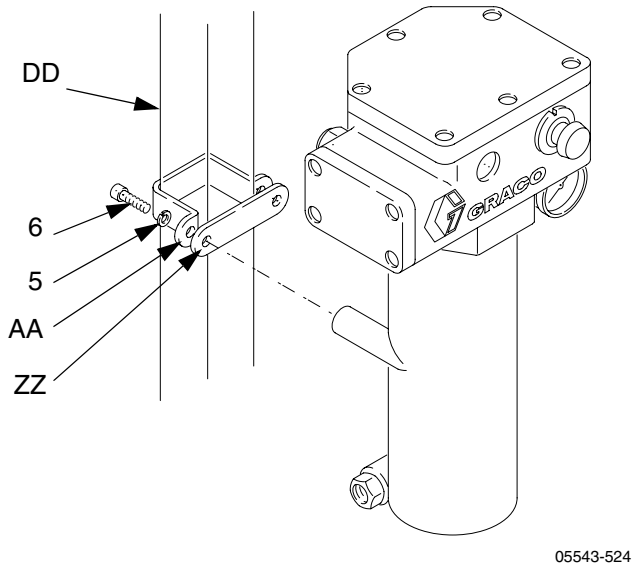


FIG. 5: Cart Mounting

## Fluid Connections & Accessories

(FIG. 6)

1. Install a fluid shutoff valve (T) in the heater's 1/2-14 npt(m) fluid inlet; do not overtighten. Connect the fluid line to the valve.

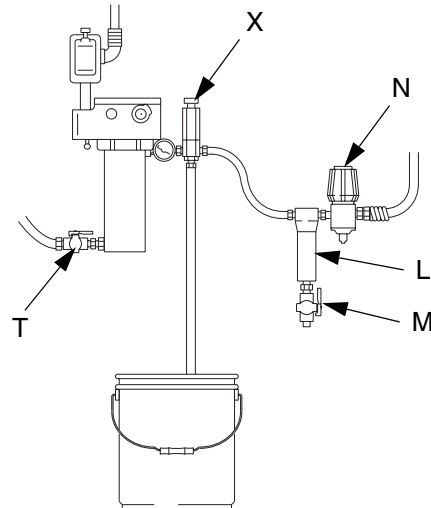




FIG. 6: Fluid Connections & Accessories

**⚠ WARNING**

To avoid rupturing a component, which can cause serious injury, including amputation; read warnings, page 4, and follow the instructions below.

2. Provide a means for adequately handling fluid expansion caused by heat. Options include:
  - Use flexible hoses between heater and gun.
  - Install a properly sized accumulator downstream from the heater.
  - Install a pressure relief valve (X) pre-set to relieve pressure when it exceeds the system maximum working pressure.

**➔** Never install a shutoff device between the heater and gun as this will trap the heated fluid and not allow for expansion. If a fluid regulator is installed between the heater and gun, never use it as a shutoff device.


3. Install a fluid filter (L), drain valve (M), and fluid pressure regulator (N) near the heater's 1/2-14 npt(f) fluid outlet. Then connect the fluid line.

## Electrical Connections

 **WARNING**

Read warnings, page 4. Install heater in compliance with all applicable codes and regulations.

 **CAUTION**


To help prevent damage, avoid spilling liquids onto electrical components.

### Requirements For All Installations


1. The voltage supply must agree with the maximum heater voltage and amperage. See **Models**, page 2.
2. Conductors used for supply connection must be suitable for at least 221°F (105°C).

### Hazardous Location Installation Requirements

1. The heater connection must be made using one of the following options:
  - a. Cable entries of a certified flameproof model.
  - b. Threaded metal conduits.

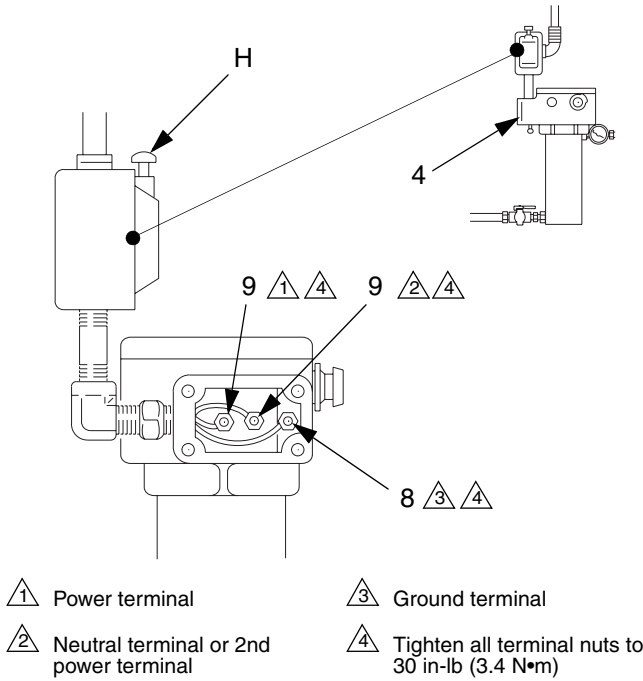
 If this option is used, a stopping box with compound filling of a certified flameproof model must be placed at the entry of the heater.

2. Unused threaded holes must be sealed by certified flameproof plugs, which must be screwed in with a minimum of 5 full threads engaged and an 8 mm length of engaged threads.

 The above accessories are not provided by Graco. Make sure that accessories are appropriate for the conditions of use.

### Wall Mounted Wiring

Mount a 2-pole, explosion-proof electric switch (H) near the heater. See FIG. 7. The switch must meet the electrical codes for your location. Also use the correct cable and plug.

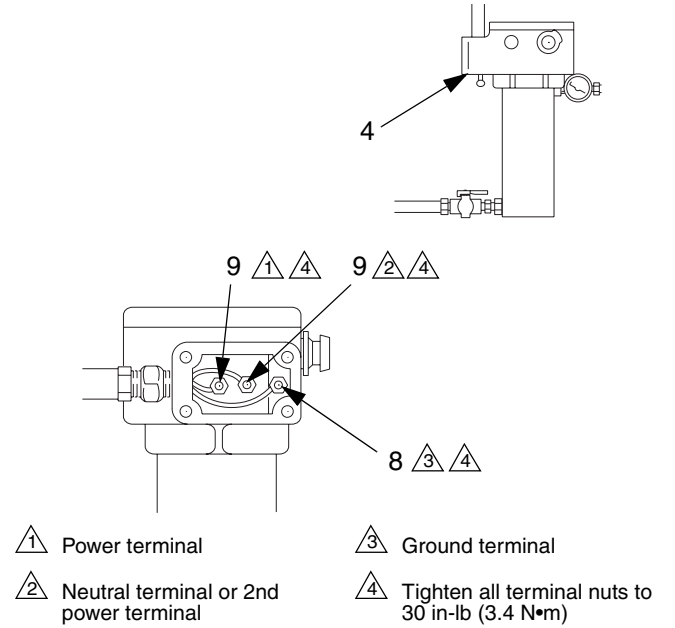


**FIG. 7: Wall Mounted Wiring**

05546-524

### Cart Mounted Wiring

Connect a plug that meets the electrical codes for your location. See FIG. 8.



**FIG. 8: Cart Mounted Wiring**

05547-524

### Grounding

Wire the heater to a properly grounded power supply through the electrical connections and external grounding lug (8). In a mobile installation, also ground the truck or trailer to a true earth ground.

