

Fluid Heater

311210 rev.A

Part No. 287672 (120V), Series A

Part No. 287673 (240V), Series A

2000 psi (14 MPa, 140 bar) Maximum Working Pressure

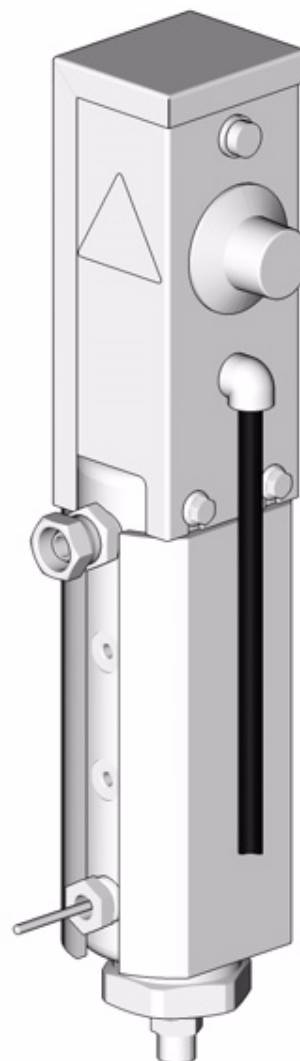


Important Safety Instructions

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

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Warnings

The following general warnings are for the setup, use, grounding, maintenance, and repair of this equipment. Additional, more specific warnings may be found throughout the body of this manual where applicable. *Symbols appearing in the body of the manual refer to these general warnings. When these symbols appear throughout the manual, refer back to these pages for a description of the specific hazard.*

 WARNING	
	<p>ELECTRIC SHOCK HAZARD</p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDS's 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.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>You must wear appropriate 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, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves • Hearing protection
	<p>SKIN INJECTION HAZARD</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. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.

 WARNING	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground equipment and conductive objects in work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a fire extinguisher in the work area.
	<p>PRESSURIZED ALUMINUM PARTS HAZARD</p> <p>Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use can cause serious chemical reaction and equipment rupture, and result in death, serious injury, and property damage.</p>
	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • 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. • Check equipment daily. Repair or replace worn or damaged parts immediately. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your Graco distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>BURN HAZARD</p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns, do not touch hot fluid or equipment. Wait until equipment/fluid has cooled completely.</p>

Troubleshooting

PROBLEM	CAUSE	SOLUTION
No heat, and heater indicator light is off.	Heater Power shut off, or circuit breaker rocker switch tripped.	Cycle Heater Power off, then on to reset circuit breaker.
	Bad thermostat.	With power on, check for continuity on/off at clicks when turning the heater control knob. To replace thermostat, see page 6.
	Bad overtemperature sensor (this is a high temperature limit fuse and must be replaced if blown).	With power on, check for continuity at overtemperature sensor. To replace sensor, see page 5.
No heat, but heater indicator light is on.	Bad heater cartridge.	Check for continuity at heater cartridge connections: 16-18.6 ohms for 120 V, 64-75 ohms for 240 V.
Heat, but no indicator light	Bad light.	Check connections. Replace lamp.

Repair

Before Beginning Repair

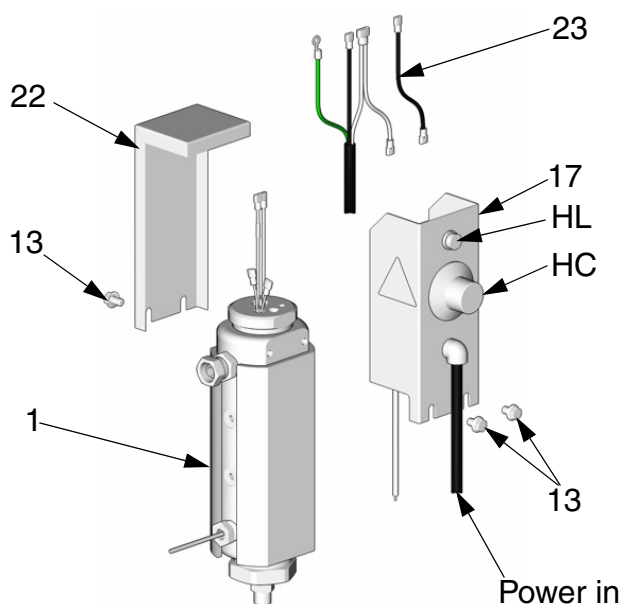
Repairing this equipment requires access to parts which may cause electric shock or other serious injury if work is not performed properly. Have a qualified electrician connect power and ground to main power switch terminals. Be sure to shut off all power to the equipment before repairing.

