

NH-4 Heaters

Customer Product Manual
Part 1602369-02

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For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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NH-4 Fluid Heaters

Safety

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the SDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:



WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show him this card
- Tell him what kind of material you were spraying

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.

Fire Safety *(contd)*

- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

<u>Element</u>	<u>Symbol</u>	<u>Prefix</u>
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material SDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Description

The Model NH-4 heaters are electrically operated, explosion-proof, high-pressure fluid heaters, designed for use with both air and airless spray systems.

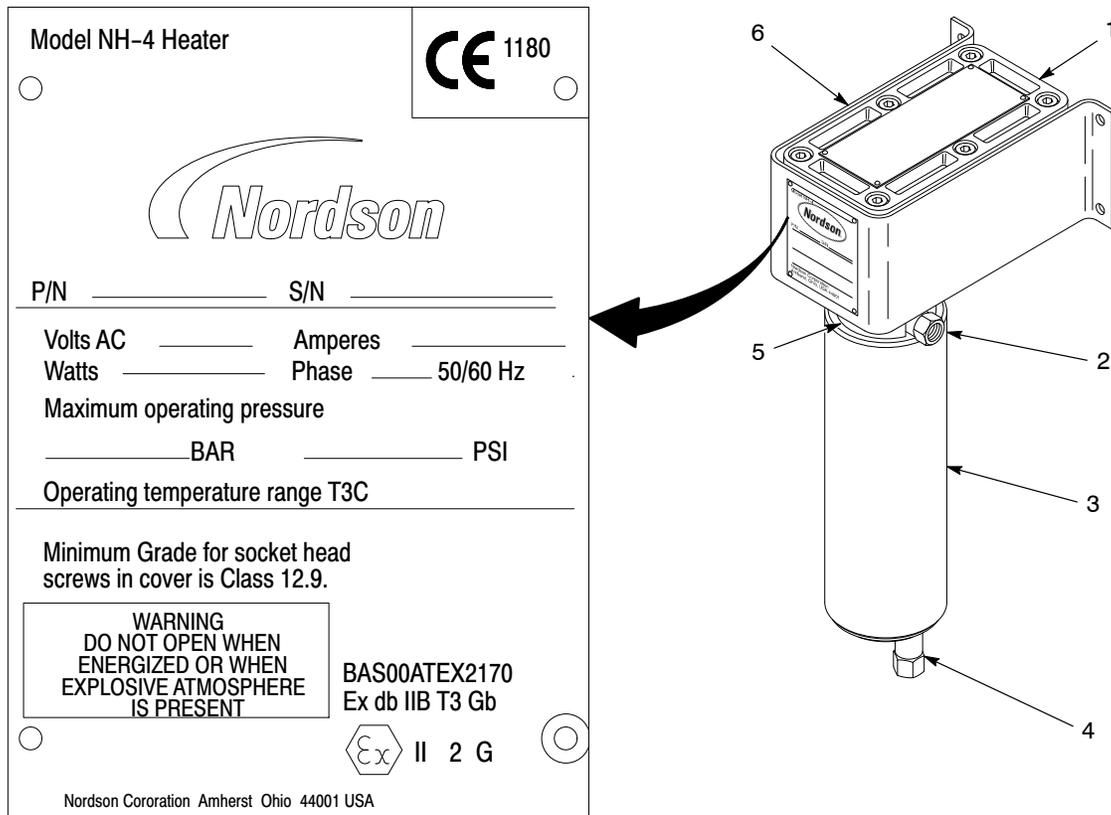


Figure 1 NH-4 ATEX Heaters

- | | | |
|--------------------|--------------------------|-------------------------|
| 1. Enclosure cover | 3. High-pressure housing | 5. Fluid passage body |
| 2. Fluid outlet | 4. Fluid inlet | 6. Electrical enclosure |

See Figure 1. The standard NH-4 heater is available in both aluminum and stainless steel versions. Refer to the *Parts* section for a complete listing of available heaters.

The heater can be wall or dolly mounted. The heater consists of an electrical enclosure (6) and a fluid section. The electrical enclosure contains a thermostat adjustment for the heater. Most versions of the NH-4 heater have internal thermostat controls so you must remove the enclosure cover (1) in order to change the setting.

The fluid section consists of a fluid passage body (5) and high-pressure housing (3). The thermostat probe, heater cartridge, and heat limiter are located within the fluid passage body.

Theory of Operation

See Figure 2. The heater cartridge heats the fluid passage body (6). Coating material flows through the inlet port (4) and the spiral passages in the fluid passage body where it is heated then exits through the outlet port (8).

An adjustable thermostat (7) controls the temperature. If the thermostat fails, causing an over-temperature condition, the heat limiter (1) will sense the excess heat and open the circuit to the heater cartridge, shutting down the heater.

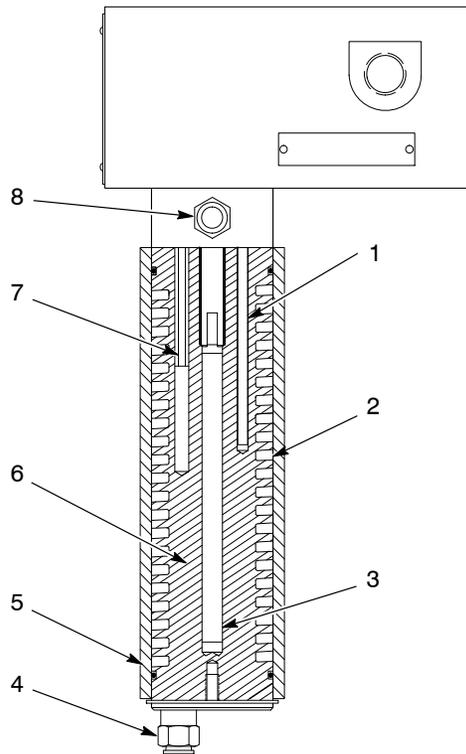


Figure 2 Cutaway View of Heater Components

- | | |
|---------------------|--------------------------|
| 1. Heat limiter | 5. High-pressure housing |
| 2. Spiral grooves | 6. Fluid passage body |
| 3. Heater cartridge | 7. Thermostat |
| 4. Inlet port | 8. Outlet port |

Identifying Groups of Heaters

This manual covers different types of NH-4 heaters. When procedures or data differs, the following codes will be used:

[EXT ADJ]—This code is used for NH-4 heaters that have an external adjustable thermostat control.

[INT ADJ]—This code is used for NH-4 heaters that have an internal adjustable thermostat control.

[ST STL]—This code is used for stainless steel NH-4 heaters.

NH-4 Heater Versions

Refer to the *Parts* section for descriptions, specifications, and part numbers of available NH-4 heaters.

Installation



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING: All ATEX approved heaters have a torque specification for the enclosure cover bolts of 1.11–1.66 kg•m (8–12 ft-lbs). Before installing the cover make sure it and the top of the enclosure are clean and free of dirt and debris. Use only bolts of the grade specified on the equipment label. Tighten the bolts to the torque specification.



WARNING: The purchaser should make the manufacturer aware of the external effects or aggressive substances that the equipment may be exposed to.

Location and Mounting



WARNING: Installation must be performed by a qualified electrician and conform to all federal, state and local codes.

See Figure 3.

Mount the NH-4 heater in a vertical position on a wall or panel, allowing adequate surrounding space to perform periodic maintenance. Always locate the heater as close to the spray operation as possible.

NOTE: All ATEX approved NH-4 heaters include a kit with several labels in different languages. Choose and install the appropriate language label for your NH-4 heater.

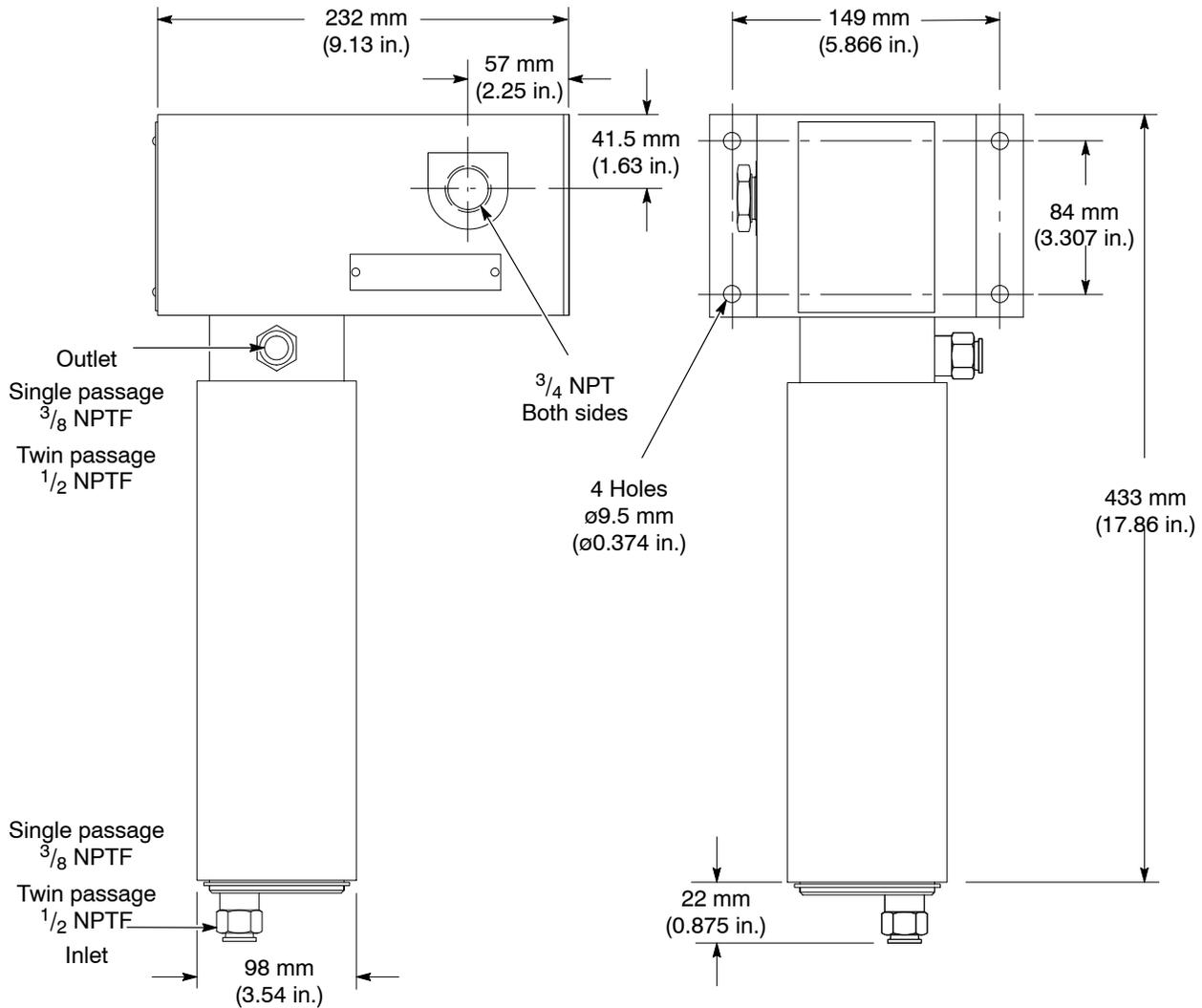


Figure 3 NH-4 Heater Dimensions

Electrical



WARNING: Install a power isolation device or disconnect in the service line ahead of the heater to prevent electrical shock during installation or servicing.

1. Remove the enclosure cover.
2. Route the power supply wiring (recommended 12 AWG, 90 °C (195 °F)) into the electrical enclosure and connect the L1 (power) and L2 (neutral) leads to the terminal block. Install the ground wire to the electrical enclosure internal ground stud.
3. Make sure the enclosure cover and top of the enclosure are clean and free of dirt and debris. Install the enclosure cover and tighten the bolts to 1.11–1.66 kg•m (8–12 ft-lbs).
4. Install the ground cable to the external ground stud and clamp the cable to a true earth ground.

