Instructions – Parts List

Parts

307914

Rev. E

(VIScosity CONtrol), STAINLESS STEEL

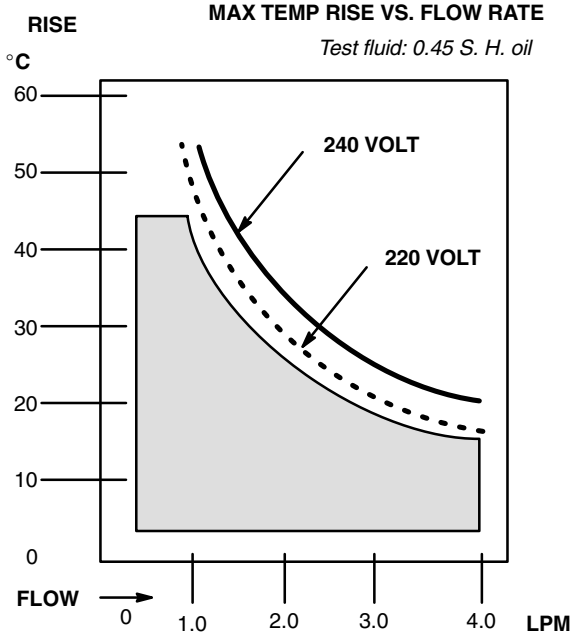
VISCON^2 FLUID HEATER

4000 psi (27.6 MPa, 276 bar) Maximum Working Pressure

Part No. 222307, Series B, Bare Heater
Part No. 237947, Series B, with Cable
220–240 Volt

INIEX Reg No. 90C.103.895
Approved EEx de II B T2 (250°C)

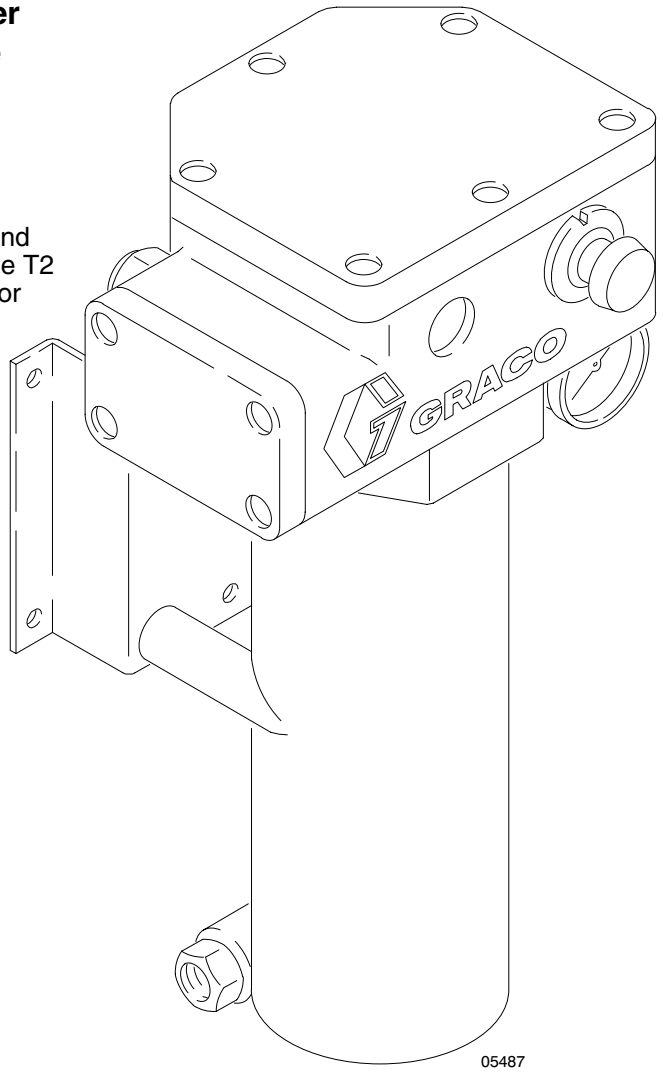
Approved to CENELEC EN50014, EN50018 and EN50019 for Hazardous Locations, Temp Code T2 (250°C). See the Technical Data on page 21 for additional information on this code.



MAX TEMP RISE VS. FLOW RATE

Test fluid: 0.45 S. H. oil

Shaded area indicates continuous operation capability of one heater. Use more heaters if your needs exceed these guidelines.



05487

Read warnings and instructions.
See page 2 for Table of Contents.

PROVEN QUALITY. LEADING TECHNOLOGY.

CE

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440–1441

Table of Contents

Symbols

Warning Symbol

⚠ WARNING

This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

⚠ WARNING

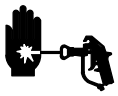
INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum temperature and working pressure of the lowest rated system component. Refer to the **Technical Data** on page 21 for the maximum temperature and working pressure of this equipment.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below –40°C (–40°F).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- Never install a shutoff device between the heater and gun.

⚠ WARNING



INJECTION HAZARD

Spray from the gun, leaks or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- Do not point the gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 12 if the spray tip clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.

MOVING PARTS HAZARD

Moving parts, such as the air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 12 to prevent the equipment from starting unexpectedly.

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.

- Ground the equipment and the object being sprayed. Refer to **Grounding** on page 7.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying immediately.** Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.
- Do not touch the heater surfaces.

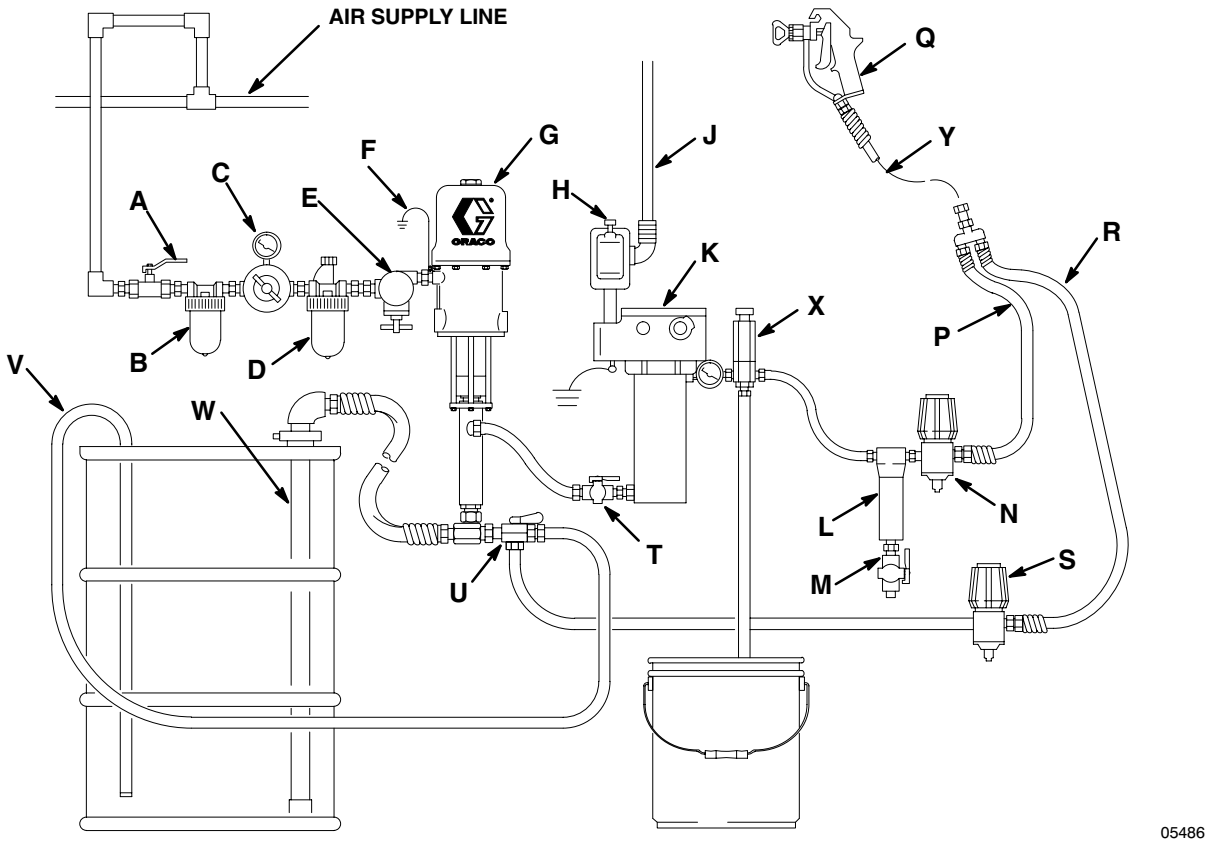
TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

Installation

HEATED CIRCULATING SYSTEM



KEY

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

Fig. 1

This Typical Installation is only a guide to setting up a heated, circulating spray system. Your Graco representative can assist you in designing a system to suit your needs.