1. Flush if necessary.
2. Shut off all power to equipment.

3. Relieve all system pressure as explained in your system manual.

Heater Temperature Controls

See FIG. 1. Control knob (HC) sets temperature of heater. Indicator light (HL) turns on when thermostat is heating, and off when heater reaches setpoint.

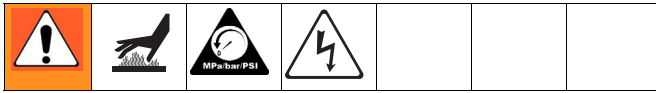


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FIG. 1

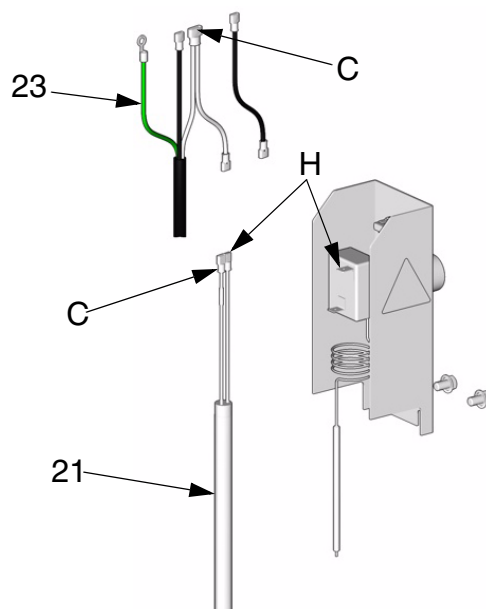
Heater Cartridge

1. See **Before Beginning Repair**, page 4. Relieve pressure.



2. Wait for heaters to cool.
3. **Testing:** Use a multimeter to check resistance across cartridge leads per the **Technical Data** chart. Also check that neither lead has continuity to the cartridge case.
4. See FIG. 1. Loosen all four screws (13) from bracket (17) and shield (22). Pull bracket assembly away from heater housing (1) to remove cartridge (21) from core. If necessary, plug (5) can be removed from the bottom of core (2) so that cartridge can be pushed out from underneath. See **Parts**, page 8.
5. Disconnect heater cartridge (21) from jumper wires (23, C) and heater thermostat switch (18, H). See FIG. 2.
6. Connect new heater cartridge (21) to jumper wires and thermostat heater switch, then reassemble heater in reverse order of disassembly.

 Apply a thin film of heat sink compound 110009 to all components in core (2).



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FIG. 2

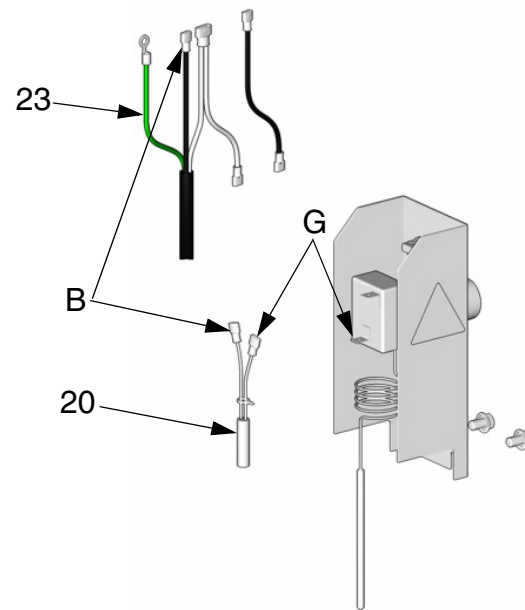
Thermal Limit Sensor

1. See **Before Beginning Repair**, page 4. Relieve pressure.



2. Wait for heaters to cool.
3. **Testing:** Check that you have continuity across the two leads. If circuit is open, replace limit sensor.
4. See FIG. 1. Loosen all four screws (13) from bracket (17) and shield (22). Pull bracket assembly away from heater housing (1). To remove thermal limit sensor (20) from core, pull upward with a steady force.
5. Disconnect thermal limit sensor (20) from jumper wire (23, B) and heater thermostat switch (18, G). See FIG. 3.
6. Connect new thermal limit sensor (20) to jumper wire and thermostat switch, then reassemble heater in reverse order of disassembly.