# Determining Proper Fluid Temperature

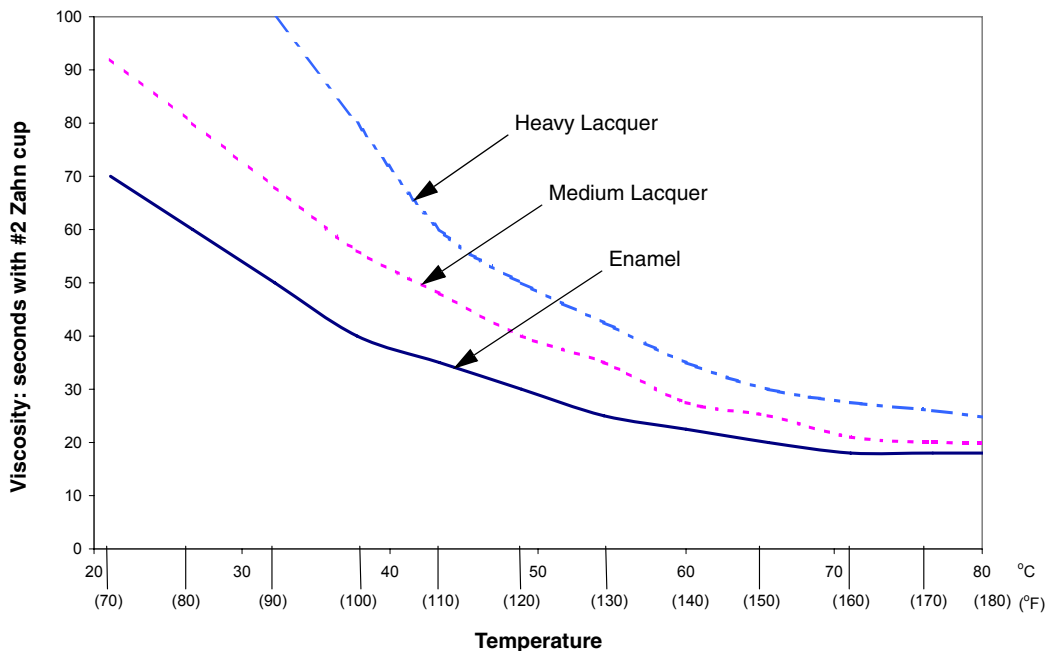
**⚠ CAUTION**  
 Operating the heater at its highest setting, over 180°F (82°C), for long periods of time decreases the heater life and can cause fluid to dry out; which can clog the heater and result in a poor finish.

Use the lowest temperature setting possible for maximum heater life. Use the chart in FIG. 9 to determine the Under-Boil® temperature. FIG. 9 also shows the effect of temperature on reducing viscosity. Note that most of the viscosity reduction occurs by 130°F (55°C).

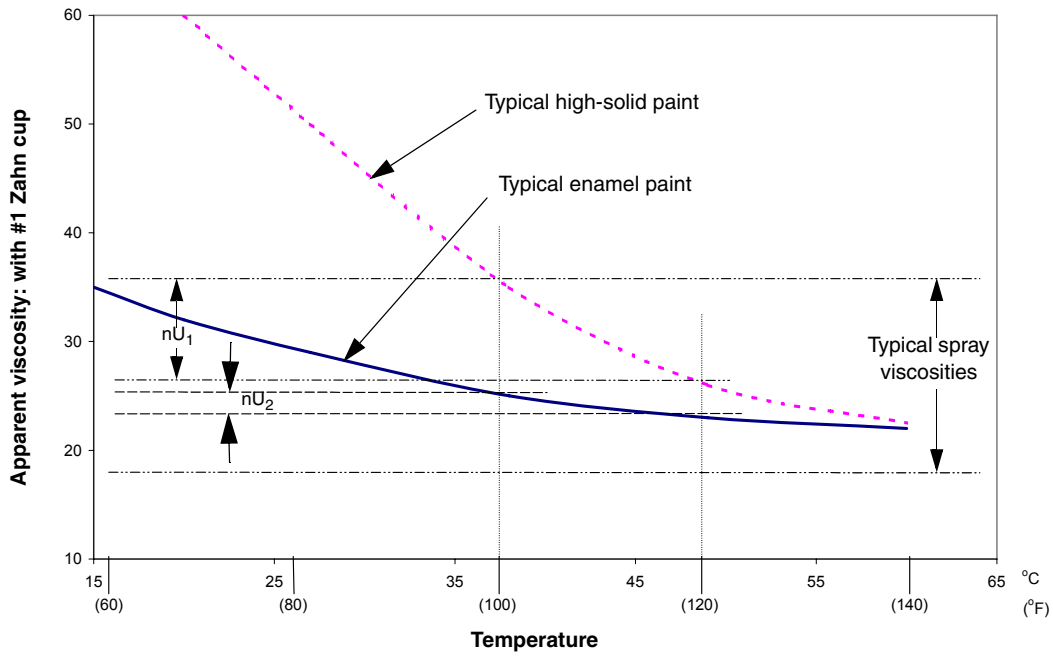
Under-Boil is the Graco method of hot, airless spraying where the fluid is heated to a temperature just under the boiling point of its most volatile solvent.

## To find your fluid's Under-Boil temperature:

1. Pour a small sample into a heat-proof container.
2. Measure and record the fluid temperature and viscosity using a No. 2 Zahn cup.
3. Heat water in a large container to 200°F (93°C). Place the sample in the water.
4. At every 10° temperature rise, measure and record the viscosity and temperature. Do this until solvents start boiling off and the viscosity starts to level off, usually 160-170°F (71-77°C).
5. To find the temperature to use in your Under-Boil system:
  - a. Subtract the lowest viscosity reading from the highest one.
  - b. Multiply the result by 0.90.
  - c. Subtract the result from the highest viscosity reading. Find this number on your temperature and viscosity records.



**FIG. 9: Reducing Viscosity: Under-Boil Method**



**FIG. 10: Effect of Temperature on Viscosity**

The chart in FIG. 10 shows the effect of temperature in reducing two fluids to a sprayable viscosity, between 20 and 34 seconds using a No. 2 Zahn cup.

Once the fluid is reduced to about 34 on the chart, viscosity reduction begins to level off and temperature will not significantly improve sprayability (it only uses more energy).

Note that temperature has more of an effect on high solid fluids than on thin enamels. That is, for the same 10° temperature rise, the viscosity of the high solid fluid is reduced more than the enamel. This means the high solid fluid is *temperature sensitive*, and you need to take this into consideration when planning your system.

# Operation

## Pressure Relief Procedure

 **WARNING**



Read warnings, page 4.

Follow **Pressure Relief Procedure** when you stop spraying, and before cleaning, checking, or servicing equipment.

1. Engage the gun safety lock.
2. Shut off main power to the heater.
3. Circulate fluid for at least 10 minutes to cool the heated fluid and heater.
4. Shut off all air and fluid supplies.
5. Disengage the safety lock.
6. Hold a metal part of the gun firmly to a grounded metal pail, and trigger the gun to relieve pressure.
7. Engage the safety lock.
8. Have a container ready to catch the fluid, then open the fluid drain valve.

## Initial Flushing

 **WARNING**

Read warnings, page 4.

The heater was tested with lightweight oil, which needs to be flushed out before using the equipment. Ensure main power is off and heater is cool before flushing. Use a compatible solvent, and follow flushing instructions in your fluid supply and spray gun manual. **Do not turn on heater until fluid lines are clear of solvent.**

## Priming System

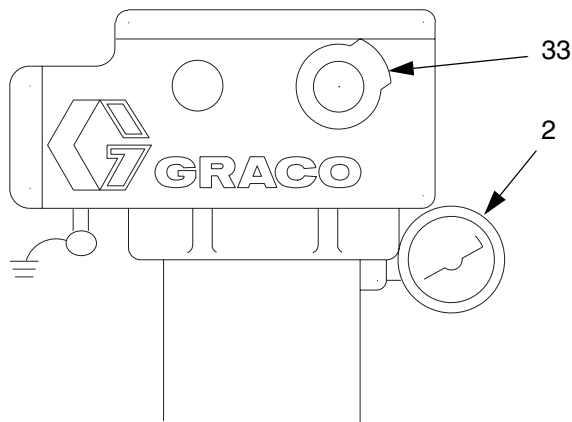
(Refer to FIG. 1, page 6)

1. Do not turn on the heater yet.
2. If using an airless spray gun, do not install a spray tip yet.
3. Start the pump according to the instructions supplied with it.
4. Turn the system director valve (U) to circulate, and circulate fluid for several minutes.
5. Open the spray gun (Q) at the last outlet to prime the line. Repeat for all gun stations.
6. Engage the gun safety latch.
7. Shut off the air supply to the pump.
8. Follow **Pressure Relief Procedure**.
9. Install the gun spray tip.