⚠ WARNING

To reduce the risk of serious injury from a fire or explosion, always select system components that meet the temperature and pressure ratings listed in the Technical Data section. The heater normal output range is adjustable from 29–104°C. Do not touch the heater surfaces.

⚠ WARNING

To reduce the risk of serious injury from a fire or explosion, always locate the heater away from all flammable materials and debris, and where operators will not come in contact with the hot metal surfaces.

⚠ WARNING

To reduce the risk of serious injury due to burns, insulate and/or label lines and components exiting the heater that may be excessively hot. Do not touch the heater surfaces.

Installation

Selecting Tubing for the Heated Section of the System

Fluid loses some of its heat through the tubing or hose between the heater and spray gun.

The chart in Fig. 2 shows a heat loss curve for three common types of tubing. Notice that the greater the flow rate, the less the heat loss.

Foam-insulated steel tubing and high pressure airless paint hose retain heat the best. When selecting tubing, keep in mind that the higher cost of insulated tubing or hose will probably be offset by lower operating costs.

Try to locate the heater close to the spray area to minimize heat loss through the plumbing.

Mounting the Heater

⚠ WARNING

To reduce the risk of serious bodily injury from a fire or explosion, always locate the heater away from all flammable materials and debris, and where operators will not come in contact with the hot metal surfaces.

1. This heater has a surface temperature of T2. Observe this code as to proper location of the heater. See page 21 for further information.
2. Be sure the heater controls are easily accessible by the operator.
3. Be sure the mounting surface can support the weight of the heater and fluid, and any stress caused during operation.
4. **Wall Mounting** (See Fig. 3)
   a. Use the wall bracket (44) as a template to mark the wall. Use M8 bolts of the appropriate length and lockwashers (CC), not supplied, to mount the bracket to the wall.
   b. Install two screws (6) and washers (5) into the top two heater mounting posts (BB) until they are about 1/8 in. (3 mm) from fully installed.
   c. Lift the heater onto the bracket so the two screw heads slide into the slots. Install the remaining two screws and tighten all four.
5. **Cart Mounting** (See Fig. 3)
   a. Order two each of the cart mounting bar, 183485, and the clamp, 183484. See **ACCESSORIES** on page 20.
   b. Place the clamps (AA) around the vertical post (DD) of the cart and secure to the heater mounting bars (Z) with M8 x 1.25 x 30 mm bolts (6) and lockwashers (5), as shown.
   c. Observe temperature ratings for the power cable to the terminal junction. Cable H07RN **DOES NOT** meet the required 105°C. An intermediate Type “e” junction may be required. Also see Fig 5.

TYPICAL TEMPERATURE DROP IN LINES

CHART BASED ON 21° C AMBIENT TEMPERATURE

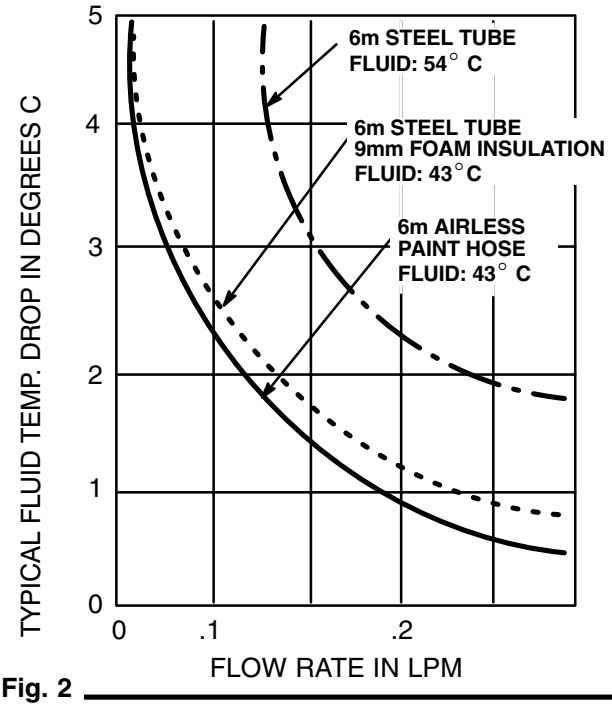


Fig. 2

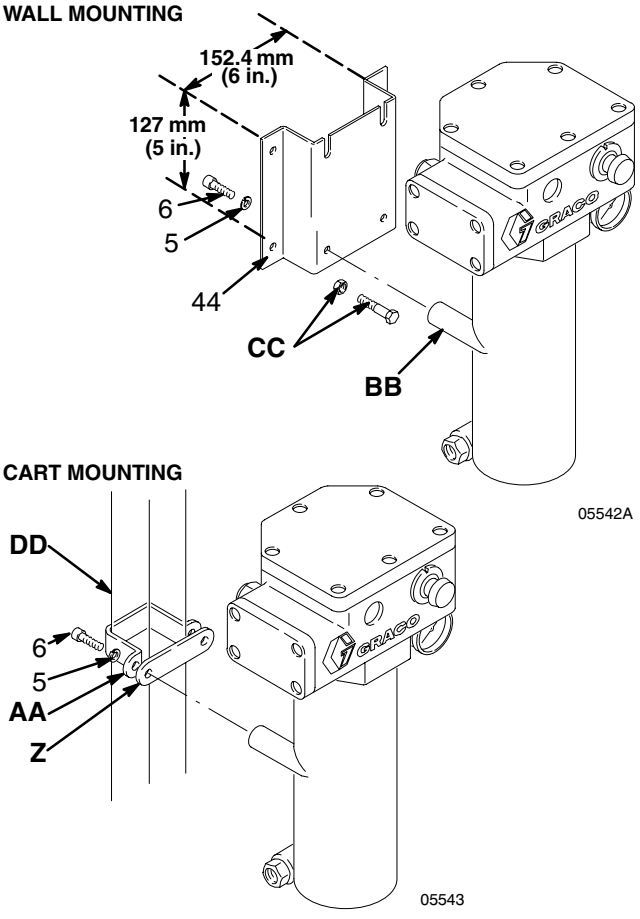


Fig. 3

Installation

Heater Fluid Connections (See Fig 4)

1. Install a fluid shutoff valve (T) in the heater's 1/2–14 npt(f) fluid inlet. Connect the fluid line.

⚠ CAUTION

Do not overtighten fittings going into the heater, to avoid damaging the heater.

2. Provide a means for adequately handling fluid expansion. See the **WARNING**, below.

⚠ WARNING

Heat causes fluid to expand. If fluid in the heated section of your system is trapped with no where to expand, it can cause a system rupture. A system rupture can result in serious injury and property damage. Be sure your system has an adequate way to handle fluid expansion.

1. Use flexible hoses between heater and gun.
2. OR, install a properly sized accumulator downstream from the heater.
3. OR, install a pressure relief valve, pre-set to relieve pressure when it exceeds the system's maximum working pressure.
4. Never install any shutoff device between the heater and gun. If you are using a fluid regulator before the gun, never use it as a shutoff device.

3. Install a fluid filter (L), a drain valve (M) and a fluid pressure regulator (N) near the heater's 3/8–18 npt(f) fluid outlet. Then connect the fluid line.

Heater Electrical Connections (See Fig 4)

⚠ WARNING

The VISCON2 heater must be installed by a qualified electrician in compliance with all codes and regulations, to reduce the risk of electric shock or other serious bodily injury, during installation or operation. See the **TECHNICAL DATA** on page 19 for further information.

Flameproof Installation Requirements: The connection of the apparatus shall be made by cable entries of a certified flameproof model or by threaded metal conduits; in the latter case a stopping box with compound filling of a certified flameproof model shall be placed at the entry of the apparatus. The unused threaded holes shall be shut by certified flameproof plugs. These accessories shall be screwed in with at least 5 full threads engaged and on a length of engaged threads of 8 mm at least. These accessories are not included in the present certificate and shall be suitable for the conditions of use.

The voltage supply must agree with the heater voltage of maximum 240 Volt, maximum 9.6 Amp.

For wall-mounted installations: Mount a 240 Volt, 13 Amp, 2-pole, explosion-proof electric switch (H) near the heater. The switch must meet the electrical codes for installation at your location. Also use an appropriate cable and plug. See Fig. 5.

For cart-mounted installations: Use 237947 Heater with cable. Attach an appropriate plug that meets the electrical codes for your location. See Fig. 5.

Grounding: Wire heater to a properly grounded power supply through the electrical connections and external lug. In a mobile installation also be sure the truck or trailer is grounded to a true earth ground.