 Apply a thin film of heat sink compound 110009 to all components in core (2).



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FIG. 3

Indicator Light

1. See **Before Beginning Repair**, page 4. Relieve pressure.



2. Wait for heaters to cool.
3. See FIG. 1. Loosen two screws (13) and remove shield (22).
4. Disconnect jumper wires (23, D, E) from back of indicator light (9), then push light out through the front face of the control bracket (17) by depressing the prongs on the sides of the light. See FIG. 4.
5. Press new light into control bracket (17) until prongs lock in place.
6. Connect jumper wires and reassemble heater in reverse order of disassembly.

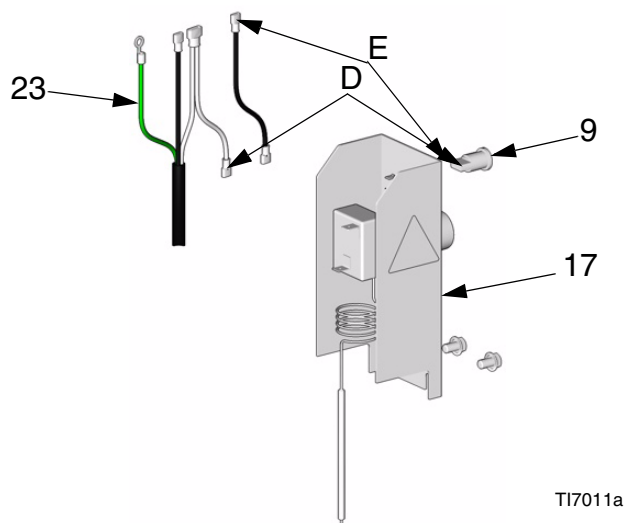
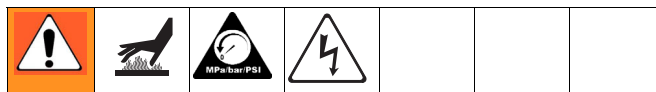


FIG. 4


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Heater Thermostat Switch

1. See **Before Beginning Repair**, page 4. Relieve pressure.



2. Wait for heaters to cool.
3. **Testing:** With thermostat bulb above 75°F (°C), and below 160°F (°C), the continuity across the contacts should open when turned to off, and close when turned up toward 8. You should hear the switch click open and closed.
4. See FIG. 1. Loosen two screws (13) and remove shield (22).
5. See FIG. 5. Detach the two push on connectors from switch (18). One is from fuse (20) at G, and dual connector H and F is from heater cartridge (21) and light (9).
6. Pull heater control knob (10) off of heater control bracket (17) face.
7. Using a phillips head screwdriver, unscrew screws (26) on control bracket face to release thermostat switch from bracket. Pull capillary bulb slowly out of heater core.
8. Insert new capillary bulb into core with heat sink compound 110009. Screw new thermostat switch into place behind bracket face and replace control knob (10).
9. Reattach jumper wires (23) and reassemble heater in reverse order of disassembly.

 Stretch capillary coils down to contact top of core (2). Route wires from thermal limit switch (20), heater cartridge (21), and ground wire through center of coils.

 Bend tabs on thermostat away from each other after installing wire connectors so that they do not interfere with cover (22).