## Setting Heater Control

(Refer to FIG. 11)

1. Set the heater control knob (33) to a trial setpoint of 4 or 5.
2. Start the pump and circulate fluid through the system at very low pressure, about 10-12 oz/min (0.30-0.35 liter/min).
3. After 10 minutes, read the temperature on the thermometer (2). If it does not match the desired temperature, adjust the setpoint.



05549-524

**FIG. 11: Setting Heater Control**

## Adjusting for Spraying

### **⚠ CAUTION**

Operating the heater at its highest setting, over 180°F (82°C), for long periods of time decreases the heater life and can cause fluid to dry out; which can clog the heater and result in a poor finish.

1. Adjust pump pressure and heater setpoint to the lowest settings needed for good fluid atomization.
2. Set all system back pressure valves (S - FIG. 1) to maintain even fluid pressure at all gun stations.

# Maintenance

**WARNING**



Read warnings, pages 4 and 5. Make sure the main power is off and heater is cool before doing maintenance.

## Flushing

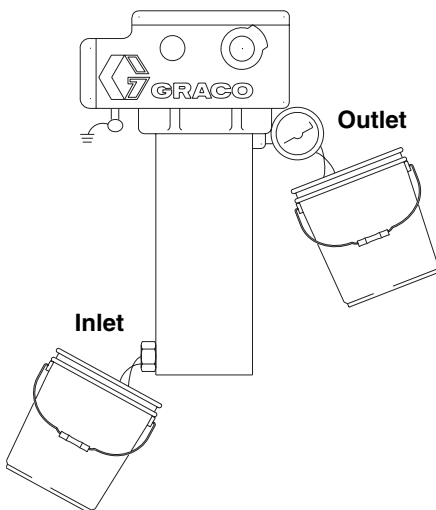
Clogged fluid passages are difficult to clean and reduce heating efficiency, flow rate, and pressure. Flush frequently, including whenever system is not in use.

1. Follow **Pressure Relief Procedure**, page 14.
2. Ensure main power is off and heater is cool before flushing. Use a compatible solvent, and follow flushing instructions in your fluid supply and spray gun manual. **Do not turn on heater until fluid lines are clear of solvent.**

## Draining Heater

(FIG. 12)

1. Follow **Pressure Relief Procedure**, page 14.
2. Remove heater inlet and outlet fittings. Have a container ready to catch the fluid.



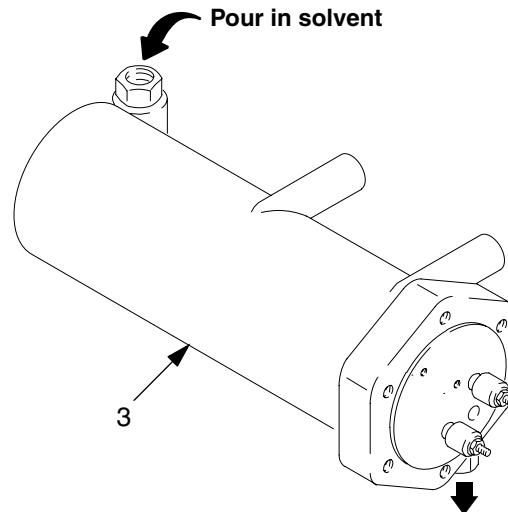
05550-524

FIG. 12: Draining Heater

## Unclogging Fluid Passages

(FIG. 13)

1. Drain the heater.
2. Remove the heater block (3) from the heater housing.
3. Pour a high strength, **compatible** solvent into the heater tube to soften the clog.
4. Flush out the clog.
5. Clean all passages thoroughly before reassembling.



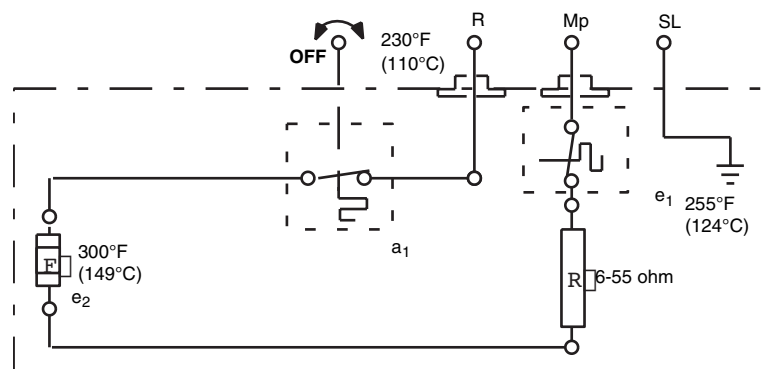
05551-524

FIG. 13: Unclogging Fluid Passages



# Troubleshooting

Problem	Cause	Solution
Heater will not heat.	No current.	Check circuit and fuses.  Check continuity of primary thermostat (24), backup thermostat (10), and thermal limit sensor (15).  Check continuity of thermostat (10) and heater block (3) terminals - Page 18.
	Burned out heater block (3).	Replace block - Page 20.
	Blown heat limiter (15).	Check continuity of primary thermostat (24) and backup thermostat (10). Replace thermostats if necessary when replacing thermal limit sensor (15) - Pages 18-20.
Temperature too low.	Fluid requires more warm-up time.	Increase warm-up time.
	Wrong temperature setting.	Adjust setting - Page 15.
	Flow rate too high.	Reduce flow rate or use 2 heaters.
	Clogged fluid passages.	Flush regularly - Page 16.
Temperature too high.	Wrong temperature setting.	Adjust setting - Page 15.
	Failed primary thermostat (24).	Replace - Page 18.
High fluctuating temperatures, about 220-250°F (104-120°C) at 0.1 GPM.	Primary thermostat (24) contacts sticking.	Replace thermostats (24, 10) - Page 18. Note that backup thermostat (10) keeps heater functioning for only a short time.
Too much pressure drop or fluid will not flow.	Flow rate too high.	Reduce flow rate or use 2 heaters.
	Clogged fluid passages.	Flush regularly - Page 16.
Heater fittings leak.	Loose or damaged fittings.	Tighten fittings or replace heater block - Page 20.



05556-524

FIG. 14: Electrical Schematic

# Repair

**WARNING**



Read warnings, pages 4-5. Make sure the main power is off and heater is cool before repairing.

**Hazardous Location Heaters: See FIG. 15 & 17**

**Non-hazardous Location Heaters: See FIG. 16 & 18**

## Primary Thermostat & Probe

1. Follow **Pressure Relief Procedure**, page 14.
2. Remove housing cover (18).
3. *Hazardous Location Heater only:* Loosen nut (27).  
*Non-hazardous Location Heater only:* Loosen screws (25).
4. Loosen setscrew (26) in switch shaft (28).
5. Remove screw (16) and bracket (19) holding probe (EE).
6. Remove wires from the primary thermostat terminals (FF).
7. Pull thermostat probe (EE) out of heater block (3). Remove thermostat (24) from housing (1).
8. *Hazardous Location Heater only:* Remove screws (25).

*Non-hazardous Location Heater only:* Remove screw standoff (35) with washer (27).

9. Remove bracket from thermostat (24) and secure to new thermostat.

**CAUTION**

To avoid damaging capillary tube (GG), which can cause heater malfunction, do not kink or nick the tube.

To avoid shorting out the heater, do not allow capillary tube to contact the block terminal (3A). Follow step 10, below.

10. Liberally apply thermal lubricant (part no. 110009) to probe (EE) of new thermostat (24). Loop capillary tube (GG) several times and wrap the loops with tie strap (42-not shown). Insert probe in the heater block (3).
11. Continue reassembling in reverse order of disassembly. See **Reassembly Notes**, below.