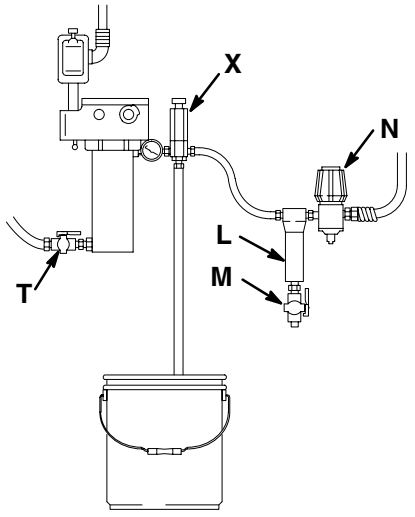


Fig. 4

Installation

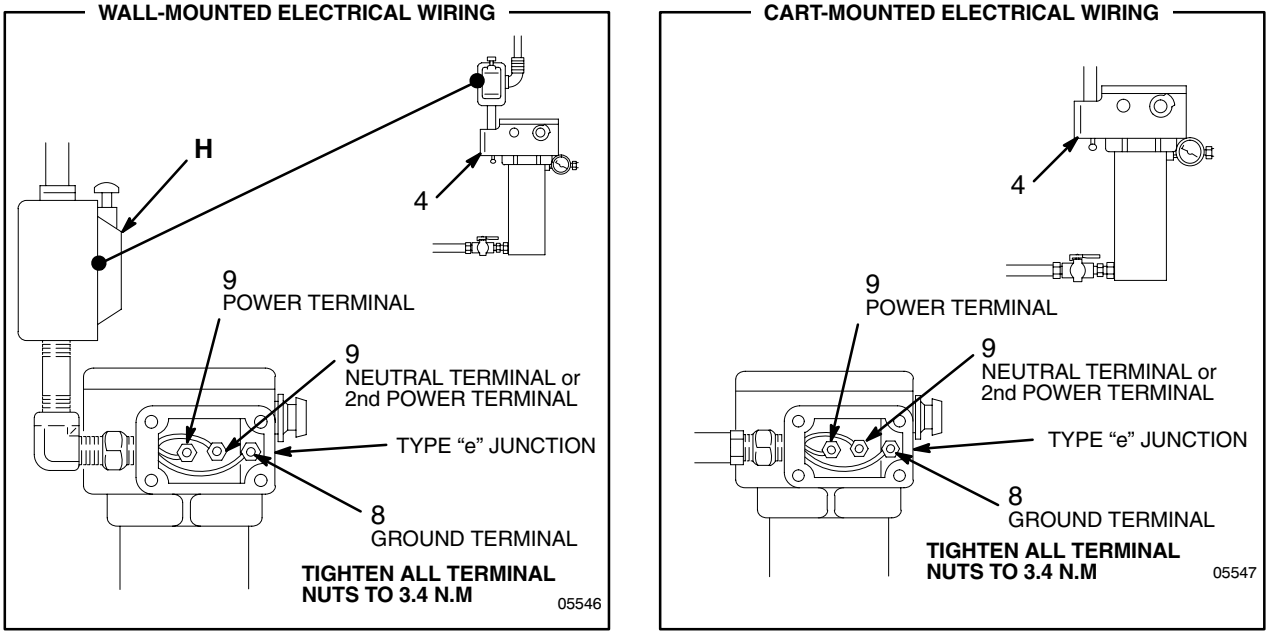


Fig. 5

Installation

Determining the Proper Fluid Temperature

⚠ CAUTION

Use the lowest temperature setting needed, for maximum heater life. Operating the heater at its highest setting – over 82°C – for long periods of time decreases the heater life.

Higher than necessary temperatures also cause the fluid to dry out, result in a poor finish and clog the heater.

The chart in Fig. 6 is used in determining the Under-Boil® temperature. It also shows the effect of temperature on reducing viscosity. Notice that most of the viscosity reduction occurs by 55°C.

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

To find the Under-Boil temperature of your fluid:

1. Pour a small sample into a heat-proof container.
2. Measure and record the temperature and viscosity of the fluid. Use a No. 2 Zahn cup.
3. Heat water in a large container to 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 71° to 77°C .
5. Subtract the lowest viscosity reading from the highest one. Multiply that result by 0.90. Subtract the new result from the highest viscosity reading. Find this number on your temperature and viscosity records. This is the temperature to use in your Under-Boil system.

EFFECT OF TEMPERATURE ON REDUCING VISCOSITY UNDER-BOIL METHOD

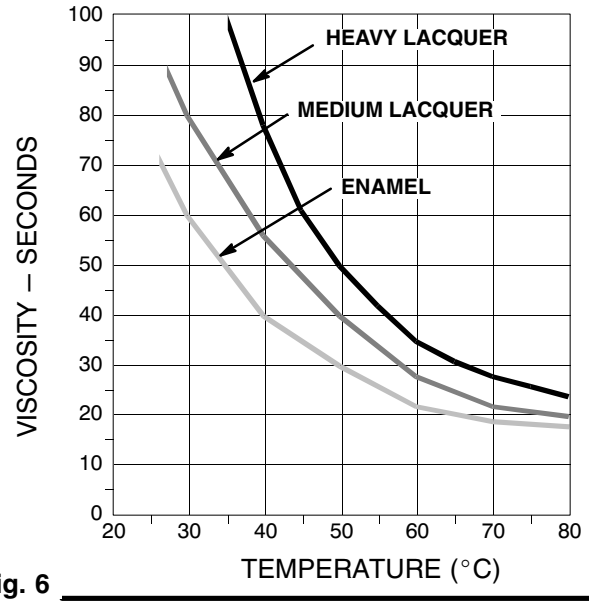


Fig. 6

The chart in Fig. 7 shows the effect of temperature in reducing two fluids to a sprayable - between 20 and 34 seconds using a No. 2 Zahn cup.

Notice that temperature has more of an effect on high solid fluids than on thin enamels. That is, for the same 10° temperature rise, more viscosity reduction occurs in the high solid fluid than the enamel. This shows that high-solid fluids are “temperature sensitive”, which needs to be taken into consideration when planning your system.

Also note that once the fluid is reduced to about 34 on the chart, viscosity reduction begins to level off. Therefore, high temperatures will not significantly improve sprayability, but will use more energy.

