



## Reactor® 2 Hydraulic Proportioning Systems

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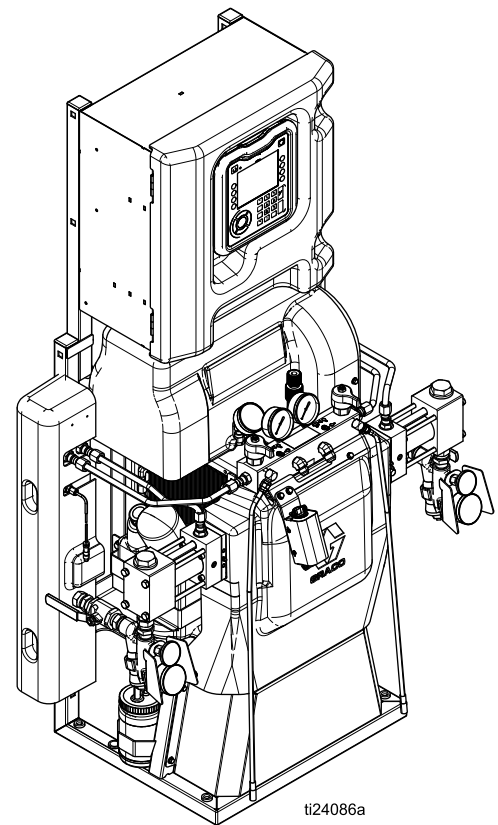
Hydraulic, Heated, Plural Component Proportioner for spraying polyurethane foam and polyurea coatings. Not for outdoor use. For professional use only. Not approved for use in explosive atmospheres or hazardous locations.



### Important Safety Instructions

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

*For model information, see page 10.*









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# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

|  <h2 style="margin: 0;">WARNING</h2>   |  |
|---|--|
| <br>    | <p><b>ELECTRIC SHOCK HAZARD</b></p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.</li> <li>• Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> <li>• Do not expose to rain. Store indoors.</li> </ul>  |
| <br> | <p><b>TOXIC FLUID OR FUMES</b></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"> <li>• Read Safety Data Sheet (SDS) for handling instructions and to know the specific hazards of the fluids you are using, including the effects of long-term exposure.</li> <li>• When spraying, servicing equipment, or when in the work area, always keep work area well ventilated and always wear appropriate personal protective equipment. See <b>Personal Protective Equipment</b> warnings in this manual.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>                                 |
|    | <p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>Always wear appropriate personal protective equipment and cover all skin when spraying, servicing equipment, or when in the work area. Protective equipment helps prevent serious injury, including long-term exposure; inhalation of toxic fumes, mists or vapors; allergic reaction; burns; eye injury and hearing loss. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• A properly fitting respirator, which may include a supplied-air respirator, chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority.</li> <li>• Protective eyewear and hearing protection.</li> </ul> |



# WARNING



## SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, 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.**



- Engage trigger lock when not spraying.
- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.



- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.



## FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:



- 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 sparking).
- Ground all equipment in the work area. See **Grounding** instructions.
- Never spray or flush solvent at high pressure.
- 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.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static or conductive.



- **Stop operation immediately** if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.



|  <h1 style="margin: 0;">WARNING</h1>   |  |
|---|--|
|    | <p><b>THERMAL EXPANSION HAZARD</b></p> <p>Fluids subjected to heat in confined spaces, including hoses, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.</p> <ul style="list-style-type: none"> <li>• Open a valve to relieve the fluid expansion during heating.</li> <li>• Replace hoses proactively at regular intervals based on your operating conditions.</li> </ul>  |
|    | <p><b>PRESSURIZED ALUMINUM PARTS HAZARD</b></p> <p>Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.</p> <ul style="list-style-type: none"> <li>• Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.</li> <li>• Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.</li> </ul> |
|     | <p><b>PLASTIC PARTS CLEANING SOLVENT HAZARD</b></p> <p>Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.</p> <ul style="list-style-type: none"> <li>• Use only compatible water-based solvents to clean plastic structural or pressure-containing parts.</li> <li>• See <b>Technical Data</b> in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's MSDSs and recommendations.</li> </ul>  |



# WARNING

|  |  |
|--|--|
|  | <p><b>EQUIPMENT MISUSE HAZARD</b></p>  |
|  | <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• 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. For complete information about your material, request MSDS from distributor or retailer.</li> <li>• Do not leave the work area while equipment is energized or under pressure.</li> <li>• Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul> |
|  | <p><b>MOVING PARTS HAZARD</b></p>  |
|  | <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>• Keep clear of moving parts.</li> <li>• Do not operate equipment with protective guards or covers removed.</li> <li>• Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> and disconnect all power sources.</li> </ul>  |
|  | <p><b>BURN HAZARD</b></p>  |
|  | <p>Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> </ul>   |

# Important Isocyanate Information

Isocyanates (ISO) are catalysts used in two component materials.

## Isocyanate Conditions





Spraying or dispensing fluids that contain isocyanates creates potentially harmful mists, vapors, and atomized particulates.




- Read and understand the fluid manufacturer’s warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to isocyanates.
- Use of isocyanates involves potentially hazardous procedures. Do not spray with this equipment unless you are trained, qualified, and have read and understood the information in this manual and in the fluid manufacturer’s application instructions and SDS.
- Use of incorrectly maintained or mis-adjusted equipment may result in improperly cured material, which could cause off gassing and offensive odors. Equipment must be carefully maintained and adjusted according to instructions in the manual.
- To prevent inhalation of isocyanate mists, vapors and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the fluid manufacturer’s SDS.
- Avoid all skin contact with isocyanates. Everyone in the work area must wear chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. After spraying, wash hands and face before eating or drinking.
- Hazard from exposure to isocyanates continues after spraying. Anyone without appropriate personal protective equipment must stay out of the work area during application and after application for the time period specified by the fluid manufacturer. Generally this time period is at least 24 hours.
- Warn others who may enter work area of hazard from exposure to isocyanates. Follow the recommendations of the fluid manufacturer and local regulatory authority. Posting a placard such as the following outside the work area is recommended:



## Material Self-Ignition

|  |   |  |  |  |
|--|---|--|--|--|
|                             |  |  |  |  |
| Some materials may become self-igniting if applied too thick. Read material manufacturer's warnings and SDS. |   |  |  |  |

## Keep Components A and B Separate

|   |   |   |  |  |
|---|---|---|--|--|
|    |  |  |  |  |
| Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage to equipment. To prevent cross-contamination:  |   |   |  |  |
| <ul style="list-style-type: none"><li>• <b>Never</b> interchange component A and component B wetted parts.</li><li>• Never use solvent on one side if it has been contaminated from the other side.</li></ul> |   |   |  |  |

## Changing Materials

|  |  |  |  |  |
|--|--|--|--|--|
| <b>NOTICE</b>  |  |  |  |  |
| Changing the material types used in your equipment requires special attention to avoid equipment damage and downtime.  |  |  |  |  |
| <ul style="list-style-type: none"><li>• When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.</li><li>• Always clean the fluid inlet strainers after flushing.</li><li>• Check with your material manufacturer for chemical compatibility.</li><li>• When changing between epoxies and urethanes or polyureas, disassemble and clean all fluid components and change hoses. Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.</li></ul> |  |  |  |  |

## Moisture Sensitivity of Isocyanates

Exposure to moisture (such as humidity) will cause ISO to partially cure, forming small, hard, abrasive crystals that become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity.

|  |  |  |  |  |
|--|--|--|--|--|
| <b>NOTICE</b>  |  |  |  |  |
| Partially cured ISO will reduce performance and the life of all wetted parts.  |  |  |  |  |
| <ul style="list-style-type: none"><li>• Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. <b>Never</b> store ISO in an open container.</li><li>• Keep the ISO pump wet cup or reservoir (if installed) filled with appropriate lubricant. The lubricant creates a barrier between the ISO and the atmosphere.</li><li>• Use only moisture-proof hoses compatible with ISO.</li><li>• Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.</li><li>• Always lubricate threaded parts with an appropriate lubricant when reassembling.</li></ul> |  |  |  |  |

**NOTE:** The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

## Foam Resins with 245 fa Blowing Agents

Some foam blowing agents will froth at temperatures above 90°F (33°C) when not under pressure, especially if agitated. To reduce frothing, minimize preheating in a circulation system.

## Related Manuals

### Component Manuals in English:

Manuals are available at [www.graco.com](http://www.graco.com).



| System Manuals           |   |
|--------------------------|---|
| 334945                   | Reactor 2 Operation                                 |
| Displacement Pump Manual |   |
| 3A3085                   | Pump Repair-Parts                                   |
| Feed System Manuals      |   |
| 309572                   | Heated Hose, Instructions-Parts                     |
| 309852                   | Circulation and Return Tube Kit, Instructions-Parts |
| 309815                   | Feed Pump Kits, Instructions-Parts                  |
| 309827                   | Feed Pump Air Supply Kit, Instructions-Parts        |
| Spray Gun Manuals        |   |
| 309550                   | Fusion AP Gun                                       |
| 312666                   | Fusion CS Gun                                       |
| 313213                   | Probler P2 Gun                                      |
| Accessory Manuals        |   |
| 3A3009                   | Inlet Sensor Kit, Instructions-Parts                |
| 3A1907                   | Remote Display Module Kit, Instructions-Parts       |
| 332735                   | Air Manifold Kit, Instructions-Parts                |
| 3A3010                   | Caster Kit, Instructions-Parts                      |
| 333276                   | Graco InSite™ Kit, Instructions-Parts               |
| 3A3084                   | Elite Kit, Instructions-Part                        |

## Accessories

| Kit Number | Description   |
|------------|---|
| 24U315     | Air Manifold (4 outlets)                            |
| 17G340     | Caster Kit  |
| 24T280     | Graco InSite Kit                                    |
| 17F837     | Inlet Sensor Kit                                    |
| 16X521     | Graco InSite Extension cable 24.6 ft (7.5 m)        |
| 24N449     | 50 ft (15 m) CAN cable (for remote display module)  |
| 24K207     | Fluid Temperature Sensor (FTS) with RTD             |
| 24U174     | Remote Display Module Kit                           |
| 15V551     | ADM Protective Covers (10 pack)                     |
| 15M483     | Remote Display Module Protective Covers (10 pack)   |
| 24M174     | Drum Level Sticks                                   |
| 121006     | 150 ft (45 m) CAN cable (for remote display module) |
| 24N365     | RTD Test Cables (to aide resistance measurements)   |
| 17F838     | Elite Kit   |

## Approvals

Intertek approvals apply to proportioners without hoses.

| Proportioner Approvals:   |
|---|
|  |
| <b>9902471</b>  |
| Conforms to ANSI/UL Std. 499<br>Certified to CAN/CSA Std. C22.2 No. 88                |
|  |

# Models

## Reactor 2 H-30 and H-30 Elite

| Model   | H-30 Model        |                    |                    |                   |                    |                    | H-30 Elite Model  |                    |                    |                   |                    |                    |
|---|-------------------|--------------------|--------------------|-------------------|--------------------|--------------------|-------------------|--------------------|--------------------|-------------------|--------------------|--------------------|
|   | 10 kW             |                    |                    | 15 kW             |                    |                    | 10 kW             |                    |                    | 15 kW             |                    |                    |
| Proportioner ★                                  | 17H031            |                    |                    | 17H032            |                    |                    | 17H131            |                    |                    | 17H132            |                    |                    |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 2000 (14, 140)    |                    |                    | 2000 (14, 140)    |                    |                    | 2000 (14, 140)    |                    |                    | 2000 (14, 140)    |                    |                    |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.074 (0.28)      |                    |                    | 0.074 (0.28)      |                    |                    | 0.074 (0.28)      |                    |                    | 0.074 (0.28)      |                    |                    |
| Max Flow Rate lb/min (kg/min)                   | 28 (12.7)         |                    |                    | 28 (12.7)         |                    |                    | 28 (12.7)         |                    |                    | 28 (12.7)         |                    |                    |
| Total System Load † (Watts)                     | 17,960            |                    |                    | 23,260            |                    |                    | 17,960            |                    |                    | 23,260            |                    |                    |
| Configurable Voltage Phase (VAC, 50/60 Hz)      | 200–<br>240<br>1Ø | 200–<br>240<br>3ØΔ | 350–<br>415<br>3ØY | 200–<br>240<br>1Ø | 200–<br>240<br>3ØΔ | 350–<br>415<br>3ØY | 200–<br>240<br>1Ø | 200–<br>240<br>3ØΔ | 350–<br>415<br>3ØY | 200–<br>240<br>1Ø | 200–<br>240<br>3ØΔ | 350–<br>415<br>3ØY |
| Full Load Peak Current*                         | 79                | 46                 | 35                 | 100               | 59                 | 35                 | 79                | 46                 | 35                 | 100               | 59                 | 35                 |

|   |                    |                    |                    |                    |                    |                    |                    |                    |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Fusion® AP Package ✖<br>(Gun Part No.)                                      | APH031<br>(246102) | AHH031<br>(246102) | APH032<br>(246102) | AHH032<br>(246102) | APH131<br>(246102) | AHH131<br>(246102) | APH132<br>(246102) | AHH132<br>(246102) |
| Fusion® CS Package ✖<br>(Gun Part No.)                                      | CSH031<br>(CS02RD) | CHH031<br>(CS02RD) | CSH032<br>(CS02RD) | CHH032<br>(CS02RD) | CSH131<br>(CS02RD) | CHH131<br>(CS02RD) | CSH132<br>(CS02RD) | CHH132<br>(CS02RD) |
| Probler P2 Package ✖<br>(Gun Part No.)                                      | P2H031<br>(GCP2R2) | PHH031<br>(GCP2R2) | P2H032<br>(GCP2R2) | PHH032<br>(GCP2R2) | P2H131<br>(GCP2R2) | PHH131<br>(GCP2R2) | P2H132<br>(GCP2R2) | PHH132<br>(GCP2R2) |
| Heated Hose<br>50 ft (15 m)<br>24K240 (scuff guard)<br>24Y240 (Xtreme-wrap) | 24K240             | 24K240             | 24K240             | 24K240             | 24Y240             | 24Y240             | 24Y240             | 24Y240             |
|   | Qty: 1             | Qty: 5             | Qty: 1             | Qty: 5             | Qty: 1             | Qty: 5             | Qty: 1             | Qty: 5             |
| Heated Whip Hose<br>10 ft (3 m)   | 246050             |                    | 246050             |                    | 246050             |                    | 246050             |                    |
| Graco Insite  |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |
| Fluid Inlet Sensors (2)   |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |

- \* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.
- † Total system watts used by system, based on maximum heated hose length for each unit.
  - H-30 series: 310 ft (94.5 m) maximum heated hose length, including whip hose.

- ★ See [Approvals, page 9](#).
- ✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories, page 9](#).

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |

## Reactor 2 H-40 and H-40 Elite, 200–240V

| Model   | H-40 Model     |                | H-40 Elite Model |                |
|---|----------------|----------------|------------------|----------------|
|   | 15 kW          | 20 kW          | 15 kW            | 20 kW          |
| Proportioner ★                                  | 17H043         | 17H044         | 17H143           | 17H144         |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 2000 (14, 140) | 2000 (14, 140) | 2000 (14, 140)   | 2000 (14, 140) |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.063 (0.24)   | 0.063 (0.24)   | 0.063 (0.24)     | 0.063 (0.24)   |
| Max Flow Rate lb/min (kg/min)                   | 45 (20)        | 45 (20)        | 45 (20)          | 45 (20)        |
| Total System Load † (Watts)                     | 26,600         | 31,700         | 26,600           | 31,700         |
| Voltage Phase (VAC 50/60 Hz)                    | 200–240 3ØΔ    | 200–240 3ØΔ    | 200–240 3ØΔ      | 200–240 3ØΔ    |
| Full Load Peak Current*                         | 71             | 95             | 71               | 95             |

|   |                    |                    |                    |                    |                    |                    |                    |                    |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Fusion® AP Package ✖</b><br>(Gun Part No.)                                       | APH043<br>(246102) | AHH043<br>(246102) | APH044<br>(246102) | AHH044<br>(246102) | APH143<br>(246102) | AHH143<br>(246102) | APH144<br>(246102) | AHH144<br>(246102) |
| <b>Fusion® CS Package ✖</b><br>(Gun Part No.)                                       | CSH043<br>(CS02RD) | CHH043<br>(CS02RD) | CSH044<br>(CS02RD) | CHH044<br>(CS02RD) | CSH143<br>(CS02RD) | CHH143<br>(CS02RD) | CSH144<br>(CS02RD) | CHH144<br>(CS02RD) |
| <b>Probler P2 Package ✖</b><br>(Gun Part No.)                                       | P2H043<br>(GCP2R2) | PHH043<br>(GCP2R2) | P2H044<br>(GCP2R2) | PHH044<br>(GCP2R2) | P2H143<br>(GCP2R2) | PHH143<br>(GCP2R2) | P2H144<br>(GCP2R2) | PHH144<br>(GCP2R2) |
| <b>Heated Hose<br/>50 ft (15 m)</b><br>24K240 (scuff guard)<br>24Y240 (Xtreme-wrap) | 24K240             | 24K240             | 24K240             | 24K240             | 24Y240             | 24Y240             | 24Y240             | 24Y240             |
|   | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             |
| <b>Heated Whip Hose<br/>10 ft (3 m)</b>   | 246050             |                    | 246050             |                    | 246050             |                    | 246050             |                    |
| <b>Graco InSite</b>   |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |
| <b>Fluid Inlet Sensors (2)</b>  |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |

\* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.

† Total system watts used by system, based on maximum heated hose length for each unit.

- H-40 series: 410 ft (125 m) maximum heated hose length, including whip hose.

★ See [Approvals, page 9](#).

✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories, page 9](#).

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |

## Reactor 2 H-40 and H-40 Elite, 350–415V (Continued)

| Model   | H-40 Model     |                | H-40 Elite Model |                |
|---|----------------|----------------|------------------|----------------|
|   | 15 kW          | 20 kW          | 15 kW            | 20 kW          |
| Proportioner ★                                  | 17H045         | 17H046         | 17H145           | 17H146         |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 2000 (14, 140) | 2000 (14, 140) | 2000 (14, 140)   | 2000 (14, 140) |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.063 (0.24)   | 0.063 (0.24)   | 0.063 (0.24)     | 0.063 (0.24)   |
| Max Flow Rate lb/min (kg/min)                   | 45 (20)        | 45 (20)        | 45 (20)          | 45 (20)        |
| Total System Load † (Watts)                     | 26,600         | 31,700         | 26,600           | 31,700         |
| Voltage Phase (VAC 50/60 Hz)                    | 350–415 3ØY    | 350–415 3ØY    | 350–415 3ØY      | 350–415 3ØY    |
| Full Load Peak Current*                         | 41             | 52             | 41               | 52             |

|   |                           |                           |                           |                           |                           |                           |                           |                           |
|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| <b>Fusion® AP Package ✖</b><br><i>(Gun Part No.)</i>                                | APH045<br><i>(246102)</i> | AHH045<br><i>(246102)</i> | APH046<br><i>(246102)</i> | AHH046<br><i>(246102)</i> | APH145<br><i>(246102)</i> | AHH145<br><i>(246102)</i> | APH146<br><i>(246102)</i> | AHH146<br><i>(246102)</i> |
| <b>Fusion® CS Package ✖</b><br><i>(Gun Part No.)</i>                                | CSH045<br><i>(CS02RD)</i> | CHH045<br><i>(CS02RD)</i> | CSH046<br><i>(CS02RD)</i> | CHH046<br><i>(CS02RD)</i> | CSH145<br><i>(CS02RD)</i> | CHH145<br><i>(CS02RD)</i> | CSH146<br><i>(CS02RD)</i> | CHH146<br><i>(CS02RD)</i> |
| <b>Probler P2 Package ✖</b><br><i>(Gun Part No.)</i>                                | P2H045<br><i>(GCP2R2)</i> | PHH045<br><i>(GCP2R2)</i> | P2H046<br><i>(GCP2R2)</i> | PHH046<br><i>(GCP2R2)</i> | P2H145<br><i>(GCP2R2)</i> | PHH145<br><i>(GCP2R2)</i> | P2H146<br><i>(GCP2R2)</i> | PHH146<br><i>(GCP2R2)</i> |
| <b>Heated Hose<br/>50 ft (15 m)</b><br>24K240 (scuff guard)<br>24Y240 (Xtreme-wrap) | 24K240                    | 24K240                    | 24K240                    | 24K240                    | 24Y240                    | 24Y240                    | 24Y240                    | 24Y240                    |
|   | Qty: 1                    | Qty: 6                    | Qty: 1                    | Qty: 6                    | Qty: 1                    | Qty: 6                    | Qty: 1                    | Qty: 6                    |
| <b>Heated Whip Hose<br/>10 ft (3 m)</b>   | 246050                    |                           | 246050                    |                           | 246050                    |                           | 246050                    |                           |
| <b>Graco Insite</b>   |                           |                           |                           |                           | ✓                         |                           | ✓                         |                           |
| <b>Fluid Inlet Sensors (2)</b>  |                           |                           |                           |                           | ✓                         |                           | ✓                         |                           |

- \* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.
- † Total system watts used by system, based on maximum heated hose length for each unit.
  - H-40 series: 410 ft (125 m) maximum heated hose length, including whip hose.