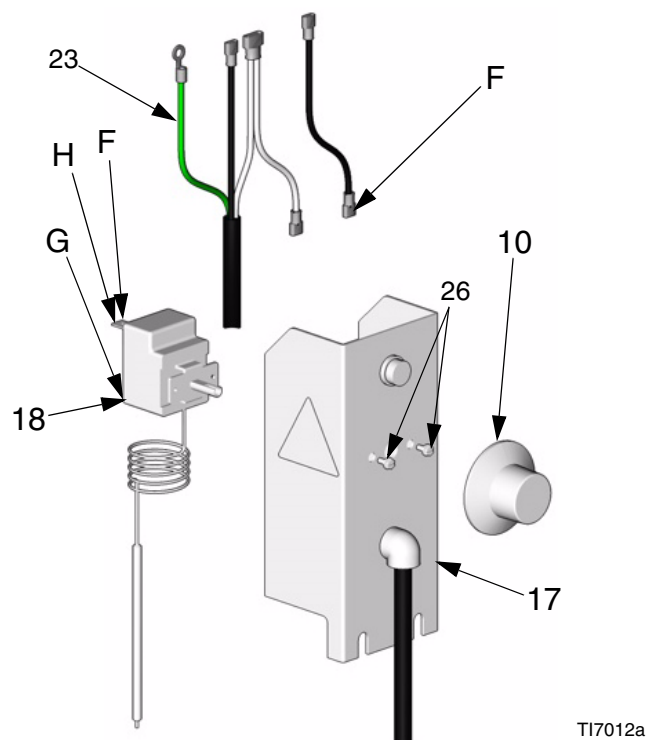


FIG. 5

Cleaning Heater Core



1. Wait for heaters to cool.
2. Loosen four screws (13) and pull control section up out of the way.
3. See FIG. 6. Unscrew core (2) from housing (1). Clean and reinsert in housing.

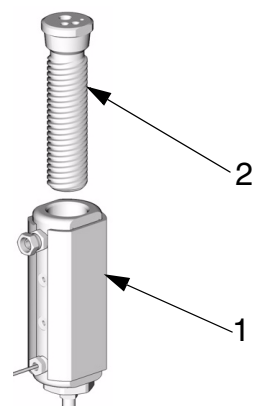
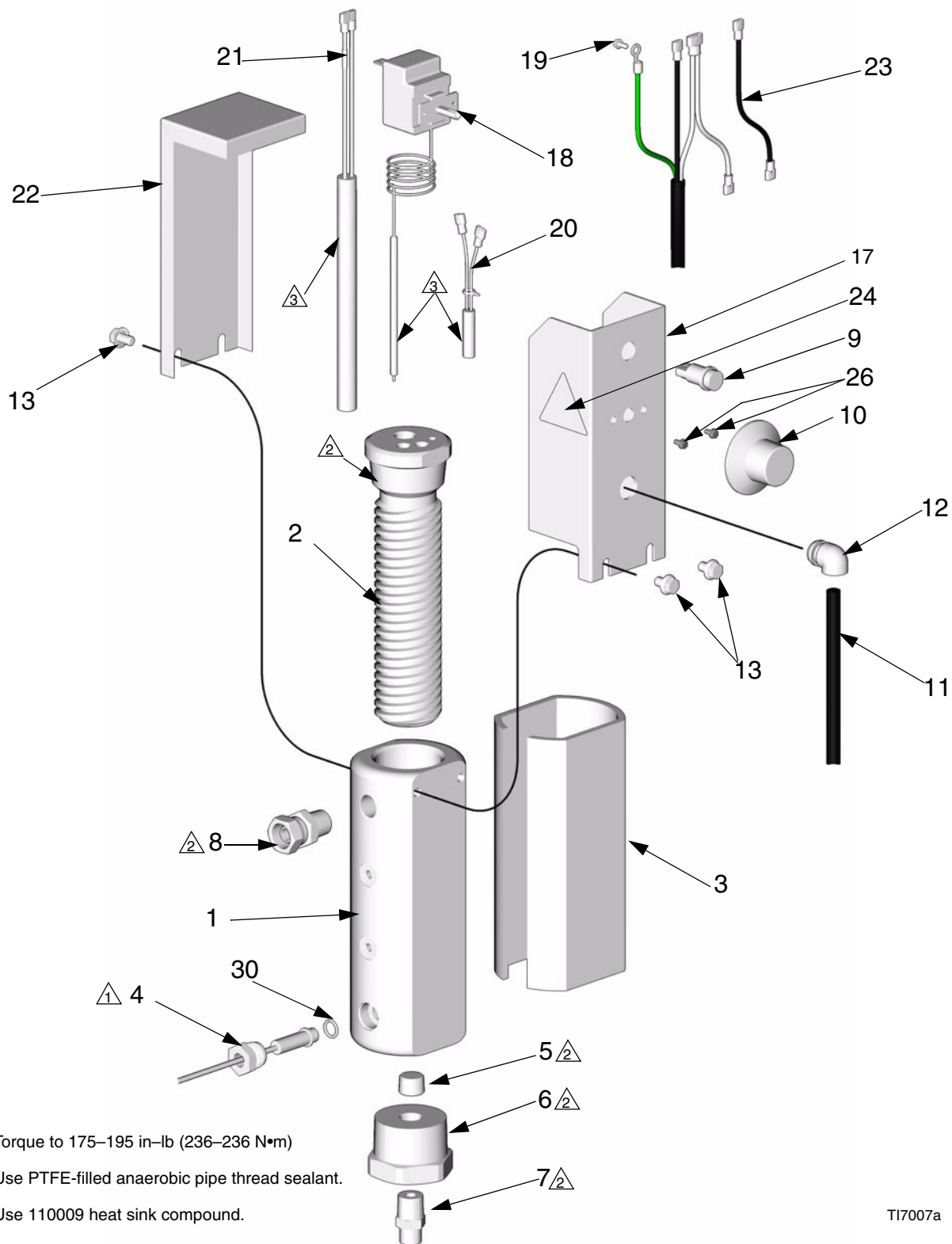