EFFECT OF TEMPERATURE ON VISCOSITY

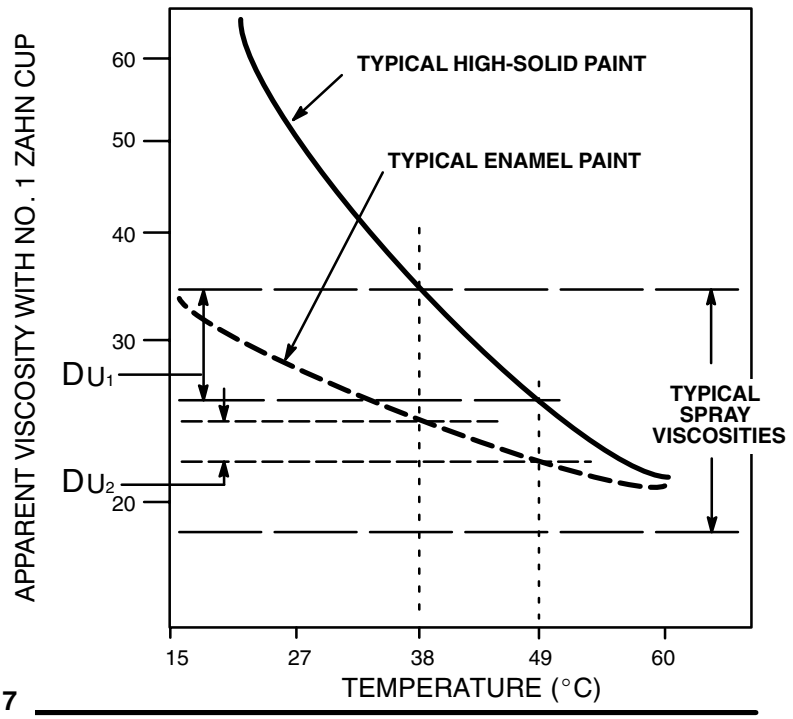


Fig. 7

Cable Clamp Installation

PARTS LIST
MODEL 237947

REF NO.	PART NO.	DESCRIPTION	QTY
1	222307	HEATER	1
2	113922	CABLE, 5 m, 105°C	1
3	113162	CLAMP, cable	1

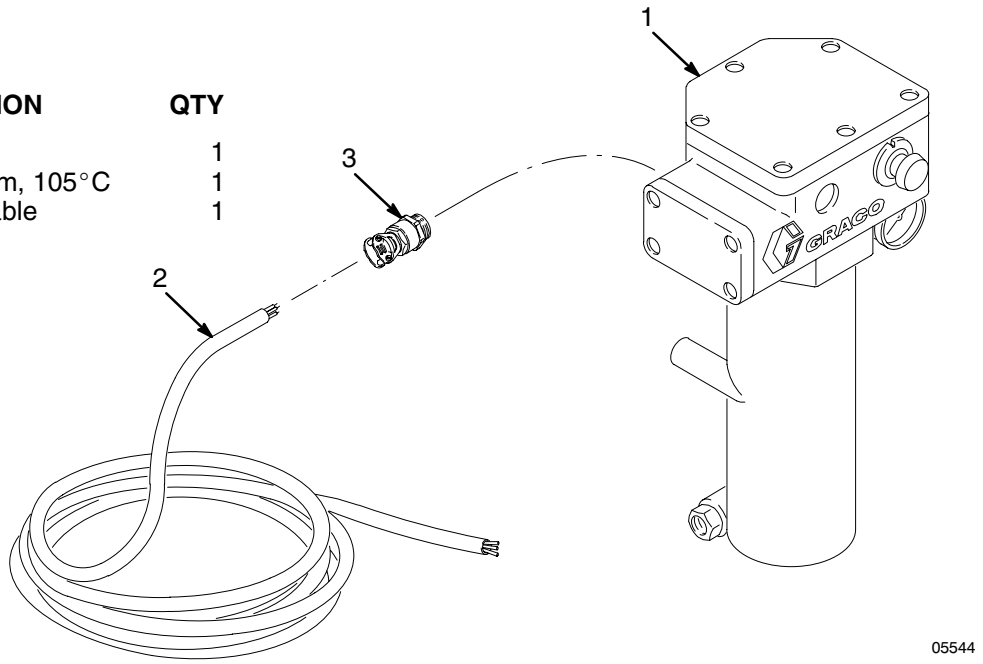


Fig. 8

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

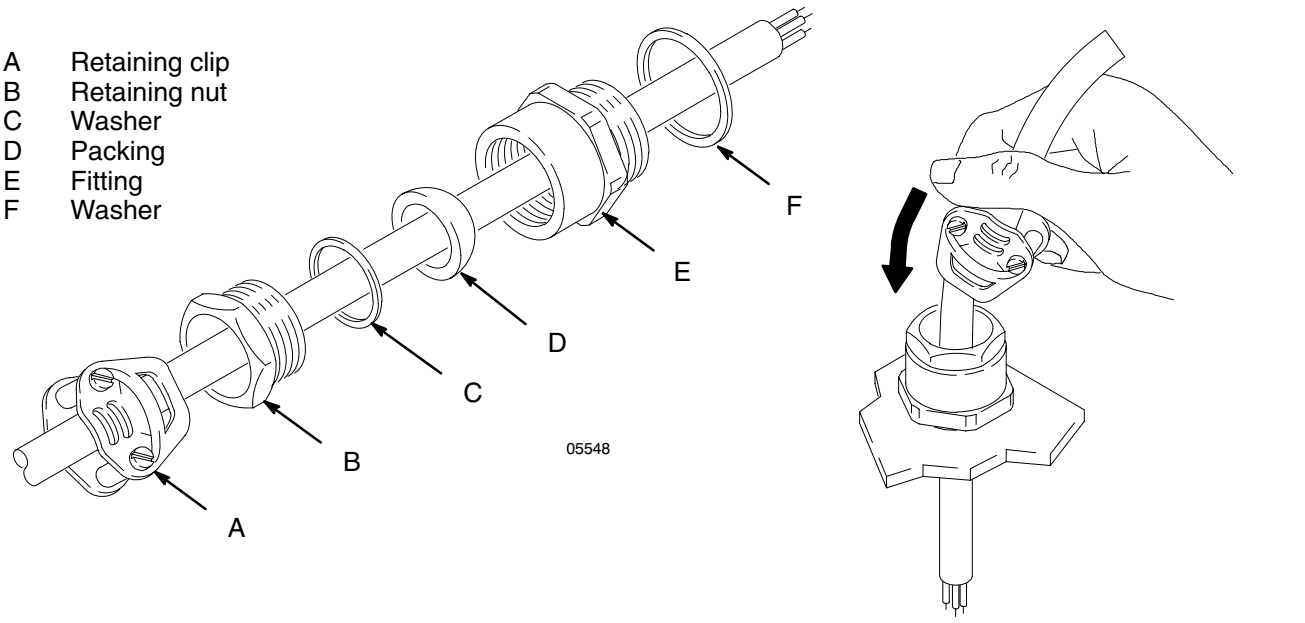


Fig. 9

Cable Clamp Installation

1. Slide cable clamp (3) onto cable (2) as shown.
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 (B). Tighten with no more than 50 mm stripped black and blue wires and 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.

Operation

Flush the Heater Before First Use

The heater was tested in lightweight oil. Without the heater turned on, flush the heater and system with a compatible solvent.

⚠ WARNING

To reduce the risk of serious bodily injury when flushing:

1. Use the lowest possible pressure to reduce the risk of fluid injection and splashing solvent in the eyes or on the skin.
2. Maintain firm metal-to-metal contact between a metal part of the gun and a grounded metal pail to reduce the risk of static sparking which can cause a fire or explosion.

⚠ WARNING

To reduce the risk of serious bodily injury from a fire or explosion, NEVER operate the heater with its covers removed.

Priming the System (Refer to Fig. 1, page 5)

1. Do not turn on the heater yet.
2. If you are 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 the 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 (airless spray guns only).
7. Shut off the air supply to the pump. Relieve pressure. Install the gun spray tip.

Set the Heater Control (See Fig. 10)

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 0.30 to 0.35 liter/min (10 to 12 oz/min).
3. After 10 minutes, read the temperature on the thermometer (2). If it does not correspond to the temperature you need, readjust the setpoint.

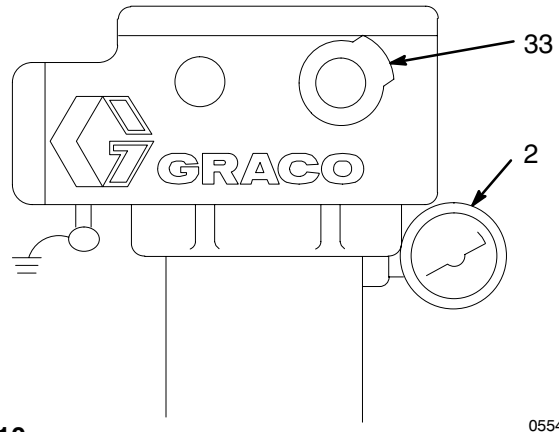


Fig. 10

Adjusting for Spraying

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

⚠ CAUTION

Use the lowest heater temperature setting possible for maximum heater life. Operating the heater at its highest temperature settings – over 82°C – for long periods of time decreases the heater life.

Excessive temperatures also cause the fluid to dry out, resulting in a poor finish and clogging of the heater.

Maintenance

Pressure Relief Procedure

⚠ WARNING

INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the spray tip.

Pressure Relief Procedure

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

Flushing After Use

⚠ WARNING

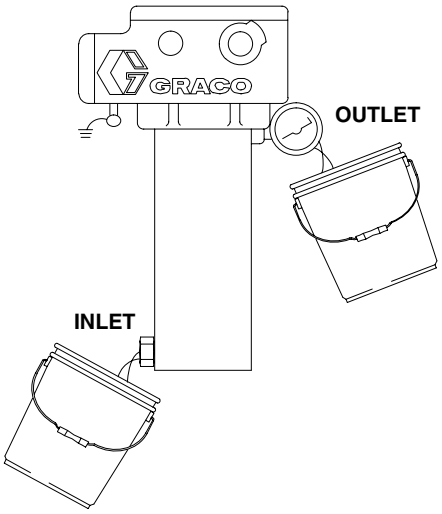
Before flushing, always shut off the main power to the heater. Circulate the fluid through the system for at least 10 minutes to cool the fluid and heater. This reduces the risk of serious bodily injury from burns.

⚠ CAUTION

Clogged fluid passages can be very difficult to clean. They also reduce heating efficiency, flow rate and pressure. To prevent clogged passages, do not overheat or let the fluid dry out, and flush frequently, including whenever the system or heater is not in use.

To Drain the Heater

1. Cool the system and follow the **Pressure Relief Procedure Warning** on page 12.
2. Remove the inlet and outlet fittings from the heater. Have a container ready to catch the fluid. See Fig. 11.

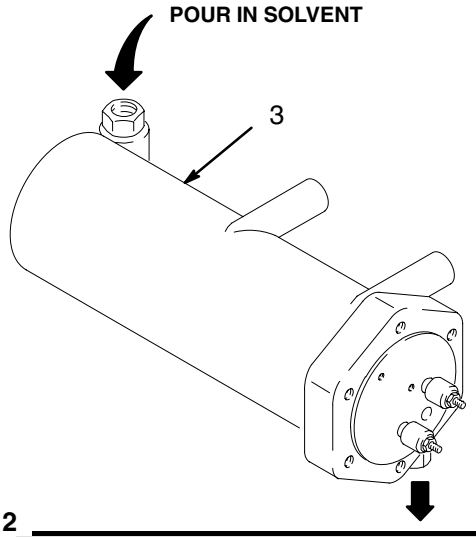


05550

Fig. 11

To Unclog Fluid Passages (See Fig. 12)

1. Remove the heater block (3) from the heater housing. See **Heater Block**, page 17.
2. Pour a high strength, **compatible** solvent into the heater tube to soften the clog.
3. Flush out the clog.
4. Clean all passages thoroughly before reassembling the heater.