- ★ See [Approvals, page 9](#).
- ✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories, page 9](#).

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |



## Reactor 2 H-50 and H-50 Elite

| Model   | H-50 Model     |                | H-50 Elite Model |                |
|---|----------------|----------------|------------------|----------------|
|   | 20 kW          | 20 kW          | 20 kW            | 20 kW          |
| Proportioner ★                                  | 17H053         | 17H056         | 17H153           | 17H156         |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 2000 (14, 140) | 2000 (14, 140) | 2000 (14, 140)   | 2000 (14, 140) |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.074 (0.28)   | 0.074 (0.28)   | 0.074 (0.28)     | 0.074 (0.28)   |
| Max Flow Rate lb/min (kg/min)                   | 52 (24)        | 52 (24)        | 52 (24)          | 52 (24)        |
| Total System Load † (Watts)                     | 31,700         | 31,700         | 31,700           | 31,700         |
| Voltage Phase (VAC, 50/60 Hz)                   | 200–240 3ØΔ    | 350–415 3ØY    | 200–240 3ØΔ      | 350–415 3ØY    |
| Full Load Peak Current*                         | 95             | 52             | 95               | 52             |

|   |                    |                    |                    |                    |                    |                    |                    |                    |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Fusion® AP Package ✖<br>(Gun Part No.)                                      | APH053<br>(246102) | AHH053<br>(246102) | APH056<br>(246102) | AHH056<br>(246102) | APH153<br>(246102) | AHH153<br>(246102) | APH156<br>(246102) | AHH156<br>(246102) |
| Fusion® CS Package ✖<br>(Gun Part No.)                                      | CSH053<br>(CS02RD) | CHH053<br>(CS02RD) | CSH056<br>(CS02RD) | CHH056<br>(CS02RD) | CSH153<br>(CS02RD) | CHH153<br>(CS02RD) | CSH156<br>(CS02RD) | CHH156<br>(CS02RD) |
| Probler P2 Package ✖<br>(Gun Part No.)                                      | P2H053<br>(GCP2R2) | PHH053<br>(GCP2R2) | P2H056<br>(GCP2R2) | PHH056<br>(GCP2R2) | P2H153<br>(GCP2R2) | PHH153<br>(GCP2R2) | P2H156<br>(GCP2R2) | PHH156<br>(GCP2R2) |
| Heated Hose<br>50 ft (15 m)<br>24K240 (scuff guard)<br>24Y240 (Xtreme-wrap) | 24K240             | 24K240             | 24K240             | 24K240             | 24Y240             | 24Y240             | 24Y240             | 24Y240             |
|   | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             |
| Heated Whip Hose<br>10 ft (3 m)   | 246050             |                    | 246050             |                    | 246050             |                    | 246050             |                    |
| Graco Insite  |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |
| Fluid Inlet Sensors (2)   |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |

\* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.

† Total system watts used by system, based on maximum heated hose length for each unit.

- H-50 series: 410 ft (125 m) maximum heated hose length, including whip hose.

★ See [Approvals, page 9](#).

✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories, page 9](#).

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |

## Reactor 2 H-XP2 and H-XP2 Elite

| Model   | H-XP2 Model      |                |                | H-XP2 Elite Model |                |                |
|---|------------------|----------------|----------------|-------------------|----------------|----------------|
|   | 15 kW            |                |                | 15kW              |                |                |
| Proportioner ★                                  | 17H062           |                |                | 17H162            |                |                |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 3500 (24.1, 241) |                |                | 3500 (24.1, 241)  |                |                |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.042 (0.16)     |                |                | 0.042 (0.16)      |                |                |
| Max Flow Rate gpm (lpm)                         | 1.5 (5.7)        |                |                | 1.5 (5.7)         |                |                |
| Total System Load † (Watts)                     | 23,260           |                |                | 23,260            |                |                |
| Voltage Phase (VAC, 50/60 Hz)                   | 200–240<br>1Ø    | 200–240<br>3ØΔ | 350–415<br>3ØY | 200–240<br>1Ø     | 200–240<br>3ØΔ | 350–415<br>3ØY |
| Full Load Peak Current*                         | 100              | 59             | 35             | 100               | 59             | 35             |

|  |                    |                    |                    |                    |
|--|--------------------|--------------------|--------------------|--------------------|
| Fusion® AP Package ✖<br>(Gun Part No.) | APH062<br>(246101) | AHH062<br>(246101) | APH162<br>(246101) | AHH162<br>(246101) |
| Probler P2 Package ✖<br>(Gun Part No.) | P2H062<br>(GCP2R1) | PHH062<br>(GCP2R1) | P2H162<br>(GCP2R1) | PHH162<br>(GCP2R1) |
| Heated Hose<br>50 ft (15 m)            | 24K241             | 24K241             | 24Y241             | 24K241             |
|  | Qty. 1             | Qty. 5             | Qty. 1             | Qty. 5             |
| Heated Whip Hose<br>10 ft (3 m)        | 246055             |                    | 246055             |                    |
| Graco Insite                           |                    |                    | ✓                  |                    |
| Fluid Inlet Sensors (2)                |                    |                    | ✓                  |                    |

\* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.

† Total system watts used by system, based on maximum heated hose length for each unit.

- H-XP2 series: 310 ft (94.5 m) maximum heated hose length, including whip hose.

★ See [Approvals](#), page 9.

✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories](#), page 9.

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |

## Reactor 2 H-XP3 and H-XP3 Elite

| Model   | H-XP3 Model      |                  | H-XP3 Elite Model |                  |
|---|------------------|------------------|-------------------|------------------|
|   | 20 kW            | 20 kW            | 20 kW             | 20 kW            |
| Proportioner ★                                  | 17H074           | 17H076           | 17H174            | 17H176           |
| Maximum Fluid Working Pressure psi (MPa, bar)   | 3500 (24.1, 241) | 3500 (24.1, 241) | 3500 (24.1, 241)  | 3500 (24.1, 241) |
| Approximate Output per Cycle (A+B) gal. (liter) | 0.042 (0.16)     | 0.042 (0.16)     | 0.042 (0.16)      | 0.042 (0.16)     |
| Max Flow Rate gpm (lpm)                         | 2.8 (10.6)       | 2.8 (10.6)       | 2.8 (10.6)        | 2.8 (10.6)       |
| Total System Load † (Watts)                     | 31,700           | 31,700           | 31,700            | 31,700           |
| Voltage Phase (VAC 50/60 Hz)                    | 200–240 3ØΔ      | 350–415 3ØY      | 200–240 3ØΔ       | 350–415 3ØY      |
| Full Load Peak Current*                         | 95               | 52               | 95                | 52               |

|   |                    |                    |                    |                    |                    |                    |                    |                    |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Fusion® AP Package ✖</b><br>(Gun Part No.)                                       | APH074<br>(246102) | AHH074<br>(246102) | APH076<br>(246102) | AHH076<br>(246102) | APH174<br>(246102) | AHH174<br>(246102) | APH176<br>(246102) | AHH176<br>(246102) |
| <b>Probler P2 Package ✖</b><br>(Gun Part No.)                                       | P2H074<br>(GCP2R2) | PHH074<br>(GCP2R2) | P2H076<br>(GCP2R2) | PHH076<br>(GCP2R2) | P2H174<br>(GCP2R2) | PHH174<br>(GCP2R2) | P2H176<br>(GCP2R2) | PHH176<br>(GCP2R2) |
| <b>Heated Hose<br/>50 ft (15 m)</b><br>24K240 (scuff guard)<br>24Y240 (Xtreme-wrap) | 24K241             | 24K241             | 24K241             | 24K241             | 24Y241             | 24Y241             | 24Y241             | 24Y241             |
|   | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             | Qty: 1             | Qty: 6             |
| <b>Heated Whip Hose<br/>10 ft (3 m)</b>   | 246055             |                    | 246055             |                    | 246055             |                    | 246055             |                    |
| <b>Graco Insite</b>   |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |
| <b>Fluid Inlet Sensors (2)</b>  |                    |                    |                    |                    | ✓                  |                    | ✓                  |                    |

\* Full load amps with all devices operating at maximum capabilities. Fuse requirements at various flow rates and mix chamber sizes may be less.

† Total system watts used by system, based on maximum heated hose length for each unit.

- H-XP3 series: 410 ft (125 m) maximum heated hose length, including whip hose.

★ See [Approvals, page 9](#).

✖ Packages include gun, heated hose, and whip hose. Elite packages also include Graco InSite and fluid inlet sensors. All Elite hose and gun system packages include Xtreme-Wrap™ 50 ft (15 m) heated hose. For part numbers, see [Accessories, page 9](#).

| Voltage Configurations Key |       |
|----------------------------|-------|
| Ø                          | PHASE |
| Δ                          | DELTA |
| Y                          | WYE   |

# Troubleshooting

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|  |  |  |  |  |

To avoid injury due to unexpected machine operation initiated by a remote controller, disconnect the cellular module from the system prior to troubleshooting. Refer to your Reactor 2 App manual for instructions.

## Troubleshoot Errors

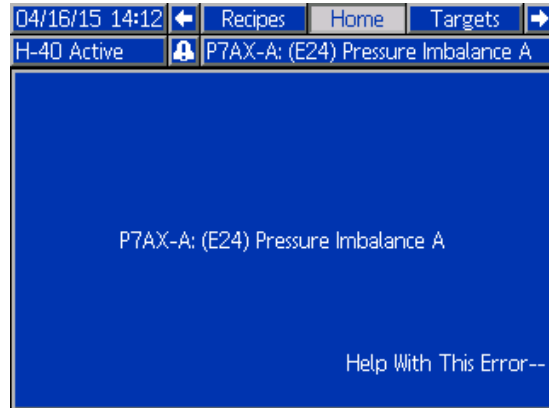
There are three types of errors that can occur. Errors are indicated on the display as well as by the light tower (optional).

| Error                 | Description   |
|-----------------------|---|
| <b>Alarms</b><br>     | A parameter critical to the process has reached a level requiring the system to stop. The alarm needs to be addressed immediately.      |
| <b>Deviations</b><br> | A parameter critical to the process has reached a level requiring attention, but not sufficient enough to stop the system at this time. |
| <b>Advisories</b><br> | A parameter that is not immediately critical to the process. The advisory needs attention to prevent more serious issues in the future. |

See [Error Codes, page 17](#), for causes and solutions to each error code.

To troubleshoot the error:

1. Press the soft key for help with the active error.



### Note

Press or to return to the previously displayed screen.

2. The QR code screen will be displayed. Scan the QR code with your smartphone to be sent directly to online troubleshooting for the active error code. Otherwise, manually navigate to <http://help.graco.com> and search for the active error.









3. If no internet connection is available, see [Error Codes, page 17](#), for causes and solutions for each error code.




## Error Codes


### Note

When an error occurs be sure to determine the code before resetting it. If you forget which error code occurred, see the Errors screen to view the last 200 errors, with date, time, and description.



| Error | Location | Type  | Description             | Cause                           | Solution   |
|-------|----------|---|-------------------------|---------------------------------|--|
| A4DA  | Heater A |    | High Current A          | Short circuit in heater wiring. | Check wiring for touching wires.   |
|       |          |   |                         | Bad Heater.                     | Confirm resistance of heater. Heater resistance should be 18–21 Ω for each heater element, 9–12 Ω combined for 10 kW systems, 6–8 Ω for 15 kW systems, and 4–6 Ω for 20 kW systems. If out of tolerance, replace heater element. |
| A4DB  | Heater B |    | High Current B          | Short circuit in heater wiring. | Check wiring for touching wires.   |
|       |          |   |                         | Bad Heater.                     | Confirm resistance of heater. Heater resistance should be 18–21 Ω for each heater element, 9–12 Ω combined for 10 kW systems, 6–8 Ω for 15 kW systems, and 4–6 Ω for 20 kW systems. If out of tolerance, replace heater element. |
| A4DH  | Hose     |  | High Current Hose       | Short circuit in hose wiring.   | Check continuity of transformer windings. Normal readings are about 0.2Ω on both primary and secondary. If reading is 0Ω replace transformer.  |
|       |          |   |                         |                                 | Check for shorts between the primary winding and the support frame or enclosure.   |
| A7DA  | Heater A |  | Unexpected Current A    | Shorted TCM                     | If error cannot be cleared or regenerates consistently, replace module.  |
| A7DB  | Heater B |  | Unexpected Current B    | Shorted TCM                     | If error cannot be cleared or regenerates consistently, replace module.  |
| A7DH  | Hose     |  | Unexpected Current Hose | Shorted TCM                     | If error cannot be cleared or regenerates consistently, replace module.  |

Troubleshooting











| <b>Error</b> | <b>Location</b> | <b>Type</b>   | <b>Description</b> | <b>Cause</b>             | <b>Solution</b>   |
|--------------|-----------------|---|--------------------|--------------------------|---|
| A8DA         | Heater A        |  | No Current A       | Tripped circuit breaker. | Visually check circuit breaker for a tripped condition. |
|              |                 |   |                    | Loose/broken connection. | Check heater wiring for loose wires.                    |
| A8DB         | Heater B        |  | No Current B       | Tripped circuit breaker. | Visually check circuit breaker for a tripped condition. |
|              |                 |   |                    | Loose/broken connection. | Check heater wiring for loose wires.                    |
| A8DH         | Hose            |  | No Current Hose    | Tripped circuit breaker. | Visually check circuit breaker for a tripped condition. |
|              |                 |   |                    | Loose/broken connection. | Check heater wiring for loose wires.                    |

| Error | Location | Type  | Description             | Cause                          | Solution  |
|-------|----------|---|-------------------------|--------------------------------|---|
| CACM  | HCM      |  | HCM Communication Error | Module does not have software. | Insert a system token into the ADM module and cycle the power. Wait until the upload is complete before removing the token.   |
|       |          |   |                         | Dial set to wrong position.    | Ensure the HCM dial is set to the correct position: <ul style="list-style-type: none"> <li>• H-30 = 0</li> <li>• H-40 = 1</li> <li>• H-50 = 2</li> <li>• H-XP2 = 3</li> <li>• H-XP3 = 4</li> </ul>  |
|       |          |   |                         | No 24 VDC supply to module.    | Green light on each module should be lit. If green light is not lit, check to make sure each CAN cable connection is tight. Verify the power supply is outputting 24 VDC. If not, check power supply wiring. If wiring is okay, replace the power supply.     |
|       |          |   |                         | Loose or broken CAN cable.     | Check the CAN cables running between GCA modules and tighten if needed. If the problem still persists move each cable around the connector and watch the flashing yellow light on the GCA modules. If the yellow light stops flashing, replace the CAN cable. |





Troubleshooting





| Error | Location | Type  | Description             | Cause                          | Solution  |
|-------|----------|---|-------------------------|--------------------------------|---|
| CACT  | TCM      |    | TCM Communication Error | Module does not have software. | Insert a system token into the ADM module and cycle the power. Wait until the upload is complete before removing the token.   |
|       |          |   |                         | No 24 VDC supply to module.    | Green light on each module should be lit. If green light is not lit, check to make sure each CAN cable connection is tight. Verify the power supply is outputting 24 VDC. If not, check power supply wiring. If wiring is okay, replace the power supply.     |
|       |          |   |                         | Loose or broken CAN cable.     | Check the CAN cables running between GCA modules and tighten if needed. If the problem still persists move each cable around the connector and watch the flashing yellow light on the GCA modules. If the yellow light stops flashing, replace the CAN cable. |
| DADX  | HCM      |  | Pump Runaway            | Flow rate is too large.        | Mix chamber too large for system selected. Use mix chamber rated for system.  |
|       |          |   |                         |                                | Ensure the system has chemical and the feed pumps are operating correctly.  |
|       |          |   |                         |                                | No material in pumps. Verify pumps are supplying chemical. If necessary, replace or refill drums.   |
|       |          |   |                         |                                | Inlet ball valves are closed. Open ball valves.   |






| Error | Location | Type  | Description              | Cause   | Solution  |
|-------|----------|---|--------------------------|---|---|
| EVCH  | ADM      |    | Manual Hose Mode Enabled | Manual hose mode has been enabled in System Setup screen. | Install a functioning fluid temperature sensor (FTS) on the hose. Manual hose mode will automatically turn off. |
| EAUX  | ADM      |    | USB Busy                 | USB drive has been inserted to the ADM.                   | Do not remove USB drive until download/upload is complete.  |
| EVSX  | HCM      |    | Standby                  | System has entered standby.                               | Trigger gun to resume spraying.<br>Turn off standby in setup screens.   |
| EVUX  | ADM      |    | USB disabled             | USB download/uploads are disabled.                        | Enable USB download/uploads on the Advanced Setup screen before inserting a USB drive.                          |
| H2MA  | Heater A |    | Low Frequency A          | Line frequency is below 45 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |
| H2MB  | Heater B |    | Low Frequency B          | Line frequency is below 45 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |
| H2MH  | Hose     |   | Low Frequency Hose       | Line frequency is below 45 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |
| H3MA  | Heater A |  | High Frequency A         | Line frequency is above 65 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |
| H3MB  | Heater B |  | High Frequency B         | Line frequency is above 65 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |
| H3MH  | Hose     |  | High Frequency Hose      | Line frequency is above 65 Hz                             | Ensure line frequency of incoming power is between 45 and 65 Hz.  |




Troubleshooting

| Error | Location | Type  | Description               | Cause  | Solution  |
|-------|----------|---|---------------------------|--|---|
| L1AX  | ADM      |  | Low Chemical Level A      | Low material level.  | Refill material and update drum level on ADM Maintenance screen.<br><br>Alarm can be disabled on the System Setup screen.                                     |
| L1BX  | ADM      |  | Low Chemical Level B      | Low material level.  | Refill material and update drum level on ADM Maintenance screen.<br><br>Alarm can be disabled on the System Setup screen.                                     |
| MMUX  | USB      |  | Maintenance Due - USB     | USB logs have reached a level where data loss will occur if logs are not downloaded. | Insert a USB drive into the ADM and download all logs.  |
| P0AX  | HCM      |  | Pressure Imbalance A High | Pressure difference between A and B material is greater than the defined value.      | Ensure material flow is equally restricted on both material lines.  |
|       |          |   |                           | Pressure imbalance is defined too low.   | Ensure that the pressure imbalance value, on the System Setup screen, is at an acceptable maximum pressure to prevent unnecessary alarms and abort dispenses. |
|       |          |   |                           | Out of material.   | Fill tanks with material  |
|       |          |   |                           | Fluid leaking from heater inlet rupture disk.  | Check if heater and PRESSURE RELIEF/SPRAY valve are plugged. Clear. Replace rupture disk. Do not replace with a pipe plug.                                    |
|       |          |   |                           | Feed system defective.   | Check feed pump and hoses for blockage. Check that feed pumps have correct air pressure.  |



| Error | Location | Type  | Description               | Cause   | Solution  |
|-------|----------|---|---------------------------|---|---|
| P0BX  | HCM      |    | Pressure Imbalance B High | Pressure difference between A and B material is greater than the defined value. | Ensure material flow is equally restricted on both material lines.  |
|       |          |   |                           | Pressure imbalance is defined too low.  | Ensure that the pressure imbalance value, on the System Setup screen, is at an acceptable maximum pressure to prevent unnecessary alarms and abort dispenses. |
|       |          |   |                           | Out of material.  | Fill tanks with material  |
|       |          |   |                           | Fluid leaking from heater inlet rupture disk.                                   | Check if heater and PRESSURE RELIEF/SPRAY valve are plugged. Clear. Replace rupture disk. Do not replace with a pipe plug.                                    |
|       |          |   |                           | Feed system defective.  | Check feed pump and hoses for blockage. Check that feed pumps have correct air pressure.  |
| P1FA  | HCM      |   | Low Inlet Pressure A      | Inlet pressure lower than defined value.  | Ensure that inlet pressure to the pump is sufficient.   |
|       |          |   |                           | Value defined too high.   | Ensure that the low pressure alarm level defined on the System Setup screen is acceptable.  |
| P1FB  | HCM      |  | Low Inlet Pressure B      | Inlet pressure lower than defined value.  | Ensure that inlet pressure to the pump is sufficient.   |
|       |          |   |                           | Value defined too high.   | Ensure that the low pressure alarm level defined on the System Setup screen is acceptable.  |
| P2FA  | HCM      |  | Low Inlet Pressure A      | Inlet pressure lower than defined value.  | Ensure that inlet pressure to the pump is sufficient.   |
|       |          |   |                           | Value defined too high.   | Ensure that the low pressure alarm level defined on the System Setup screen is acceptable.  |