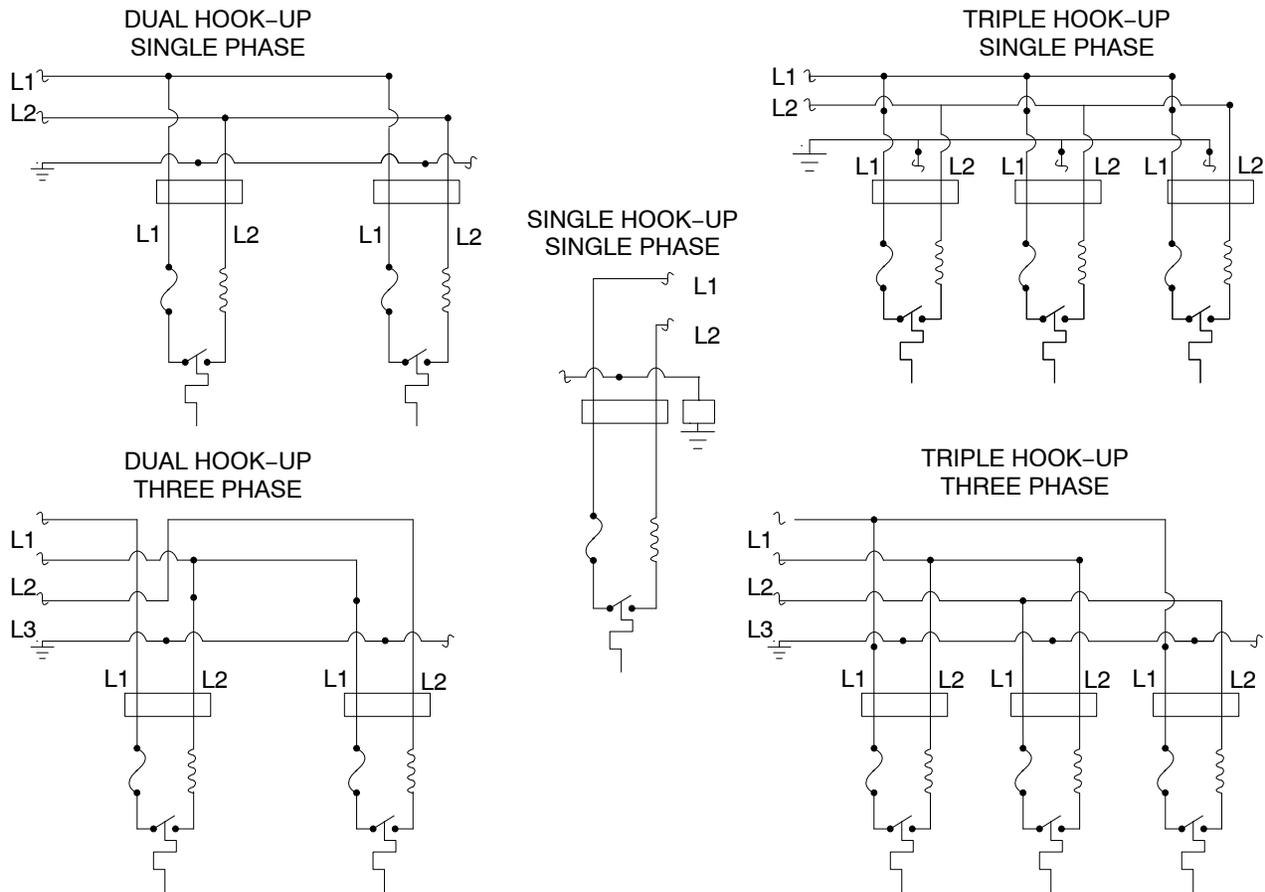


Figure 4 NH-4 Heater Wiring Diagrams

Fluid Lines and Fittings



CAUTION: The heater inlet and outlet fittings use O-ring seals which form a leak-proof hydraulic seal if tightened properly. To prevent damage to the seals, do not over-tighten fittings.

1. Install the fluid inlet fitting to the fluid inlet port. Tighten the fluid inlet fitting to 2.08 kg (15 ft-lb).
2. Install the fluid outlet fitting to the fluid outlet port. Tighten the fluid outlet fitting to 2.08 kg (15 ft-lb).
3. Install the high-pressure fluid line from the pump to the heater fluid inlet fitting.

Multiple Heater Installations

Configure multiple heater installations in a series or parallel.

See Figure 5. Install the heaters in series for all general finishing applications, except for those with very viscous materials or extremely high flow rates, such as continuous coaters.

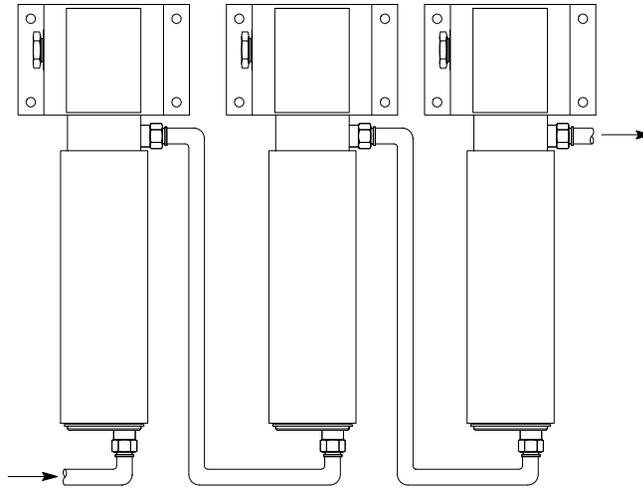


Figure 5 Series Installation

See Figure 6. Install the heaters in parallel for very viscous materials or extremely high flow rate applications. In parallel systems the length of the hose between the manifold and the heaters must not exceed 0.91 m (3 ft).

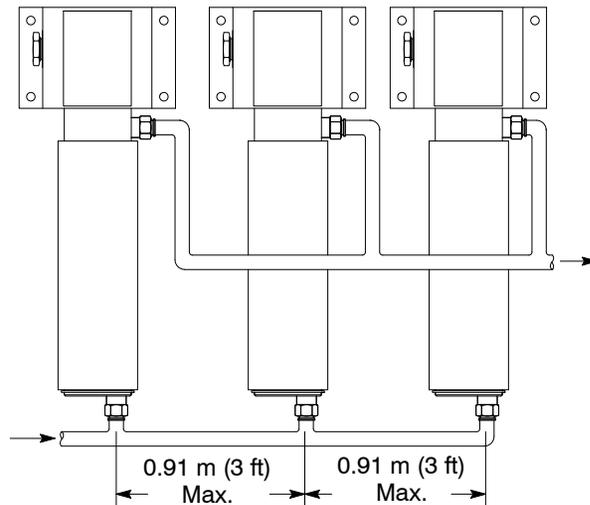


Figure 6 Parallel Installation

Thermometer Installation

Install the thermometer at the heater outlet port, or at the filter outlet port. The installation kit furnished with the heater includes the fittings necessary for either installation.

See Figure 7.

1. Install the close nipple (6) in the heater output port, or hex nipple (6) to the filter output port.



CAUTION: Use the stainless steel thermometer and fittings with the stainless steel NH-4 heater to prevent damage to the equipment.

NOTE: If the thermometer is installed after the filter, use the hex nipple included with the heater installation to install the adapter to the filter.

2. Install the applicable thermometer adapter (2 or 5) to the nipple.
3. Install the thermometer (1) to the thermometer adapter.
4. Install the elbow (3) to the thermometer adapter.
5. Connect the high-pressure fluid line to the thermometer adapter elbow.
6. Make sure all fittings are tightened securely.

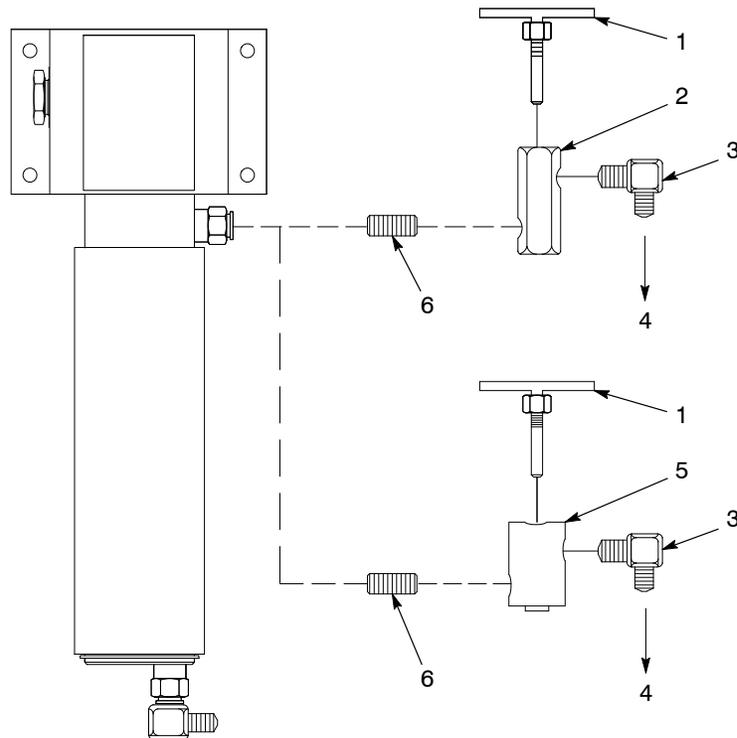


Figure 7 Thermometer Installation

- | | |
|---|-------------------------------------|
| 1. Thermometer | 4. To filter inlet port |
| 2. Standard and stainless steel thermometer adapter | 5. Twin passage thermometer adapter |
| 3. Elbow | 6. Nipple |

Filter Installation

Most coating materials and compounds eventually leave residual deposits on the inside walls of the heater. These deposits may separate from the heater as small flakes or granules, which then pass through the system and cause nozzle or fluid tip plugging. To prevent this from happening, install a filter between the heater and the first spray gun in the system.

Use insulated or uninsulated high-pressure fluid hose or seamless steel tubing to connect the heater to the filter assembly. The selection of fluid line, length, and routing (hung on a wall, laid on the floor, etc.) will have a direct effect on thermostat setting and fluid temperature at the spray gun. It is extremely important to place the heater and filter as close to the spray operation as possible.

Thermostat Adjustment — Single Heater Installation

Adjust the thermostat to provide a starting point temperature for heater operation. Refer to the *Operation* section for adjustment procedures to obtain the desired fluid temperature.

1. Ensure the power is removed from the heater.

NOTE: Rotating the thermostat control clockwise increases the heater temperature. Rotating the thermostat control counter-clockwise decreases the heater temperature.

2. [EXT ADJ] Adjust the thermostat control to mid-range.

[INT ADJ] Remove the enclosure from the heater, adjust the thermostat control to mid-range and install the cover. Tighten the cover bolts to 1.11–1.66 kg•m (8–12 ft-lbs).

Thermostat Adjustment — Multiple Heater Installations

Adjust each thermostat to provide a starting point temperature for operation. Refer to the *Operation* section for adjustment procedures to obtain the desired fluid temperature.

1. Ensure the power is removed from the heaters.

NOTE: Rotating the thermostat control clockwise increases the heater temperature. Rotating the thermostat control counterclockwise decreases the temperature.

NOTE: The heater in the flow system that provides the final fluid output to the filter is the last heater.

2. [EXT ADJ] Adjust the thermostat control on the last heater to mid-range. Turn the thermostat controls on the remaining heaters fully counterclockwise.

[INT ADJ] Remove the enclosure covers from the heaters. Adjust the thermostat control on the last heater in the system to mid-range. Turn the thermostat control on remaining heaters fully counterclockwise. Install the enclosure covers and tighten the cover bolts to 1.11–1.66 kg•m (8–12 ft-lbs).

Operation



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING: This equipment can be dangerous unless it is used in accordance with the rules laid down in this manual.

This section covers safety precautions, and single and multiple heater operation procedures for the NH-4 heater. When a procedure is only applicable to a particular model it is identified with a code. Refer to the *Description* section for an explanation of these codes.

Safety Precautions

Observe the following safety precautions when operating a system with a heater.



WARNING: Make sure all equipment in the spray area is properly grounded. Periodically check grounds. Sparks, which can result in poor grounds, can cause fires or explosions.



WARNING: Inspect and maintain fire detection systems and interlocks daily.

Refer to the *Safety* section for additional safety precautions.

Startup



WARNING: Do not operate the heater until the fluid system is fully pressurized and circulating. Failure to observe this warning can cause damage to the heat limiter or heater.

1. Make sure that the heater is securely connected to a true earth ground.
2. Tighten all heater fittings securely before starting the pump.
3. Start the pump. Refer to the applicable pump manual for starting procedures.
4. Adjust the pump to 8–10 strokes per minute. Refer to the applicable pump manual for adjusting procedures.



WARNING: Before applying power to the heater, make sure all conductive objects in the spray area are properly grounded. Electrical sparks discharged from ungrounded conductive objects may start fires or cause explosions.

5. Apply power to the heater.
6. Allow the fluid temperature to stabilize.

Thermostat Adjustments

[EXT ADJ] If the thermometer is not indicating the desired temperature, adjust the thermostat control. If using multiple heaters, adjust the last heater before the filter until the desired temperature is obtained, then adjust the thermostats on the remaining heaters to the same setting.

[INT ADJ] If the thermometer is not indicating the desired temperature, proceed as follows:

1. Remove the power from the heater(s).



WARNING: Make sure the spray activity is not in progress while the enclosure cover is removed from the heater. Failure to observe this warning may result in fire or explosion.

2. Remove the enclosure cover from the heater(s).
3. Adjust the thermostat control. If using multiple heater installation, adjust the thermostat of the last heater before filter to midrange and all other heaters to zero (extreme counterclockwise position).
4. Apply power to the heater(s) and observe the thermometer.
5. Repeat steps 1 through 4 until the desired fluid temperature is indicated on the thermometer. If using multiple heaters, adjust thermostat controls on the remaining heaters to the same setting as the last heater, and replace covers.

NOTE: If the temperature appears to vary slightly during spraying operation, adjust the thermostat control on the last heater. Refer to step 5.

NOTE: Consider the following if it is necessary to adjust the thermostat at the extreme high range in order to maintain the proper fluid temperature:

- Replace the hose with an insulated hose
- Relocate the hose or heater
- Install an additional NH-4 heater assembly

Shutdown



CAUTION: Always shut down the heater and continue to circulate coating material through the heater as it cools to avoid material curing inside the heater fluid passages. Cured coating materials can clog the heater and damage it.