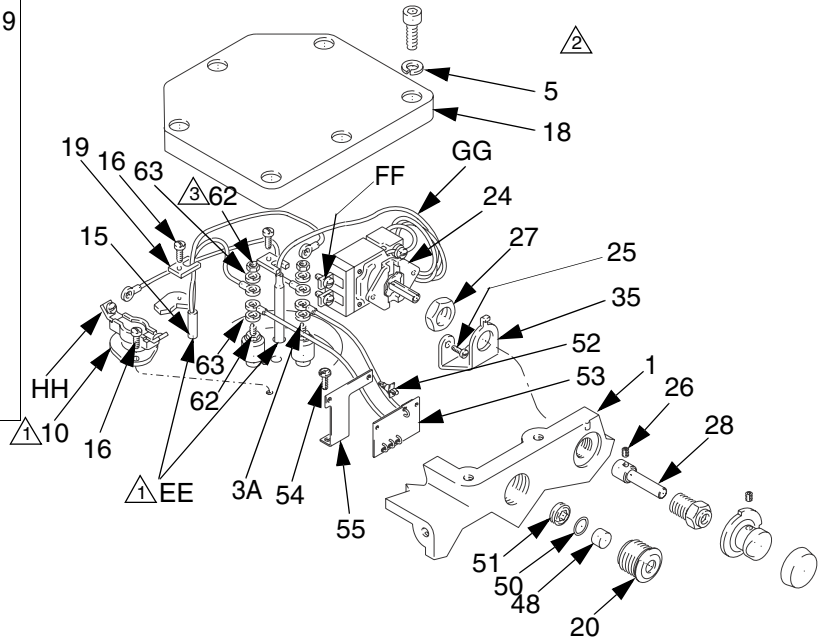
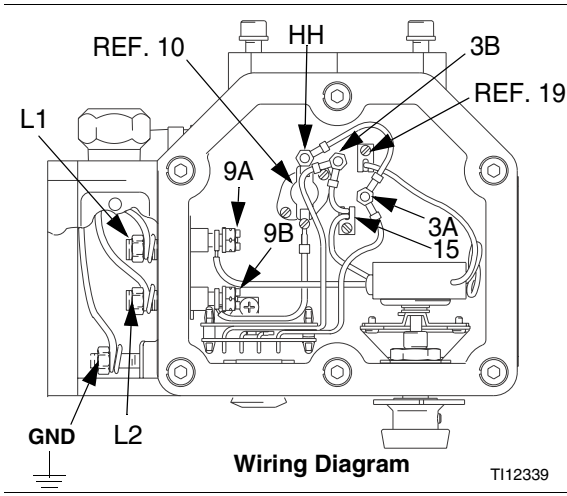
## Backup Thermostat

1. Follow **Pressure Relief Procedure**, page 14.
2. Remove housing cover (18).
3. Remove screws (HH) on backup thermostat (10) tabs, and remove the wires – one from heater block (3A) and one from line in (9B).
4. Remove the two screws (16), then remove the thermostat (10).
5. Liberally apply thermal lubricant (part no. 110009) to the bottom of the thermostat (10) and reinstall it in reverse order of disassembly.



### Reassembly Notes

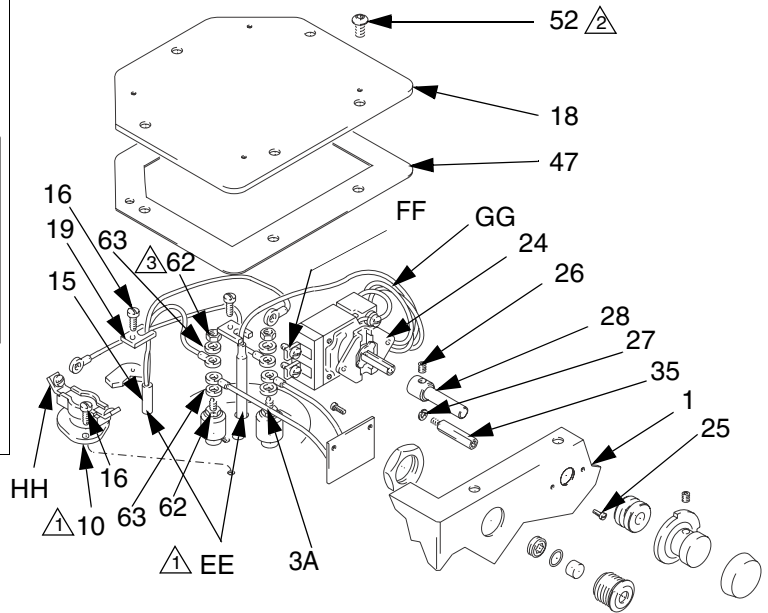
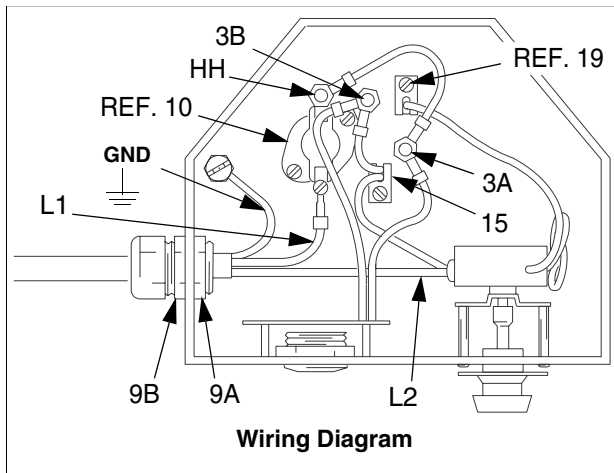
- Refer to FIG. 15 or 16 for wiring connections.
- *Non-hazardous Location Heater only:* Make sure gasket (47) is installed and aligned with electrical housing screw holes.
- Secure cover (18) with lockwashers (5) and screws (6 or 52); torque screws to 89 in-lb (10 N•m).



- 1 Apply thermal lubricant
- 2 Torque to 89 in-lb (10 N•m)
- 3 Torque nuts (62) to 10-12 in-lb (1.1-1.3 N•m)

T112335C

**FIG. 15: Thermostat Repair – Hazardous Location Heaters**



- 1 Apply thermal lubricant
- 2 Torque to 89 in-lb (10 N•m)
- 3 Torque nuts (62) to 10-12 in-lb (1.1-1.3 N•m)

T112337B

**FIG. 16: Thermostat Repair – Non-hazardous Heaters**

## Thermal Limit Sensor

### CAUTION

To avoid damaging the capillary tube (GG), which can cause heater malfunction, do not kink or nick the tube.

To avoid shorting out the heater, do not allow the capillary tube to contact the block terminal (3A).

1. Follow **Pressure Relief Procedure**, page 14.
2. Remove housing cover (18).
3. Remove nut (FF) and nut (3B) holding the leads of the thermal limit sensor (15) and remove the sensor. See FIG. 15 or 16, page 19.
4. Apply thin film of thermal lubricant (part no. 110009) to the thermal limit sensor (15) bulb and install a new sensor in the reverse order of disassembly. See **Reassembly Notes**, below.

## Control Knob

1. Follow **Pressure Relief Procedure**, page 14.
2. Turn knob (33) to setpoint 1.
3. Loosen setscrew (30) in the control knob (33).
4. Remove control knob (33).
5. Remove adjusting knob (12) from the control knob (33), and press fit it onto the new control knob. Check the bushing (29) and replace it if worn.
6. Position new knob (33) so setpoint 1 aligns with mark (JJ) on the housing (12:00 position) and the knob is about 1/16 in. (1 mm) away from the housing. Tighten setscrew (30).