05551

Fig. 12

Troubleshooting

⚠ WARNING

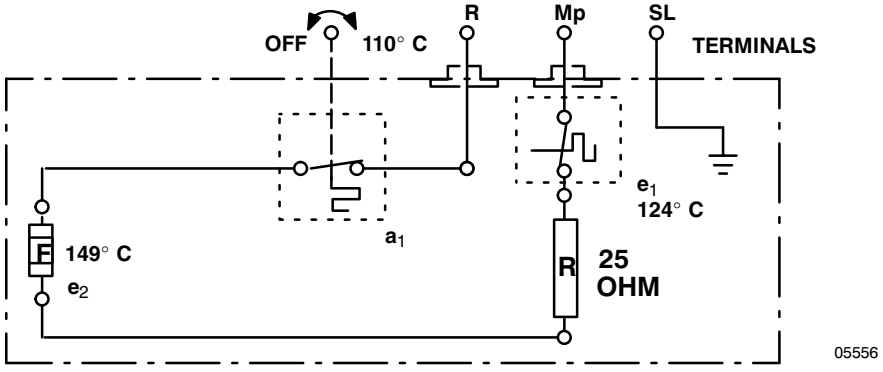
INJECTION HAZARD

To reduce the risk of serious injury, whenever you are instructed to relieve pressure, follow the **Pressure Relief Procedure** on page 12.

Check all the information in the chart before disassembling the heater.

PROBLEM	CAUSE	SOLUTION
Heater will not heat	1. No current.	1.a. Check circuit, fuses.
		1.b. Check continuity of primary thermostat (24), backup thermostat (10) and heat limiter (15).
		1.c. Check continuity of thermostat switch (10) and heater block (3) terminals. See page 14.
	2. Burned out heater block (3)	2. Replace block. See page 15.
	3. Blown heat limiter (15).	3. Check continuity of primary thermostat (24), and backup thermostat (10). Replace, if bad, when replacing heat limiter (15). See page 13.
Temperature too low	1. Fluid requires more warmup time.	1. Increase warmup time.
	2. Wrong temperature setting	2. Adjust.
	3. Flow rate too high.	3. Reduce flow rate or use two heaters.
	4. Clogged fluid passages.	4. Flush regularly. See page 11.
Temperature too high	1. Wrong temperature setting.	1. Adjust.
	2. Bad thermostat (24).	2. Replace. See page 14.
High fluctuating temperatures, about 104° to 121° C at 0.1 GPM	1. Sticking contacts on primary thermostat (24)	1. Replace thermostats (24 & 10). See page 12. Backup thermostat (10) keeps heater functioning only a short time.
Too much pressure drop/Fluid will not flow	1. Flow rate too high.	1. Reduce flow rate or use two heaters.
	2. Clogged fluid passages	2. Flush regularly. See page 11.
Leakage from heater fittings	1. Loose or damaged fittings	1. Tighten fittings or replace heater block. See page 17.

SCHEMATIC



Service

Thermostat Switch and Probe (See Fig. 13)

1. Follow the **Pressure Relief Procedure Warning** on page 12. Shut off the main power circuit breaker. Be sure the heater is cool to the touch.
2. Remove the housing cover (18).
3. Loosen the nut (27). Loosen the setscrew (26) in the switch shaft (28).
4. Remove the screw (16) and bracket (19) holding the probe (B).
5. Remove the wires from the terminals (A) of the thermostat switch (24).
6. Pull the thermostat probe (B) out of the heater block (3). Remove the thermostat from the housing.
7. Remove the bracket (35) from thermostat and secure it to the new thermostat.

⚠ CAUTION

To avoid damage to the capillary tube which can cause the heater to malfunction, do not kink or nick the tube.

To avoid shorting out the heater, be sure to loop the capillary tube and wrap it with the tie strap (47), as explained in Step 8, to prevent the tube from coming in contact with the block terminal (3A).

8. Liberally apply thermal lubricant (see **ACCESSORIES**) to the probe (B) of the new thermostat. Loop the capillary tube (C) several times and wrap the loops with the tie strap (47) as shown in Fig. 13. Insert the probe in the heater block.
9. Continue reassembling in the reverse order.
10. Refer to Fig. 14, page 15, to be sure the wiring is done properly.
11. Install the lockwashers (5) and screws (6) and torque to 10 N.m.

Backup Thermostat (See Fig. 13)

1. Follow the **Pressure Relief Procedure Warning** on page 12. Shut off the main power circuit breaker. Be sure the heater is cool to the touch.
2. Remove the housing cover (18).
3. Loosen the screws (D) on the tabs of the thermostat (10) and remove the wires – one from the heat limiter (15) and one from the thermostat switch (24).
4. Remove the two screws (16) holding the thermostat in place, and then remove the thermostat.
5. Liberally apply thermal lubricant (see **ACCESSORIES**) to the bottom of the thermostat and reinstall it in the reverse order of disassembly.
6. Refer to Fig. 14, page 15, to be sure the wiring is done properly.
7. Install the lockwashers (5) and screws (6) and torque to 10 N.m.

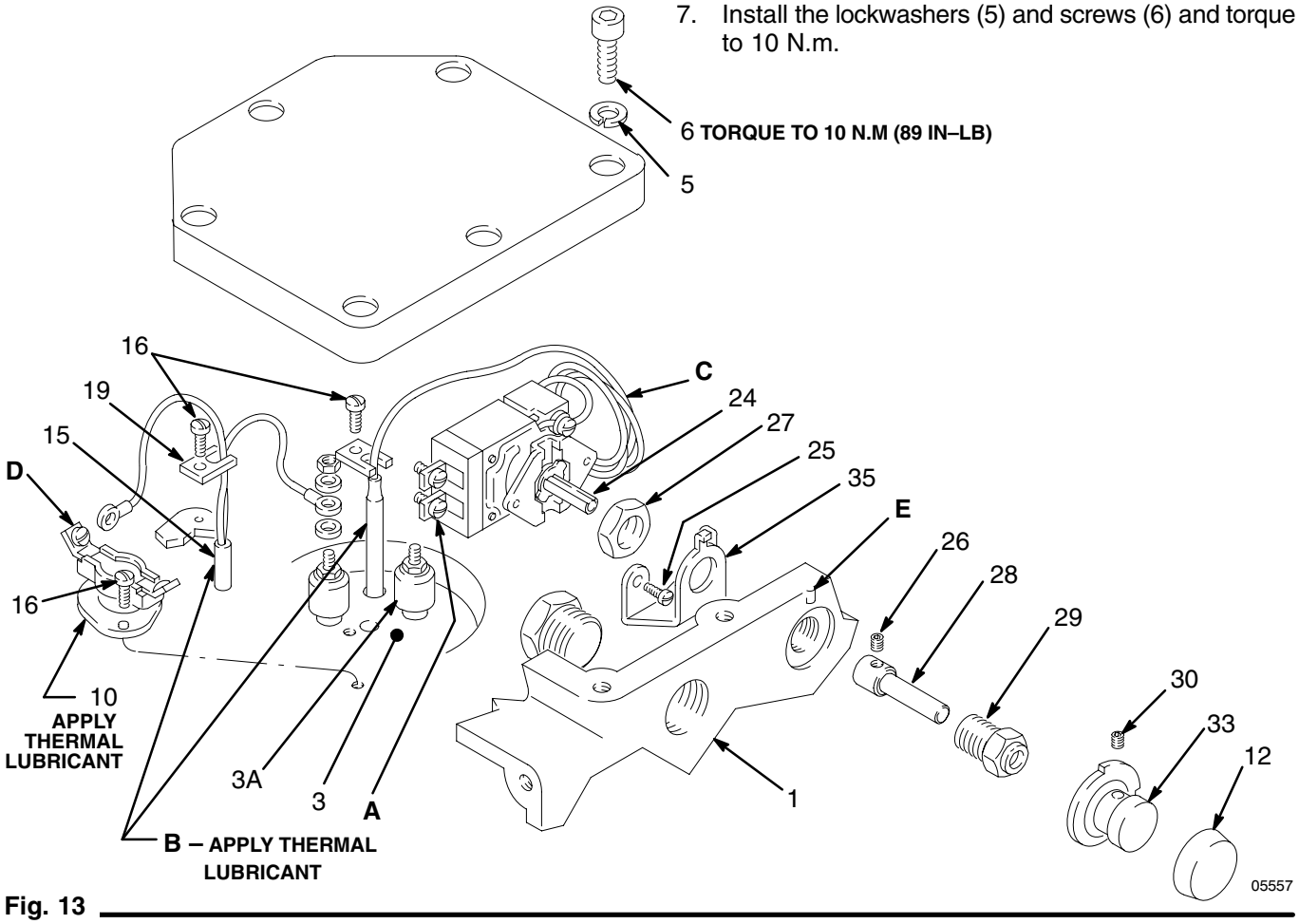


Fig. 13

Service

Heater Limiter (See Fig. 13 and 14)

1. Follow the **Pressure Relief Procedure Warning** on page 12. Shut off the main power circuit breaker. Be sure the heater is cool to the touch.
2. Remove the housing cover (18).
3. Loosen the nut (9B) and the nut (3B) holding the leads of the heater limiter (15) and remove the limiter.
4. Install a new limiter in the reverse order of disassembly.
5. Apply a thin film of thermal compound to the bulb of the heat limiter (15). Purchase the thermal compound separately from Graco, part no. 110009.
6. See Fig. 14 to be sure the wiring is done properly.
7. Install the lockwashers (5) and screws (6) and torque to 10 N.m (89 in–lb).