1. Remove power from the heater 1–15 minutes before shutting down the pump.
2. Shut down the pump. Refer to the applicable pump manual for shutdown procedures.

Daily Maintenance



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING: Use appropriate respiratory and skin protection when using coating materials and solvents. Obtain and read the Material Data and Safety Sheets from the manufacturer before use, and follow manufacturer's recommended handling and disposal procedures.

1. Remove paint with a solvent soaked cloth. Do not soak any component in solvent. O-rings may be affected by some solvents.
2. Make sure fittings are tightened securely.
3. Tighten the tube fittings for the stainless heater inlet and outlet ports to their original position as follows:
 - a. Make sure the tubing is resting firmly on the shoulder of fitting.
 - b. Tighten the nut by hand.
 - c. Using a wrench, tighten the nut to the original position. An increase in resistance occurs when the original position has been reached.
 - d. Tighten the nut slightly.
4. Make sure the heater is grounded.
5. Leave a compatible solvent in the heater when it is not in use.

Troubleshooting



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

These troubleshooting procedures cover only the most common problems. If you cannot solve a problem with the information given here, contact your local Nordson representative for help.

Problem	Possible Cause	Corrective Action
1. Insufficient heat	Faulty thermometer	Lightly tap the thermometer to make sure it is not giving an erratic reading. If an erratic reading still exists, replace the thermometer.
	Demand is exceeding the capacity of the heater	Make sure the heating capacity is not being exceeded. A single heater has the capacity to raise the temperature of most organic solvent type coating materials 56 °C (100 °F) at a flow rate of 45 l/hr (12 gph). A temperature rise greater than 56 °C (100 °F) would proportionately decrease the capacity of the heater.
	Coating material is baked on the inside of the fluid passage body	For stainless steel heaters: Flush the heater with a compatible solvent. If the heat output is not sufficient after flushing it out, replace the fluid reservoir. For all other heaters: Disassemble the heater and clean the fluid passage body. Refer to the <i>Repair</i> section or the <i>Disassembly Tool Kit</i> section for more information.
2. No heat output	Thermostat failed in the on position causing the heat limiter to open an electrical circuit to the heater cartridge	Replace the thermostat and heat limiter. Refer to the <i>Repair</i> section for more information.
	Heater cartridge failed	Refer to the <i>Repair</i> section for more information. Disconnect the heater cartridge leads 2 and L2 from the terminal block. Check for continuity between the heater cartridge leads 2 and L2. If continuity is not present, replace the heater cartridge.

Repair



WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING: Remove power, relieve fluid and air pressure, and allow the heater to cool down before performing any repairs. Failure to observe this warning may cause serious injury to personnel and/or damage to equipment.

Thermostat Replacement

When a thermostat fails in the on position, it causes the heat to rise above the preset limit. The heat limiter senses the excess heat and opens the electrical circuit to the heating cartridge. This prevents damage to the heater, however, it does require replacement of the heat limiter. If either the thermostat or the heat limiter has failed, always replace both.

Thermostat Removal



WARNING: Make sure no spray activity is in progress while the cover is removed from the electrical enclosure. Failure to observe this warning may cause serious injury to personnel and/or damage to equipment.

NOTE: Thermostats are coated with heat-conductive paste before installation. The viscosity of this paste may make removal difficult. It may be easier to remove the thermostat while the heater body is still warm.

See Figure 8.

1. Remove the six socket head screws (1) and six lock washers (2) securing the cover (3) to the electrical enclosure (4).
2. Disconnect electrical lead 1 from the COMMON terminal on the thermostat (5).
3. Disconnect electrical lead 2 from the NORM CLOSED terminal on the thermostat.
4. Remove the screws (7) and lock washers (6) securing the thermostat (5) to the electrical enclosure (4). Carefully remove the thermostat from the heater.

Thermostat Installation

1. See Figure 8. Insert the heat conductive paste applicator (supplied with the thermostat kit) into the fluid passage body bore stamped T (4) and dispense all the paste into the bore.
2. Using a screw and lock washer, install the thermostat bracket support into the electrical enclosure and tighten securely.

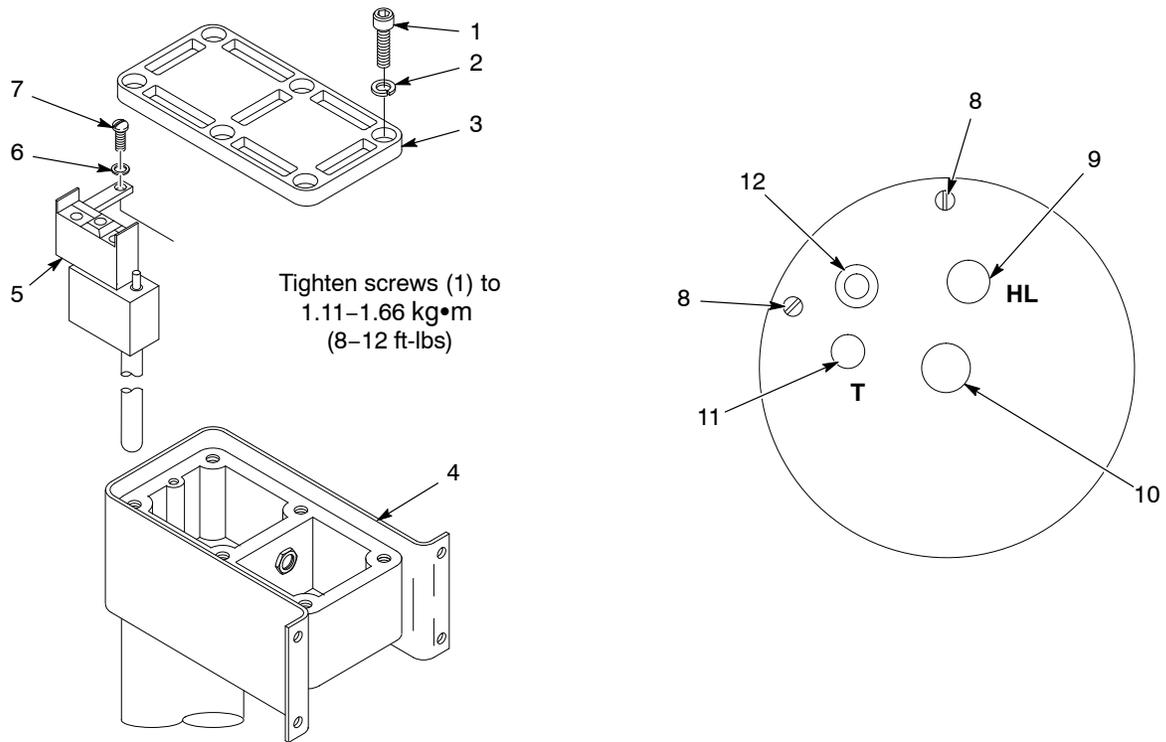


Figure 8 Thermostat Replacement

- | | | |
|-------------------------|----------------|----------------------|
| 1. Socket head screws | 5. Thermostat | 9. Heat limiter |
| 2. Lock washers | 6. Lock washer | 10. Heater cartridge |
| 3. Cover | 7. Screw | 11. Thermostat |
| 4. Electrical enclosure | 8. Set screws | 12. Body plug |

Note: DO NOT REMOVE ITEM 12 PLUG.

3. Carefully install the thermostat probe into the passage body bore stamped T (4).
4. Using screws (7) and lock washers (6), secure the thermostat bracket (if used) and the thermostat (5) to the electrical enclosure (4) and tighten securely.
5. Connect electrical lead 1 to the COMMON terminal on the thermostat.
6. Connect electrical lead 2 to the NORM CLOSED terminal on the thermostat.
7. Using the six socket-head screws (1) and lock washers (2), install the electrical enclosure cover (3). Tighten the socket-head screws 1.11–1.66 kg•m (8–12 ft-lb).
8. Before operating the heater, make sure the thermostat is adjusted. Refer to the *Heater Operation* for thermostat adjustment procedures.

Heat Limiter Replacement



WARNING: Remove power, relieve fluid and air pressure, and allow heater to cool down before performing any maintenance. Failure to observe this warning may cause serious injury to personnel and/or damage to equipment.

1. Remove the thermostat. Refer to *Thermostat Removal* on page 17.
2. Disconnect the lead wire L1 from the heat limiter.
3. See Figure 8. Carefully pull the heat limiter out of the HL bore (2) in the fluid passage body.
4. Install the heat limiter into the HL bore (2) in the fluid passage body.
5. Connect the lead wire L1 to the heat limiter.
6. Install the thermostat. Refer to *Thermostat Installation* on page 17.

Heater Cartridge Replacement

1. Remove the thermostat. Refer to *Thermostat Removal* on page 17.
2. Disconnect the wire lead L2 from the cartridge.
3. Remove the heater cartridge.

Standard Heaters:

- a. Remove the socket head screw and lock washer located in the bottom of the fluid passage body.
- b. Place a 6.4 mm ($\frac{1}{4}$ in.) diameter rod, approximately 254 mm (10 in.) in length, into the socket head screw hole against the drive-out plug.
- c. Carefully drive the heater cartridge out of the fluid passage body.

Stainless Steel Heaters: Remove the heater cartridge from the top of the fluid passage body.

4. Install the heater cartridge into the fluid passage body.

Standard heaters: Make sure the drive-out plug is installed in the fluid passage body before installing the heater cartridge. Install the socket head screw and lock washer into the bottom of the fluid passage body and tighten securely.

5. Connect wire lead L2 to the heater cartridge.
6. Install the thermostat. Refer to *Thermostat Installation* on page 17.

Fluid Heating Reservoir Replacement



WARNING: Remove power, relieve fluid and air pressure, and allow the heater to cool down before performing any repairs. Failure to observe this warning may cause serious injury to personnel and/or damage to equipment.

Fluid Heating Reservoir Removal

1. Remove the thermostat. Refer to *Thermostat Removal* on page 17.
2. Remove the heat limiter. Refer to *Heat Limiter Removal* on page 19.
3. Remove the heater cartridge. Refer to *Heater Cartridge Removal* on page 19.
4. See Figure 9. Disconnect the fluid inlet (8) and fluid outlet fittings (4). Remove the O-rings (3, 7) from the fittings and discard them.
5. See Figure 8. Loosen the set screws (1) securing the fluid heating reservoir to the electrical enclosure. Screws are visible when the enclosure cover is removed.
6. Rotate the fluid heating reservoir assembly counterclockwise to remove it from the electrical enclosure.

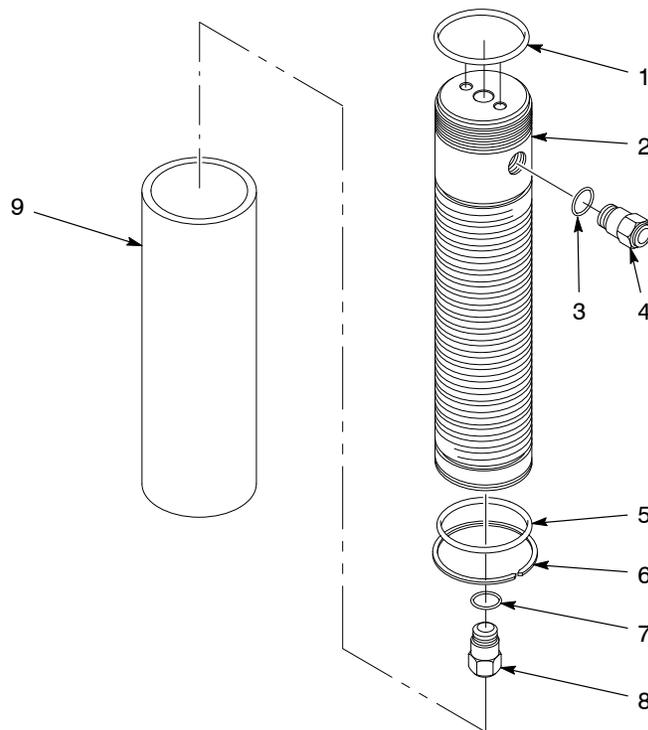


Figure 9 Heater Reservoir Replacement

- | | |
|-----------------------|--------------------------|
| 1. O-ring | 6. Retaining ring |
| 2. Fluid passage body | 7. O-ring |
| 3. O-ring | 8. Inlet fitting |
| 4. Outlet fitting | 9. High-pressure housing |
| 5. O-ring | |

High Pressure Housing Removal – Standard Heaters Only

See Figure 9.

1. Remove the retaining ring (6) from the fluid passage body (2).
2. Place a wooden block on a hard surface. Grasping the reservoir assembly firmly, strike the top surface of the fluid passage body against the wood block until the lower O-ring (5) is exposed.
3. Remove the lower O-ring (5), turn the reservoir assembly right side up and strike against the wood block until the upper O-ring (1) is exposed. Remove the upper O-ring.
4. Use the wood block as a driver to force the fluid passage body (2) out of the high-pressure housing (9).
5. Soak the fluid passage body in a suitable solvent until hardened coating material has softened. Use a blunt instrument such as a thin piece of wood, or similar object, to clean spiral grooves.
6. Install new O-rings onto the fluid passage body.
7. Install the fluid passage body into the high-pressure housing and secure with the retaining ring.