## Heater Block

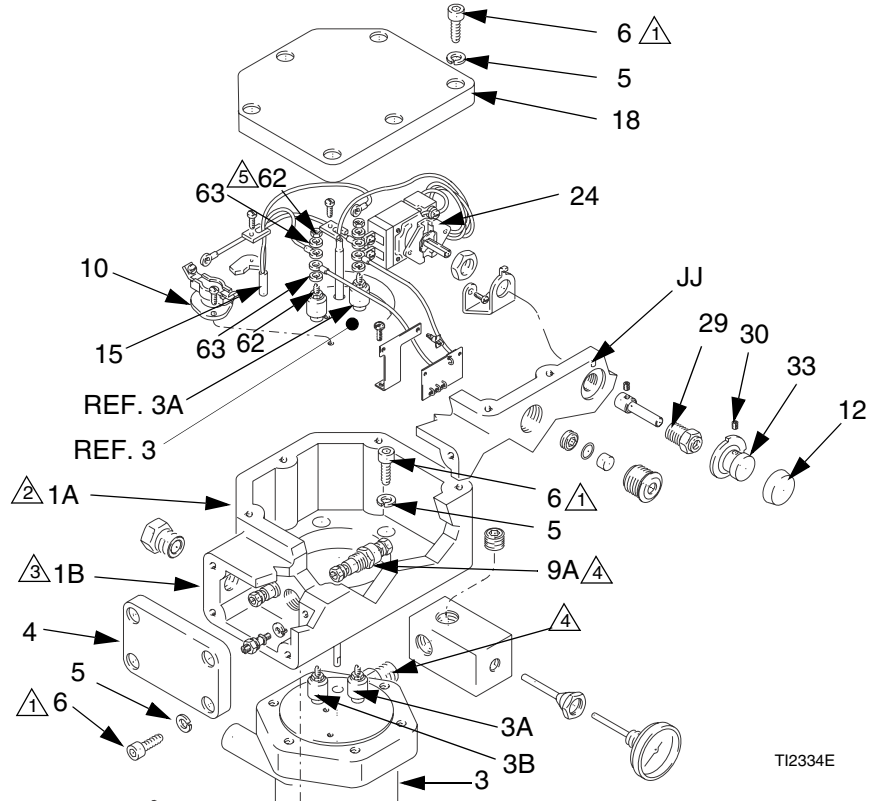
1. Follow **Pressure Relief Procedure**, page 14.
2. Remove housing cover (18).
3. *Hazardous Location Heater only:* Remove electrical junction box cover (4).
4. *Hazardous Location Heater only:* In the junction box (1B), disconnect the main power lead from the terminal of the post bushing (9A).  
  
*Non-hazardous Location Heater only:* Disconnect the main power lead from the primary thermostat (24).
5. *Hazardous Location Heater only:* In the electrical housing (1A), use a wrench on the flats of the post bushing (9A) to unscrew it from the housing.
6. See the appropriate sections on pages 18-20 to remove the primary thermostat and probe (24), the backup thermostat (10), the thermal limit sensor (15) and the control knob (33).
7. Remove the 6 screws (6) and lockwashers (5) holding the housing to the heater block (3).
8. Reassemble heater with the new block (3) in reverse order of disassembly.



### Reassembly Notes

- Refer to FIG. 15 or 16 for wiring connections.
- *Non-hazardous Location Heater only:* Make sure gasket (47) is installed and aligned with electrical housing screw holes.
- Secure cover (18) with lockwashers (5) and screws (6 or 52); torque screws to 89 in-lb (10 N•m).

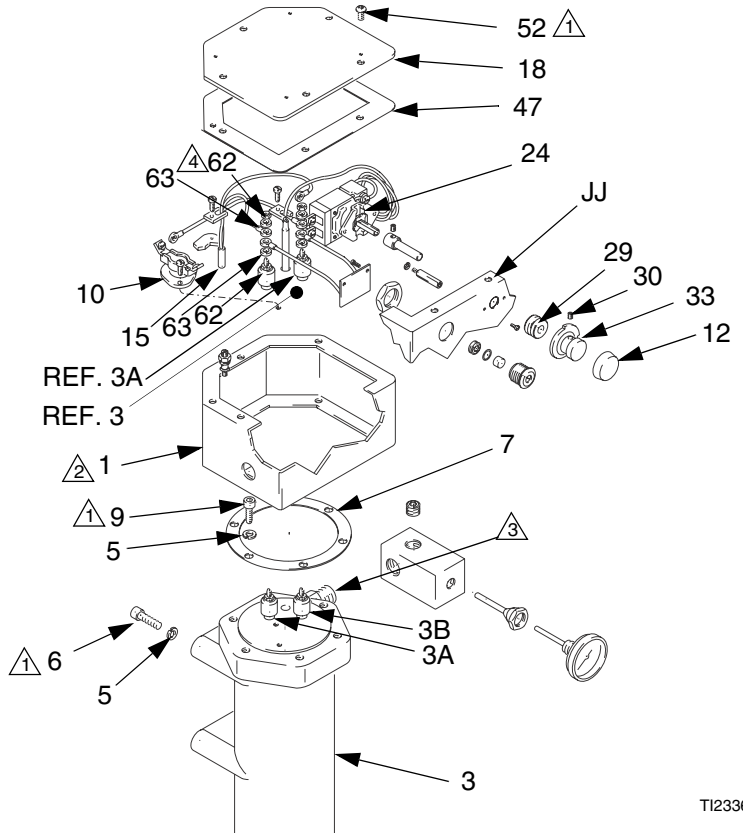
- ⚠ Torque to 89 in-lb (10 N•m)
- Ⓜ Electrical Housing
- Ⓝ Junction Box
- Ⓞ Apply sealant
- Ⓟ Torque nuts (62) to 10-12 in-lb (1.1-1.3 N•m)



T12334E

**FIG. 17: Control Repair – Hazardous Location Heaters**

- ⚠ Torque to 89 in-lb (10 N•m)
- Ⓜ Electrical Housing
- Ⓝ Apply sealant
- Ⓞ Torque nuts (62) to 10-12 in-lb (1.1-1.3 N•m)