Control Knob (See Fig. 13)

1. Follow the **Pressure Relief Procedure Warning** on page 12. Shut off the main power circuit breaker. Be sure the heater is cool to the touch.
2. Turn the knob (33) to **setpoint 1.**
3. Loosen the setscrew (30) in the control knob (33).
4. Pull the control knob off.
5. Remove the adjusting knob (12) from the control knob and press fit it onto the new control knob. Check the bushing (29) and replace it, if it is worn.
6. Position the new knob (33) so the **setpoint 1** aligns with the mark (E) on the housing and the knob is about 1 mm away from the housing. Tighten the setscrew (30).

⚠ CAUTION

Do not allow the capillary tube (A) to come in contact with the terminal (3A) of the heater block to avoid shorting out the heater.

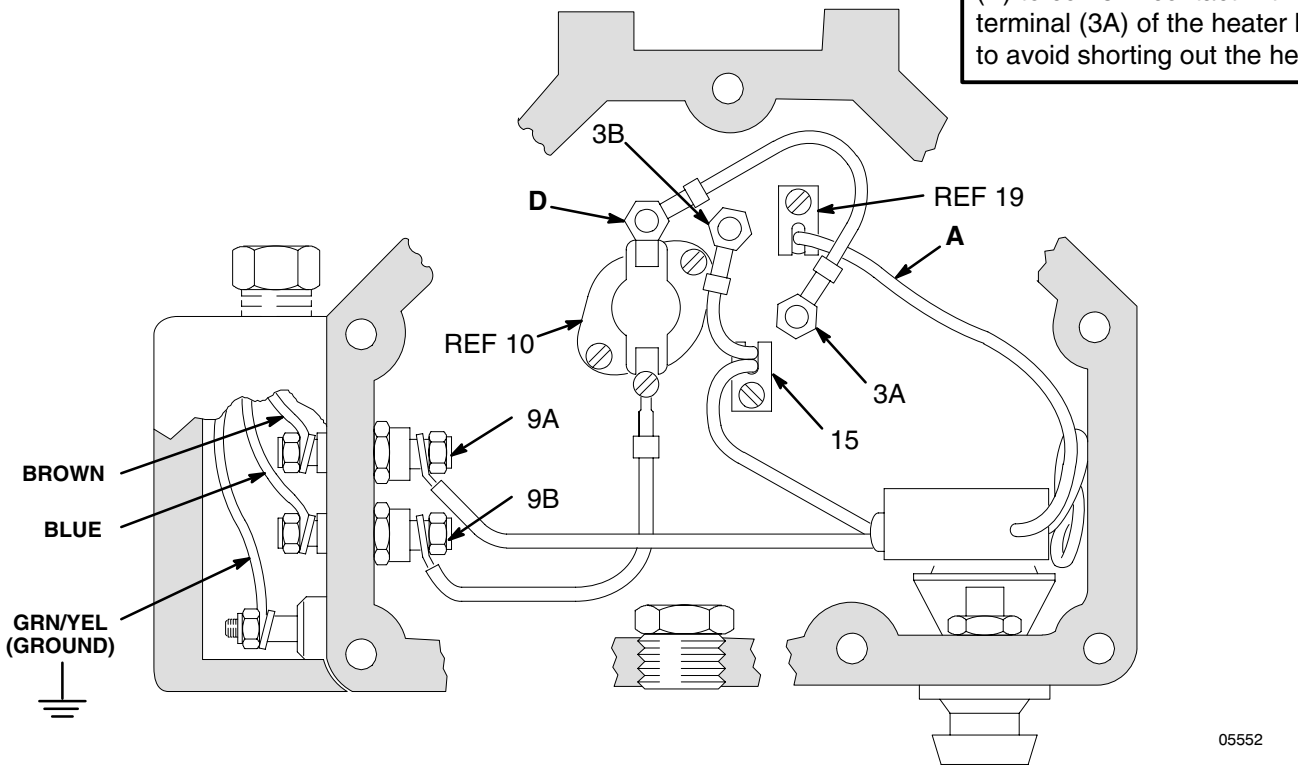


Fig. 14

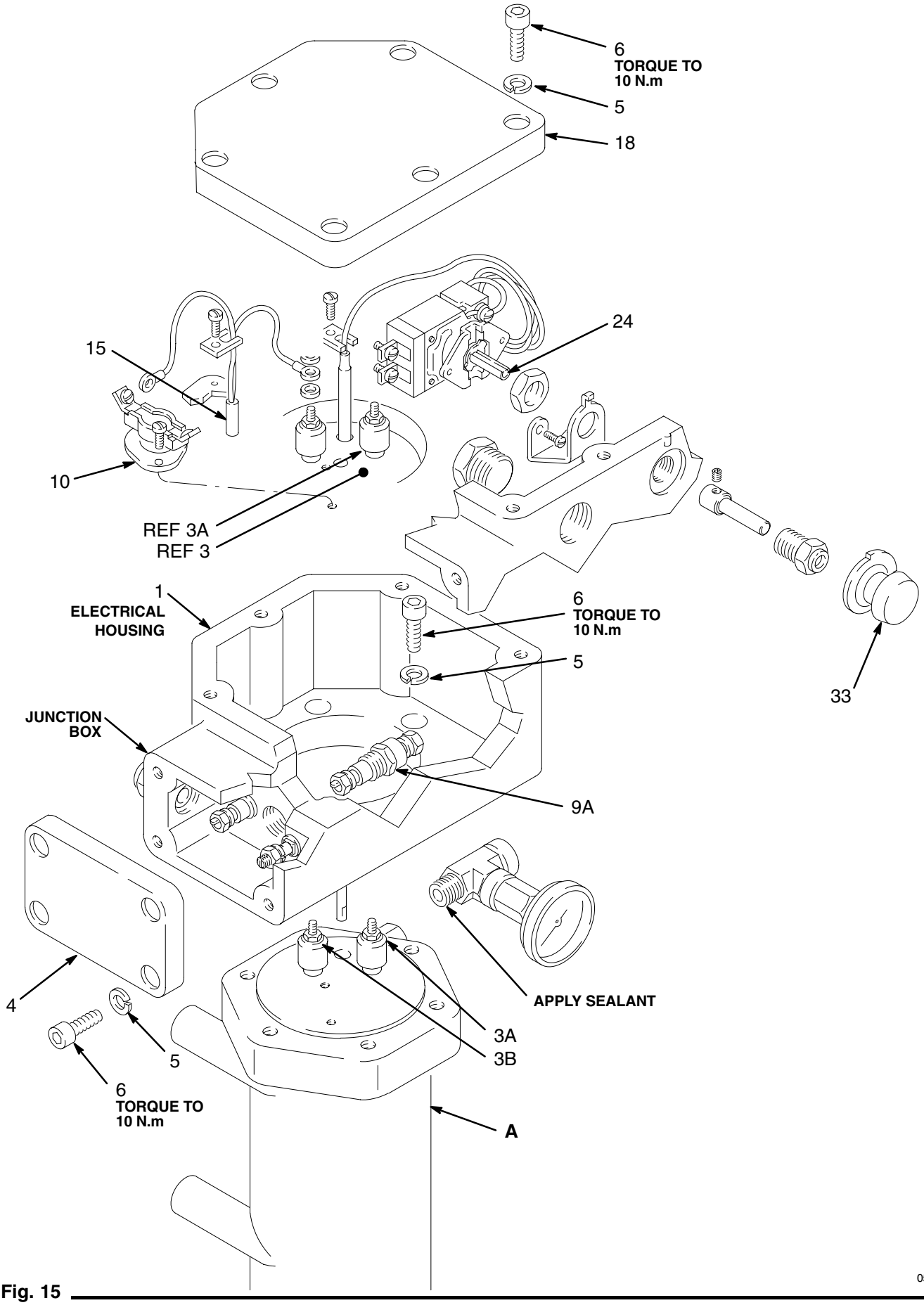

6
TORQUE TO
10 N.m
5
18
24
15
10
REF 3A
REF 3
1
ELECTRICAL
HOUSING
6
TORQUE TO
10 N.m
5
33
JUNCTION
BOX
9A
4
APPLY SEALANT
3A
3B
5
6
TORQUE TO
10 N.m
A
05553

Fig. 15

Heater Block (See Fig. 15 and 16)

1. Follow the **Pressure Relief Procedure Warning** on page 12. Shut off the main power circuit breaker. Be sure the heater is cool to the touch.
2. Remove the housing cover (18) and the electrical junction box cover (4).
3. Working in the junction box, disconnect the main power lead from the terminal of the post bushing (9A) on the right side of the box.
4. Working inside the electrical housing, use a wrench on the flats of the post bushing (9A) to unscrew it from the housing.
5. See the appropriate sections on page 12 to remove the thermostat and probe (24), the backup thermostat (10), the heat limiter (15) and the control knob (33).
6. Remove the six screws (6) and lockwashers (5) holding the housing (1) to the heater block.
7. Reassemble the heater with the new block in the reverse order of disassembly.
8. Refer to Fig. 16, to be sure the wiring is done properly.
9. Install the lockwashers (5) and screws (6) and torque to 10 N.m.