Troubleshooting

| Error | Location | Type  | Description          | Cause  | Solution   |
|-------|----------|---|----------------------|--|--|
| P2FB  | HCM      |    | Low Inlet Pressure B | Inlet pressure lower than defined value.                   | Ensure that inlet pressure to the pump is sufficient.  |
|       |          |   |                      | Value defined too high.                                    | Ensure that the low pressure alarm level defined on the System Setup screen is acceptable.   |
| P4AX  | HCM      |    | High Pressure A      | System pressurized before allowing heat to reach setpoint. | Pressure in the hose and pumps will increase as the system heats up. Turn on heat and allow all zones to reach the temperature setpoint before turning on the pumps. |
|       |          |   |                      | Bad pressure transducer.                                   | Verify the ADM pressure reading and the analog gauges at the manifold. Replace transducer if they do not match.  |
|       |          |   |                      | H-XP2 or H-XP3 system configured as H-30, H-40, or H-50.   | Alarm level is lower for H-30, H-40 and H-50 than for H-XP2 and H-XP3.. Ensure dial on HCM is set to position "3" for H-XP2 or "4" for H-XP3.                        |
| P4BX  | HCM      |  | High Pressure B      | System pressurized before allowing heat to reach setpoint. | Pressure in the hose and pumps will increase as the system heats up. Turn on heat and allow all zones to reach the temperature setpoint before turning on the pumps. |
|       |          |   |                      | Bad pressure transducer.                                   | Verify the ADM pressure reading and the analog gauges at the manifold.   |
|       |          |   |                      | H-XP2 or H-XP3 system configured as H-30, H-40, or H-50.   | Alarm level is lower for H-30, H-40 and H-50 than for H-XP2 and H-XP3.. Ensure dial on HCM is set to position "3" for H-XP2 or "4" for H-XP3.                        |





| Error | Location | Type  | Description                   | Cause                        | Solution  |
|-------|----------|---|-------------------------------|------------------------------|---|
| P6AX  | HCM      |    | Pressure Sensor Error A       | Loose/bad connection.        | Check to ensure the pressure transducer is properly installed and all wires are properly connected.   |
|       |          |   |                               | Bad sensor.                  | Check if the error follows the transducer. Disconnect transducer cables from the HCM (connectors 6 and 7). Reverse A and B connections and check if the errors follows. If the error follows the transducer, replace the pressure transducer. |
| P6BX  | HCM      |    | Pressure Sensor Error B       | Loose/bad connection.        | Check to ensure the pressure transducer is properly installed and all wires are properly connected.   |
|       |          |   |                               | Bad sensor.                  | Check if the error follows the transducer. Disconnect transducer cables from the HCM (connectors 6 and 7). Reverse A and B connections and check if the errors follows. If the error follows the transducer, replace the pressure transducer. |
| P6FA  | HCM      |  | Pressure Sensor Error Inlet A | Inlet sensors not installed. | If inlet sensors are not installed, inlet sensors should be disabled on the System Setup screen.  |
|       |          |   |                               | Loose/bad connection.        | Check to ensure inlet sensor is properly installed and all wires are properly connected.  |
|       |          |   |                               | Bad sensor.                  | Check if the error follows the inlet sensor. Disconnect inlet sensor cables from the HCM (connectors 8 and 9). Reverse A and B connections and check if the errors follows. If the error follows the sensor, replace the inlet sensor.        |

Troubleshooting



| Error | Location | Type  | Description                   | Cause   | Solution   |
|-------|----------|---|-------------------------------|---|--|
| P6FB  | HCM      |  | Pressure Sensor Error Inlet B | Inlet sensors not installed.  | If inlet sensors are not installed, inlet sensors should be disabled on the System Setup screen.   |
|       |          |   |                               | Loose/bad connection.   | Check to ensure inlet sensor is properly installed and all wires are properly connected.   |
|       |          |   |                               | Bad sensor.   | Check if the error follows the inlet sensor. Disconnect inlet sensor cables from the HCM (connectors 8 and 9). Reverse A and B connections and check if the errors follows. If the error follows the sensor, replace the inlet sensor. |
| P7AX  | HCM      |  | Pressure Imbalance A High     | Pressure difference between A and B material is greater than the defined value. | Ensure material flow is equally restricted on both material lines.   |
|       |          |   |                               | Pressure imbalance is defined too low.  | Ensure that the pressure imbalance value, on the System Setup screen, is at an acceptable maximum pressure to prevent unnecessary alarms and abort dispenses.  |
|       |          |   |                               | Out of material.  | Fill tanks with material   |
|       |          |   |                               | Fluid leaking from heater inlet rupture disk.                                   | Check if heater and PRESSURE RELIEF/SPRAY valve are plugged. Clear. Replace rupture disk. Do not replace with a pipe plug.   |
|       |          |   |                               | Feed system defective.  | Check feed pump and hoses for blockage. Check that feed pumps have correct air pressure.   |

| Error | Location | Type   | Description               | Cause   | Solution  |
|-------|----------|--|---------------------------|---|---|
| P7BX  | HCM      |   | Pressure Imbalance B High | Pressure difference between A and B material is greater than the defined value. | Ensure material flow is equally restricted on both material lines.  |
|       |          |  |                           | Pressure imbalance is defined too low.  | Ensure that the pressure imbalance value, on the System Setup screen, is at an acceptable maximum pressure to prevent unnecessary alarms and abort dispenses. |
|       |          |  |                           | Out of material.  | Fill tanks with material  |
|       |          |  |                           | Fluid leaking from heater inlet rupture disk.                                   | Check if heater and PRESSURE RELIEF/SPRAY valve are plugged. Clear. Replace rupture disk. Do not replace with a pipe plug.                                    |
|       |          |  |                           | Feed system defective.  | Check feed pump and hoses for blockage. Check that feed pumps have correct air pressure.  |
| T2DA  | Heater A |  | Low Temperature A         | Flow is too high at current setpoint.   | Use a smaller mix chamber that is rated for the unit in use. If recirculating, decrease flow or decrease temperature setpoint.                                |
|       |          |  |                           | Bad RTD or bad RTD placement against heater.                                    | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.  |
|       |          |  |                           | Bad heater element.   | Confirm resistance of heater. Heater resistance should be 9-12 Ω for 10 kW systems and 6-8 Ω for 15 kW systems. If out of tolerance, replace heater element.  |
|       |          |  |                           | Loose heater wires.   | Check for loose heater element wires.   |




Troubleshooting



| Error | Location | Type  | Description             | Cause   | Solution   |
|-------|----------|---|-------------------------|---|--|
| T2DB  | Heater B |    | Low Temperature B       | Flow is too high at current setpoint.                                   | Use a smaller mix chamber that is rated for the unit in use. If recirculating, decrease flow or decrease temperature setpoint.                               |
|       |          |   |                         | Bad RTD or bad RTD placement against heater.                            | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.   |
|       |          |   |                         | Bad heater element.   | Confirm resistance of heater. Heater resistance should be 9-12 Ω for 10 kW systems and 6-8 Ω for 15 kW systems. If out of tolerance, replace heater element. |
|       |          |   |                         | Loose heater wires.   | Check for loose heater element wires.  |
| T2DH  | Hose     |    | Low Temperature Hose    | Flow is too high at current setpoint.                                   | Use a smaller mix chamber that is rated for the unit in use. If recirculating, decrease flow or decrease temperature setpoint.                               |
|       |          |   |                         | Cold chemical in unheated portion of system passed hose FTS at startup. | Recirculate heated chemical back to drum in cold conditions before startup.  |
| T2FA  | HCM      |  | Low Temperature Inlet A | Inlet fluid temperature is below the defined level.                     | Recirculate fluid through heaters until inlet fluid temperature is above defined error level.  |
|       |          |   |                         |   | Increase the low temperature deviation level on the System Setup screen.   |
| T2FB  | HCM      |  | Low Temperature Inlet B | Inlet fluid temperature is below the defined level.                     | Recirculate fluid through heaters until inlet fluid temperature is above defined error level.  |
|       |          |   |                         |   | Increase the low temperature deviation level on the System Setup screen.   |





| Error | Location | Type  | Description  | Cause   | Solution  |
|-------|----------|---|--------------|---|---|
| T3CH  | Hose     |  | Hose Cutback | Hose current has been reduced because hose has been drawing current for an extended period. | Hose setpoint higher than A and B setpoints. Decrease hose setpoint.  |
|       |          |   |              |   | Hose FTS is in a colder environment than the rest of the hose. Expose FTS to the same environment as the rest of the hose.                              |
| T3CT  | TCM      |  | TCM Cutback  | High ambient temperature.   | Ensure ambient temperature is below 120°F(48°C) before using the system.  |
|       |          |   |              | Enclosure fan not operating.  | Ensure fan in electrical enclosure is spinning. If it is not, check fan wiring or replace fan.  |
|       |          |   |              | Module fan not operating.   | If a TCM fan error (WMIO) has occurred, fan inside the module is not working properly. Check TCM fan for debris and clear with forced air if necessary. |




Troubleshooting

| Error | Location | Type  | Description          | Cause  | Solution  |
|-------|----------|---|----------------------|--|---|
| T4CT  | TCM      |    | High Temperature TCM | High ambient temperature.  | Ensure ambient temperature is below 120°F(48°C) before using the system.  |
|       |          |   |                      | Enclosure fan not operating.   | Ensure fan in electrical enclosure is spinning. If it is not, check fan wiring or replace fan.  |
|       |          |   |                      | Module fan not operating.  | If a TCM fan error (WM10) has occurred, fan inside the module is not working properly. Check TCM fan for debris and clear with forced air if necessary. |
| T4DA  | Heater A |    | High Temperature A   | Bad RTD or bad RTD placement against heater.   | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.  |
|       |          |   |                      | Flow too high for temperature setpoint, causing temperature overshoots when gun is de-triggered. | Use a smaller mix chamber that is rated for the unit in use.  |
| T4DB  | Heater B |  | High Temperature B   | Bad RTD or bad RTD placement against heater.   | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.  |
|       |          |   |                      | Flow too high for temperature setpoint, causing temperature overshoots when gun is de-triggered. | Use a smaller mix chamber that is rated for the unit in use.  |






| Error | Location | Type  | Description               | Cause   | Solution   |
|-------|----------|---|---------------------------|---|--|
| T4DH  | Hose     |    | High Temperature Hose     | Hose portion exposed to an excessive heat source, like hot sun or coiled hose, can pass fluid more than 27°F (15°C) over hose temperature setting to the FTS. | Shade exposed hose from hot sun or expose FTS to same environment when at rest. Uncoil entire hose before heating to avoid self-heating.   |
|       |          |   |                           | Setting the A or B setpoint much higher than hose setpoint can cause fluid more than 27°F (15°C) over hose temperature setting to reach the FTS.              | Increase hose setpoint so it is closer to A and B setpoints.   |
|       |          |   |                           | Cold ambient temperature is causing hose to heat  | Cold ambient temperature is chilling the FTS and causing hose heat to stay on longer than needed. Insulate the FTS area of the hose so that it heats at the same rate as the rest of the hose.   |
| T4EA  | Heater A |  | High Temperature Switch A | Overtemperature switch sensed a fluid temperature above 230°F (110°C).  | Heater was delivered too much power, causing the overtemperature switch to open. RTD is not reading properly. After the heater cools down, replace RTD. Switch closes and the error can be cleared when the heater temperature falls below 190°F (87°C). |
|       |          |   |                           | Disconnected or loose overtemperature switch cable/connection.  | If heater is not actually over temperature, check all wiring and connections between the TCM and the overtemperature switches.   |
|       |          |   |                           | Overtemperature switch failed in the open position.   | Replace overtemperature switch.  |






Troubleshooting











| Error | Location | Type  | Description               | Cause  | Solution   |
|-------|----------|---|---------------------------|--|--|
| T4EB  | Heater B |  | High Temperature Switch B | Overtemperature switch sensed a fluid temperature above 230°F (110°C). | Heater was delivered too much power, causing the overtemperature switch to open. RTD is not reading properly. After the heater cools down, replace RTD. Switch closes and the error can be cleared when the heater temperature falls below 190°F (87°C). |
|       |          |   |                           | Disconnected or loose overtemperature switch cable/connection.         | If heater is not actually over temperature, check all wiring and connections between the TCM and the overtemperature switches.   |
|       |          |   |                           | Overtemperature switch failed in the open position.                    | Replace overtemperature switch.  |
| T6DA  | Heater A |  | Sensor Error A            | Disconnected or loose RTD cable or connection.                         | Check all wiring and connection to RTD.  |
|       |          |   |                           | Bad RTD.   | Switch the RTD with another and see if the error message follows the RTD. Replace RTD if the error follows the RTD.  |

| Error | Location | Type  | Description       | Cause   | Solution   |
|-------|----------|---|-------------------|---|--|
| T6DB  | Heater B |  | Sensor Error B    | Disconnected or loose RTD cable or connection.        | Check all wiring and connection to RTD.  |
|       |          |   |                   | Bad RTD.  | Switch the RTD with another and see if the error message follows the RTD. Replace RTD if the error follows the RTD.  |
| T6DH  | Hose     |  | Sensor Error Hose | Disconnected or shorted RTD cable in hose or bad FTS. | Expose each hose RTD connection to check and retighten any loose connector. Measure hose RTD cable and FTS continuity. See <a href="#">Repair Heated Hose, page 60</a> . Order RTD Test kit 24N365 for measurement.<br><br>Disconnect hose RTD and use manual hose mode to finish job until repair can be completed. |
| T6DT  | TCM      |  | Sensor Error TCM  | Shorted RTD cable in hose or FTS.                     | Expose each hose RTD connection to check for exposed and shorted RTD wires. Measure hose RTD cable and FTS continuity. See <a href="#">Repair Heated Hose, page 60</a> . Order RTD Test kit 24N365 for measurement.<br><br>Disconnect hose RTD and use manual hose mode to finish job until repair can be completed. |
|       |          |   |                   | Shorted A or B Heater RTD                             | If the error still occurs with the hose FTS unplugged, one of the heater RTDs is bad. Unplug the A or B RTD from the TCM. If unplugging an RTD fixes the T6DT error, replace the RTD.  |

Troubleshooting

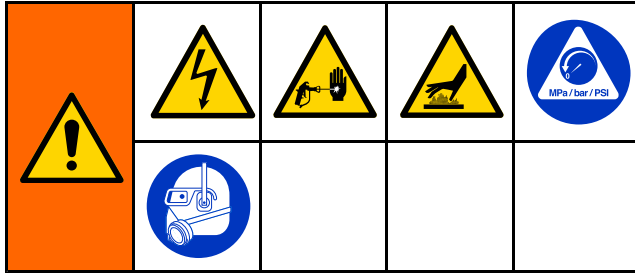
| Error | Location | Type  | Description              | Cause   | Solution   |
|-------|----------|---|--------------------------|---|--|
| T8DA  | Heater A |    | No Temperature Rise A    | Bad RTD or bad RTD placement against heater.                  | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.   |
|       |          |   |                          | Bad heater element.   | Confirm resistance of heater. Heater resistance should be 9-12 Ω for 10 kW systems, 6-8 Ω for 15 kW systems, 4-6 Ω for 20 kW systems. If out of tolerance, replace heater element. |
|       |          |   |                          | Loose heater wires.   | Check for loose heater element wires.  |
|       |          |   |                          | Started spraying before heater reached operating temperature. | Wait until operating temperature has been reached before spraying or recirculating.  |
| T8DB  | Heater B |    | No Temperature Rise B    | Bad RTD or bad RTD placement against heater.                  | Swap A and B heater output cables and RTD cables and see if issue follows. If so, replace RTD.   |
|       |          |   |                          | Bad heater element.   | Confirm resistance of heater. Heater resistance should be 9-12 Ω for 10 kW systems, 6-8 Ω for 15 kW systems, 4-6 Ω for 20 kW systems. If out of tolerance, replace heater element. |
|       |          |   |                          | Loose heater wires.   | Check for loose heater element wires.  |
|       |          |   |                          | Started spraying before heater reached operating temperature. | Wait until operating temperature has been reached before spraying or recirculating.  |
| T8DH  | Hose     |  | No Temperature Rise Hose | Started spraying before heater reached operating temperature. | Wait until operating temperature has been reached before spraying or recirculating.  |
| V1IT  | TCM      |  | Low Voltage CAN          | Bad 24 VDC power supply.                                      | Check voltage of power supply. Voltage should be 23-25 VDC. If out of tolerance, replace power supply.   |
| V2IT  | TCM      |  | Low Voltage CAN          | Bad 24 VDC power supply.                                      | Check voltage of power supply. Voltage should be 23-25 VDC. If out of tolerance, replace power supply.   |

| Error | Location | Type  | Description      | Cause  | Solution   |
|-------|----------|---|------------------|--|--|
| V2MA  | TCM      |    | Low Voltage A    | Loose connection or tripped circuit breaker. | Check wiring for loose connection or tripped circuit breaker.  |
|       |          |   |                  | Low incoming line voltage.                   | Measure voltage at circuit breaker and ensure voltage is greater than 195 VAC.                                     |
| V2MB  | TCM      |    | Low Voltage B    | Loose connection or tripped circuit breaker. | Check wiring for loose connection or tripped circuit breaker.  |
|       |          |   |                  | Low incoming line voltage.                   | Measure voltage at circuit breaker and ensure voltage is greater than 195 VAC.                                     |
| V2MH  | TCM      |    | Low Voltage Hose | Loose connection or tripped circuit breaker. | Check wiring for loose connection or tripped circuit breaker.  |
|       |          |   |                  | Low incoming line voltage.                   | Measure voltage at circuit breaker and ensure voltage is greater than 195 VAC.                                     |
| V3IT  | TCM      |    | High Voltage CAN | Bad 24 VDC power supply.                     | Check voltage of power supply. Voltage should be 23-25 VDC. If out of tolerance, replace power supply.             |
| V3MA  | TCM      |  | High Voltage A   | Incoming line voltage is too high.           | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC. |

| Error | Location | Type  | Description             | Cause  | Solution  |
|-------|----------|---|-------------------------|--|---|
| V3MB  | TCM      |    | High Voltage B          | Incoming line voltage is too high.                     | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC.            |
| V3MH  | TCM      |    | High Voltage Hose       | Incoming line voltage is too high.                     | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC.            |
| V4IT  | TCM      |    | High Voltage CAN        | Bad 24 VDC power supply.                               | Check voltage of power supply. Voltage should be 23-25 VDC. If out of tolerance, replace power supply.                        |
| V4MA  | TCM      |    | High Voltage A          | Incoming line voltage is too high.                     | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC.            |
| V4MB  | TCM      |    | High Voltage B          | Incoming line voltage is too high.                     | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC.            |
| V4MH  | TCM      |  | High Voltage Hose       | Incoming line voltage is too high.                     | Ensure incoming system power is wired properly. Verify voltage at each circuit breaker is between 195 and 264 VAC.            |
| WMI0  | TCM      |  | TCM Fan Error           | Fan inside TCM is not operating properly.              | Check for debris in the TCM fan and clear with forced air if necessary.   |
| WSUX  | USB      |  | Configuration Error USB | A valid configuration file can't be found for the USB. | Inset a system token into the ADM and cycle power. Wait until the lights on the USB port stop flashing before removing token. |
| WXUD  | ADM      |  | USB Download Error      | Log download failed.                                   | Backup and reformat the USB drive. Retry download.  |
| WXUU  | ADM      |  | USB Upload Error        | Custom language file failed to upload.                 | Perform normal USB download and use the new disptext.txt file to upload the custom language.                                  |



## Hydraulic Drive System



Before performing any troubleshooting procedures:

1. Follow [Pressure Relief Procedure, page 48](#).


2. Turn main power OFF.
3. Allow equipment to cool.

Try the recommended solutions in the order given for each problem, to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

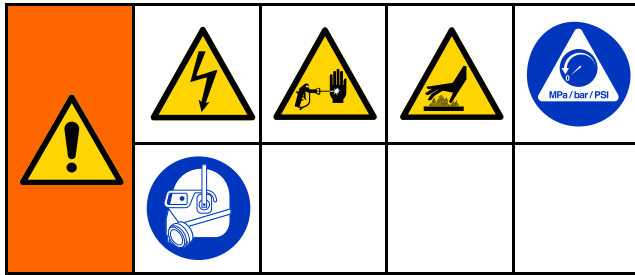
**Note**

Motor startup is delayed a maximum of 5 seconds from the last time the motor was turned off to reduce the chance of the motor overheating.