Fluid Heating Reservoir Installation

1. Install the fluid heating reservoir to the electrical enclosure. Use PTFE paste on the threads to prevent galling. Tighten securely.
2. See Figure 8. Align the holes for the set screws (1). Back the fluid heating reservoir out by no more than one turn to align the holes. Install the set screws and tighten securely.

NOTE: Refer to the *Parts* section for part numbers for the appropriate reservoir seal kit. This kit contains replacement O-rings for the fluid fittings, along with heat-conductive paste for thermostat installation.

3. See Figure 9. Install new O-rings on the fluid inlet (8) and outlet fittings (4).
4. Install the fluid outlet and inlet fittings into the fluid passage body. Tighten the fittings to 1.66–2.08 kg•m (12–15 ft-lb).
5. Insert the applicator (supplied with the seal kit) into the fluid passage body bore stamped T and dispense all heat-conductive paste into the bore.
6. Install the heater cartridge. Refer to *Heater Cartridge Replacement* on page 19.
7. Install the heater limiter. Refer to *Heat Limiter Replacement* on page 19.
8. Install the thermostat. Refer to *Thermostat Installation* on page 17.

Parts

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

Heater Reference Chart

NOTE: Heaters are equipped with internal temperature adjustment unless otherwise specified.

Heater Type	Volts	Watts	Heater	Heat Limiter/ Thermostat	Thermostat	Reservoir Seal Kit	Heater Cartridge
Standard NH-4 Heaters							
Single Passage	115	1700	245672	106363	106283	106282	245634
EECS, Single Passage – Obsolete	115	1700	247747	106363	106283	106282	245634
Twin Passage	115	500	246238	106363	106283	106310	246242
Twin Passage	115	1000	246490	106363	106283	106310	246492
Single Passage	200	1700	245673	106363	106283	106282	245635
Twin Passage	200	1700	247477	106363	106283	106310	245635
Single Passage, Japan Only	200	1700	246566	—	106362	106282	247532
Twin Passage, Japan Only	200	1700	248162	—	106362	106310	247532
Single Passage	230	1700	245674	106363	106283	106282	245636
Baseefa (ATEX), Single Passage	230	1700	247748	106363	106283	106282	245636
EECS, Twin Passage – Obsolete	230	1000	247750	106363	106283	106310	246243
Twin Passage	230	1700	247478	106363	106283	106310	245636
Single Passage	380	1700	245675	106363	106283	106282	245643
Twin Passage	380	1700	247479	106363	106283	106282	245643
Single Passage	460	1700	245676	106363	106283	106282	245637
Twin Passage	460	1700	247480	106363	106283	106310	245637
Stainless Steel NH-4 Heaters							
Single Passage	115	1700	712905	106356	—	—	245634
Single Passage, Japan Only	200	1700	246664	—	106362	—	247532
Single Passage	230	1700	246665	106356	—	106282	245636
Baseefa (ATEX)	230	1700	238502	106356	—	106282	245636
Single Passage	460	1700	248334	106356	—	106282	245637

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Standard NH-4 Heaters**115 Volt: Single Passage — 1700 watts**

See Figure 10.

Item	Part	Part	Description	Quantity	Note
—	245672	X	HEATER, NH-4, 115 Volt, 1700 watt	1	
—	X	247747	HEATER, NH-4, 115 Volt, EECS, 1700 watt (OBSOLETE)	1	
1	982006	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER ENCLOSURE, NH-4	1	A
4	245634	245634	• HEATER, assembly, cartridge, 115V (1700 watt), NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C, D
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	C, D
7	-----	-----	• THERMOSTAT, probe-type	1	C, D
8	-----	-----	• HEAT LIMITER, NH-4	1	C
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	X	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	X	• BLOCK, terminal, end	1	
12a	X	235609	• PLATE, terminal block	1	
13	933233	X	• BLOCK terminal, contact	2	
13a	X	933747	• BLOCK, terminal, 2 station	1	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting, NH-4	1	A
18	245840	-----	• ENCLOSURE, electrical, NH-4	1	A
19	973442	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground with wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel	2	
NS	245677	X	• RESERVOIR, fluid heating	1	
22	945018	945018	• • O-RING, hotpaint, 2.734 x 0.139 in.	2	E
NS	X	247466	• RESERVOIR, fluid heating (EECS)	1	
NS	245679	245679	• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
23	245583	245583	• • • FITTING, fluid, $\frac{3}{8}$ -in NPTF	2	

Continued...

Item	Part	Part	Description	Quantity	Note
24	945017	945017	• • • O-RING, hotpaint, 3/8-in. tube	2	E
25	-----	-----	• • BODY, fluid passage, NH-4	1	A
26	245585	245585	• • HOUSING, pressure, NH-4	1	
27	986915	986915	• • RETAINING RING, external, 300, spiral	1	
NS	245705	245705	• INSTALLATION KIT, NH-4	1	
28	245777	245777	• • ADAPTER, thermometer	1	
29	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hexagon, 6 mm	1	
30	972180	972180	• • ELBOW, male, 37, 1/2-20 JIC x 3/8-in. NPT, steel	2	
31	973022	973022	• • NIPPLE, extra heavy, 3/8 x 1.50 in., steel	1	
32	973958	973958	• • NIPPLE, hex, 3/8 x 1/4 x 1.406 in., steel, nickel	1	
33	983417	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	982049	• SCREW, hex, cap, M8 x 25, black	1	
36	X	982169	• SCREW, pan, slot, M3 x 16, zinc	1	
37	X	983 400	• LOCK WASHER, split, M3 steel, zinc	1	
38	X	982 327	• SCREW, chez head, slot, M4 x 12, zinc	2	
39	245896	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Obsolete heater 247747 uses three screws, part 982005.

C: Part is included in the *Standard NH-4 Thermostat/Heat Limiter Kit*, part 106363, located on page 51.

D: Part is included in the *Standard Thermostat Kit*, part 106283, located on page 51.

E: Part is included in the *Single Passage Reservoir Seal Kit*, part 106282, located on page 52.

NS: Not Shown

115 Volt: Twin Passage — 500 watts

See Figure 10.

Item	Part	Description	Quantity	Note
—	246238	HEATER, NH-4, 115 Volt, twin passage, 500 watt	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, English, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER ENCLOSURE, NH-4	1	A
4	246 242	• HEATER, assembly, cartridge, 115V (500 watt), NH-4	1	
5	982005	• SCREW, chez, head, slotted, M4 x 10, zinc	5	B, C
6	983111	• LOCK WASHER, split, #8, zinc	5	B, C
7	-----	• THERMOSTAT, probe-type	1	B
8	-----	• HEAT LIMITER, NH-4	1	B
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	• BLOCK, terminal, end	1	
13	933233	• BLOCK terminal, contact	2	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	-----	• BRACKET, mounting, NH-4	1	A
18	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	• CLAMP, ground with wire	1	
21	983152	• LOCK WASHER, English, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	247473	• RESERVOIR, twin passage, fluid heating	1	
22	945018	• • O-RING, hotpaint, 2.734 x 0.139 in.	2	D
NS	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
24	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	D
25	-----	• • BODY, fluid passage, twin passage	1	A
26	245585	• • HOUSING, pressure, NH-4	1	
27	986915	• • RETAINING RING, external, 300, spiral	1	
NS	246731	• INSTALLATION KIT, NH-4, WP	1	
28	246732	• • ADAPTER, thermometer, WP, NH-4	1	
NS	973434	• • • PLUG, pipe square head, $\frac{1}{2}$ -in. NPT, stainless steel	1	
29	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
31	973081	• • NIPPLE, hex, $\frac{1}{2}$ x $\frac{1}{2}$ x 1.89 in., steel, el	1	
33	983417	• WASHER, flat, oversized, 8, steel, zinc	1	

Continued...

Item	Part	Description	Quantity	Note
34	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	• SCREW, hex, cap, M8 x 25, black	1	
39	245896	• FEED THRU, two-wire	1	
NOTE A: Not serviced separately. B: Part is included in the <i>Standard NH-4 Thermostat/Heat Limiter Kit</i> , part 106363, located on page 51. C: Part is included in the <i>Standard Thermostat Kit</i> , part 106283, located on page 51. D: Part is included in the <i>Twin Passage Reservoir Seal Kit</i> , part 106310, located on page 52. NS: Not Shown				

115 Volt: Twin Passage — 1000 watts

See Figure 10.

Item	Part	Description	Quantity	Note
—	246490	HEATER, NH-4, 115 Volt, twin passage, 1000 watt	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER ENCLOSURE, NH-4	1	A
4	246492	• HEATER, assembly, cartridge, 115V (1000 watt), NH-4	1	
5	982005	• SCREW, chez, head, slotted, M4 x 10, zinc	5	B
6	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	• HEAT LIMITER, NH-4	1	C
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	• BLOCK, terminal, end	1	
13	933233	• BLOCK, terminal, contact	2	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	-----	• BRACKET, mounting, NH-4	1	A
18	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	• CLAMP, ground with wire	1	
21	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	247473	• RESERVOIR, twin passage, fluid heating	1	
22	945018	• • O-RING, hotpaint, 2.734 x 3.00 x 0.139 in.	2	D
NS	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
24	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	D
25	-----	• • BODY, fluid passage	1	A
26	245585	• • HOUSING, pressure, NH-4	1	
27	986915	• • RETAINING RING, external, 300, spiral	1	
NS	246731	• INSTALLATION KIT, NH-4, WP	1	
28	246732	• • ADAPTER, thermometer, WP, NH-4	1	
NS	973434	• • • PLUG, pipe square head, $\frac{1}{2}$ -in. NPT, stainless steel	1	
29	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
31	973081	• • NIPPLE, hex, $\frac{1}{2} \times \frac{1}{2} \times 1.89$ in., steel, el	1	
33	983417	• WASHER, flat, oversized, 8, steel, zinc	1	

Continued...

Item	Part	Description	Quantity	Note
34	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	• SCREW, hex, cap, M8 x 25, black	1	
39	245896	• FEED THRU, two-wire	1	
NOTE A: Not serviced separately. B: Part is included in the <i>Standard Thermostat Kit</i> , part 106283, located on page 51. C: Part is included in the <i>Standard NH-4 Thermostat/Heat Limiter Kit</i> , part 106363, located on page 51. D: Part is included in the <i>Twin Passage Reservoir Seal Kit</i> , part 106310, located on page 52.				

200 Volt: Single and Twin Passage — 1700 watt

See Figure 10.

Item	Part	Part	Description	Quantity	Note
—	245673	X	HEATER, NH-4, 200 Volt single passage	1	
—	X	247477	HEATER, NH-4, 200 Volt twin passage	1	
1	982006	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER ENCLOSURE, NH-4	1	A
4	245635	245635	• HEATER ASSEMBLY, cartridge, 200V, 1700 watt, NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	-----	• HEAT LIMITER, NH-4	1	B
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	983402	• WASHER, flat, Metric, narrow, M4, steel, zinc	2	
12	933232	933232	• BLOCK, terminal, end	1	
13	933233	933233	• BLOCK, terminal, contact	2	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting, NH-4	1	A
18	245840	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	973442	• PLUG, pipe, socket, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground w/wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	245677	X	• RESERVOIR, fluid heating	1	
NS	X	247473	• RESERVOIR, twin passage, fluid heating	1	
22	945018	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	D, E
NS	245679	X	• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
NS	X	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	245583	X	• • • FITTING, fluid, $\frac{3}{8}$ -in. NPTF	2	
23		246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
24	945017	X	• • • O-RING, hotpaint, $\frac{3}{8}$ -in. tube	2	D

Continued...

Item	Part	Part	Description	Quantity	Note
24	X	945023	• • • O-RING, hotpaint, 1/2-in. tube	2	E
25	-----	-----	• • BODY, fluid passage	1	A
26	245585	245585	• • HOUSING, pressure, NH-4	1	
27	986915	986915	• • RETAINING RING, external, 300, spiral	1	
NS	245705	X	• INSTALLATION KIT, NH-4	1	
NS	X	247481	• INSTALLATION KIT, twin passage, NH-4	1	
28	245777	X	• • ADAPTER, thermometer	1	
28	X	246732	• • ADAPTER, thermometer, WP, NH-4	1	
NS	X	973434	• • • PLUG, pipe, square head, 1/2-in. NPT, stainless steel	1	
29	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hex, 6 mm	1	
30	972180	X	• • ELBOW, male, 37, 1/2-20 JIC x 3/8-in. NPT, steel	2	
30	X	972182	• • ELBOW, male, 37, 3/4-16 JIC x 1/2-in. NPT, steel	2	
31	973022	X	• • NIPPLE, extra heavy, 3/8 x 1.50 in., steel	1	
31	X	973081	• • NIPPLE, hex, 1/2 x 1/2 x 1.89 in., steel, el	1	
32	973958	X	• • NIPPLE, hex, 3/8 x 1/4 x 1.406 in., steel, nickel	1	
32	X	973983	• • NIPPLE, hex, 1/2-in. NPT x 1/4-in. NPT, steel, elni	1	
33	983417	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	982049	• SCREW, hex, cap, M8 x 25, black	1	
39	245896	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Part is included in the *Standard NH-4 Thermostat/Heat Limiter Kit*, part 106363, located on page 51.

C: Part is included in the *Standard Thermostat Kit*, part 106283, located on page 51.