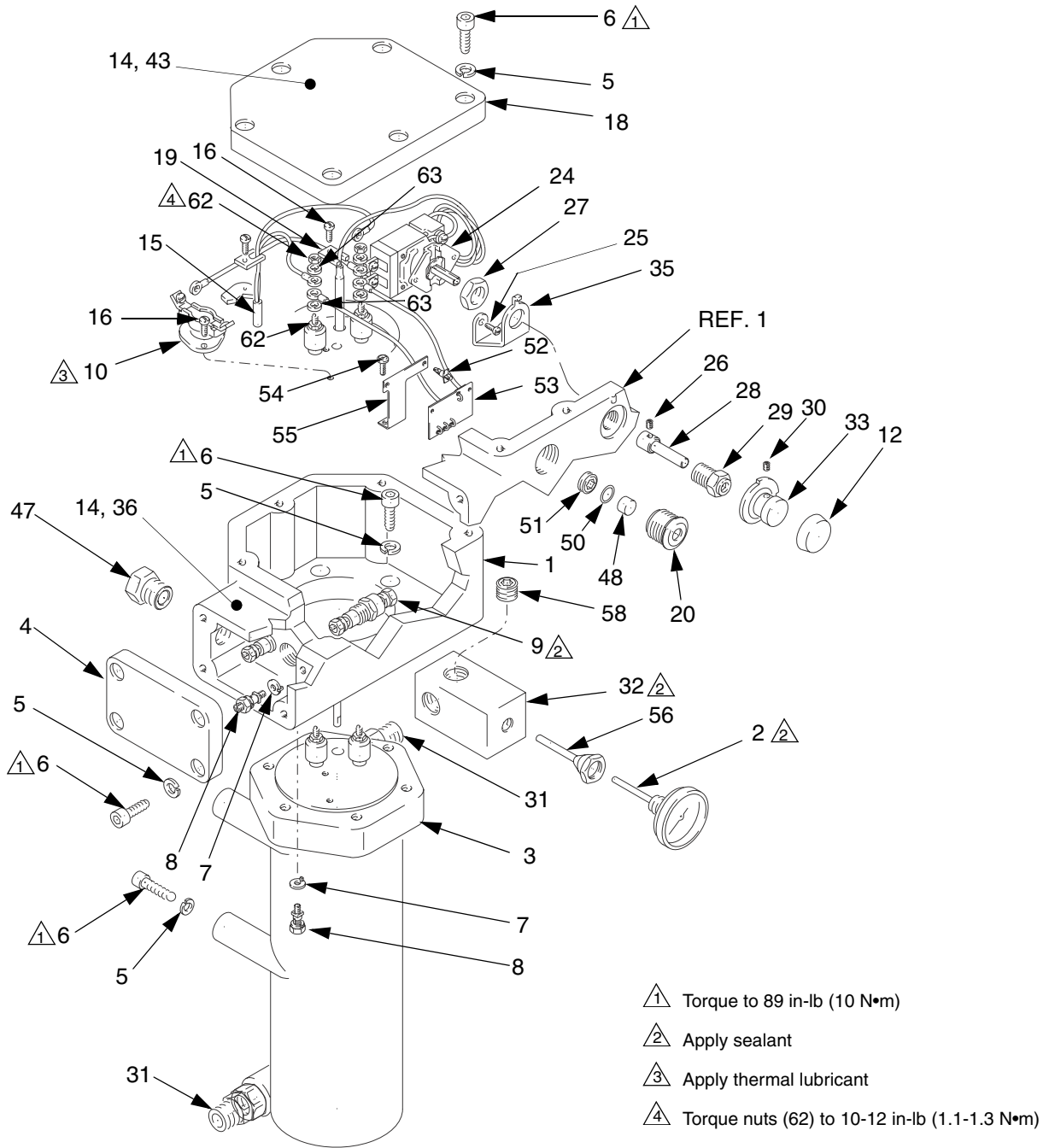


T12336F

**FIG. 18: Control Repair – Non-hazardous Location Heaters**

# Parts

## Hazardous Location Heaters



i12334E

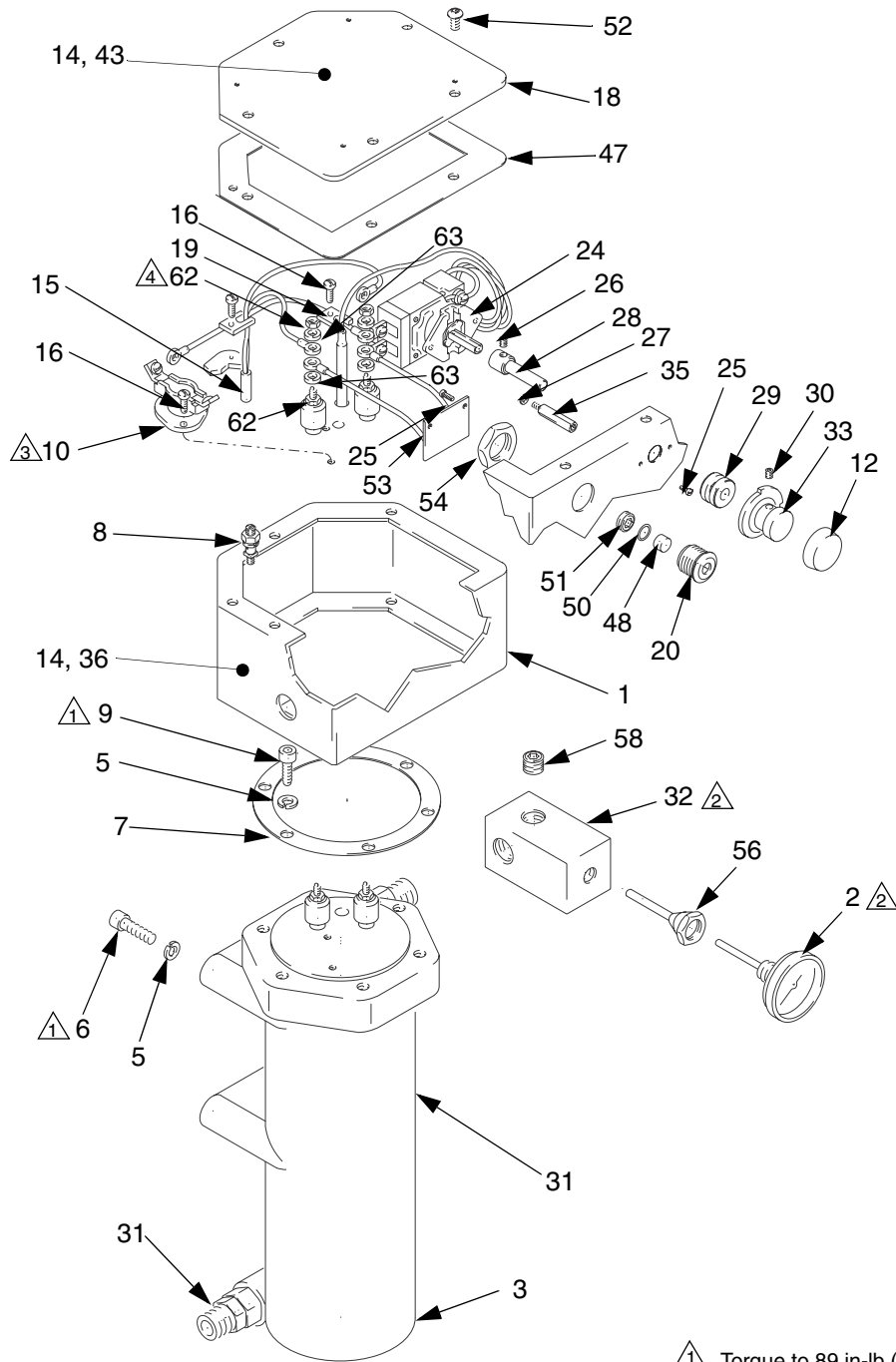
## Hazardous Location Heaters

Part No.	Series	Ref. No. 3 Heater Block Part No.	Volts / Watts
245848	A	246616	120 / 2300
245862	A	246617	200 / 4000
245863	A	246618	240 / 4000
245864	A	246619	480 / 4000
246254	A	246620	380 / 4000

Ref. No.	Part No.	Description	Qty.
1	183074	CONTROL HOUSING	1
2	102124	THERMOMETER DIAL	1
3		HEATER BLOCK; see table; includes ref. no. 2, 31, 32, 56	1
4	183066	COVER	1
5	107542	LOCKWASHER	20
6	109114	SCREW; M8 x 1.25 mm	20
7	104582	WASHER	2
8	104029	GROUNDING CLAMP	2
9	108675	BUSHING; 1000 V max.; 250 A max.	2
10	108674	BACKUP THERMOSTAT	1
11	235524	WIRE ASSEMBLY	1
12	177969	KNOB	1
13▲	177922	WARNING TAG	1
14	100055	SCREW; #6 type U	10
15	223126	THERMAL LIMIT SENSOR, 152°	1
16	105676	SCREW; M4 x 0.7 x 12 mm	4
18	183073	COVER	1
19	183072	BRACKET	2
20	15B828	LIGHT HOUSING	1
21	108664	ALLEN WRENCH; 6 mm	1
22	105747	ALLEN WRENCH; 2 mm	1
23	101369	ALLEN WRENCH; 0.0927 in.	1
24	108676	PRIMARY THERMOSTAT	1
25	100032	SCREW; #6-32 UNC-2A	2
26	105672	SET SCREW; M4 x 0.7 x 6 mm	1
27	183070	NUT; M15 x 1.5	1
28	183068	SWITCH SHAFT	1
29	183071	BUSHING; M15 x 1.5	1
30	101366	SET SCREW; #10-24 x 0.312 in.	1
31	117344	FITTING; 5/8 in. OD tube x 1/2-14 npt(m)	2
32	15A808	T-FITTING	1
33	177968	KNOB	1
35	183067	BRACKET	1
36▲	15B623	WARNING PLATE, English	1
	15B777	WARNING PLATES, multilingual	1
37	235523	WIRE ASSEMBLY	2
42	102478	TIE STRAP	1
43▲	15B625	WARNING PLATE. English	1
	15B819	WARNING PLATE, multilingual	1
47	185065	ADAPTER, 3/4 npt	1
48	15B827	LIGHT LENS	1
50	103338	O-RING; fluoroelastomer	1
51	117483	SOCKET JAM SCREW; 5/8-18 x 5/16	1
52	117514	SPACER	2
53	246014	LIGHT CIRCUIT BOARD	1
54	114669	SCREW; M5 x 10 mm	2
55	15B243	BRACKET	1
56	15D757	HOUSING, thermometer	1
58	100361	PLUG, pipe; 1/2 npt	1
62	100166	NUT, full hex	4
63	102360	WASHER, flat	4

▲ Replacement Danger and Warning labels, tags and cards are available at no cost.