| PROBLEM  | CAUSE   | SOLUTION   |
|--|---|--|
| Electric motor will not start or stops during operation. | Loose connections and/or contactor (CT01) is not closing. | Check wiring between the following components: <ul style="list-style-type: none"> <li>• HCM and contactor CT01</li> <li>• HCM and fuses F11/F12</li> </ul>   |
|  | Damaged HCM.  | Replace HCM.   |
|  | Loose connections and/or contactor (CT01) is closing.     | Check wiring between the following components: <ul style="list-style-type: none"> <li>• motor junction box and CB12</li> <li>• CB12</li> <li>• contact CT01 and main disconnect switch (or terminal blocks TB06 and TB09)</li> </ul> |
|  | Circuit breaker tripped.                                  | Reset CB12 within the electrical enclosure after confirming wiring is correct and its insulation is intact.  |

| PROBLEM  | CAUSE   | SOLUTION   |
|--|---|--|
| <p>Hydraulic pump does not develop pressure. Low or zero pressure with screeching noise.</p> | <p>Pump is not primed or lost its prime.</p>  | <p>Check electric motor rotation. Both motor and hydraulic pump must rotate counterclockwise when viewed from shaft end. If rotation is incorrect, reverse leads L1 and L2. See <b>Connect Electrical Cord</b> in Operation manual.</p>  |
|  |   | <p>Check dipstick to ensure that hydraulic reservoir is properly filled (see Operation manual).</p>  |
|  |   | <p>Check that inlet fitting is fully tight, to ensure no air is leaking into the pump inlet.</p>   |
|  |   | <p>To prime pump, run unit at lowest pressure setting and slowly increase pressure. In some cases it may be necessary to remove motor cover and drive belt to allow for manual (counterclockwise) rotation of hydraulic pump. Turn fan pulley by hand. Verify oil flow by removing oil filter to see flow into filter manifold. Reinstall oil filter. Do NOT operate unit without a properly installed oil filter.</p> |
|  | <p>Screeching noise is characteristic of cavitation and is normal at initial startup for a maximum of 30 seconds.</p> | <p>If noise continues longer than 30 seconds, press  to shut off the motor. Check that the inlet fittings are tight and that the pump has not lost its prime.</p>  |
|  | <p>Hydraulic fluid is too hot.</p>  | <p>Ensure that the reservoir is properly serviced. Improve ventilation to allow more efficient heat dissipation.</p>   |
|  | <p>Electric motor operating in wrong direction for 3 Phase system.</p>  | <p>Motor must operate counterclockwise from pulley end.</p>  |
|  | <p>Drive belt loose or broken.</p>  | <p>Check drive belt condition. Replace if broken.</p>  |

## Proportioning System



1. Follow [Pressure Relief Procedure, page 48](#).
2. Turn main power OFF.
3. Allow equipment to cool.

**Problems:**

Try the recommended solutions in the order given for each problem, to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

Before performing any troubleshooting procedures:

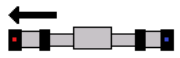
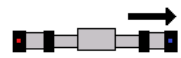
| PROBLEM  | CAUSE  | SOLUTION   |
|--|--|--|
| Proportioning pump does not hold pressure when stalled.                        | Pump piston or intake valve leaking.                                     | <ol style="list-style-type: none"> <li>1. Observe gauges to determine which pump is losing pressure.</li> <li>2. Determine in which direction the pump has stalled by observing which directional icon is displayed on the ADM Home screen. See Table 1.</li> <li>3. Repair the valve. See pump manual.</li> </ol> |
| Material Imbalance. See <a href="#">Pressure/Material Imbalance, page 40</a> . | Restriction at the gun.  | Clean the gun; see your separate gun manual.   |
|  | Inadequate flow from pump; cavitation.                                   | Increase fluid supply to proportioning pump: <ul style="list-style-type: none"> <li>• Use 2:1 supply pump</li> <li>• Use minimum 3/4 in. (19 mm) ID supply hose, as short as practical</li> </ul>  |
|  |  | Fluid is too thick. Consult your material supplier for the recommended fluid temperature to maintain a viscosity of 250 to 1500 centipoise.  |
|  |  | Clean inlet strainer screen.   |
| Worn pump inlet valve ball/seat or gasket. Replace pump.                       |  |  |
| Pressure relief/circulation valve leaking back to supply.                      | Remove return line and determine if flow is present while in SPRAY mode. |  |

| PROBLEM  | CAUSE   | SOLUTION   |
|--|---|--|
| Pumps do not reverse direction or pumps do not move. | Loose reversing proximity switch.                       | See <a href="#">Pumps Do Not Reverse Direction, page 41</a> .  |
|  | Loose piston packing bolt.                              | See <a href="#">Pumps Do Not Reverse Direction, page 41</a> .  |
|  | Faulty directional valve.                               | See <a href="#">Pumps Do Not Reverse Direction, page 41</a> .  |
| Erratic pump movement.                               | Pump cavitation.  | Feed pump pressure is too low. Adjust pressure to maintain 100 psi (0.7 MPa, 7 bar) minimum.   |
|  |   | Fluid is too thick. Consult your material supplier for recommended fluid temperature to maintain a viscosity of 250 to 1500 centipoise.              |
|  | Loose reversing proximity switch.                       | See <a href="#">Pumps Do Not Reverse Direction, page 41</a> .  |
|  | Faulty directional valve.                               | Replace directional valve.   |
| Pump output low.                                     | Obstructed fluid hose or gun; fluid hose ID too small.  | Open fluid hose to clear obstruction, or use hose with larger ID.  |
|  | Worn piston valve or intake valve in displacement pump. | See pump manual.   |
|  | Inadequate feed pump pressure.                          | Check feed pump pressure and adjust to 100 psi (0.7 MPa, 7 bar) minimum.   |
| Fluid leak at pump rod seal.                         | Worn throat seals.                                      | Replace. See pump manual.  |
| No pressure on one side.                             | Fluid leaking from pump outlet rupture disk.            | Check if heater and PRESSURE RELIEF/SPRAY valve (SA or SB) are plugged. Clear. Replace rupture disk with a new one; do not replace with a pipe plug. |
|  | Inadequate feed pump pressure.                          | Check feed pump pressure and adjust to 100 psi (0.7 MPa, 7 bar) minimum.   |

**Note**

Table 1 is related to troubleshooting problem, "Proportioning pump does not hold pressure when stalled."

**Table 1 Determine Valve Leak Location**

|   |   |
|---|---|
|  |  |
| B-side pump piston valve is dirty or damaged.                                       | B-side pump inlet valve is dirty or damaged.  |
| A-side pump inlet valve is dirty or damaged.  | A-side pump piston valve is dirty or damaged.                                       |

**Pressure/Material Imbalance**





To determine which component is out of balance, check the color of some sprayed material. Two-component materials are usually a mix of light and dark fluids, so the under-proportioned component can often be readily determined.

When you have determined which component is under-proportioned, spray off-target, focusing on the pressure gauge for that component.

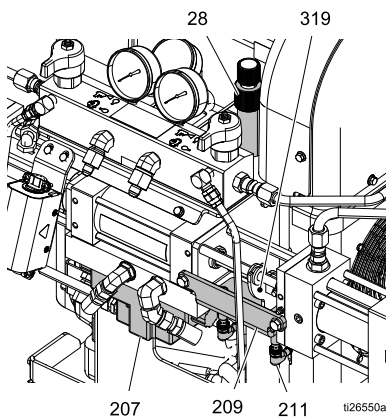
*For example:* if component B is under-proportioned, focus on the B-side pressure gauge. If the B gauge reads considerably higher than the A gauge, the problem is at the gun. If the B gauge reads considerably lower than the A gauge, the problem is at the pump.

## Pumps Do Not Reverse Direction

For proportioning pumps to reverse direction, the proximity switches (211) must sense the switching plate (319) to reverse the directional valve (207).

|  |   |   |   |  |
|--|---|---|---|--|
|   |  |  |  |  |
| <p>Voltage is still present inside the directional valve. Improper testing of the proximity switch connections inside the directional valve may cause injury or electric shock. Check the proximity switch connections as instructed. Measure voltage across correct terminals. See <a href="#">Electrical Schematics, page 94</a>.</p> <p>The switching plate moves from side to side during operation. Keep hands away from the switching plate, while checking the functionality of the directional valve, to prevent pinching hands.</p> |   |   |   |  |

1. Check the functionality of each proximity switch (211).
  - a. Remove the front cover.
  - b. With the motor powered off, confirm that the indicating lights on the body of each proximity switch (211) turns on when a metallic item, such as the shaft of a screwdriver, is placed on the face of each switch.
  - c. If the indicating lights turn on, the proximity switches, its wiring, and the HCM are likely operating correctly; proceed to step 2. If the indicating lights do not turn on, proceed to step 6.
2. Confirm the proximity switches (211), switch bracket (209), and switching plate (319) are firmly mounted and not damaged.
3. Check distance between the proximity switches (211) and the switching plate (319).
  - a. Park the pump.
  - b. Confirm that the proximity switch (211) nearest the A-side of the pump is backed out 0.5 to 1.5 turns from being in contact with the switching plate (319).
  - c. Disconnect the cable from the proximity switch (211) nearest the B-side of the pump. Operate the pump until the switching plate (319) is located above the B-side proximity switch, then turn off the motor/pump.
  - d. Confirm that the proximity switch (211) nearest the B-side of the pump is backed out 0.5 to 1.5 turns from being in contact with the switching plate (319).
  - e. Reconnect the cable to the B-side proximity switch (219).
4. Check functionality of the directional valve (207).
  - a. Confirm that the directional valve cable is connected properly from HCM port 15 to the directional valve body (207) and is not damaged. Inspect wiring inside the cover of the directional valve. See [Electrical Schematics, page 94](#).
  - b. During operation, the direction indicator lights on the directional valve body (207) should switch on based on the valve that is open.



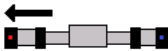
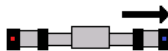
## Troubleshooting

- c. Turn on the motor and stall the pumps at the lowest pressure setting (compensator knob turned fully counter-clockwise). The pump will travel in either the A or B direction until the pressure setting is reached.
- d. Identify the solenoid that is operating by viewing the direction indicator lights on the cover of the directional valve (207). Measure voltage across the associated terminals to determine if proper voltage is reaching the valve (approximately 200 to 240 VAC). See [Electrical Schematics, page 94](#), and the table below, to identify the proper terminals to measure across.
- e. Trigger each proximity switch (211) with the shaft of a screwdriver, confirming each solenoid within the directional valve (207) operates as described in table below.
- f. If one or both sides are not operating properly, according to the table, first reconfirm wiring to directional valve (207) per [Electrical Schematics, page 94](#), then replace directional valve (207).

5. If you have determined that the cause is none of the previous possible causes, check for a loose piston packing retaining bolt. This causes the piston to contact the inner face of the pump inlet flange before the switching plate activates the proximity switch. Shut down the unit and disassemble the appropriate pump for repair.

### Following step 1, if the proximity switch indicating lights do not light:

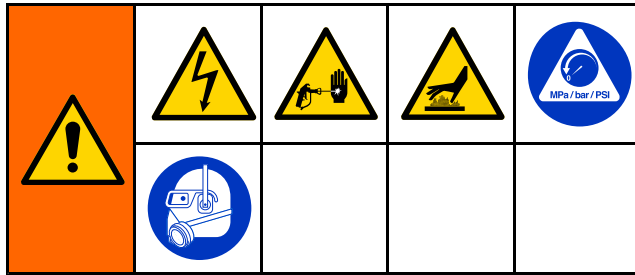
6. Check for loose or faulty proximity switch cable or connections. Confirm the connections to the proximity switches are tight and internally free from oil and other contaminants.
7. Swap the cables to the proximity switches to see if the problem follows the switch or is in the cable. Replace either the failed switch or the cable.
8. Replace the HCM. See [Replace HCM, page 66](#).

| For given pump movement direction:         | Pump driving left (toward park position)  | Pump driving right (away from park position)  |
|--|---|---|
| ADM indicates                              |  |  |
| Indicator light on directional valve cover | Left arrow, labeled "b"   | Right arrow, labeled "a"  |
| Last proximity switch triggered            | Right side proximity switch   | Left side proximity switch  |
| Terminals in directional valve energized   | Terminals associated with red and orange wires                                      | Terminals associated with black and white wires                                     |

### Note

For diagnostic purposes, it is possible to manually override the directional valve by using a small screwdriver to depress the button in the center of either directional valve end cap. Depressing the button in the right end cap should cause the pump to travel to the right. Depressing the left button should cause the pump to travel to the left.

## Hose Heat System



Before performing any troubleshooting procedures:

1. Follow [Pressure Relief Procedure, page 48](#).
2. Turn main power switch OFF.
3. Allow equipment to cool.

| Problem  | Cause                                  | Solution  |
|--|--|---|
| Hose heats but heats slower than usual or it does not reach temperature. | Ambient temperature is too cold.       | Relocate hoses to a warmer area or recirculate heated fluid through the hose.   |
|  | FTS failed or not installed correctly. | Check FTS, see <a href="#">Check RTD Cables and FTS, page 60</a> .  |
|  | Low supply voltage.                    | Verify line voltage. Low line voltage significantly reduces power available to the hose heat system, affecting longer hose lengths. |
| Hose does not maintain temperature while spraying.                       | A and B setpoints too low.             | Increase A and B setpoints. Hose is designed to maintain temperature, not to increase it.   |
|  | Ambient temperature is too cold.       | Increase A and B setpoints to increase fluid temperature and keep it steady.  |
|  | Flow too high.                         | Use smaller mix chamber. Decrease pressure.   |
|  | Hose was not fully preheated.          | Wait for hose to heat to correct temperature before spraying.   |
|  | Low supply voltage.                    | Verify line voltage. Low line voltage significantly reduces power available to the hose heat system, affecting longer hose lengths. |

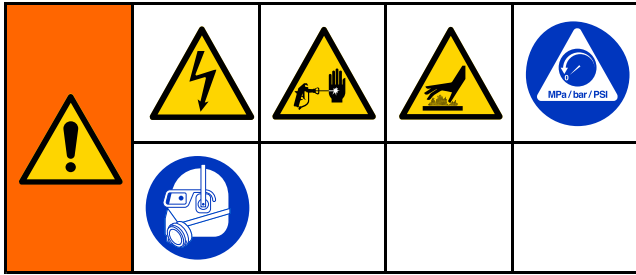
Troubleshooting

| Problem                            | Cause   | Solution   |
|------------------------------------|---|--|
| Hose temperature exceeds setpoint. | A and/or B heaters are overheating material.      | Check primary heaters for either an RTD problem or a failed element attached to RTD, see <a href="#">Electrical Schematics, page 94</a> .                              |
|                                    | Faulty FTS connections.                           | Verify that all FTS connections are snug and that pins of connectors are clean. Unplug and re-plug RTD wires, cleaning off any debris.                                 |
|                                    | Ambient temperature is too high.                  | Cover hoses or move to a location with a lower ambient temperature.  |
|                                    | Hose insulation over the FTS location is damaged. | Replace damaged insulation.  |
| Erratic hose temperature.          | Faulty FTS connections.                           | Verify that all FTS connections are snug and that pins of connectors are clean. Unplug and re-plug FTS wires along length of hose, cleaning off any debris.            |
|                                    | FTS not installed correctly.                      | FTS should be installed close to end of hose in same environment as gun. Verify FTS installation, see <a href="#">Repair Fluid Temperature Sensor (FTS), page 62</a> . |
| Hose does not heat.                | FTS failed.                                       | Check FTS, see <a href="#">Repair Fluid Temperature Sensor (FTS), page 62</a> .  |
|                                    | FTS not installed correctly.                      | FTS should be installed close to end of hose in same environment as gun. Verify FTS installation, see <a href="#">Repair Fluid Temperature Sensor (FTS), page 62</a> . |
|                                    | Loose hose electrical connections.                | Check connections. Repair as necessary.  |
|                                    | Circuit breakers tripped.                         | Reset breakers (CB11 and/or CB15), see <a href="#">Repair Circuit Breaker Module, page 63</a> .  |
|                                    | Hose zone not turned on.                          | Turn on hose heat zone.  |
|                                    | A and B temperature setpoints too low.            | Check. Increase if necessary.  |



| Problem   | Cause   | Solution   |
|---|---|--|
| Hoses near Reactor are warm, but hoses downstream are cold. | Shorted connection or failed hose heating element.          | With power off, check the hose resistance with and without the whip hose attached. With the whip hose attached, the reading should be less than 3 ohm. Without the whip hose attached, the reading should be OL (open loop). See <a href="#">Check Hose Wires, page 60</a> . |
| Low hose heat.  | A and B temperature setpoints too low.                      | Increase A and B setpoints. Hose designed to maintain temperature, not increase temperature.   |
|   | Hose temperature setpoint too low.                          | Check. Increase if necessary to maintain heat.   |
|   | Flow too high.  | Use smaller mix chamber. Decrease pressure.  |
|   | Low current; FTS not installed.                             | Install FTS, see operation manual.   |
|   | Hose heat zone not turned on long enough to reach setpoint. | Allow hose to heat up, or preheat fluid.   |
|   | Loose hose electrical connections.                          | Check connections. Repair as necessary.  |
|   | Ambient temperature is too low                              | Relocate hoses to a warmer area or increase A and B setpoints.   |

## Primary Heater



Before performing any troubleshooting procedures:

1. Follow [Pressure Relief Procedure, page 48](#).
2. Turn main power switch OFF.
3. Allow equipment to cool.

Try the recommended solutions in the order given for each problem, to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

| Problem  | Cause                              | Solution   |
|--|------------------------------------|--|
| Primary Heater(s) does not heat.   | Heat turned off.                   | Turn on heat zones.  |
|  | Temperature control alarm.         | Check ADM for error codes.   |
|  | Signal failure from RTD.           | Check ADM for error codes. Confirm RTD cabling is properly connected and not damaged. Replace RTD.   |
| Control of primary heat is abnormal; high temperature overshoots (T4DA, T4DB) occurs intermittently. | Dirty RTD connections.             | Examine RTD cables connected to TCM. Confirm RTDs are not plugged into opposite heat zone. Unplug and re-plug RTD connectors. Unplug and re-plug RTD connectors. Ensure RTD tip contacts the heater element. |
|  | RTD not contacting heater element. | Loosen ferrule nut, push in RTD so tip contacts heater element. Holding RTD tip against heater element, tighten ferrule nut 1/4 turn past tight.   |
|  | Failed heater element.             | See <a href="#">Replace Heater Element, page 58</a> .  |
|  | Signal failure from RTD.           | See (T6DA, T6DB), <a href="#">Error Codes</a> .  |

## Graco InSite

| Problem  | Cause   | Solution   |
|--|---|--|
| No module status LEDs are illuminated.                                       | No power to cellular module.  | Turn Reactor ON.   |
|  |   | Ensure unit is properly installed.   |
|  |   | Verify 24V at output of the power supply.  |
|  |   | Make sure the M8, 4-pin to M12, 8-pin cable is installed between cellular module and power supply.   |
| Has not identified GPS location (green module status LED flashing).          | Still identifying location.   | Wait a few minutes for the unit to identify the location.  |
|  | Unable to identify location. In a location where GPS lock cannot occur. Buildings and warehouses often prevent GPS locks. | Move system to a location with a clear view of the sky.<br>Use extension cable 16X521 and move cellular module to a location with a clear view of the sky.                           |
| Has not established cellular connection (orange module status LED flashing). | Still establishing cellular connection.   | Wait a few minutes for the unit to establish the connection.   |
|  | Unable to establish cellular connection.  | Move system to a location with cellular service to establish cellular connection.<br>Use extension cable 16X521 and move cellular module to a location with a clear view of the sky. |
| Cannot view data for my unit(s) on website.                                  | Graco InSite unit has not been activated.   | Activate unit. See Registering and Activating the Graco InSite section.  |
| Temperature data not displayed on website.                                   | Reactor temperature measurement is not working.   | See System troubleshooting section.  |
| Hose zone temperature data not displayed on website.                         | The RTD or thermocouple is not correctly installed on the hose or is broken.  | See RTD or Thermocouple repair section.  |
| Pressure data not displayed on website.                                      | Reactor pressure measurement is not working.  | See System troubleshooting section.  |

# Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|  |  |  |  |  |

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing equipment.

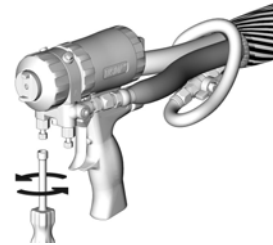
The Fusion AP gun is shown.