D: Part is included in the *Single Passage Reservoir Seal Kit*, part 106282, located on page 52.

E: Part is included in the *Twin Passage Reservoir Seal Kit*, part 106310, located on page 52.

NS: Not Shown

200 Volt: Single Passage — Japan Only — 1700 watt

See Figure 11.

Item	Part	Description	Quantity	Note
—	246566	HEATER, NH-4, 200 Volt, Japan, single passage	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER, enclosure, NH-4	1	A
4	247532	• HEATER, cartridge, 200V, 1700 watt, NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	2	
6	983111	• LOCK WASHER, split, #8, steel, zinc	2	
7	248093	• THERMOSTAT, dual, with bracket	1	B
8	-----	• HEAT LIMITER, NH-4	1	
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	1	
11	245574	• RETAINER, wire	2	
12	-----	• STUD, ground	2	A
13	-----	• BRACKET, mounting, NH-4	1	A
14	-----	• ENCLOSURE, electrical, NH-4, Japan	1	A
15	973442	• PLUG PIPE, socket, flush, $\frac{3}{4}$ in., zinc	1	
16	240976	• CLAMP, ground with wire	1	
17	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	248094	• RERSERVOIR, fluid heating	1	
18	945018	• • O-RING, hotpaint, 2.734 x 3.00 x 0.139 in.	2	C
NS	245679	• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
19	245583	• • • FITTING, fluid, $\frac{3}{8}$ -in. NPTF	2	
20	945017	• • • O-RING, hotpaint, $\frac{3}{8}$ -in. tube	2	C
21	-----	• • BODY, fluid passage, NH-4	1	A
22	245585	• • HOUSING, pressure, NH-4	1	
23	986915	• • RETAINING RING, external, 300, spiral	1	
24	-----	• SCREW, button, socket cap, M6 x 16, zinc	1	A
25	983409	• LOCK WASHER, split, M6, steel, zinc	1	
NS	246234	• WASHER, retaining	1	
NS	247933	• INSTALLATION KIT, NH-4, Japan	1	
26	245777	• • ADAPTER, thermometer	1	
27	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
28	972180	• • ELBOW, male, 37, $\frac{1}{2}$ -20 JIC x $\frac{3}{8}$ -in. NPT, steel	1	
29	973050	• • NIPPLE, extra heavy, $\frac{3}{8}$ x 1.00 in., steel	1	
30	973958	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{1}{4}$ x 1.406 in., steel, nickel	1	
31	245582	• • PLUG, enclosure, electrical	1	
32	983417	• • WASHER, flat, oversized, 8, steel, zinc	1	

Continued...

Item	Part	Description	Quantity	Note
33	983404	• • LOCK WASHER, split, M8, steel, zinc	1	
34	982049	• • SCREW, hex, cap, M8 x 25, black	1	
35	240764	• WIRE, ground	1	
36	246274	• FEED THRU, two-wire, PTB	1	
NOTE A: Not serviced separately. B: Part is included in the <i>Manual Reset Thermostat Kit</i> , part 106362, located on page 52. C: Part is included in the <i>Single Passage Reservoir Seal Kit</i> , part 106282, located on page 52. NS: Not Shown				

200 Volt: Twin Passage — Japan Only — 1700 watt

See Figure 11.

Item	Part	Description	Quantity	Note
	248162	HEATER, NH-4, 200 Volt, Japan, twin passage	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER, enclosure, NH-4	1	A
4	247532	• HEATER, cartridge, 200V, 1700 watt, NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	2	
6	983111	• LOCK WASHER, split, #8, steel, zinc	2	
7	248093	• THERMOSTAT, dual, with bracket	1	B
8	-----	• HEAT LIMITER, NH-4	1	
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	1	
11	245574	• RETAINER, wire	2	
12	-----	• STUD, ground	2	A
13	-----	• BRACKET, mounting, NH-4	1	A
14	-----	• ENCLOSURE, electrical, NH-4, Japan	1	A
15	973442	• PLUG, pipe, socket, flush, $\frac{3}{4}$ in., zinc	1	
16	240976	• CLAMP, ground with wire	1	
17	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	247473	• RESERVOIR, fluid heating	1	
18	945018	• • O-RING, hotpaint, 2.734 x 3.00 x 0.139 in.	2	C
NS	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
19	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
20	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	C
21	-----	• • BODY, fluid passage, NH-4	1	A
22	245585	• • HOUSING, pressure, NH-4	1	
23	986915	• • RETAINING RING, external, 300, spiral	1	
24	-----	• SCREW, button, socket cap, M6 x 16, zinc	1	A
25	983409	• LOCK WASHER, split, M6, steel, zinc	1	
NS	246234	• WASHER, retaining	1	
NS	247481	• INSTALLATION KIT, NH-4, Japan	1	
26	246732	• • ADAPTER, thermometer, WP, NH-4	1	
27	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
28	972182	• • ELBOW, male, 37, $\frac{3}{4}$ -16 JIC x $\frac{1}{2}$ -in. NPT, steel	2	
29	973081	• • NIPPLE, hex, $\frac{1}{2}$ x $\frac{1}{2}$ x 1.89 in., steel, el	1	
30	973983	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{1}{4}$ in., steel, elni	1	
31	245582	• • PLUG, enclosure, electrical	1	
32	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
33	983404	• LOCK WASHER, split, M8, steel, zinc	1	

Continued...

Item	Part	Description	Quantity	Note
34	982049	• SCREW, hex, cap, M8 x 25, black	1	
35	240764	• WIRE, ground	1	
36	246274	• FEED THRU, two-wire, PTB	1	
NOTE A: Not serviced separately. B: Part is included in the <i>Manual Reset Thermostat Kit</i> , part 106362, located on page 52. C: Part is included in the <i>Twin Passage Reservoir Seal Kit</i> , part 106310, located on page 52. NS: Not Shown				

230 Volt: Single Passage — 1700 watt

See Figure 12.

Item	Part	Part	Description	Quantity	Note
—	245674		HEATER, NH-4, 230 Volt	1	
—		247748	HEATER, NH-4, 230 Volt, Baseefa	1	
1	982006	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER ENCLOSURE, NH-4	1	A
4	245636	245636	• HEATER ASSEMBLY, cartridge, 230V, (1700 watt), NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C, D
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	C, D
7	-----	-----	• THERMOSTAT, probe-type	1	C, D
8	-----	-----	• HEAT LIMITER, NH-4	1	C
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402		• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232		• BLOCK, terminal, end	1	
12a		235609	• PLATE, terminal block	1	
13	933233		• BLOCK, terminal, contact	2	
13a		933747	• BLOCK, terminal, 2 station	1	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting, ATEX, NH-4f	1	A
18	245840	-----	• ENCLOSURE, electrical, NH-4	1	A
19	973442	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground with wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	245677		• RESERVOIR, fluid heating	1	
NS		247466	• RESERVOIR, fluid heating	1	
22	945018	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	E
NS	245679	245679	• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
23	245583	245583	• • • FITTING, fluid, $\frac{3}{8}$ -in. NPTF	2	
24	945017	945017	• • • O-RING, hotpaint, $\frac{3}{8}$ -in. tube	2	E
25	-----	-----	• • BODY, fluid passage, NH-4	1	A
26	245585	245585	• • HOUSING, pressure, NH-4	1	

Continued...

Item	Part	Part	Description	Quantity	Note
27	986915	986915	• • RETAINING RING, external, 300, spiral	1	
NS	245705	245705	• INSTALLATION KIT, NH-4	1	
28	245777	245777	• • ADAPTER, thermometer	1	
29	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hexagon, 6 mm	1	
30	972180	972180	• • ELBOW, male, 37, 1/2-20 JIC x 3/8-in. NPT, steel	2	
31	973022	973022	• • NIPPLE, extra heavy, 3/8 x 1.50 in., steel	1	
32	973958	973958	• • NIPPLE, hex, 3/8 x 1/4 x 1.406 in., steel, nickel	1	
33	983417	983417	• WASHER, flat, oversized, M8, steel, zinc	1	
34	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	982049	• SCREW, hex, cap, M8 x 25, black	1	
36		983400	• LOCK WASHER, split, M3, steel, zinc	1	
37		982169	• SCREW, pan, slot, M3 x 16, zinc	1	
38		982327	• SCREW, chez head, slot, M4 x 12, zinc	2	
39	245896	245896	• FEED THRU, two-wire	1	
<p>NOTE A: Not serviced separately.</p> <p>B: Heater, part 247748, has a quantity of three screws, part 982005.</p> <p>C: Part is included in the <i>Standard NH-4 Thermostat/Heat Limiter Kit</i>, part 106363, located on page 51.</p> <p>D: Part is included in the <i>Standard Thermostat Kit</i>, part 106283, located on page 51.</p> <p>E: Part is included in the <i>Single Passage Reservoir Seal Kit</i>, part 106282, located on page 52.</p> <p>NS: Not Shown</p>					

230 Volt: Twin Passage — 1000 watt

See Figure 12. This heater is OBSOLETE.

Item	Part	Description	Quantity	Note
—	-----	HEATER, NH-4, 230 Volt, twin passage, 1000 watt, EECS (OBSOLETE)	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER ENCLOSURE, NH-4	1	A
4	246243	• HEATER ASSEMBLY, cartridge, 230V, (1000 watt), NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	• HEAT LIMITER, NH-4	1	B
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
12a	235609	• PLATE, terminal block	1	
13a	933747	• BLOCK, terminal, 2 station	1	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	-----	• BRACKET, mounting, NH-4	1	A
18	-----	• ENCLOSURE, electrical, NH-4	1	A
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in.	1	
20	240976	• CLAMP, ground with wire	1	
21	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	247753	• RESERVOIR, twin passage, fluid heating (EECS)	1	
22	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	D
NS	973423	• • PLUG, pipe, socket head, $\frac{3}{8}$ -in. NPT, stainless steel	1	
NS	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
24	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	D
25	-----	• • BODY, fluid passage	1	A
26	245585	• • HOUSING, pressure, NH-4	1	
27	986915	• • RETAINING RING, external, 300, spiral	1	
NS	246731	• INSTALLATION KIT, NH-4, WP	1	
28	246732	• • ADAPTER, thermometer, WP, NH-4	1	
NS	973434	• • • PLUG, pipe, square head, $\frac{1}{2}$ -in. NPT, stainless steel	1	
29	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
31	973081	• • NIPPLE, hex, $\frac{1}{2}$ x $\frac{1}{2}$ x 1.89 in., steel, el	1	

Continued...

Item	Part	Description	Quantity	Note
33	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	• SCREW, hex, cap, M8 x 25, black	1	
36	983400	• LOCK WASHER, split, M3, steel, zinc	1	B, C
37	982169	• SCREW, pan, slot, M3 x 16, zinc	1	
39	245896	• FEED THRU, two-wire	1	
NS	982327	• SCREW, chez head, slotted, M4 x 12, zinc	2	
<p>NOTE A: Not serviced separately.</p> <p>B: Part is included in the <i>Standard NH-4 Thermostat/Heat Limiter Kit</i>, part 106363, located on page 51.</p> <p>C: Part is included in the <i>Standard Thermostat Kit</i>, part 106283, located on page 51.</p> <p>D: Part is included in the <i>Twin Passage Reservoir Seal Kit</i>, part 106310, located on page 52.</p> <p>NS: Not Shown</p>				

230 Volt: Twin Passage — 1700 watt

See Figure 12.

Item	Part	Description	Quantity	Note
—	247478	HEATER, NH-4, 230 Volt, twin passage, 1700 watts	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER enclosure, NH-4	1	A
4	245636	• HEATER ASSEMBLY, cartridge, 230V, (1700 watt), NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	• HEAT LIMITER, NH-4	1	B
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	• BLOCK, terminal, end	1	
13	933233	• BLOCK, terminal, contact	2	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	-----	• BRACKET, mounting, NH-4	1	A
18	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in.	1	
20	240976	• CLAMP, ground with wire	1	
21	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	247473	• RESERVOIR, twin passage, fluid heating	1	
22	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	D
NS	246245	• • FITING, $\frac{1}{2}$ in., with O-ring	2	
23	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	
24	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	D
25	-----	• • BODY, fluid, twin passage	1	A
26	245585	• • HOUSING, pressure, NH-4	1	
27	986915	• • RETAINING RING, external, 300, spiral	1	
NS	247481	• INSTALLATION KIT, twin passage, NH-4	1	
28	246732	• • ADAPTER, thermometer, WP, NH-4	1	
NS	973434	• • • PLUG, pipe, square head, $\frac{1}{2}$ -in. NPT, stainless steel	1	
29	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
30	972182	• • ELBOW, male, 37, $\frac{3}{4}$ -16 JIC x $\frac{1}{2}$ -in. NPT, steel	2	

Continued...

Item	Part	Description	Quantity	Note
31	973081	• • NIPPLE, hex, $1/2 \times 1/2 \times 1.89$ in., steel, el	1	
32	973983	• • NIPPLE, hex, $1/2$ -in. NPT x $1/4$ -in. NPT, steel, elni	1	
33	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982050	• SCREW, hex, cap, M8 x 35, black	1	
39	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Part is included in the *Standard NH-4 Thermostat/Heat Limiter Kit*, part 106363, located on page 51.

C: Part is included in the *Standard Thermostat Kit*, part 106283, located on page 51.