# Non-Hazardous Location Heaters



- △1 Torque to 89 in-lb (10 N•m)
- △2 Apply sealant
- △3 Apply thermal lubricant
- △4 Torque nuts (62) to 10-12 in-lb (1.1-1.3 N•m)

T12336F



## Non-Hazardous Location Heaters

Part No.	Series	Ref. No. 3 Heater Block Part No.	Volts / Watts
245867	B	246616	120 / 2300
245868	B	246617	200 / 4000
245869	B	246618	240 / 4000
245870	B	246619	480 / 4000
246276	B	246620	380 / 4000

Ref. No.	Part No.	Description	Qty.
1	262891	ENCLOSURE	1
2	102124	THERMOMETER DIAL	1
3		HEATER BLOCK; see table; includes ref. no. 2, 31, 32, 56	1
5	107542	LOCKWASHER	1
6	109114	SCREW	6
7	15A990	GASKET	2
8	104029	GROUND CLAMP	2
9	117367	SCREW; M8 x 18 mm	6
10	108674	THERMOSTAT	1
11	235524	WIRE ASSEMBLY	1
12	177969	KNOB	1
13▲	177922	WARNING TAG	1
14	100055	SCREW; #6 type U	10
15	223126	THERMAL LIMIT SENSOR, 152°	1
16	105676	SCREW; M4 x 0.7 x 12 mm	4
18	15A810	TOP COVER	1
19	183072	BRACKET	2
20	15B828	LIGHT HOUSING	1
21	108664	ALLEN WRENCH; 6 mm	1
22	105747	ALLEN WRENCH; 2 mm	1
23	101369	ALLEN WRENCH; 0.0927 in.	1
24	108676	THERMOSTAT SWITCH	1
25	100032	SCREW; #6-32 UNC-2A	4
26	105672	SET SCREW	1
27	114027	WASHER, #6	2
28	183068	SWITCH SHAFT	1
29	112738	GROMMET	2
30	101366	SET SCREW; #10-24 x 0.312 in.	1
31	117344	FITTING; 5/8 in. OD tube x 1/2-14 npt(m)	2
32	15A808	T-FITTING	1
33	177968	KNOB	1
35	117526	SPACER	2
36▲	15B623	WARNING PLATE, English	1
	15B777	WARNING PLATES, multilingual	1
37	246346	WIRE ASSEMBLY	2
42	102478	TIE STRAP	1
43▲	15B625	WARNING PLATE, English	1
	15B819	WARNING PLATE, multilingual	1
47	15A991	GASKET	1
48	15B827	LIGHT LENS	1
50	103338	O-RING; fluoroelastomer	1
51	117483	SOCKET JAM SCREW; 5/8-18 x 5/16	1
52	111962	SCREW; 1/4-28 UNRF-3A	5
53	246014	LIGHT CIRCUIT BOARD	1
54	106216	NUT; 3/4-14 npsm	1
55	100633	ALLEN WRENCH; 5/32	1
56	15D757	HOUSING, thermometer	1
58	100361	PLUG, pipe; 1/2 npt	1
62	100166	NUT, full hex	4
63	102360	WASHER, flat	4

▲ Replacement Danger and Warning labels, tags and cards are available at no cost.

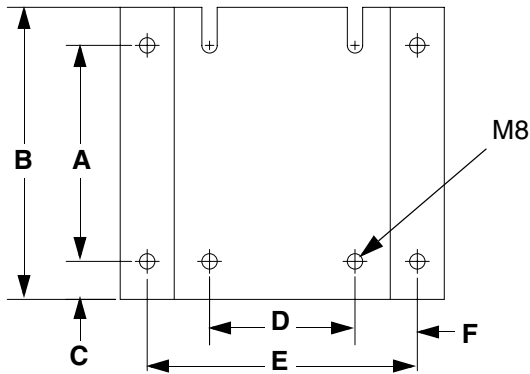
# Accessories

## Heater Conversion Kit

**246302:** Includes two fittings to make VISCON HP ports match VISCON<sup>2</sup>

## Mounting Bracket

**192585:** European version (see below)

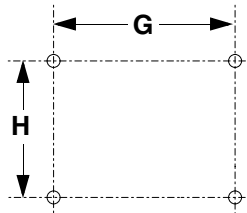


### Measurements – inches (mm)

A	B	C	D	E	F
5 (127)	6.76 (171.7)	0.88 (22.4)	3.37 (85.5)	6.25 (158.8)	1.44 (36.6)

**183982:** USA version

G	H
6 (152)	5 (127)

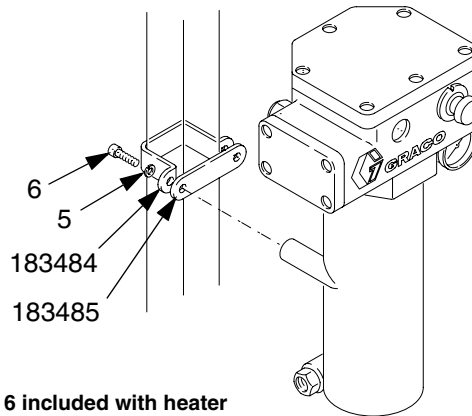


## Cart Bracket

Order 2 each of the following:

**183484:** Clamp

**183485:** Mounting bar



5 & 6 included with heater

05543

## Power Cord Set\*

**110160:** 600 V, 12 Awg, Extra Hard Usage Type St, High Temperature (221°F, 105°C) rated

## Thermal Lubricant

**110009:** 6.5 gram tube

## Cable Clamp Kit\*

**246303:** Contains a strain relief cable clamp and 5 m, 221°F (105°C) cable. See page 27 for installation instructions.

\* Hazardous location heaters are no longer rated for use in a hazardous area when used with these accessories.

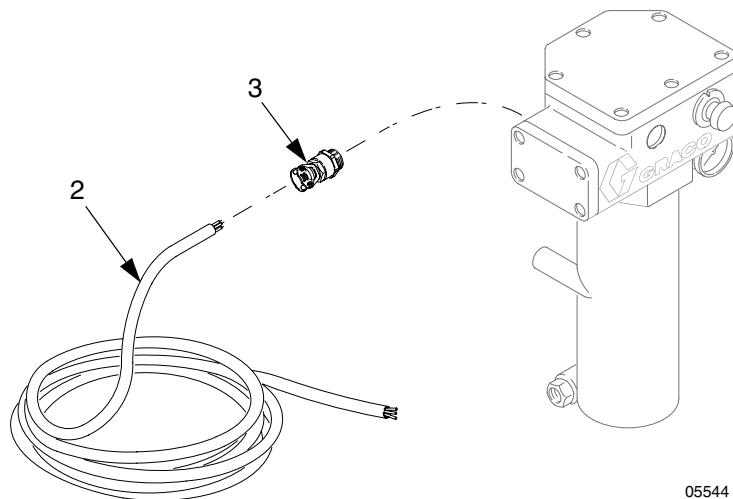
### Cable Clamp Kit 246303 Installation

1. Slide cable clamp (3) onto cable (2).
2. Place washer (F) on fitting (E).
3. Push conical-shaped packing (D) into fitting (E).
4. Place washer (C) on retaining nut (B).

5. Screw retaining nut (B) into fitting (E). Tighten with no more than 2 in. (50 mm) stripped black and blue wires and 4 in. (100 mm) yellow/green ground wire inside terminal junction box.
6. Place one side of retaining clip onto retaining clip nut, and insert as shown.