1. Press to stop the pumps.
2. Turn off all heat zones.



3. Relieve pressure in gun and perform gun shutdown procedure. See gun manual.

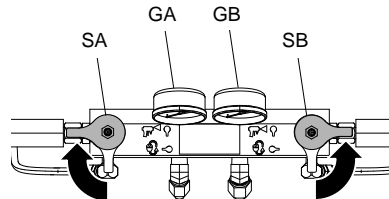
4. Close gun fluid inlet valves A and B.



5. Shut off feed pumps and agitator, if used.
6. Route fluid to waste containers or supply tanks. Turn PRESSURE RELIEF/SPRAY valves (SA, SB) to PRESSURE RELIEF/CIRCULATION



7. Ensure gauges drop to 0.



7. Engage gun piston safety lock.



8. Disconnect gun air line and remove gun fluid manifold.



# Shutdown

**NOTICE**


Proper system setup, startup, and shutdown procedures are critical to electrical equipment reliability. The following procedures ensure steady voltage. Failure to follow these procedures will cause voltage fluctuations that can damage electrical equipment and void the warranty.

1. Press  to stop the pumps.
2. Turn off all heat zones.




3. Relieve pressure. See [Pressure Relief Procedure, page 48.](#)



4. Press  to park the Component A and Component B pumps. The park operation is complete when green dot goes out. Verify the park operation is complete before moving to next step.





5. Press  to deactivate the system.

6. Turn off the air compressor, air dryer, and breathing air.

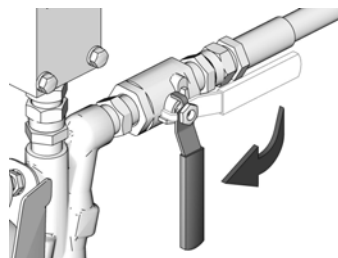


7. Turn main power switch OFF.

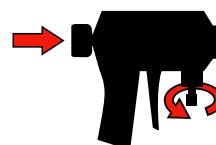


|   |   |  |  |
|---|---|--|--|
|                               |  |  |  |
| To prevent electric shock do not remove any covers or open the electrical enclosure door while the power is ON. |   |  |  |

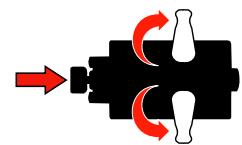
8. Close all fluid supply valves.



9. Set PRESSURE RELIEF/SPRAY valves to SPRAY to seal out moisture from the drain line.
10. Engage gun piston safety lock then close fluid inlet valves A and B.






Fusion



Probler

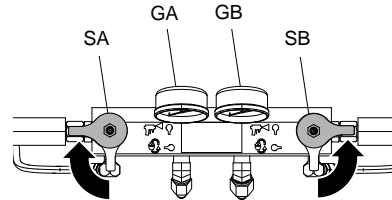
# Flushing

|  |   |   |  |  |
|--|---|---|--|--|
|   |  |  |  |  |
| <p>To avoid fire and explosion:</p> <ul style="list-style-type: none"><li>• Flush equipment only in a well-ventilated area.</li><li>• Ensure main power is off and heater is cool before flushing.</li><li>• Do not turn on heater until fluid lines are clear of solvent.</li></ul> |   |   |  |  |

To flush feed hoses, pumps, and heaters separately from heated hoses, set PRESSURE RELIEF/SPRAY valves (SA, SB) to PRESSURE





RELIEF/CIRCULATION. Flush through bleed lines (N).



To flush entire system, circulate through gun fluid manifold (with manifold removed from gun).

To prevent moisture from reacting with isocyanate, always leave the system filled with a moisture-free plasticizer or oil. Do not use water. Never leave the system dry. See [Important Two-Component Material Information, page 7](#).

# Repair


|  |   |  |  |  |
|--|---|--|--|--|
|   |  |  |  |  |
| <p>Repairing this equipment requires access to parts that may cause electric shock or other serious injury if work is not performed properly. Be sure to shut off all power to equipment before repairing.</p> |   |  |  |  |

## Before Beginning Repair

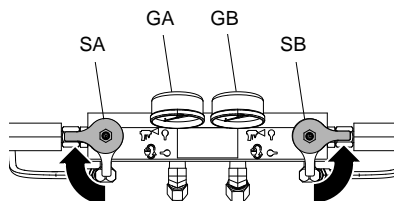
|   |
|---|
| <b>NOTICE</b>   |
| <p>Proper system setup, startup, and shutdown procedures are critical to electrical equipment reliability. The following procedures ensure steady voltage. Failure to follow these procedures will cause voltage fluctuations that can damage electrical equipment and void the warranty.</p> |

1. Flush if necessary. See [Flushing, page 50](#).
2. See [Shutdown, page 49](#).

## Repair Proportioning Pumps

|   |   |  |  |  |
|---|---|--|--|--|
|  |  |  |  |  |
|---|---|--|--|--|

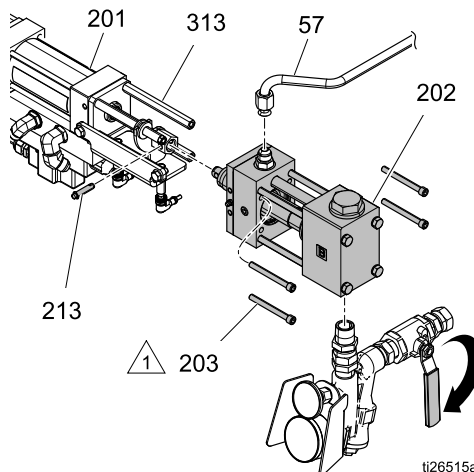
1. Follow [Before Beginning Repair, page 51](#).
2. Turn both Pressure Relief/Spray valve (SA, SB) to Pressure Relief/Circulation. Route fluid to waste containers or supply tanks. Ensure gauges (GA, GB) drop to 0 psi.



### Note

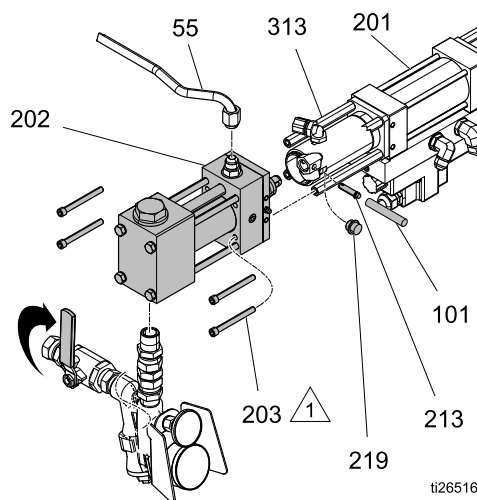
Use drop cloth or rags to protect the Reactor and surrounding area from spills.


3. Disconnect the B (Resin) side pump inlet line, the inlet y-strainer, and hard tube (57). Remove the pin (213) from the clevis (317) to disconnect the pump from the hydraulic cylinder (201). Remove the four screws (203) holding the pump to the spacers (313) of the cylinder. Take the pump assembly to a workbench.



 Torque to 200 in.-lb (22.6 N•m).

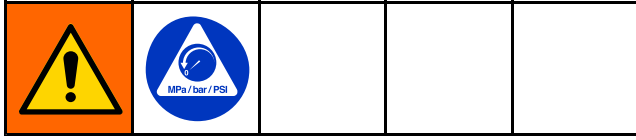
4. Disconnect the A (ISO) side pump inlet line, the inlet y-strainer, and hard tube (55). Use the pin extractor tool (101) to remove the pin (213), which disconnects the pump from the hydraulic cylinder (201). Remove the four screws (203) holding the pump to the spacers (313) of the cylinder. Take the pump assembly to a workbench.



 Torque to 200 in.-lb (22.6 N•m).

5. See pump manual for repair instructions.
6. Reconnect the pump in the reverse order. Torque the screws to 200 in.-lb (22.6 N•m)

## Change Lubricant



Check the condition of the ISO pump lubricant daily. Change the lubricant if it becomes a gel, its color darkens, or it becomes diluted with isocyanate.

Gel formation is due to moisture absorption by the pump lubricant. The interval between changes depends on the environment in which the equipment is operating. The pump lubrication system minimizes exposure to moisture, but some contamination is still possible.

Lubricant discoloration is due to continual seepage of small amounts of isocyanate past the pump packings during operation. If the packings are operating properly, lubricant replacement due to discoloration should not be necessary more often than every 3 or 4 weeks.

To change pump lubricant:

1. Follow [Pressure Relief Procedure, page 48](#).
2. Lift the lubricant reservoir (LR) out of the bracket (RB) and remove the container from the cap. Holding the cap over a suitable container, remove the check valve and allow the lubricant to drain. Reattach the check valve to the inlet hose.
3. Drain the reservoir and flush it with clean lubricant.
4. When the reservoir is flushed clean, fill with fresh lubricant.
5. Thread the reservoir onto the cap assembly and place it in the bracket.
6. Push the larger diameter supply (ST) tube approximately 1/3 of the way into the reservoir.
7. Push the smaller diameter return tube (RT) into the reservoir until it reaches the bottom.  
**NOTE:** The return tube must reach the bottom of the reservoir to ensure that isocyanate crystals will settle to the bottom and not be siphoned into the supply tube and returned to the pump.

8. The lubrication system is ready for operation. No priming is required.

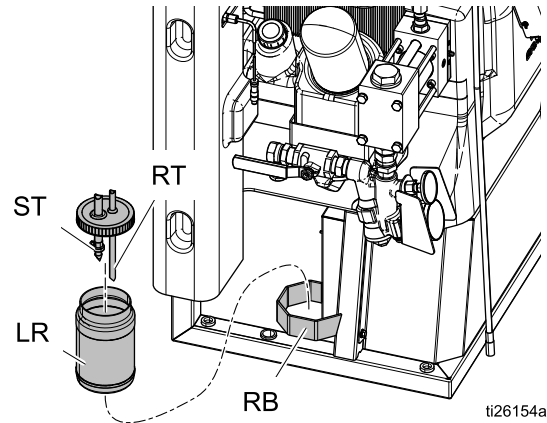
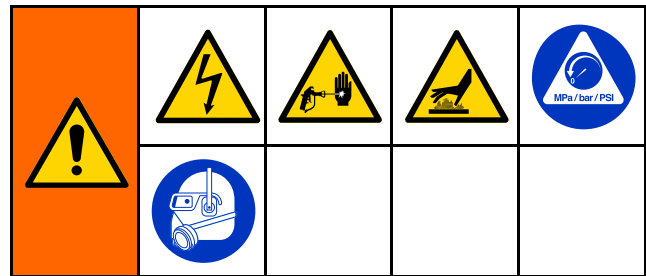


Figure 1 Pump Lubrication System

## Change Hydraulic Fluid and Filter



### Note

Change break-in oil in a new system after the first 250 hours of operation or within 3 months, whichever comes first.

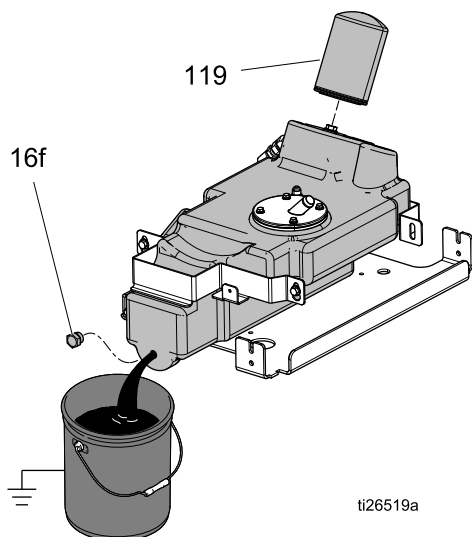
Table 2 Frequency of Oil Changes

| Ambient Temperature             | Recommended Frequency                          |
|---------------------------------|--|
| 0 to 90°F (-17 to 32°C)         | 1000 hours or 12 months, whichever comes first |
| 90°F and above (32°C and above) | 500 hours or 6 months, whichever comes first   |

1. Follow [Pressure Relief Procedure, page 48](#).
2. Allow hydraulic fluid to cool



- Place a pan under the reservoir drain plug (16f) to catch oil.



- Remove the drain plug (16f).
- Place a rag around base of oil filter (119) to prevent oil from spilling. Unscrew filter 1/4-3/4 turn to break air lock in filter. Wait five minutes to allow oil in filter to drain back into reservoir. Unscrew filter and remove.
- Reinstall drain plug (16f).
- Replace filter (119):
  - Coat filter seal with fresh oil.
  - Screw filter on snug, then an additional 1/4 turn.
- Refill reservoir with approved hydraulic fluid. See Table 3.
- Proceed with normal operation

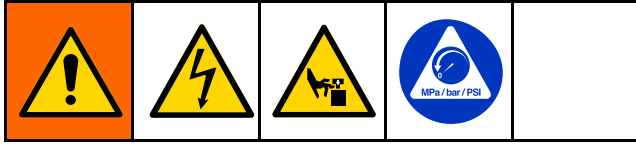
**Note**

Upon starting motor, hydraulic pump may make a screeching noise until primed. If this noise continues for more than 30 seconds, switch off motor control.

**Table 3 Approved Anti-Wear (AW) Hydraulic Oils**

| Supplier  | Name                              |
|---|-----------------------------------|
| Citgo   | A/W ISO Grade 46                  |
| Amsoil  | AWI ISO Grade 46 (synthetic*)     |
| BP Oil International  | Energol® HLP-HM, ISO Grade 46     |
| Carl Bechem GmbH  | Staroil HVI 46                    |
| Castrol   | Hyspin AWS 46                     |
| Chevron   | Rykon® AW, ISO 46                 |
| Exxon   | Humble Hydraulic H, ISO Grade 46  |
| Mobil   | Mobil DTE 25, ISO Grade 46        |
| Shell   | Shell Tellus, ISO Grade 46        |
| Texaco  | Texaco AW Hydraulic, ISO Grade 46 |
| * Note: Do not mix mineral-based and synthetic hydraulic oils. Completely drain oil from reservoir and pump prior to converting between oils. |                                   |
| If the approved oils are not available in your area, use an alternative hydraulic oil meeting the following requirements:                     |                                   |
| <b>Oil Type:</b> Anti-Wear (AW) Hydraulic   |                                   |
| <b>ISO Grade:</b> 46  |                                   |
| <b>Viscosity, cSt at 40°C:</b> 43.0-47.0  |                                   |
| <b>Viscosity, cSt at 100°C:</b> 6.5-9.0   |                                   |
| <b>Viscosity Index:</b> 95 or higher  |                                   |
| <b>Pour Point, ASTM D 97:</b> -15°F (-26°C) or lower  |                                   |
| <b>Other essential properties:</b> Formulated for anti-wear, anti-foaming, oxidation stability, corrosion protection, and water separation.   |                                   |

## Replace Electric Motor



### Remove

#### NOTICE

To prevent dropping the electric motor, two people may be required to remove the motor from the system.

1. Follow [Shutdown](#), page 49.
2. Open electrical enclosure. Disconnect the A side heater connector from the TCM. See [Electrical Schematics](#), page 94. Close the electrical enclosure door.
3. Remove mounting bolts from the bottom frame and move the system away from the wall.

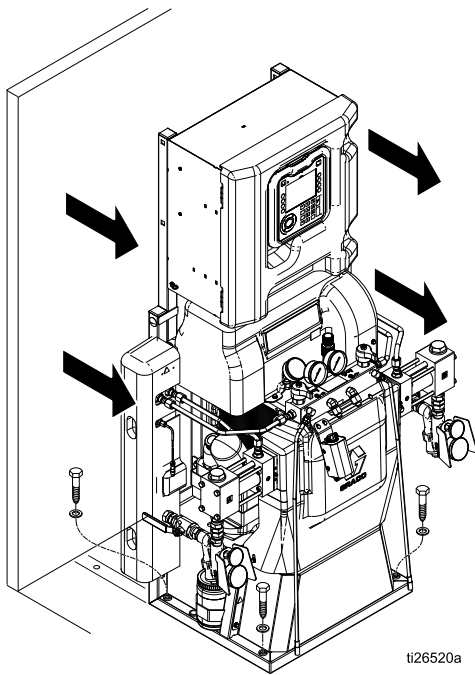


Figure 2

4. Remove upper bolts (3). Tilt the electrical enclosure down to gain access to the motor cover.

5. Remove motor and belt covers (123, 131, 132). Lift cover (132) and loosen the blue bracket (131) fasteners. Lift the blue bracket (133) off of the fasteners and set aside. Remove the belt covers (131, 132).

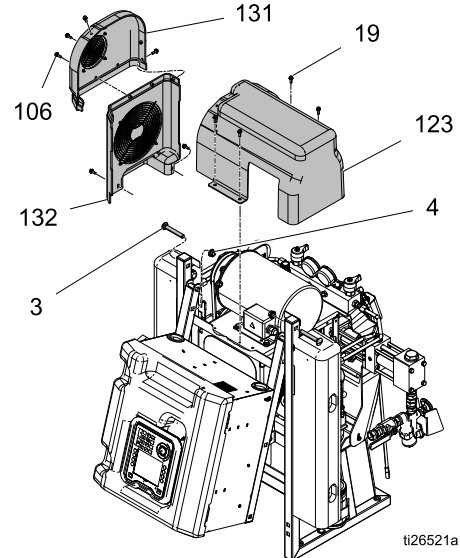


Figure 3 Motor and Belt Covers

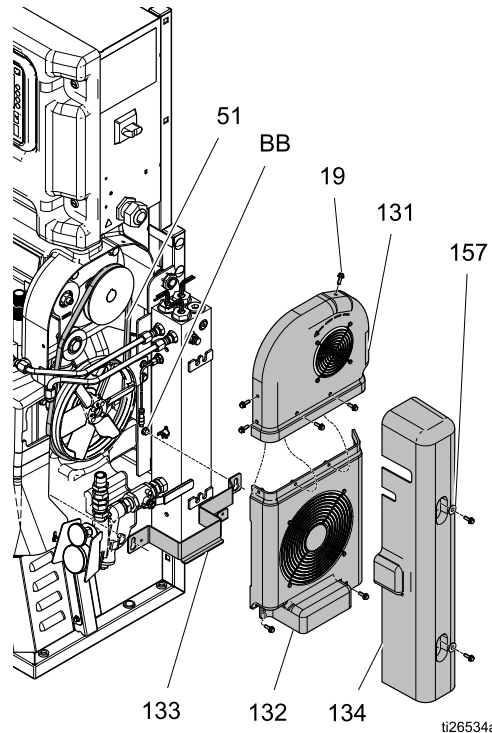


Figure 4 Heater and Belt Covers

- Remove the belt (51). See [Replace Belt, page 56](#). Remove the two pulley screws (48) and the belt tensioning assembly from the motor.

**NOTICE**

To prevent damage to cables, do not crush or strain any cables near the point where the frame halves hinge.

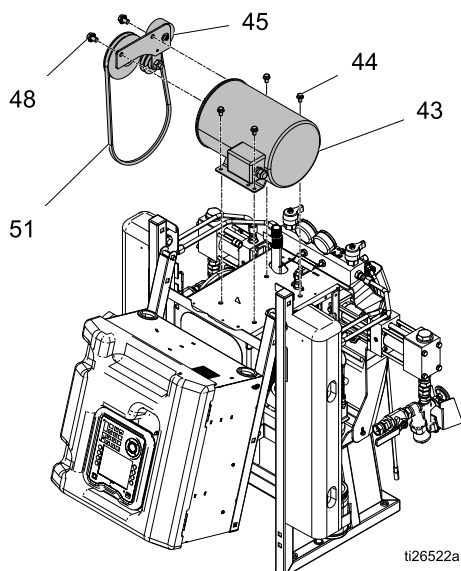


Figure 5 Motor and Belt Assembly

- Remove the electric motor junction box cover (43).
- Disconnect the motor cables. See [Electrical Schematics, page 94](#).

- Note or label the wire connections. See the [Electrical Schematics, page 94](#) and the diagram inside the motor junction box cover. The motor must operate counter-clockwise when looking at the output shaft.
- Remove the motor.

### Installation

- Place the motor on the unit.
- Fasten the motor with bolts.
- Connect the wires, using wire nuts. See [Electrical Schematics, page 94](#), and the diagram inside the motor junction box.

**Note**

For 3-Phase Motors, the motor must rotate counterclockwise when viewed from the shaft end. If rotation is incorrect, reverse power leads L1 and L2. Follow **Connect Electrical Cord** instructions in the system operation manual.

- Replace bracket (133) and the belt and heater covers (131, 132, 134).
- Raise electrical enclosure into the vertical position and ensure wires are not pinched between the frame halves. Replace and tighten bolts (3).
- Open electrical enclosure. Connect the A side heater connector the TCM.
- Secure the system to original mounting location.
- Return to service.