FIG. 6

Parts

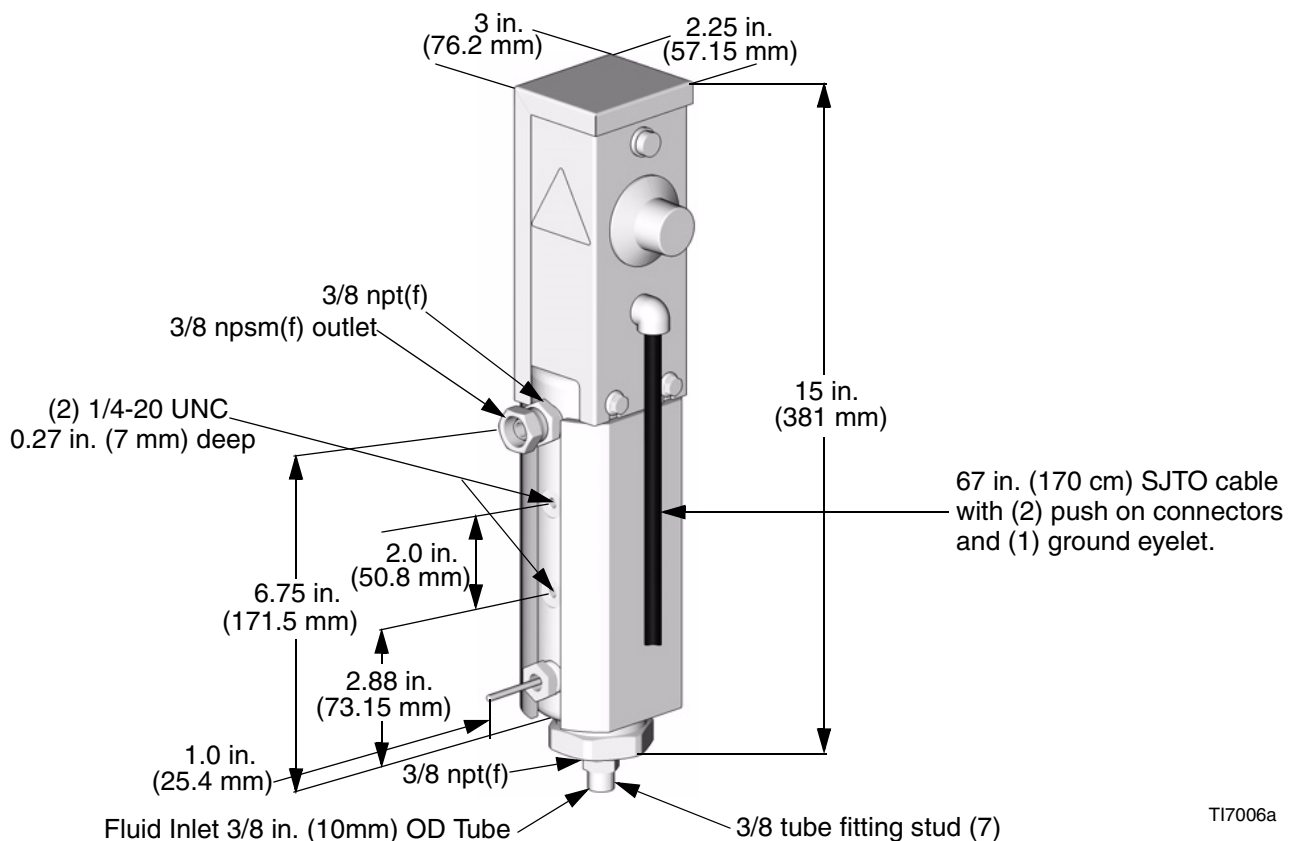
Part No. 287672 and 287673



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Part No. 287672 Fluid Heater 120V**Part No. 287673 Fluid Heater 240V**