D: Part is included in the *Twin Passage Reservoir Seal Kit*, part 106310, located on page 52.

NS: Not Shown

380 Volt: Single Passage and Twin Passage — 1700 watt

See Figure 12.

Item	Part	Part	Description	Quantity	Note
—	245675		HEATER, NH-4, 380 Volt, single passage	1	
—		247479	HEATER, NH-4, 380 Volt, twin passage	1	
1	982006	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER, enclosure, NH-4	1	A
4	245643	245643	• HEATER ASSEMBLY, cartridge, 380V, 1700 watt, NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	-----	• HEAT LIMITER, NH-4	1	B
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	933232	• BLOCK, terminal, end	1	
13	933233	933233	• BLOCK, terminal, contact	2	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting, NH-4	1	A
18	245840	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	973442	• PLUG, pipe, socket, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground with wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	245677	X	• RESERVOIR, single fluid heating	1	
	X	247473	• RESERVOIR, twin passage, fluid heating	1	
22	945018	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	D, E
NS	245679	X	• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
	X	246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	245583	X	• • • FITTING, fluid, $\frac{3}{8}$ -in. NPTF	2	
	X	246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	

Continued...

Item	Part	Part	Description	Quantity	Note
24	945017	X	• • • O-RING, hotpaint, $\frac{3}{8}$ -in. tube	2	D
	X	945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	E
25	-----	-----	• • BODY, fluid passage, NH-4	1	A
26	245585	245585	• • HOUSING, pressure, NH-4	1	
27	986915	986915	• • RETAINING RING, external, 300, spiral	1	
NS	245705	X	• INSTALLATION KIT, single passage, NH-4	1	
	X	247481	• INSTALLATION KIT, twin passage, NH-4	1	
28	245777	X	• • ADAPTER, thermometer	1	
	X	246732	• • ADAPTER, thermometer, W.P., NH-4	1	
29	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hexagon, 6 mm	1	
30	972180	X	• • ELBOW, male, 37, $\frac{1}{2}$ -20 JIC x $\frac{3}{8}$ -in. NPT, steel	2	
	X	972182	• • ELBOW, male, 37, $\frac{3}{4}$ -16 JIC x $\frac{1}{2}$ -in. NPT, steel	2	
31	973022	X	• • NIPPLE, extra heavy, $\frac{3}{8}$ x 1.50 in., steel	1	
	X	973081	• • NIPPLE, hexagon, $\frac{1}{2}$ x $\frac{1}{2}$ x 1.89 in., steel	1	
32	973958	X	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{1}{4}$ x 1.406 in., steel, nickel	1	
	X	973983	• • NIPPLE, hexagon, $\frac{1}{2}$ x $\frac{1}{4}$ in., steel, nickel	1	
33	983417	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	982049	• SCREW, hex, cap, M8 x 25, black	1	
39	245896	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Part is included in the *Standard NH-4 Thermostat/Heat Limiter Kit*, part 106363, located on page 51.

C: Part is included in the *Standard Thermostat Kit*, part 106283, located on page 51.

D: Part is included in the *Single Passage Reservoir Seal Kit*, part 106282, located on page 52.

E: Part is included in the *Twin Passage Fluid Reservoir Seal Kit*, part 106310 located on page 7-42.

X: Part not included with this style of heater.

NS: Not Shown

460 Volt: Single and Twin Passage — 1700 watt

See Figure 12.

Item	Part	Part	Description	Quantity	Note
—	245676		HEATER, NH-4, 460 Volt	1	
—		247480	HEATER, NH-4, 460 Volt, twin passage, 1700 watt	1	
1	982006	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER, enclosure, NH-4	1	A
4	245637	245637	• HEATER ASSEMBLY, cartridge, 460V, 1700 watts, NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	B, C
7	-----	-----	• THERMOSTAT, probe-type	1	B, C
8	-----	-----	• HEAT LIMITER, NH-4	1	B
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	933232	• BLOCK, terminal, end	1	
13	933233	933233	• BLOCK, terminal, contact	2	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting, NH-4	1	A
18	245840	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	973442	• PLUG, pipe, socket, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground with wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
NS	245677		• RESERVOIR, fluid heating	1	
NS		247473	• RESERVOIR, twin passage, fluid heating	1	
NS		-----	• • PLUG, expansion, 0.6562 in.	1	
22	945018	945018	• • O-RING, hotpaint, 2.734 x 3.000 x 0.139 in.	2	D, E
NS	245679		• • FITTING, $\frac{3}{8}$ in., with O-ring	2	
NS		246245	• • FITTING, $\frac{1}{2}$ in., with O-ring	2	
23	245583		• • • FITTING, fluid, $\frac{3}{8}$ -in. NPTF	2	
23		246244	• • • FITTING, fluid, $\frac{1}{2}$ -in. NPTF	2	

Continued...

Item	Part	Part	Description	Quantity	Note
24	945017		• • • O-RING, hotpaint, $\frac{3}{8}$ -in. tube	2	D
24		945023	• • • O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2	E
25	-----	-----	• • BODY, fluid passage	1	A
26	245585	245585	• • HOUSING, pressure, NH-4	1	
27	986915	986915	• • RETAINING RING, external, 300, spiral	1	
NS	245705		• INSTALLATION KIT, NH-4	1	
NS		247481	• INSTALLATION KIT, twin passage, NH-4	1	
28	245777		• • ADAPTER, thermometer	1	
28		246732	• • ADAPTER, thermometer, WP, NH-4	1	
29	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hexagon, 6 mm	1	
30	972180		• • ELBOW, male, 37, $\frac{1}{2}$ -20 JIC x $\frac{3}{8}$ -in. NPT, steel	2	
30		972182	• • ELBOW, male, 37, $\frac{3}{4}$ -16 JIC x $\frac{1}{2}$ -in. NPT, steel	2	
31	973022		• • NIPPLE, extra heavy, $\frac{3}{8}$ x 1.50 in., steel	1	
32	973958		• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{1}{4}$ x 1.406 in., steel, nickel	1	
32		973983	• • NIPPLE, hex, $\frac{1}{2}$ NPT x $\frac{1}{4}$ -in. NPT, steel, elni	1	
NS		973081	• • NIPPLE, hex, $\frac{1}{2}$ x $\frac{1}{2}$ x 1.89 in., steel, el	1	
33	983417	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
34	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
35	982049	982049	• SCREW, hex, cap, M8 x 25, black	1	
39	245896	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Part is included in the *Standard NH-4 Thermostat/Heat Limiter Kit*, part 106363, located on page 51.

C: Part is included in the *Standard Thermostat Kit*, part 106283, located on page 51.

D: Part is included in the *Single Passage Reservoir Seal Kit*, part 106282, located on page 52.

E: Part is included in the *Twin Passage Reservoir Seal Kit*, part 106310, located on page 52.

NS: Not Shown

Stainless Steel NH-4 Heaters**115 Volt: Single Passage — 1700 watt**

See Figure 13.

Item	Part	Description	Quantity	Note
—	712905	HEATER, NH-4, stainless steel, 115 Volt	1	
1	982006	• SCREW, socket, head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER, enclosure, NH-4	1	A
4	245634	• HEATER ASSEMBLY, cartridge, 115 Volt, 1700 watts, NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B
6	983111	• LOCK WASHER, split, #8, steel, zinc	5	B
7	-----	• THERMOSTAT, probe-type	1	B
8	-----	• HEAT LIMITER, NH-4	1	B
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	• WASHER, flat, M, narrow, M4, steel, zinc	2	
12	933232	• BLOCK, terminal, end	1	
13	933233	• BLOCK, terminal, contact	2	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	-----	• BRACKET, mounting	1	A
18	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	• CLAMP, ground wire	1	
21	983152	• LOCK WASHER, English, internal, $\frac{5}{16}$ in., steel, zinc	2	
22	246658	• BODY, fluid, stainless steel, w/fittings	1	
23	971771	• • CONNECTOR, female, hydraulic, comp, 0.50-in. tube x $\frac{3}{8}$ -in. NPT	2	
NS	246657	• INSTALLATION KIT, stainless steel, NH-4	1	
24	115290	• • ADAPTER, thermometer, stainless steel	1	
25	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
26	972718	• • ELBOW, male, 37, $\frac{1}{2}$ -20 x $\frac{3}{8}$ -in. NPT	2	
27	973059	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{3}{8}$ x 1.45 in., stainless steel	1	
29	983417	• WASHER, flat, M, oversized, 8, steel, zinc	1	
30	983404	• LOCK WASHER, M, split, M8, steel, zinc	1	
31	982049	• SCREW, hex, cap, M8 x 25, black	1	
35	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.

B: Part is included in the *Stainless Steel Thermostat/Heat Limiter Kit*, part 106356, located on page 51.

NS: Not Shown

230 Volt: Single Passage — 1700 watt

See Figure 13.

Item	Part	Part	Description	Quantity	Note
—	246665		HEATER, NH-4, stainless steel, 230 Volt	1	
—		238502	HEATER, NH-4, 230 Volt, stainless steel, Baseefa	1	
1	982006	982006	• SCREW, socket, head, M8 x 20, zinc	8	
2	983150	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	-----	• COVER, enclosure, NH-4	1	A
4	245636	245636	• HEATER ASSEMBLY, cartridge, 230V, 1700 watt, NH-4	1	
5	982005	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B, C
6	983111	983111	• LOCK WASHER, split, #8, steel, zinc	5	C
7	-----	-----	• THERMOSTAT, probe-type	1	C
8	-----	-----	• HEAT LIMITER, NH-4	1	C
9	245576	245576	• PLUG, drive-out	1	
10	982004	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402		• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232		• BLOCK, terminal, end	1	
12a		235609	• PLATE, terminal block	1	
13	933233		• BLOCK, terminal, contact	2	
13a		933747	• BLOCK, terminal, 2 station	1	
14	245574	245574	• RETAINER, wire	2	
15	-----	-----	• STUD, ground	2	A
16	245582	245582	• PLUG, enclosure, electrical	1	
17	-----	-----	• BRACKET, mounting	1	A
18	245840	-----	• ENCLOSURE, electrical, ATEX, NH-4	1	
19	973442	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	240976	• CLAMP, ground wire	1	
21	983152	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
22	246658		• BODY, fluid, stainless steel, with fittings	1	
22		240525	• BODY, fluid, stainless steel, with fittings, EECS	1	
23	971771	971771	• • CONNECTOR, female, hydraulic, comp, 0.50-in. tube x $\frac{3}{8}$ -in. NPT	2	D

Continued...

48 NH-4 Fluid Heaters

Item	Part	Part	Description	Quantity	Note
NS	246657	246657	• INSTALLATION KIT, stainless steel, NH-4	1	
24	115290	115290	• • ADAPTER, thermometer, stainless steel	1	
25	901202	901202	• • THERMOMETER	1	
NS	901933	901933	• • KEY, hexagon, 6 mm	1	
26	972718	972718	• • ELBOW, male, 37, 1/2-20 x 3/8-in. NPT	2	
27	973059	973059	• • NIPPLE, hex, 3/8 x 3/8 x 1.45 in., stainless steel	1	
29	983417	983417	• WASHER, flat, oversized, M8, steel, zinc	1	
30	983404	983404	• LOCK WASHER, split, M8, steel, zinc	1	
31	982049		• SCREW, hex, cap, M8 x 25, black	1	
31		982050	• SCREW, hex, cap, M8 x 35, black	1	
32		982169	• SCREW, pan, slot, M3 x 16, zinc	1	
33		983400	• LOCK WASHER, split, M3, steel, zinc	1	
34		982327	• SCREW, chez head, slot, M4 x 12, zinc	2	
35	245896	245896	• FEED THRU, two-wire	1	
<p>NOTE A: Not serviced separately.</p> <p>B: Heater, part 238502, has a quantity of three screws, part 982005.</p> <p>C: Part is included in the <i>Stainless Steel Thermostat/Heat Limiter Kit</i>, part 106356, located on page 51.</p> <p>D: Heater, part 238502, has a quantity of one female connector, part 971771.</p> <p>NS: Not Shown</p>					

460 Volt: Single Passage – 1700 watt

See Figure 13.

Item	Part	Description	Quantity	Note
—	248334	HEATER, NH-4, stainless steel, 460 Volt	1	
1	982006	• SCREW, socket, head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER, enclosure, NH-4	1	A
4	245637	• HEATER ASSEMBLY, cartridge, 460V (1700 watt), NH-4	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	5	B
6	983111	• LOCK WASHER, split, #8, steel, zinc	5	B
7	-----	• THERMOSTAT, probe-type	1	B
8	-----	• HEAT LIMITER, NH-4	1	B
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	2	
11	983402	• WASHER, flat, narrow, M4, steel, zinc	2	
12	933232	• BLOCK, terminal, end	1	
13	933233	• BLOCK, terminal, contact	2	
14	245574	• RETAINER, wire	2	
15	-----	• STUD, ground	2	A
16	245582	• PLUG, enclosure, electrical	1	
17	245898	• BRACKET, mounting	1	
18	245840	• ENCLOSURE, electrical, NH-4	1	
19	973442	• PLUG, pipe, socket head, flush, $\frac{3}{4}$ in., zinc	1	
20	240976	• CLAMP, ground wire	1	
21	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
22	246658	• BODY, fluid, stainless steel, with fittings	1	
23	971771	• • CONNECTOR, female, hydraulic comp, 0.50-in. tube x $\frac{3}{8}$ -in. NPT	2	
NS	246657	• INSTALLATION KIT, stainless steel, NH-4	1	
24	115290	• • ADAPTER, thermometer, stainless steel	1	
25	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
26	972718	• • ELBOW, male, 37, $\frac{1}{2}$ -20 x $\frac{3}{8}$ -in. NPT	2	
27	973059	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{3}{8}$ x 1.45 in., stainless steel	1	
29	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
30	983404	• LOCK WASHER, split, M8, steel, zinc	1	
31	982049	• SCREW, hex, cap, M8 x 25, black	1	
35	245896	• FEED THRU, two-wire	1	

NOTE A: Not serviced separately.
 B: Part is included in the *Stainless Steel Thermostat/Heat Limiter Kit*, part 106356, located on page 51.
 NS: Not Shown

200 Volt: Single Passage — Japan Only — 1700 watt

See Figure 14.