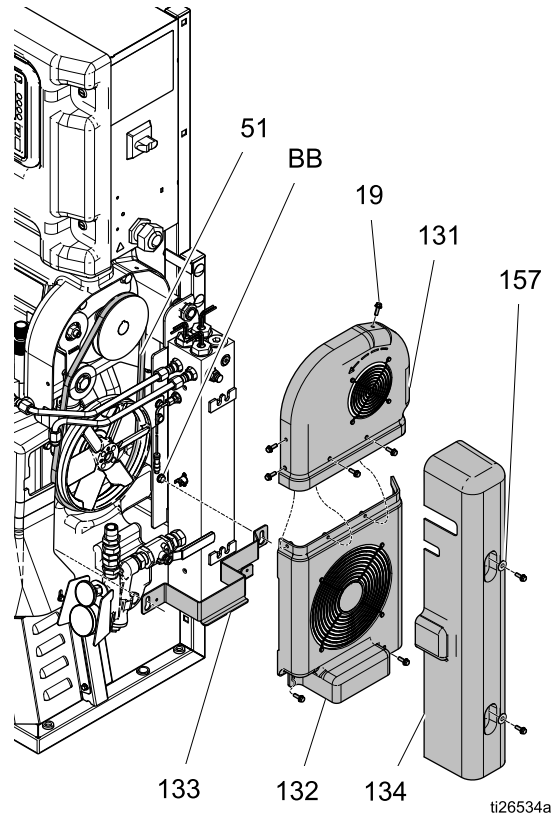
## Replace Belt

1. Follow [Shutdown](#), page 49.
2. Remove the heater cover (134) and the belt cover fasteners (19).

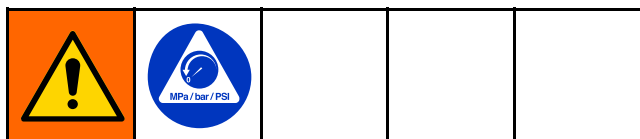
### NOTICE

To prevent damage to the overtemperature switch, carefully remove the covers.

3. Lift cover (132) and loosen the blue bracket (131) fasteners. Lift the blue bracket (133) off of the fasteners and set aside. Remove the belt covers (131, 132).
4. Remove the belt.
5. Install the new belt and replace the covers.



## Replace Fluid Inlet Sensor



See Fluid Inlet Sensor Kit 17F837 manual 3A3009.

1. Flush. See [Flushing, page 50](#).
2. See [Shutdown, page 49](#).
3. Disconnect inlet sensor cable from the fluid inlet assembly. Inspect cable for damage and replace if necessary. See [Electrical Schematics, page 94](#).

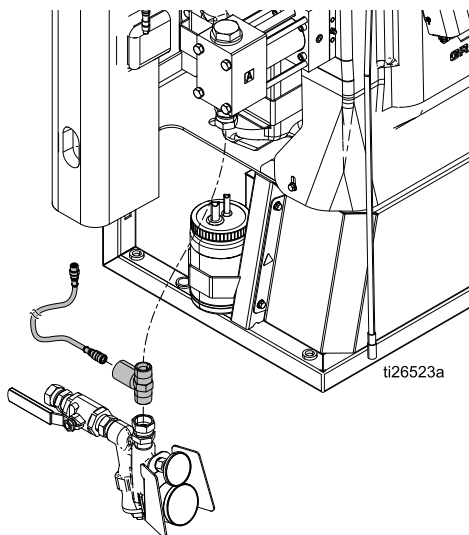


Figure 6 Fluid Inlet Sensor

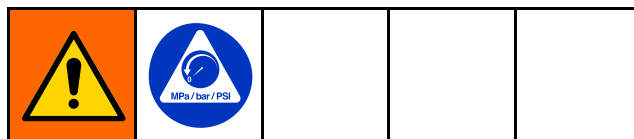
4. To replace sensor cable:
  - a. Cut any wire ties and disconnect from HCM. See [Electrical Schematics, page 94](#).

**NOTICE**

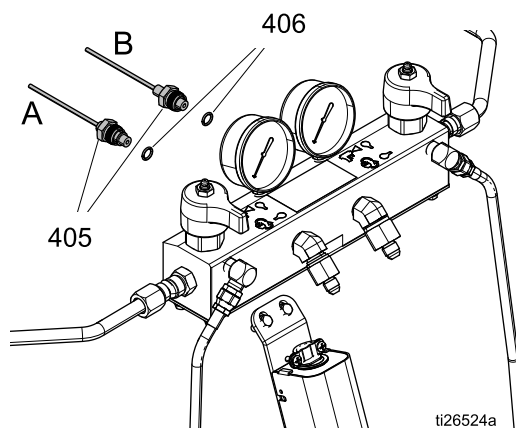
To prevent damage to cable, secure cable with wire ties.

5. Replace sensor and secure with wire ties.

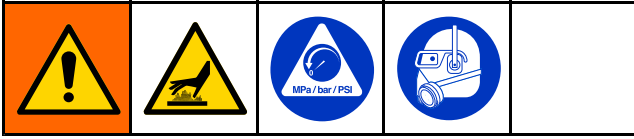
## Replace Pressure Transducers



1. Flush. See [Flushing, page 50](#).
2. See [Shutdown, page 49](#).
3. Disconnect transducer cables (405) from #6 and #7 connectors on the HCM.
4. Remove wire ties constraining transducer cable and remove cable from cabinet.
5. Install o-ring (406) on new transducer (405).
6. Install transducer in manifold. Mark end of cable with tape (red=transducer A, blue=transducer B).
7. Route new cable into cabinet and thread into bundle as before. Attach cable ties to bundle as before.
8. Connect A side pressure transducer cable to HCM port #6. Connect B side pressure transducer cable to HCM port #7.



## Repair Primary Heater



### Replace Heater Element

1. Follow [Before Beginning Repair, page 51](#).
2. Wait for heaters to cool.
3. Remove heater cover.
4. Disconnect heater element wires from heater wire connector inside the electrical enclosure. See [Electrical Schematics, page 94](#). Test with an ohmmeter.

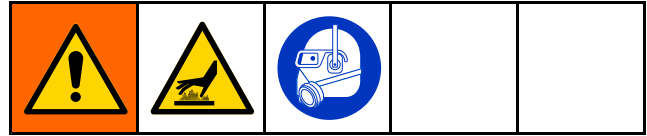
| System                  | Total Heater Wattage | Element | Ohms per element |
|-------------------------|----------------------|---------|------------------|
| H-30                    | 10 kW                | 2,550   | 18–21            |
| H-30,<br>H-40,<br>H-XP2 | 15 kW                | 2,550   | 18–21            |
| H-40,<br>H-50,<br>H-XP3 | 20 kW                | 2,550   | 18–21            |

5. If the RTD is on the heater element, remove the RTD (512) to avoid damage. See [Replace RTD, page 59](#).
6. Use a wrench to remove the heater element (508). Inspect element. It should be relatively smooth and shiny. Replace element if there is a crusted, burnt ash-like material adhered to the element, or if the sheath shows pitting marks.
7. Install the new heater element (508), holding the mixer (510) so it does not block the RTD port. Torque to 120 ft-lbs (163 N•m).
8. Install the RTD (512), if removed earlier. See [Replace RTD, page 59](#).
9. Reconnect the wires inside the electrical enclosure.

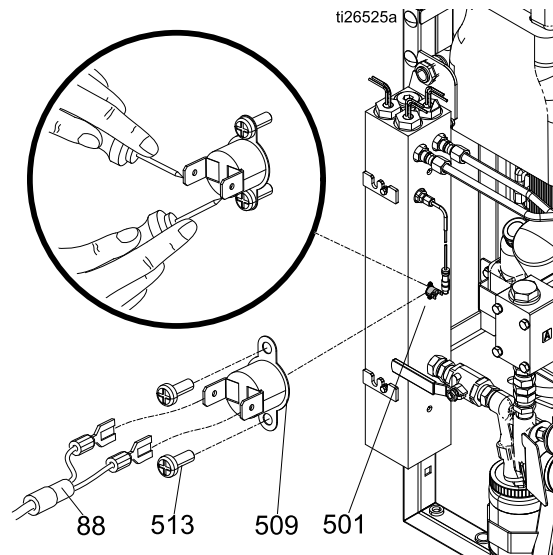
### Line Voltage

The heater outputs its rated wattage at 230 VAC. Low line voltage will reduce power available and the heater will not perform at full capacity.

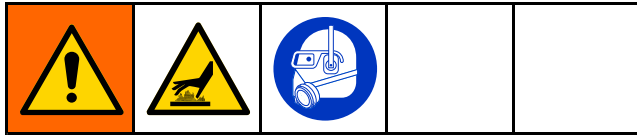
## Repair Heater Overtemperature Switch



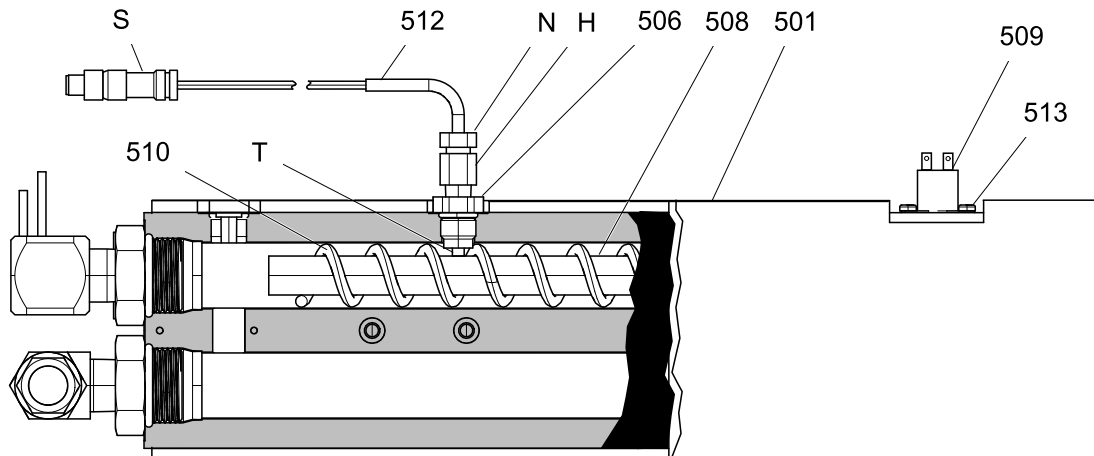
1. Perform [Shutdown, page 49](#).
2. Wait for heaters to cool.
3. Disconnect overtemperature switches (509) from cable (88). Test across spade terminals with ohmmeter.
  - a. If the resistance is not approximately 0 ohms, the overtemperature switch (509) needs to be replaced. Go to step 5.
  - b. If the resistance is approximately 0 ohms, inspect cable (88) to ensure it is not cut or open. Reconnect the overtemperature switch (509) and cable (88). Disconnect cable from the TCM. Test from pin 1 to 3 and 1 to 4. If the resistance is not approximately 0, and switches are 0, replace cable in place or original cable.
4. If the switch fails the test, remove the screws. Discard the failed switch. Apply a thin layer of thermal compound 110009, install a new switch (509) in the same location on housing (501). Secure with screws (513) and reconnect cables (88).



## Replace RTD



1. Perform [Shutdown, page 49](#).
2. Wait for heater to cool.
3. Remove heater covers.
4. Cut cable ties around the woven wrap with the RTD cable (512).
5. Disconnect RTD cable (512) from TCM (453).
6. Loosen ferrule nut (N). Remove RTD (512) from heater housing (501), then remove RTD housing (H). Do not remove the adapter (206) unless necessary. If adapter must be removed, ensure that mixer (510) is out of the way when replacing the adapter.
7. Remove RTD cable (512) from woven wrap.
8. Replace RTD cable (512).
  - a. Apply PTFE tape and thread sealant to male pipe threads and tighten RTD housing (H) into adapter (506).
  - b. Push in RTD (512) so tip contacts heater element (508).
  - c. Holding RTD (512) against heater element, tighten ferrule nut (N) 3/4 turn past finger-tight.
9. Route wires (S) as before through woven wrap and reconnect RTD cable (512) to the TCM.
10. Replace heater covers.
11. Follow startup instructions in the operation manual. Turn on A and B heat simultaneously to test. Temperatures should rise at same rate. If one is low, loosen ferrule nut (N) and tighten RTD housing (H) to ensure RTD tip contacts the heater element (212) when ferrule nut (N) is retightened.



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Figure 7

## Repair Heated Hose

Refer to the heated hose manual 309572 for hose replacement parts.

### Check Hose Wires

1. Perform [Shutdown, page 49](#).

**Note**

Whip hose must be connected.

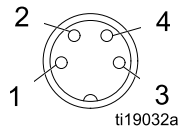
2. Remove cover (CV).
3. Disconnect system wires from the Reactor.
4. Disconnect hose wires (HW) from terminal block (TB), see Fig 3.
5. Using an ohmmeter, check between the hose wires (HW). There should be continuity.
6. If hose fails test, retest at each length of hose from the system out to the gun, including whip hose, until failure is isolated.
7. Reconnect wires and install cover (CV).

### Check RTD Cables and FTS

1. Perform [Shutdown, page 49](#).
2. Disconnect RTD cable (C) at Reactor (SC).
3. Test with an ohmmeter between pins of M8 cable connector C.

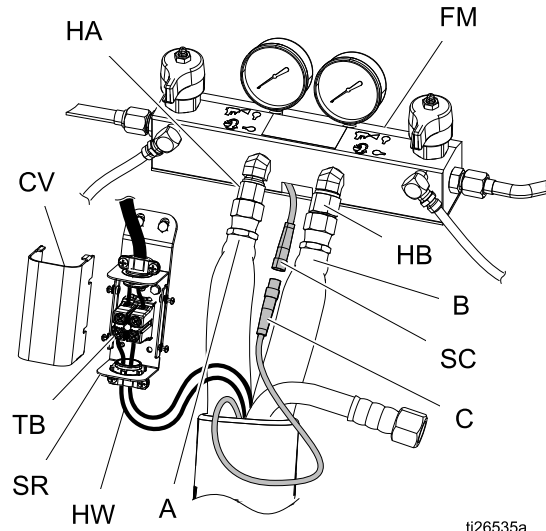
**Note**

Do not touch outer ring with test probe while measuring resistance.



| M8 Connector Pins | Resistance  |
|-------------------|---|
| 3 to 1            | See <a href="#">RTD Resistance vs. Temperature, page 61</a> . |
| 3 to 4            | See <a href="#">RTD Resistance vs. Temperature, page 61</a> . |
| 1 to 4            | 0.2 - 0.4 ohms at the FTS (each 50 ft cable adds 2.5 ohms)    |
| 2 to any          | infinity (open)   |

4. Retest at each length of hose, including whip hose, until failure is located.
5. If the FTS is not reading properly at the end of the hose, connect FTS directly to RTD cable (C) at the manifold.
6. If the FTS reads properly at the manifold but not at the end of the hose, check cable (C) connections. Verify they are tight.



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Heated Hose  
Figure 8

**Note**

To assist in taking readings, order RTD Test Kit 24N365. Kit includes two cables: one cable with a compatible female M8 connector and another cable with a male M8 connector. Both cables have stripped wire at the other end for easy test probe access.

| Pins / Wire Color       | Result  |
|-------------------------|---|
| 3 to 1 / brown to blue  | See <a href="#">RTD Resistance vs. Temperature, page 61</a> . |
| 3 to 4 / blue to black  | See <a href="#">RTD Resistance vs. Temperature, page 61</a> . |
| 1 to 4 / brown to black | 0.2 - 0.4 ohms at the FTS (each 50 ft cable adds 2.5 ohms)    |
| 2 to any / N/A          | infinity (open)   |



**RTD Resistance vs. Temperature**

| <b>Approximate Resistance (Ohms)</b> | <b>Temperature °C (°F)</b> |
|--------------------------------------|----------------------------|
| 843                                  | -40 (-40)                  |
| 882                                  | -30 (-22)                  |
| 922                                  | -20 (-4)                   |
| 961                                  | -10 (14)                   |
| 1000                                 | 0 (32)                     |
| 1039                                 | 10 (50)                    |
| 1078                                 | 20 (68)                    |
| 1117                                 | 30 (86)                    |
| 1155                                 | 40 (104)                   |
| 1194                                 | 50 (122)                   |
| 1232                                 | 60 (140)                   |
| 1271                                 | 70 (158)                   |
| 1309                                 | 80 (176)                   |
| 1347                                 | 90 (194)                   |
| 1385                                 | 100 (212)                  |

## Repair Fluid Temperature Sensor (FTS)

### Installation

The Fluid Temperature Sensor (FTS) is supplied with the system. Install FTS between main hose and whip hose. See Heated Hose manual 309572 for instructions.

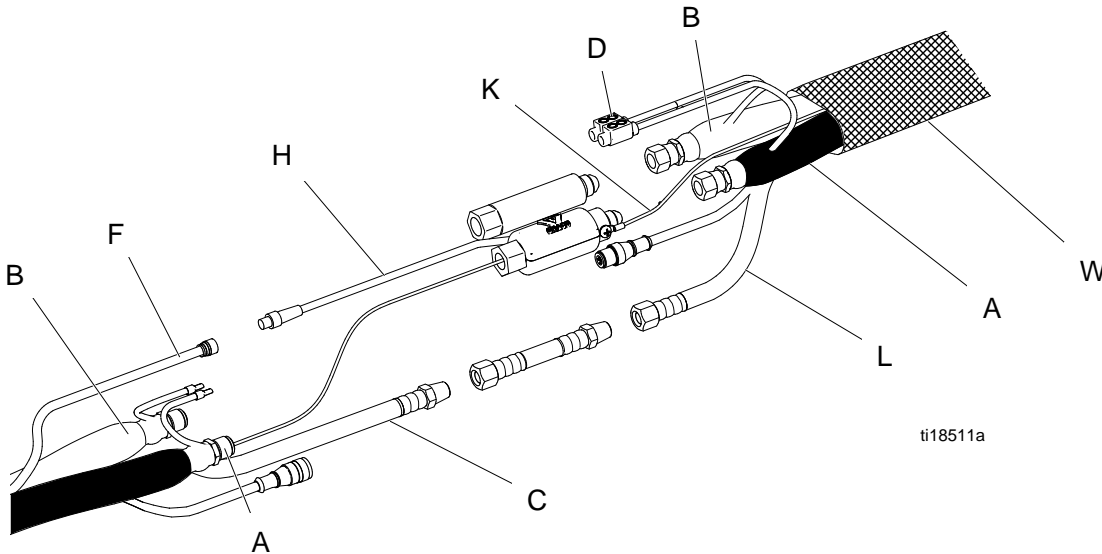
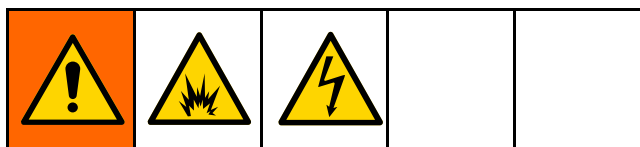


Figure 9

### Test/Removal

1. Perform [Shutdown, page 49](#).
2. Remove tape and protective covering from FTS. Disconnect hose cable (F).
3. If FTS is not reading properly at the end of the hose, see [Check RTD Cables and FTS, page 60](#).
4. If FTS fails, replace FTS.
  - a. Disconnect air hoses (C,L) and electrical connectors (D).
  - b. Disconnect FTS from whip hose (W) and fluid hoses (A, B).
  - c. Remove ground wire (K) from ground screw on underside of FTS.
  - d. Remove FTS probe (H) from component A (ISO) side of hose.

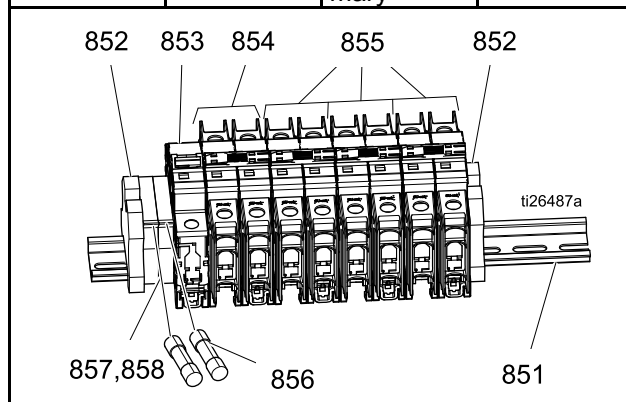
## Repair Circuit Breaker Module



1. Follow [Before Beginning Repair, page 51](#).
2. Using an ohmmeter, check for continuity across the circuit breaker (top to bottom). If no continuity, trip the breaker, reset, and retest. If there still is no continuity, replace the breaker as follows:
  - a. Refer to [Electrical Schematics, page 94](#).
  - b. Refer to the circuit breaker identification table and electrical diagrams.
  - c. Loosen the screws connecting the wires to the circuit breaker that will be replaced. Disconnect wires.
  - d. Pull the locking tab out 1/4 in. (6 mm) and pull circuit breaker away from the din rail. Install the new circuit breaker. Insert wires and tighten down all screws.