⚠ CAUTION

Do not allow the capillary tube (A) to come in contact with the terminal (3A) of the heater block to avoid shorting out the heater.

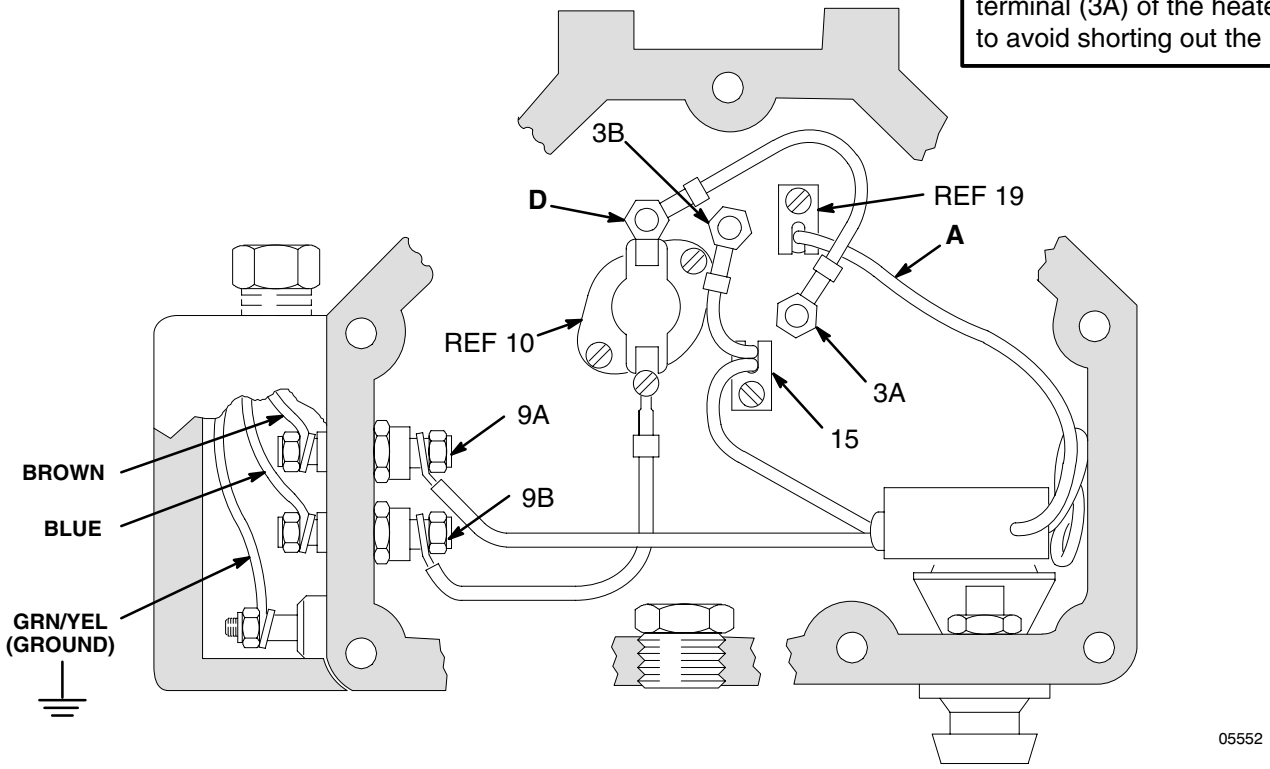
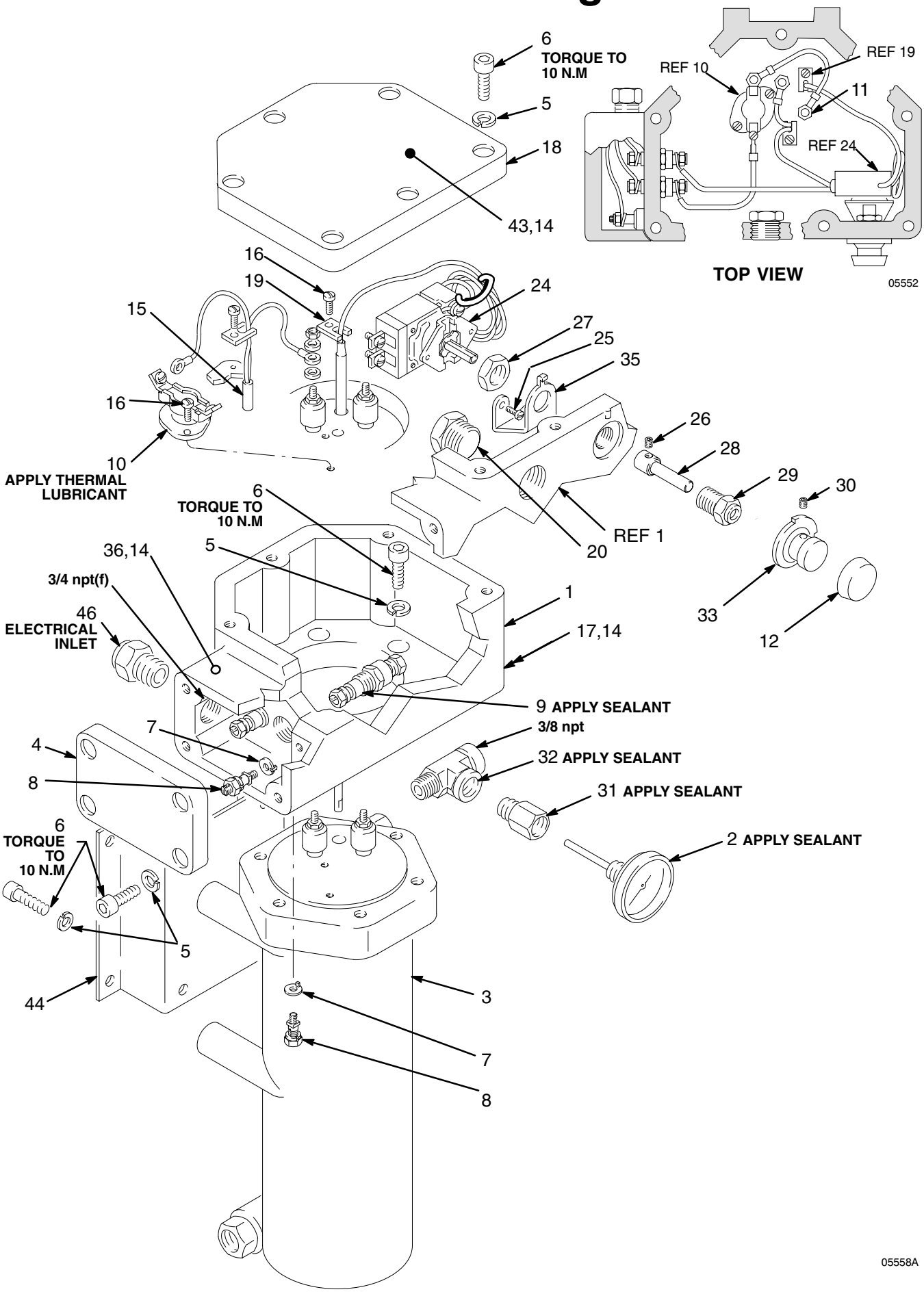