Item	Part	Description	Quantity	Note
—	246664	HEATER, NH-4, 200 Volt, stainless steel, Japan	1	
1	982006	• SCREW, socket head, M8 x 20, zinc	8	
2	983150	• LOCK WASHER, split, $\frac{5}{16}$ in., steel, nickel	6	
3	-----	• COVER, enclosure, NH-4	1	A
4	247532	• HEATER, cartridge, 200V, 1700 watts, NH-4, KK	1	
5	982005	• SCREW, chez head, slotted, M4 x 10, zinc	2	
6	983111	• LOCK WASHER, split, #8, steel, zinc	2	
7	248093	• THERMOSTAT, dual, with bracket	1	B
8	-----	• HEAT LIMITER, NH-4	1	
9	245576	• PLUG, drive-out	1	
10	982004	• SCREW, set, knurl cup, M6 x 16, zinc	1	
11	245574	• RETAINER, wire	2	
12	-----	• STUD, ground	2	A
13	-----	• BRACKET, mounting, NH-4	1	A
14	-----	• ENCLOSURE, electrical, NH-4, Japan	1	A
15	973442	• PLUG, pipe, socket, flush, $\frac{3}{4}$ in., zinc	1	
16	240976	• CLAMP, ground with wire	1	
17	983152	• LOCK WASHER, internal, $\frac{5}{16}$ in., steel, zinc	2	
18	246658	• BODY, fluid, stainless steel, with fittings	1	
19	971771	• • CONNECTOR, female, hydraulic. comp, 0.50-in. tube x $\frac{3}{8}$ -in. NPT	2	
20	245582	• PLUG, enclosure, electrical	1	
21	983409	• LOCK WASHER, split, M6, steel, zinc	1	
22	-----	• SCREW, button, socket cap, M6 x 16, zinc	1	A
NS	246234	• WASHER, retaining	1	
NS	246657	• INSTALLATION KIT, NH-4, stainless steel	1	
23	115290	• • ADAPTER, thermometer, stainless steel	1	
24	901202	• • THERMOMETER	1	
NS	901933	• • KEY, hexagon, 6 mm	1	
25	972718	• • ELBOW, male, 37, $\frac{1}{2}$ -20 x $\frac{3}{8}$ -in. NPT, stainless steel	2	
26	973059	• • NIPPLE, hex, $\frac{3}{8}$ x $\frac{3}{8}$ x 1.45 in., stainless steel	1	
27	983417	• WASHER, flat, oversized, 8, steel, zinc	1	
28	983404	• LOCK WASHER, split, M8, steel, zinc	1	
29	982049	• SCREW, hex, cap, M8 x 25, black	1	
30	240764	• WIRE, ground	1	
31	246274	• FEED THRU, two-wire, PTB	1	
NOTE A: Not serviced separately.				
B: Part is included in the <i>Manual Reset Thermostat Kit</i> , part 106362, located on page 52.				
NS: Not Shown				

Kits and Spare Parts

NOTE: The only way to receive the heat limiter is to order the standard thermostat/heat limiter kit, part 106283, or the stainless steel thermostat/heat limiter kit, part 106356.

Standard NH-4 Thermostat/Heat Limiter Kit

Part	Description	Quantity
106363	THERMOSTAT/HEAT LIMITER SERVICE KIT, NH-4 (aluminum heater)	1
-----	• HEAT LIMITER, NH-4	1
-----	• THERMOSTAT, probe-type	1
982003	• SCREW, chez head, slotted, M3 x 8, steel, zinc	1
983400	• LOCK WASHER, split, M3, steel, zinc	1
245773	• APPLICATOR, heat conductive paste, 1 cc	1

Standard NH-4 Thermostat Kit

Part	Description	Quantity
106283	THERMOSTAT SERVICE KIT, NH-4	1
-----	• THERMOSTAT, probe-type	1
982003	• SCREW, chez head, slotted, M3 x 8, zinc	1
983400	• LOCK WASHER, split, M3, steel, zinc	1
245773	• APPLICATOR, heat conductive paste, 1 cc	1

Stainless Steel NH-4 Thermostat/Heat Limiter Kit

Part	Description	Quantity
106356	STAINLESS STEEL THERMOSTAT/HEAT LIMITER SERVICE KIT, NH-4	1
-----	• HEAT LIMITER, NH-4	1
-----	• THERMOSTAT, probe-type	1
982005	• SCREW, chez head, slotted, M4 x 10, zinc	1
983111	• LOCK WASHER, split, #8, steel, zinc	1
245773	• APPLICATOR, heat conductive paste, 1 cc	1

External Adjust Kit

NOTE: External adjust can be used on aluminum or stainless steel heaters to allow you to change the temperature without removing the enclosure cover. An arrow will guide you in turning the temperature higher or lower.

Part	Description	Quantity
249489	COVER, adjust thermostat	1
131126	• CAP, thermostat, adjusting	1
131132	• POINTER, thermostat	1
-----	• COVER, enclosure, NH-4, adjusting	1
-----	• PLATE WITH HOLE, warning, NH-4	1
-----	• SCREW, adjusting	1
249493	• SPRING, adjusting	1
981000	• SCREW, fillister, 5-40 x 0.25 in., slotted, zinc	1

Manual Reset Thermostat Kit — Japan Only

Part	Description	Quantity
106362	THERMOSTAT SERVICE KIT, manual reset	1
248093	• THERMOSTAT, dual, with bracket	1
245773	• APPLICATOR, heat conductive paste, 1 cc	1

Standard NH-4 Single Passage Fluid Reservoir Seal Kit

Part	Description	Quantity
106282	SINGLE PASSAGE SEAL SERVICE KIT, heater, NH-4	1
945017	• O-RING, hotpaint, $\frac{3}{8}$ -in., tube	2
945018	• O-RING, hotpaint, 2.734 x 3.00 x 0.139 in.	2
245773	• APPLICATOR, heat conductive paste, 1 cc	1

Standard NH-4 Twin Passage Fluid Reservoir Seal Kit

Part	Description	Quantity
106310	TWIN PASSAGE SEAL SERVICE KIT, heater, NH-4	1
945023	• O-RING, hotpaint, $\frac{1}{2}$ -in. tube	2
945018	• O-RING, hotpaint, 2.734 x 3.00 x 0.139 in.	2
245773	• APPLICATOR, heat conductive paste, 1 cc	1

Stainless Steel Alternate Fitting

Part	Description	Quantity
249356	FITTING, $\frac{3}{8}$ -in. NPTF, with O-ring	1
-----	• FITTING, fluid, $\frac{3}{8}$ -in. NPTF, stainless steel	1
945017	• O-RING, hotpaint, $\frac{3}{8}$ -in. tube	1

Heater Cartridges (Standard and Stainless Steel Heaters)

Part	Description	Quantity
245633	HEATER CARTRIDGE, 100V/1700W	1
245634	HEATER CARTRIDGE, 115V/1700W	1
246242	HEATER CARTRIDGE, 115V/500W	1
246492	HEATER CARTRIDGE, 115V/1000W	1
247532	HEATER CARTRIDGE, 200V/1700W, Japan	1
245635	HEATER CARTRIDGE, 200V/1700W (twin passage)	1
245636	HEATER CARTRIDGE, 230V/1700W	1
246243	HEATER CARTRIDGE, 230V/1000W	1
245643	HEATER CARTRIDGE, 380V/1700W	1
245637	HEATER CARTRIDGE, 460V/1700W	1

Recommended Spare Parts

Keep the following parts in inventory to avoid unplanned downtime. Quantities listed support a single NH-4 heater. Adjust order quantities based on the number of heaters in service.

Part	Description	Quantity	Note
106363	SERVICE KIT, thermostat heat limiter, NH-4, aluminum	1	
106283	SERVICE KIT, thermostat, NH-4	1	
106356	SERVICE KIT, stainless steel thermostat/heat limiter, NH-4	1	
106362	SERVICE KIT, thermostat, manual reset (Japan)	1	
106282	SERVICE KIT, single passage seal, heater, NH-4	1	
106310	SERVICE KIT, twin passage seal, heater, NH-4	1	
-----	HEATER ASSEMBLY, cartridge	1	A
245774	APPLICATOR, heat conductive paste, carton of 12 applicators, 1 cc each	1	

NOTE A: Order the appropriate heater cartridge.

USE FOR THE FOLLOWING HEATERS:

- 245672
- 247747
- 246238
- 246490
- 245673
- 247477

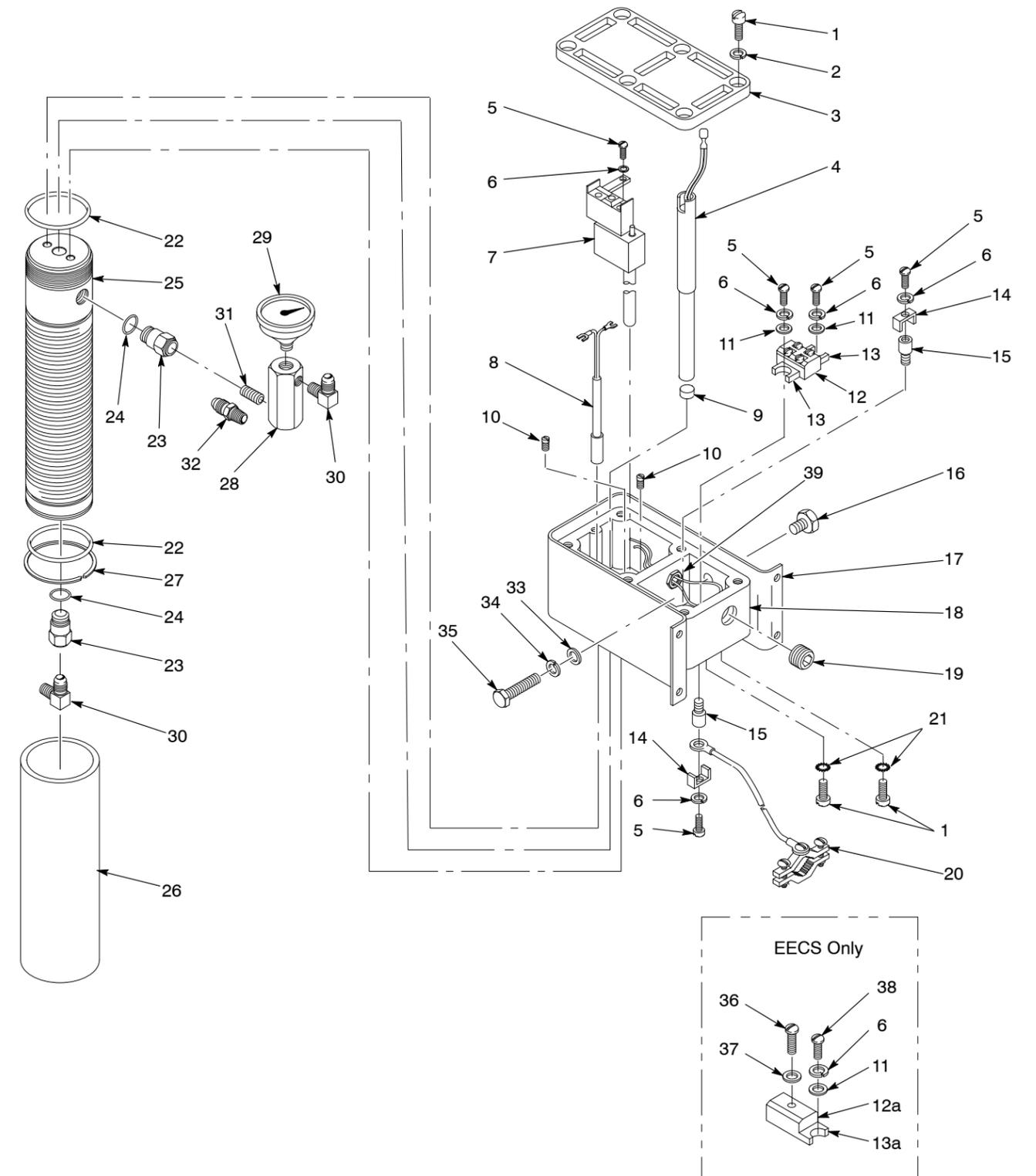


Figure 10 Standard Steel Plated NH-4 Heaters – Single and Twin Passage, 115 and 200 Volt