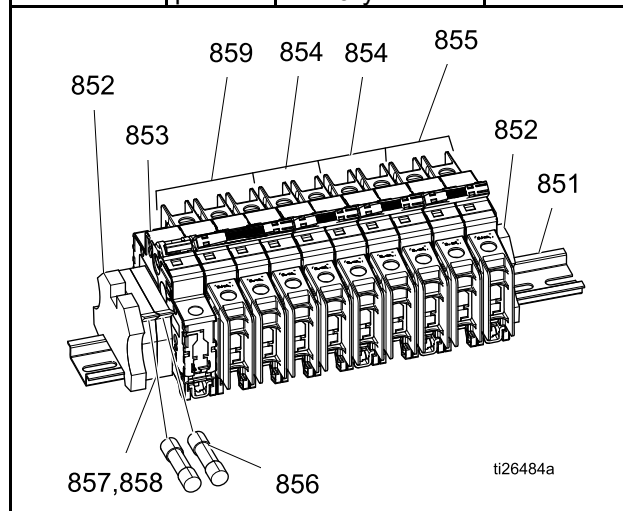
**Table 4 H-30, H-XP2 Circuit Breakers**

| Ref.       | Size        | Component           | Part No. |
|------------|-------------|---------------------|----------|
| 853 (CB11) | 50A, 1 pole | Heated Hose         | 17A319   |
| 854 (CB12) | 20A, 2 pole | Motor               | 17A314   |
| 855 (CB13) | 40A, 2 pole | Heater A            | 17A317   |
| 855 (CB14) | 40A, 2 pole | Heater B            | 17A317   |
| 855 (CB15) | 40A, 2 pole | Transformer Primary | 17A317   |



**Table 5 H-40, H-50, H-XP3 Circuit Breakers**

| Ref.       | Size        | Component           | Part No. |
|------------|-------------|---------------------|----------|
| 853 (CB11) | 50A, 1 pole | Heated Hose         | 17A319   |
| 859 (CB12) | 20A, 3 pole | Motor               | 17G724   |
| 854 (CB13) | 60A, 2 pole | Heater A            | 17G723   |
| 854 (CB14) | 60A, 2 pole | Heater B            | 17G723   |
| 855 (CB15) | 40A, 2 pole | Transformer Primary | 17A317   |



## Transformer Primary Check

See [Electrical Schematics, page 94](#).

1. Check wires and transformer:
  - a. See [Shutdown, page 49](#).
  - b. Shut off CB15.
  - c. Use an ohmmeter to test for continuity between terminals 2 and 4 of CB15. If there is no continuity, check transformer and wiring between CB15 and TB31 located behind the lower cover. Go to step 2.
2. Check transformer and TB31:
  - a. See [Shutdown, page 49](#).
  - b. Remove the lower cover.
  - c. Locate the two smaller (10 AWG) wires, labeled 1 and 2, coming out of transformer. Trace these wires back to terminal blocks TB31.
  - d. Use an ohmmeter to test for continuity between two wires; there should be continuity.

## Transformer Secondary Check

See [Electrical Schematics, page 94](#).

1. Check wires and transformer:
  - a. See [Shutdown, page 49](#).
  - b. Disconnect 7 pin green connector from TCM.
  - c. Use an ohmmeter to test for continuity between terminals 6 and 7 on the TCM 7 pin green connector. There should be continuity. If there is no continuity, check transformer and wiring.
  - d. Leave 7 pin green connector disconnected from TCM.

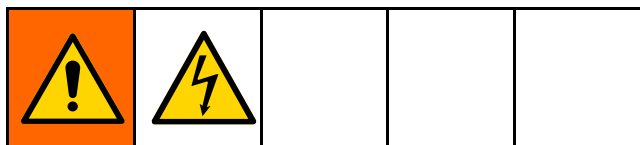
2. Check transformer:
  - a. Remove lower cover.
  - b. Locate the two larger (6 AWG) wires, labeled 3 and 4, coming out of transformer. Trace these wires back to TB31. Use an ohmmeter to test for continuity between two transformer wires in terminal block TB31; there should be continuity.
  - c. Reconnect the 7 pin green connector to the TCM.
  - d. Apply incoming power to system.
  - e. To verify voltage on the secondary leads of the transformer, measure between the transformer leads labeled 3 and 4 at TB31. Verify the transformer output voltage is approximately 37.5% of the system supply voltage for H-30 and H-XP2 systems or approximately 50% of system supply voltage for H-40, H-50, and H-XP3. For example, with a 240 VAC system supply voltage the transformer output voltage for an H-30 or H-XP2 would be (.375 x 240V), or approximately 90V; for an H-40, H-50, or H-XP3 it would be (.50 x 240V), or approximately 120V.
  - f. See the Diagnostic Run Screen on the ADM. The Diagnostic Run Screen displays the transformer output voltage (approximately 90 or 120 VAC) under "Hose Voltage". The diagnostic screen will show a Hose Voltage of "0" volts if the circuit breaker has been tripped for the incoming power to the TCM.

### Note

The Diagnostic Run Screen is disabled by default and must be enabled in the Setup screens. See the Operation manual for instructions.

| 04/16/15 13:58   |            |               |
|------------------|------------|---------------|
| Job Data         |            |               |
| Diagnostic       |            |               |
| Recipes          |            |               |
| H-40 Active      |            |               |
| No Active Errors |            |               |
| A Chemical       | B Chemical | Hose Chemical |
| 70 °F            | 70 °F      | 70 °F         |
| A Current        | B Current  | Hose Current  |
| 0 A              | 0 A        | 0 A           |
| TCM PCB          |            |               |
| 70 °F            |            |               |
| A Voltage        | B Voltage  | Hose Voltage  |
| 230 V            | 230 V      | 90 V          |
| Pressure A       | Pressure B |               |
| 501 psi          | 478 psi    |               |
|                  | CPM        | Total Cycles  |
|                  | 60         | 38            |

## Replace Power Supply



1. Perform [Shutdown, page 49](#).
2. Disconnect input and output cables from both sides of the power supply (805). See [Electrical Schematics, page 94](#).
3. Insert a flat head screw driver in the mounting tab on the bottom of the power supply (805) to remove from the din rail.
4. Install new power supply (805) in reverse order.

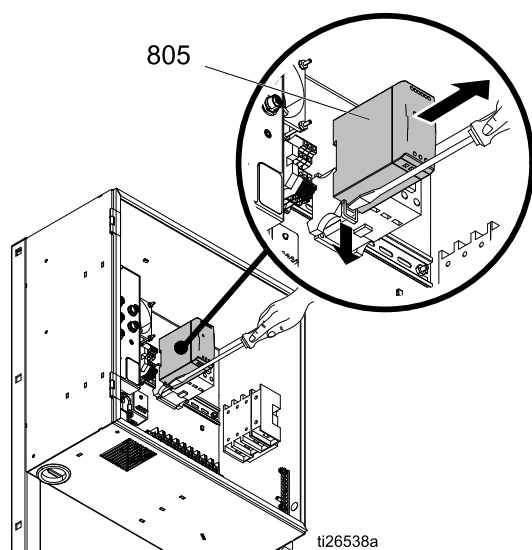


Figure 10 24 VDC Power Supply

## Replace Surge Protector

1. Loosen connections on terminals 1 and 3 on CB13. See [Electrical Schematics, page 94](#).
2. Loosen connections on input to power supply (805) on N and L connections. See [Electrical Schematics, page 94](#).
3. Remove two screws (612), washers (611), and surge protector (705) from enclosure.
4. Install new surge protector (705) in reverse order.

### Note

Wire on both the circuit breaker and power supply are interchangeable.

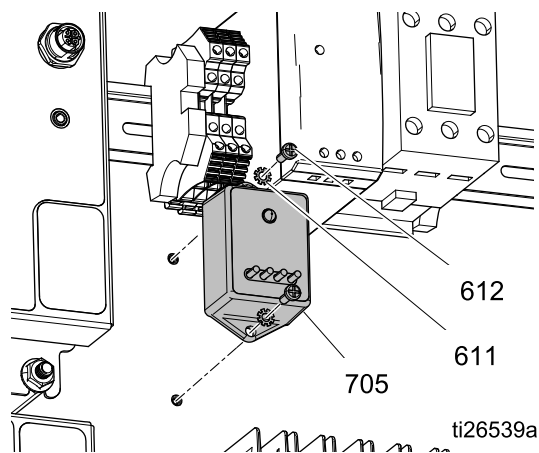


Figure 11 Surge Protector

## Replace TCM

1. Follow [Before Beginning Repair, page 51](#).
2. Open the electrical enclosure and disconnect all cables from the TCM (602).
3. Remove the nuts (610) and TCM (602).

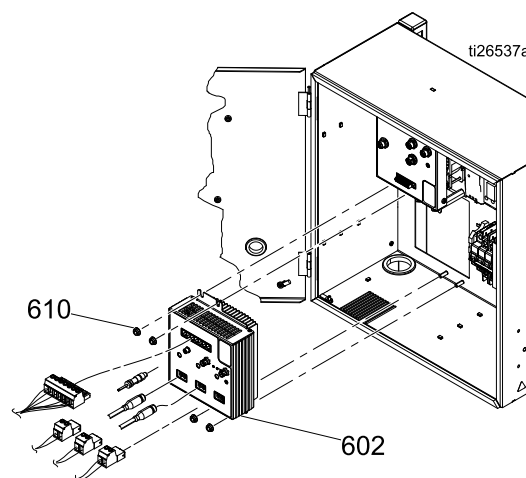


Figure 12 Replace TCM

## Replace HCM

1. Follow [Before Beginning Repair, page 51](#).
2. Open the electrical enclosure and disconnect all cables from the HCM (603).
3. Remove the nuts (610) and HCM (603).
4. Set rotary switch.

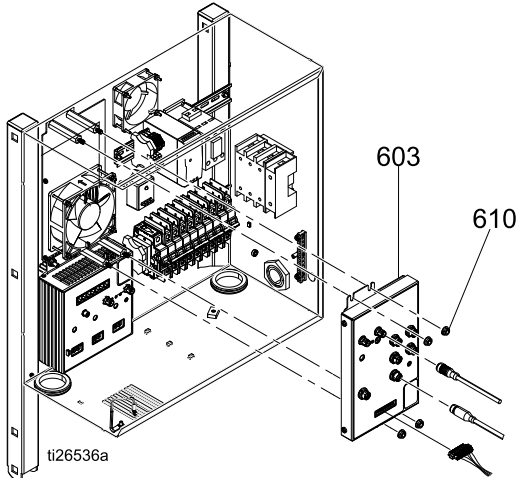


Figure 13 Replace HCM

### HCM Rotary Switch Positions

- 0 = Reactor 2, H-30
- 1 = Reactor 2, H-40
- 2 = Reactor 2, H-50
- 3 = Reactor 2, H-XP2
- 4 = Reactor 2, H-XP3

## Replace ADM

1. Loosen four screws (70) on inside of electrical enclosure door (61). Lift up and pull out to remove ADM (88).
2. Disconnect CAN cable (475).
3. Inspect ADM (88) for damage. Replace if necessary.

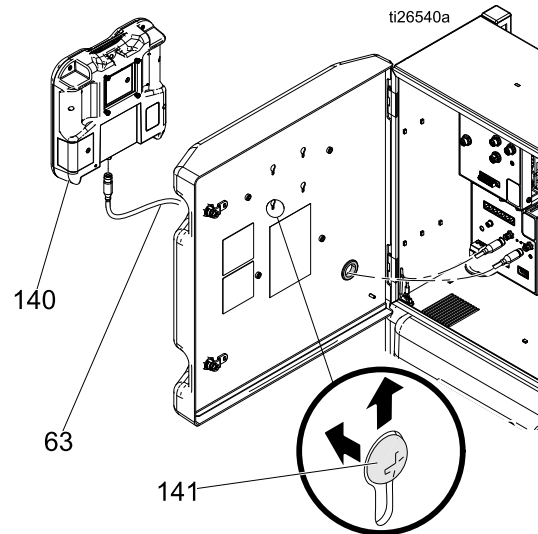


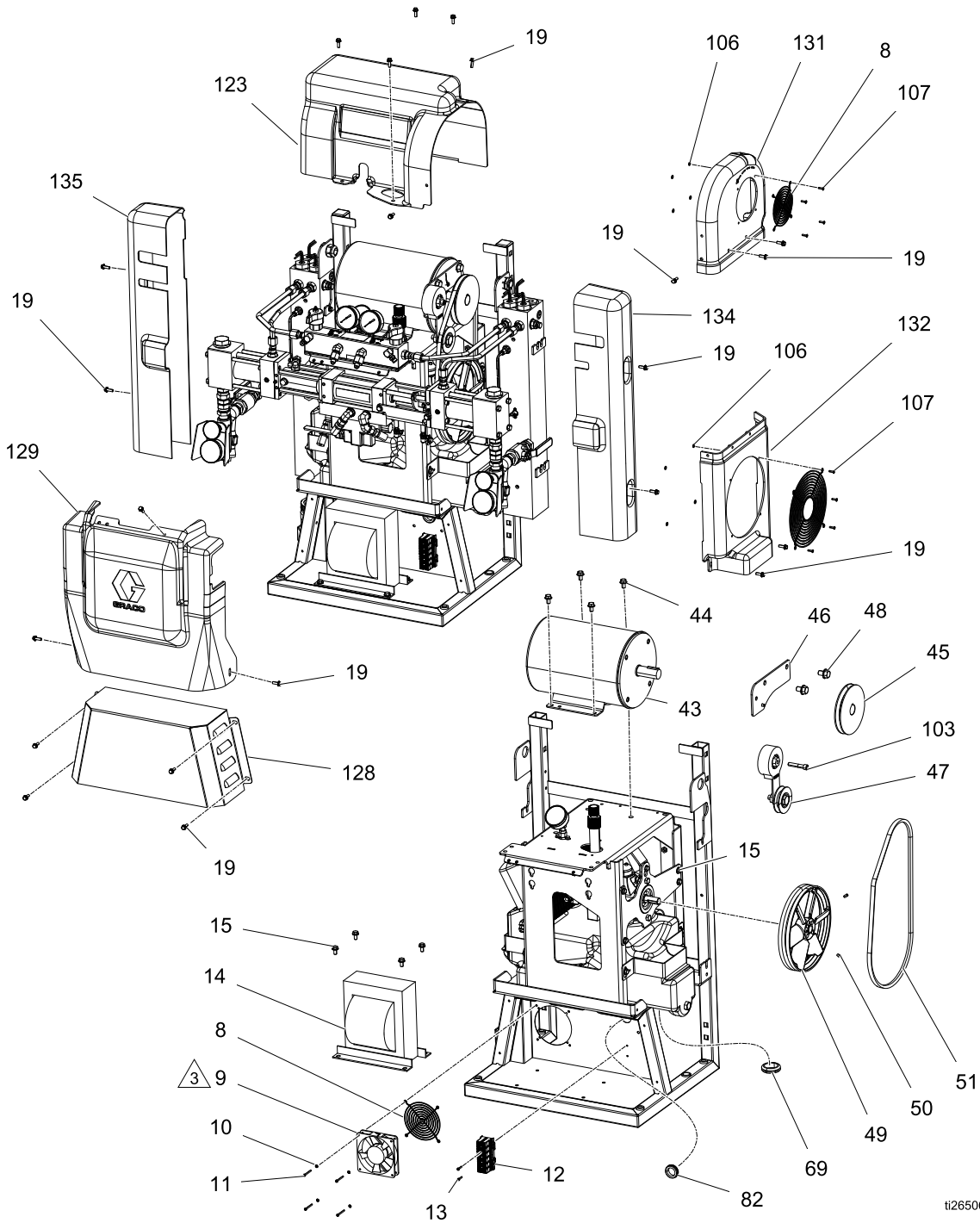
Figure 14

# Parts

## Elite Proportioners

| Elite Proportioner | Description | Proportioner<br>see <a href="#">Proportioner Parts</a> ,<br>page 68 | Elite Kit<br>see manual 3A3084 |
|--------------------|-------------|---|--------------------------------|
| 17H131             | H-30        | 17H031  | 17F838                         |
| 17H132             | H-30        | 17H032  | 17F838                         |
| 17H143             | H-40        | 17H043  | 17F838                         |
| 17H144             | H-40        | 17H044  | 17F838                         |
| 17H145             | H-40        | 17H045  | 17F838                         |
| 17H146             | H-40        | 17H046  | 17F838                         |
| 17H153             | H-50        | 17H053  | 17F838                         |
| 17H156             | H-50        | 17H056  | 17F838                         |
| 17H162             | H-XP2       | 17H062  | 17F838                         |
| 17H174             | H-XP3       | 17H074  | 17F838                         |
| 17H176             | H-XP3       | 17H076  | 17F838                         |

# Proportioner Parts

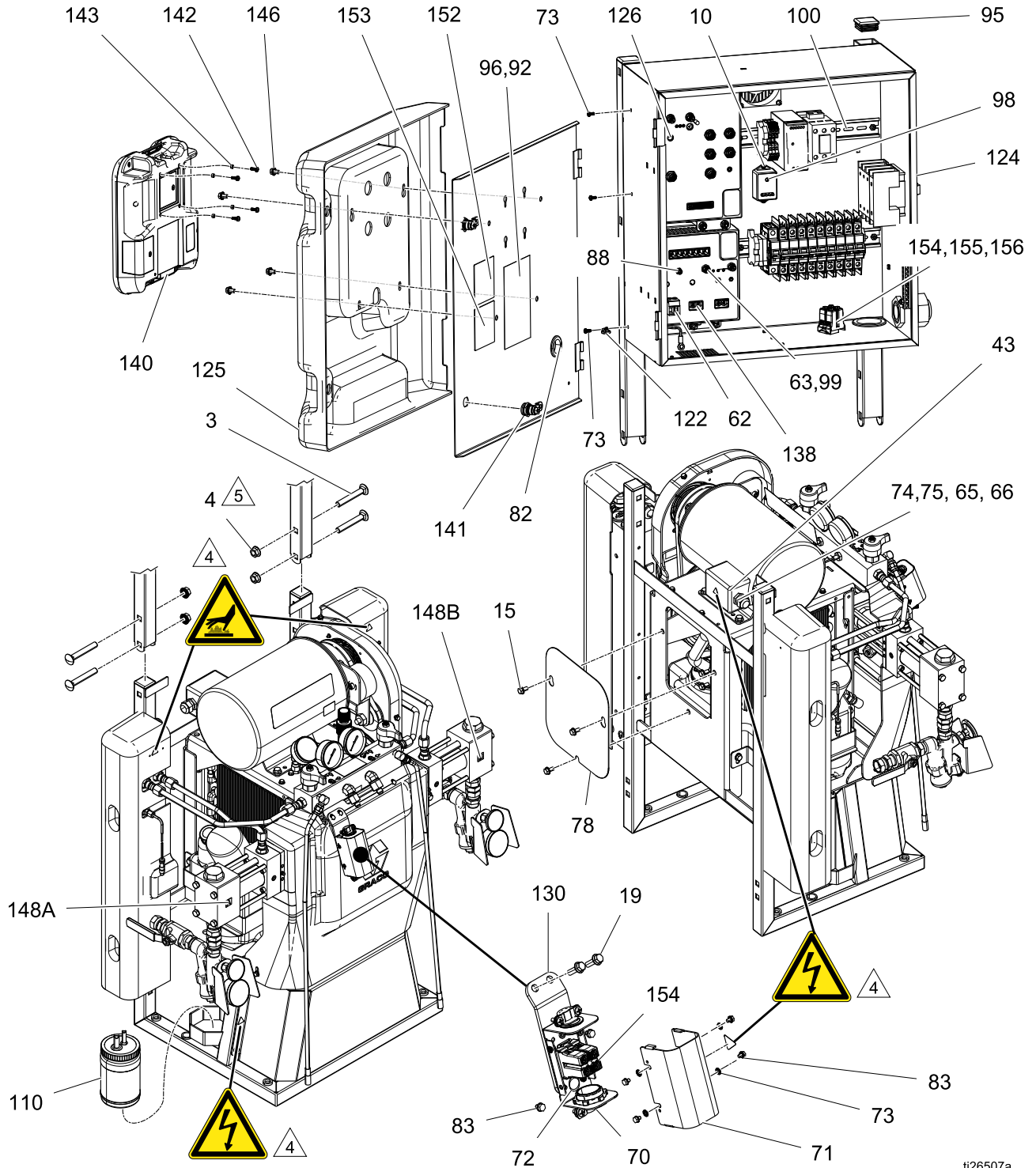


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- 1. Apply anaerobic pipe sealant to all non-swiveling pipe threads.
- 3. Ensure that the fan (9) direction arrow points away from the mounting panel.