Fig. 16

Parts Drawing



Parts List

Model 222307, Series B
220–240 Volt Heater
Includes items 1 to 47

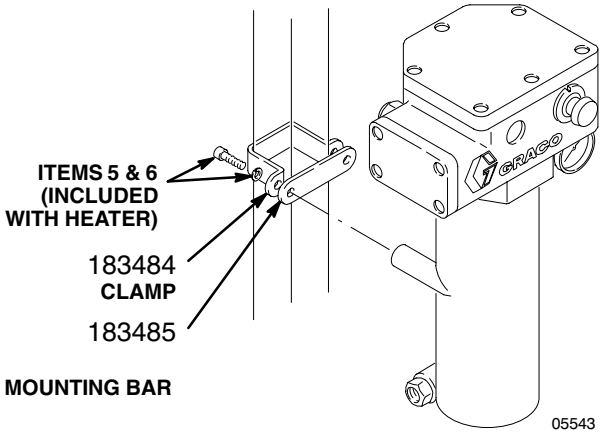
REF NO.	PART NO.	DESCRIPTION	QTY
1	183074	HOUSING, control	1
2	102124	DIAL, thermometer	1
3	183060	BLOCK, heater	1
4	183066	COVER	1
5	107542	LOCKWASHER, spring, Sz 8	20
6	109114	CAPSCREW, socket head; M8x1.25 mm	20
7	104582	WASHER, tab	2
8	104029	CLAMP, grounding	2
9	108675	BUSHING, post type; 1000 V max, 250 AMP max	2
10	108674	THERMOSTAT	1
11	235524	WIRE ASSY	1
12	177969	KNOB, adjusting	1
14	100055	SCREW, drive, type U, No. 6	12
15	223126	LIMITER, heat (thermal cutoff)	1
16	105676	SCREW, mach, panhead; M4 x 0.7 x12 mm	3
18	183073	COVER, housing	1
19	183072	BRACKET, probe	2
20	108940	PLUG, pipe; 3/4–14 npsm	1
21	108664	TOOL, hex key wrench; 6 mm	1
22	105747	TOOL, hex key wrench; 2 mm	1
23	101369	TOOL, hex key wrench; 0.0927”	1
24	108676	SWITCH, thermostat	1
25	100032	SCREW, mach, slotted pnh; No. 6–32 unc–2a	2
26	105672	SETSCREW, socket head; M4 x 0.7 x 6 mm	1
27	183070	NUT, bushing, M15 x 1.5	1
28	183068	SHAFT, switch	1
29	183071	BUSHING, M15 x 1.5	1
30	101366	SETSCREW, sch, No. 10–24 x 0.312”	1
31	183050	BUSHING, hex, 3/8–18 npt(m) x 1/4–18 npt(f)	1
32	108673	TEE, street	1
33	177968	KNOB, control	1
35	183067	BRACKET, switch	1
36	185063	PLATE, warning	1
37	235523	WIRE, electrical, 14 AWG	2
43	185064	PLATE, warning	1
44	192585	BRACKET, mounting	1
46	185065	BUSHING, 3/4 npt	1
47	102478	TIE STRAP	1

Accessories

Must be purchased separately.

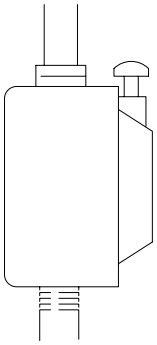
CART BRACKET
Order two each of the following

183484 Clamp
183485 Mounting Bar



FLUID PRESSURE REGULATOR 206661
210 bar MAXIMUM WORKING PRESSURE
70–210 bar REGULATED FLUID PRESSURE RANGE
3/8 npt inlet, two 1/4 npt outlets

BACK PRESSURE VALVE 206819
210 bar MAXIMUM INLET PRESSURE
70–210 bar REGULATED PRESSURE RANGE
1/4 npt inlet & outlet



THERMAL LUBRICANT 110009
6.5 gram tube

HOSE 221102
210 bar MAXIMUM WORKING PRESSURE
0.9 m x 1/2” ID; cpld 1/2–14 npt (mbe)

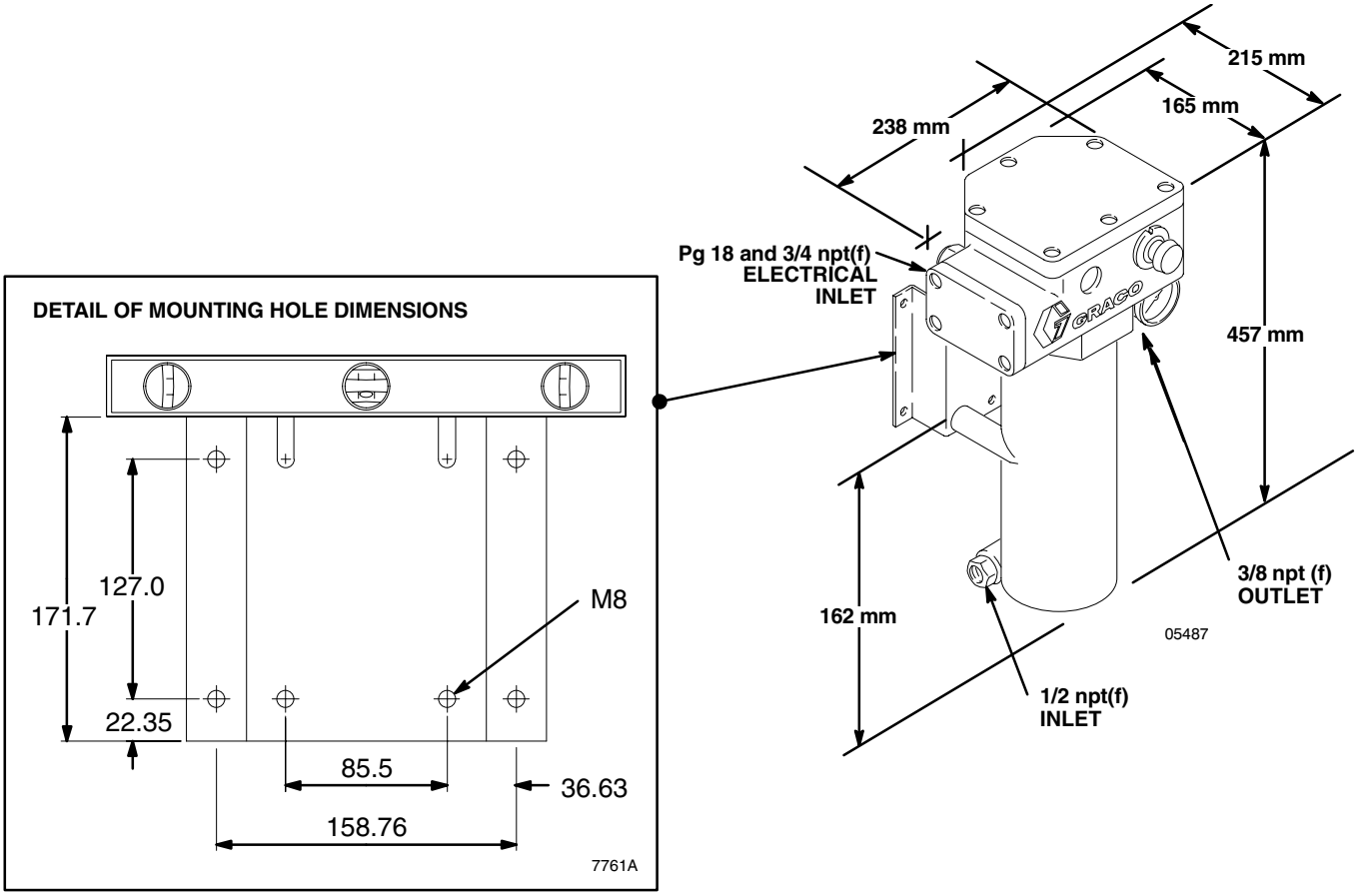
EXPLOSION-PROOF SWITCH
Not available from Graco. Purchase at a local electrical supply house. Be sure it is classified as flameproof.

Technical Data

Maximum working pressure	27.6 MPa, 276 bar (4000 psi)
Voltage	220–240 VAC, Single Phase, 9.6 Amp
Heating Element Wattage	2300 Watts
Fluid passage area	129,032 mm^2
Fluid passage diameter	9.7 mm
Fluid passage length	4166 mm
Thermometer range	–18 to 121°C
Wetted parts	Stainless Steel
Temperature operating range	29 to 104°C
Surface temperature code*	T2 (250°C)
Weight	17.6 Kg

*This heater has a surface temperature code of T2 (250° C), indicating a maximum external (surface) temperature rating of 250° C in accordance with EN50014 – Article 4. See and comply with the requirements of these and similar codes as to the proper location of the heater.

Dimensions



Notes

Notes

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor 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 procedures concernées.

Graco Information

TO PLACE AN ORDER, contact your Graco distributor, or call one of the following numbers to identify the distributor closest to you:

1–800–367–4023 Toll Free
612–623–6921
612–378–3505 Fax

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.

Sales Offices: Minneapolis, Detroit
International Offices: Belgium, Korea, Hong Kong, Japan

www.graco.com

PRINTED IN USA 307914 11/1990, Revised 05/2003