**Ref.**

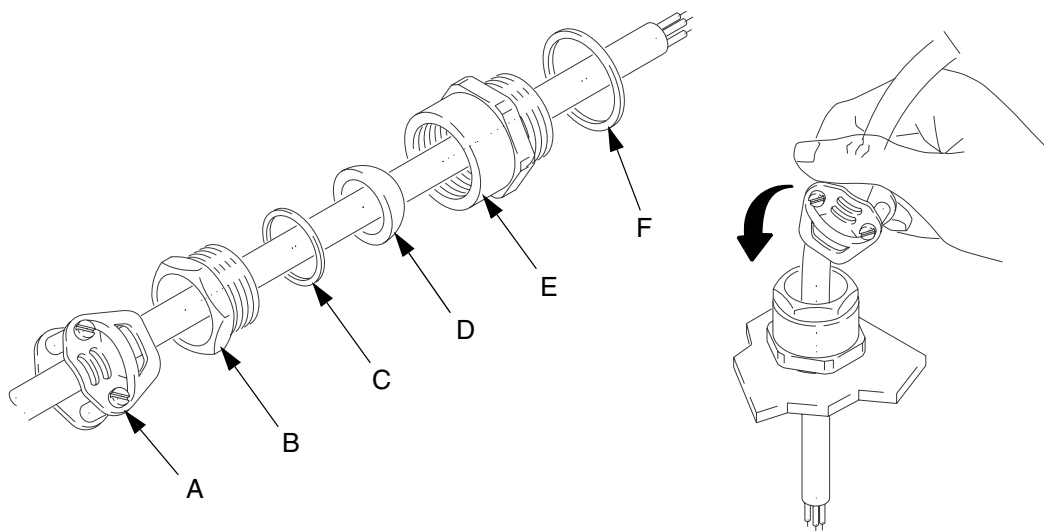
No.	Part No.	Description	Qty
2		Cable, 16.4 ft. (5 m), 221° F (105° C)	1
3	113162	Clamp	1



**FIG. 19: Cable Clamp Kit**

**Key:**

- A Retaining clip
- B Retaining nut
- C Washer
- D Packing
- E Fitting
- F Washer



**FIG. 20: Kit Assembly**

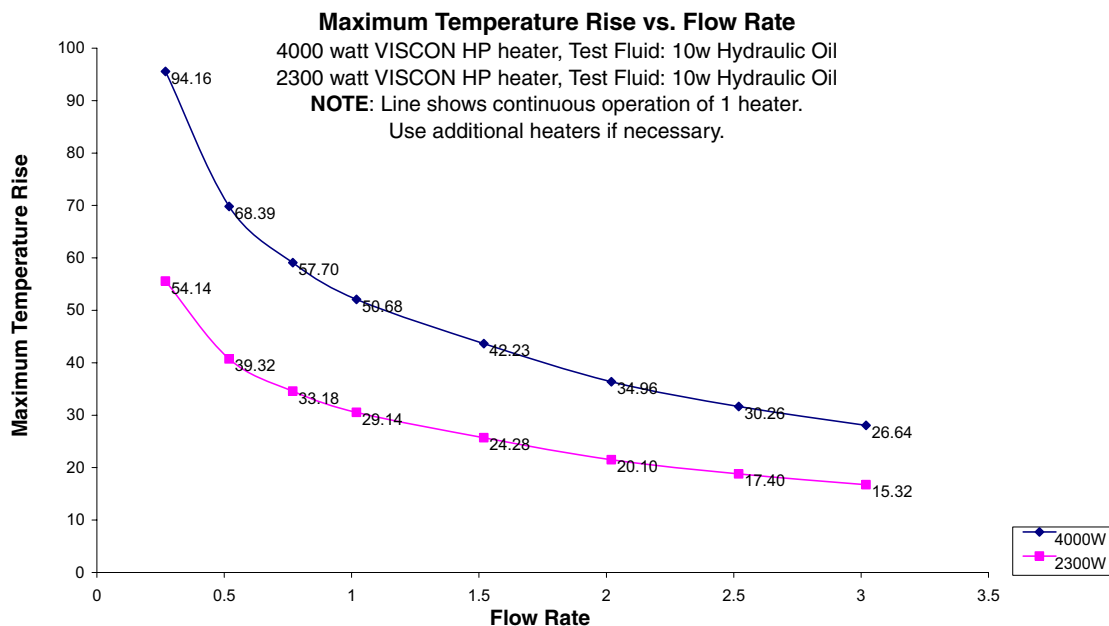
# Technical Data

The heater can be used in the following environmental conditions: indoor use, 99% maximum relative humidity, pollution degree 2, installation category II, maximum ambient temperature 135° F (57° C).

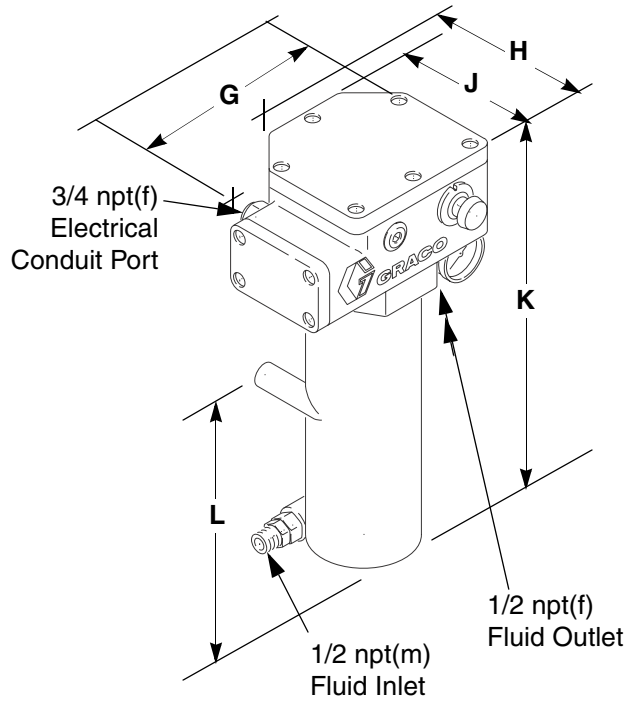
Maximum Working Pressure	7250 psi (50 MPa, 500 bar)
Voltage / Wattage / Current*	See <b>Models</b> , page 2
Fluid Passage Area	182 in. <sup>2</sup> (117,419 mm <sup>2</sup> )
Fluid Passage Diameter	0.435 in. (11.1 mm)
Fluid Passage Length	133 in. (3383 mm)
Thermometer Range	64–250°F (-18–121°C)
Wetted Parts	Stainless Steel
Temperature Operating Range	84–219°F (-29–104°C)
Surface Temperature Code**	T2 (482°F, 250°C)
Weight	39 lb. (17.6 Kg)

\* Main supply fluctuation not to exceed 10%.

\*\* The heater has a surface temperature code of T2 (482°F, 250°C), indicating a maximum external (surface) temperature rating of 482°F (250°C) in accordance with EN 60079-0:2006 (IEC 60079-0:2004) and EN 60079-1:2007 (IEC 60079-1:2007). This heater has a surface temperature code (identification code) of T2, indicating a maximum external (surface) temperature rating of 250°C (482°F) in accordance with Article 500 - Hazardous Locations - of NFPA 70 National Electrical Code and/or Section 18 - Hazardous Locations - of Part 1 of the Canadian Electrical Code. Read and comply with the requirements of these and similar codes as to proper location of the heater.



# Dimensions



Measurements – inches (mm)

G	H	J	K	L
9.375 (238)	8.46 (215)	6.5 (165)	18 (457)	6.375 (162)

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

## **FOR GRACO CANADA CUSTOMERS**

The Parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés, à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

## Graco Information

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

**TO PLACE AN ORDER**, contact your Graco distributor or call to identify the nearest distributor.

**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

*For patent information, see [www.graco.com/patents](http://www.graco.com/patents).*

*Original instructions. This manual contains English. MM 309524*

**Graco Headquarters:** Minneapolis

**International Offices:** Belgium, China, Japan, Korea

**GRACO INC. AND SUBSIDIARIES • P.O. BOX 1441 • MINNEAPOLIS MN 55440-1441 • USA**  
**Copyright 2002, Graco Inc. All Graco manufacturing locations are registered to ISO 9001.**

[www.graco.com](http://www.graco.com)

Revised January 2013