USE FOR THE FOLLOWING HEATERS:
246566
248162

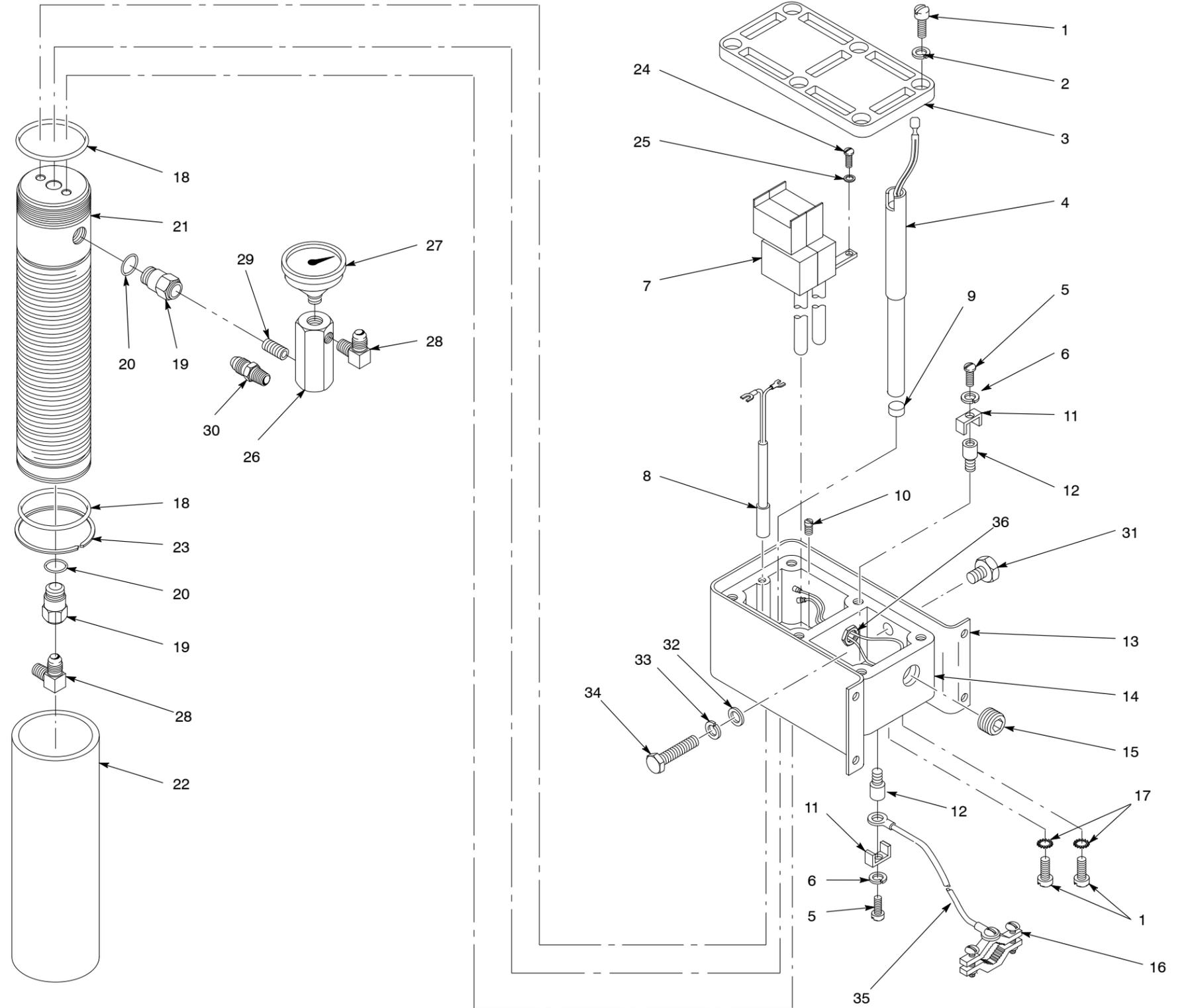


Figure 11 Standard Steel Plated NH-4 Heaters – Single and Twin Passage, 200 Volt – Japan Only

USE FOR THE FOLLOWING HEATERS:

- 245674
- 247748
- 247750
- 247478
- 245675
- 247479
- 245676
- 247480

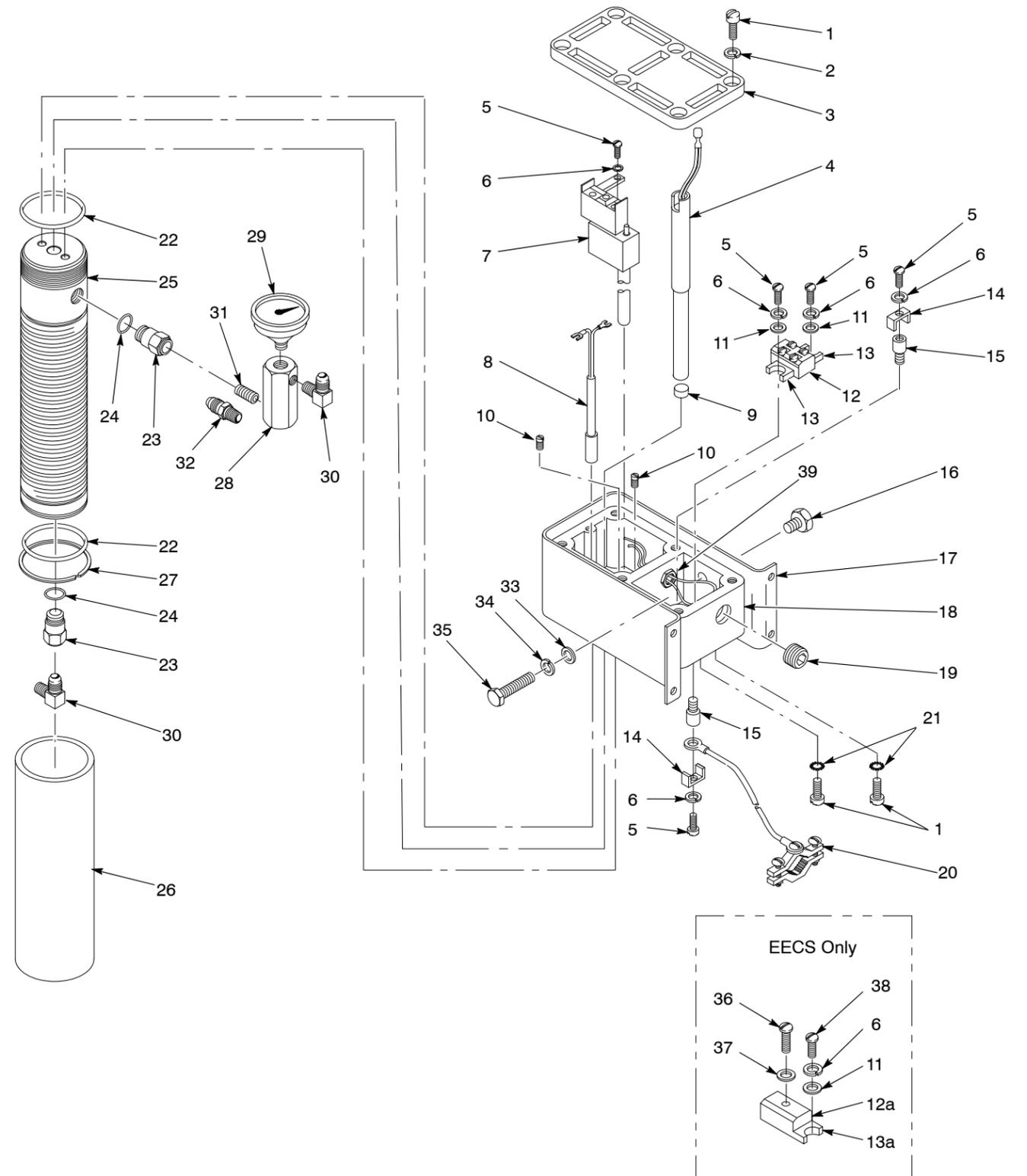


Figure 12 Standard Steel Plated NH-4 Heaters – Single and Twin Passage, 230, 240, 380, 460 Volt

USE FOR THE FOLLOWING HEATERS:
 712905
 246665
 238502
 248334

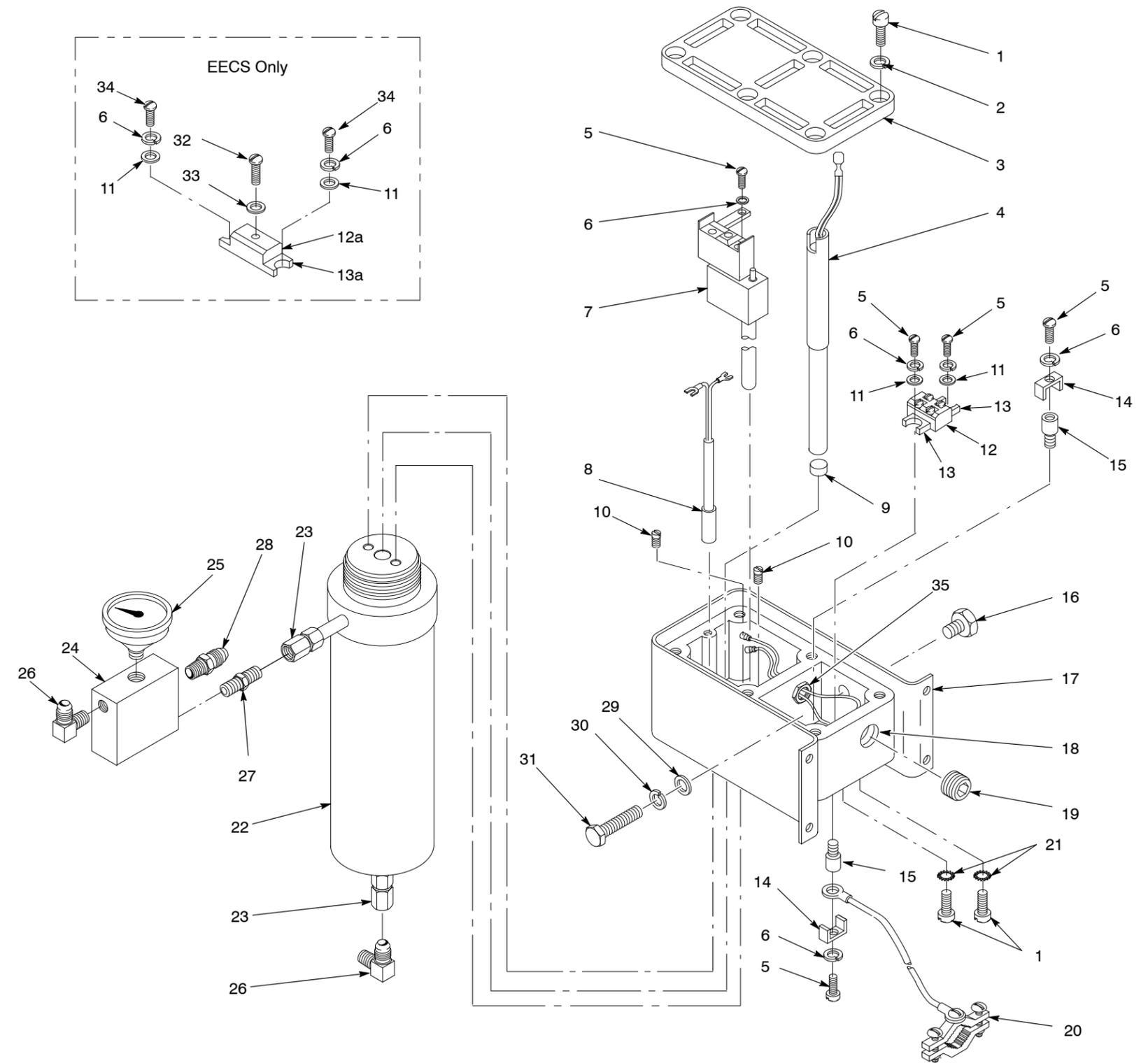


Figure 13 Stainless Steel NH-4 Heaters – Single and Twin Passage, 115, 230, 230 EECS, 460 Volt

EU DECLARATION of Conformity

Product: NH-4 Liquid Heater

Models: NH-4

Description: This is a heater used for heating liquids before they are sprayed or dispensed from an applicator. These liquids could be flammable or non-flammable.

Applicable Directives:

2006/42/EC - Machinery Directive

2014/35/EU - Low Voltage Directive

2014/34/EU - ATEX equipment for use in potentially explosive atmospheres

Standards Used for Compliance:

EN12100-1 (2009) EN60079-0 (2012)

EN60204 (2006) EN60079-1 (2014)

Principles:

This product has been designed and manufactured to the directive and standards / norms described above.

Type of Protection:

- Ex db IIB T3 Gb

ATEX Product Certificate:

- Baseefa (Buxton, Derbyshire, UK) – BAS00ATEX2170

ATEX Quality System Certificate

- 1180 Baseefa (Buxton, Derbyshire, UK)



Date: 01 March 2017

Hallie Smith - Petee
Engineering Manager
Industrial Coating Systems
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Nordson Authorized Representative in the EU

Person authorized to compile the relevant technical documentation.

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