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	15F677	HOUSING, heater	1	13	119865	SCREW, mach; hex serrated hd; 1/4-20 x 3/8 (10 mm)	4
2	15F678	CORE, heater	1	17	249521	BRACKET, heater control	1
3	15F828	INSULATOR, heater	1	18	119797	SWITCH, thermostat, heater	1
4	246123	TRANSDUCER, pressure control	1	19	116343	SCREW, ground	1
5	101754	PLUG, pipe	1	20	119857	SENSOR, thermal limit	1
6	15F811	BUSHING, reducing; 1-1/2 npt(m) x 3/8 npt(f)	1	21	15F770	CARTRIDGE, heater; 850W; 120V (287672)	1
7	119890	FITTING, compression; 3/8 npt(m) x 3/8 (10 mm) OD tube	1		15F771	CARTRIDGE, heater; 1000W; 240V (287673)	1
8	155665	UNION, adapter; 3/8 npt(m) x 3/8 npsm(f)	1	22	249520	SHIELD, heater control	1
9	114280	LIGHT, indicator; 120V (287672)	1	23	119858	WIRE, jumper	2
	114286	LIGHT, indicator; 240V (287673)	1	24	189285	LABEL, warning	1
10	119823	KNOB, control, heater;	1	26	195874	SCREW, mach, phillips pan head; M4x8	2
11	119859	CORD SET, power, heater	1	30	111457	PACKING, o-ring; PTFE	1
12	119924	BUSHING, relief, strain	1				

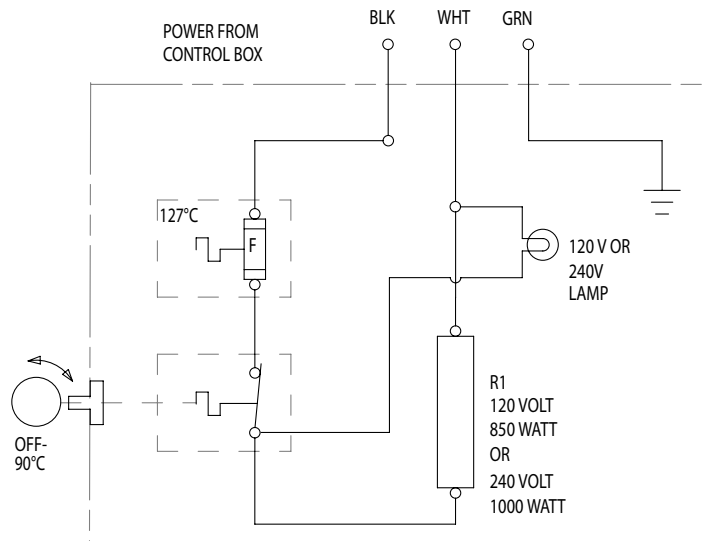
Dimensions

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Technical Data

Maximum Working Pressure	2000 psi (140 bar, 14MPa)
Maximum Amps	
120V	7.5 Amps
240V	4.5 Amps
Maximum Fluid Temperature	180°F (82°C)
Voltage	
287672	120 VAC (850 W)
287673	240 VAC (1000 W)
Heater Resistance	
287672	16 ohms to 18.7 ohms
287673	64 ohms to 74.5 ohms
Heated Core Area	68 in. ² (438 cm ²)
Fluid Path	3 parallel paths, 40 in. each
Pressure Drop	Equivalent to 40 in. of 1/4 in. (6.3 mm) ID hose
Inlet	3/8 npt(f)
Outlet	3/8 npt(f)
Wetted Parts	aluminum, zinc-plated steel, stainless steel, PTFE

Schematic Diagram



Accessories

198241 Plug replaces transducer (4). For applications that do not require the pressure transducer.

167002 Insulating washer used for mounting.

110009 Heat sink compound. 1 oz. tube.



A series of horizontal lines for writing or drawing, spanning the width of the page.

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.

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

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