- 4. Install pulley (45) flush with motor shaft (43).
- 5. Install pulley (44) overhung on pump shaft (27) by  $.18 \pm .03$  in. On models 17H031, 17H032, and 17H074: Install pulley (49)  $.49 \pm .03$  in. from pump shaft (27) end.




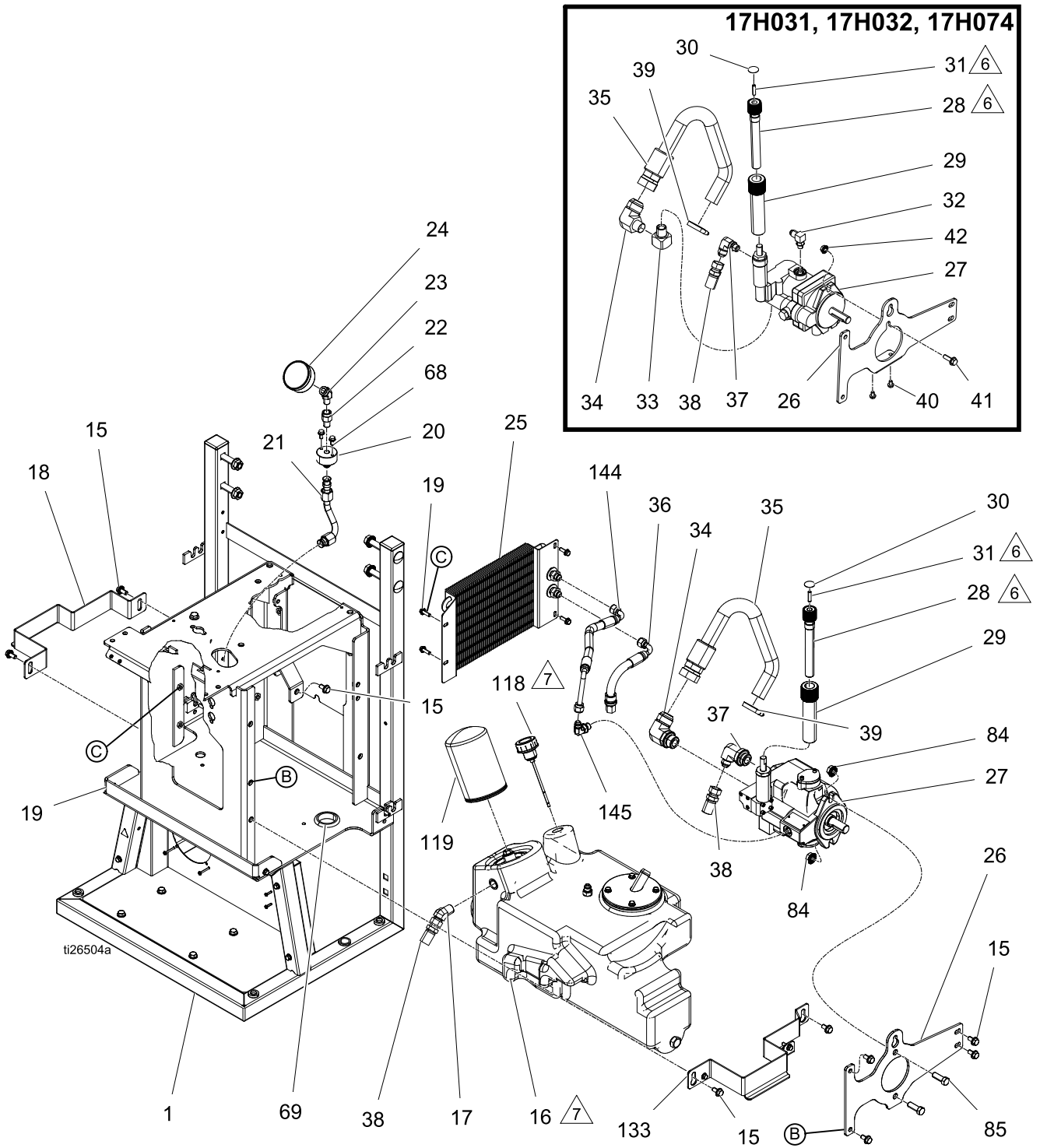


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1. Apply anaerobic pipe sealant to all non-swiveling pipe threads.


 Labels are from warning label (629) included in the Electrical Enclosure. See [Electrical Enclosure, page 87](#).

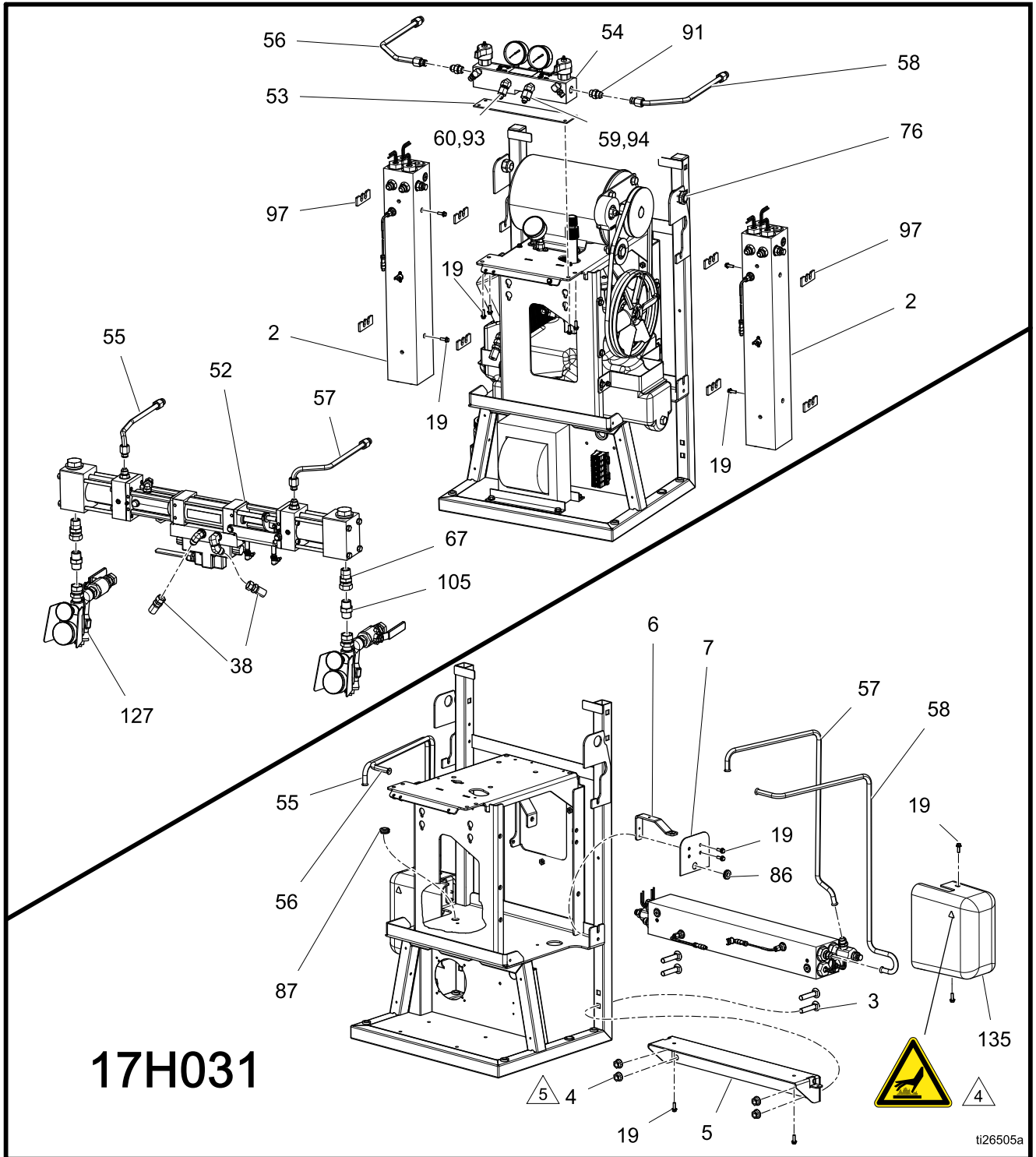
 Apply single component thixotropic anaerobic sealant to threads..





1. Apply anaerobic pipe sealant to all non-swiveling pipe threads.

 Apply high viscosity anaerobic sealant to threads.

 Fill reservoir (16) with hydraulic oil.



1. Apply anaerobic pipe sealant to all non-swiveling pipe threads.
-  Labels are from warning label (629) included in the Electrical Enclosure. See [Electrical Enclosure, page 87](#).
-  Apply single component thixotropic anaerobic sealant to threads.

## H-30, H-XP2

| Ref. | Part   | Description                       | Quantities |        |        |
|------|--------|-----------------------------------|------------|--------|--------|
|      |        |                                   | H-30       |        | H-XP2  |
|      |        |                                   | 17H031     | 17H032 | 17H062 |
| 1    | - - -  | CART                              | 1          | 1      | 1      |
| 2    | 17G646 | HEATER, 7.5kw, 1 zone, rtd        |            | 2      | 2      |
|      | 17G647 | HEATER, assy, 10.2kw, 2 zone, rtd | 1          |        |        |
| 3    | 127277 | BOLT, carriage, 1/2-13 x 3.5 l    | 8          | 4      | 4      |
| 4    | 112731 | NUT, hex, flanged                 | 8          | 4      | 4      |
| 5    | 17G618 | BRACKET, 10kw, hanger             | 1          |        |        |
| 6    | 17G617 | BRACKET, 10kw, shroud             | 2          |        |        |
| 7    | 17G619 | BRACKET, 10kw, guard              | 2          |        |        |
| 8    | 115836 | GUARD, finger                     | 2          | 2      | 2      |
| 9    | 24U847 | FAN, cooling, 120mm, 24vdc        | 1          | 1      | 1      |
| 10   | 103181 | WASHER, lock ext                  | 4          | 4      | 4      |
| 11   | 117683 | SCREW, mach, phil pan hd          | 4          | 4      | 4      |
| 12   | 17G680 | BLOCK, terminal, 6 pole           | 1          | 1      | 1      |
| 13   | - - -  | SCREW, 3/4 in, #6-32              | 2          | 2      | 2      |
| 14   | 247812 | TRANSFORMER, 4090va, 230/90       | 1          | 1      | 1      |
| 15   | 111800 | SCREW, cap, hex hd                | 20         | 20     | 20     |
| 16   | 247826 | RESERVOIR, assembly, hydraulic    | 1          | 1      | 1      |
| 16a  | 247778 | HOUSING, inlet                    | 1          | 1      | 1      |
| 16b  | 247771 | GASKET, inlet                     | 1          | 1      | 1      |
| 16c  | 247777 | TUBE, inlet                       | 1          | 1      | 1      |
| 16d  | 247770 | TUBE, return                      | 1          | 1      | 1      |
| 16e  | 25D893 | FILTER, inlet                     | 1          | 1      | 1      |
| 16f  | 255032 | PLUG                              | 1          | 1      | 1      |
| 16g  | 255021 | FITTING, straight                 | 1          | 1      | 1      |
| 17   | 117556 | FITTING, nipple, #8 jic x 1/2 npt | 1          | 1      | 1      |
| 18   | 17G621 | BRACKET, retaining, tank          | 1          | 1      | 1      |
| 19   | 113796 | SCREW, flanged, hex hd            | 34         | 36     | 36     |
| 20   | - - -  | ADAPTER, hydraulic gauge          | 1          | 1      | 1      |
| 21   | 17G624 | TUBE, gauge, pressure             | 1          | 1      | 1      |
| 22   | 15H524 | ACCUMULATOR, pressure, 1/4 npt    | 1          | 1      | 1      |
| 23   | 119789 | FITTING, elbow, street, 45 deg    | 1          | 1      | 1      |
| 24   | 112567 | GAUGE, pressure, fluid            | 1          | 1      | 1      |
| 25   | 247829 | COOLER, hydraulic, complete       | 1          | 1      | 1      |
| 26   | 17G611 | BRACKET, mntg, pump, hyd, lf      | 1          | 1      | 1      |
| 27   | 247855 | PUMP, hydraulic                   | 1          | 1      | 1      |
| 27a  | 129375 | KEY, square                       | 1          | 1      | 1      |
| 28*  | - - -  | KNOB, compensator                 | 1          | 1      | 1      |
| 29*  | - - -  | KNOB, lock, compensator           | 1          | 1      | 1      |
| 30   | 15H512 | LABEL, control                    | 1          | 1      | 1      |
| 31*  | - - -  | SCREW, set, 1/4-20 sst            | 1          | 1      | 1      |
| 32   | 110792 | FITTING, elbow, male, 90 deg      | 1          | 1      | 1      |
| 33   | 115764 | FITTING, elbow, 90                | 1          | 1      | 1      |
| 34   | 120804 | FITTING, elbow, 1/2 npt x 1 jic   | 1          | 1      | 1      |
| 35   | 247793 | HOSE, inlet, coupled              | 1          | 1      | 1      |
| 36   | 15G784 | HOSE, coupled                     | 2          | 2      | 2      |
| 37   | 121321 | FITTING, elbow, sae x jic         | 1          | 1      | 1      |
| 38   | 15T895 | HOSE, hydraulic supply            | 2          | 2      | 2      |

| Ref. | Part   | Description                            | Quantities |        |        |
|------|--------|--|------------|--------|--------|
|      |        |  | H-30       |        | H-XP2  |
|      |        |  | 17H031     | 17H032 | 17H062 |
| 39   | 117464 | CLAMP, hose, micro 1.75 max dia.       | 1          | 1      | 1      |
| 40   | 112161 | SCREW, mach, hex, wshr hd              | 2          | 2      | 2      |
| 41   | 112586 | SCREW, cap, hex hd                     | 1          | 1      | 1      |
| 42   | 110996 | NUT, hex, flange head                  | 1          | 1      | 1      |
| 43   | 247816 | MOTOR, 230 vac, 4.0 hp                 | 1          | 1      | 1      |
| 43a  | 120710 | KEY, square, .25                       | 1          | 1      | 1      |
| 44   | 113802 | SCREW, hex hd, flanged                 | 4          | 4      | 4      |
| 45   | 15H256 | PULLEY, drive, vee                     | 1          | 1      | 1      |
| 45a  | ---    | SCREW, cup point, 5/16-18              | 2          | 2      | 2      |
| 46   | 15H207 | BRACKET, tensioner                     | 1          | 1      | 1      |
| 47   | 247853 | ADJUSTER, belt, tensioner              | 1          | 1      | 1      |
| 48   | 111802 | SCREW, cap, hex hd                     | 2          | 2      | 2      |
| 49   | 15E410 | PULLEY, fan                            | 1          | 1      | 1      |
| 50   | 120087 | SCREW, set, 1/4 x 1/2                  | 2          | 2      | 2      |
| 51   | 803889 | BELT, ax46                             | 1          | 1      | 1      |
| 52   | 25D458 | KIT, pump, hydrl, w/iso and resin, 80  |            |        | 1      |
|      | 25D460 | KIT, pump, hydrl, w/iso and resin, 140 | 1          | 1      |        |
| 53   | 15B456 | GASKET, manifold                       | 1          | 1      | 1      |
| 54   | ---    | MANIFOLD, fluid                        | 1          | 1      | 1      |
| 55   | 17G616 | TUBE, fluid, iso, heater, in, 10kw     | 1          |        |        |
|      | 17G600 | TUBE, fluid, iso, heater, inlet        |            | 1      | 1      |
| 56   | 17G615 | TUBE, fluid, iso, heater, out, 10kw    | 1          |        |        |
|      | 17G601 | TUBE, fluid, iso, heater, outlet       |            | 1      | 1      |
| 57   | 17G613 | TUBE, fluid, res, heater, inlet, 10kw  | 1          |        |        |
|      | 17G603 | TUBE, fluid, res, heater, inlet        |            | 1      | 1      |
| 58   | 17G614 | TUBE, fluid, res, heater, outlet, 10kw | 1          |        |        |
|      | 17G604 | TUBE, fluid, res, heater, outlet       |            | 1      | 1      |
| 59   | 117677 | FITTING, reducer #6 x #10 (jic)        | 1          | 1      | 1      |
| 60   | 117502 | FITTING, reducer #5 x #8 (jic)         | 1          | 1      | 1      |
| 61#  | 24U845 | TUBE, pressure relief                  | 2          | 2      | 2      |
| 62#  | 24R754 | CONNECTOR, power, male, 2 pin          |            | 1      | 1      |
| 63#  | 127290 | CABLE, 4-pin, mf, 1.3m, molded         | 1          | 1      | 1      |
| 64   | ---    | SLEEVE, wire, .50 id                   | 3          | 3      | 3      |
| 65#  | 17G668 | NUT, wire, gray                        | 2          | 2      | 2      |
| 66#  | 295731 | NUT, wire                              | 2          | 2      | 2      |
| 67   | 118459 | FITTING, union, swivel, 3/4"           | 2          | 2      | 2      |
| 68   | 113161 | SCREW, flange, hex hd                  | 2          | 2      | 2      |
| 69   | ---    | GROMMET                                | 1          | 1      | 1      |
| 70   | 24W204 | ENCLOSURE, terminal block              | 1          | 1      | 1      |
| 71   | 17C258 | ENCLOSURE, cover                       | 1          | 1      | 1      |
| 72   | 172953 | LABEL, designation                     | 1          | 1      | 1      |
| 73   | 16X129 | SCREW, mach, phillips, tooth wash      | 8          | 8      | 8      |
| 74   | ---    | BUSHING, strain relief, 1/2 npt        | 1          | 1      | 1      |
| 75   | ---    | NUT, strain relief, 1/2 npt            | 1          | 1      | 1      |
| 76   | ---    | BUSHING, strain relief                 |            | 2      | 2      |
| 77   | 17G645 | TIE, cable, fir tree                   | 17         | 17     | 17     |
| 78   | 17G599 | COVER, access                          | 1          | 1      | 1      |
| 80   | 17D775 | LABEL, safety, elec encl, lf           | 1          | 1      | 1      |
| 82   | 114269 | GROMMET, rubber                        | 1          | 1      | 1      |

Parts

| Ref. | Part    | Description                                    | Quantities |        |        |
|------|---------|--|------------|--------|--------|
|      |         |  | H-30       |        | H-XP2  |
|      |         |  | 17H031     | 17H032 | 17H062 |
| 83   | ---     | SCREW, mach, serrated hex head; 1/4 in, #10-32 | 1          | 2      | 2      |
| 86   | ---     | GROMMET, 3/4 hole x 3/32 thick                 | 1          |        |        |
| 87   | ---     | GROMMET  | 1          |        |        |
| 88#  | 24T242  | CABLE, over-temp, single reactor               | 1          |        |        |
| 88#  | 17G687  | HARNESS, overtemp, reactor, dual               |            | 1      | 1      |
| 89#  | 17G684  | HARNESS, heater, A, 64 in.                     | 1          |        |        |
| 90#  | 17G685  | HARNESS, heater, B , 72 in.                    | 1          |        |        |
| 91   | 121309  | FITTING, adapter, sae-orb x jic                | 2          | 2      | 2      |
| 92   | 24U846  | BRIDGE, plug-in jumper, ut35                   | 4          | 4      | 4      |
| 93   | ---     | CAP, 9/16-18 jic cap-aluminum                  | 1          | 1      | 1      |
| 94   | ---     | CAP, 1/2-20 jic cap-aluminum                   | 1          | 1      | 1      |
| 95   | 111218  | CAP, tube, square                              | 2          | 2      | 2      |
| 96   | ---     | ENVELOPE, packing, self-adhesive               | 1          | 1      | 1      |
| 97   | 16W654  | INSULATOR, foam, heater                        |            | 8      | 8      |
| 98#  | 16U530  | MODULE, sys srg prot                           | 1          | 1      | 1      |
| 99#  | 15D906  | SUPPRESSOR, round snap ferrite .260            | 1          | 1      | 1      |
| 100▲ | 16Y839  | LABEL, notice, jumper                          | 1          | 1      | 1      |
| 101  | 296607  | TOOL, clevis pin extractor                     | 1          | 1      | 1      |
| 102  | 24K207  | KIT, fts, rtd, single hose                     | 1          | 1      | 1      |
| 103  | C19843  | SCREW, cap, sockethead                         | 1          | 1      | 1      |
| 104  | 255716  | KIT, heater wire connector                     | 1          |        |        |
| 105  | C20487  | FITTING, nipple, hex                           | 2          | 2      | 2      |
| 106  | 114027  | WASHER, flat                                   | 8          | 8      | 8      |
| 107  | ---     | RIVET, pop, 5/32 dia.                          | 8          | 8      | 8      |
| 109  | 117284  | GRILL, fan guard                               | 1          | 1      | 1      |
| 110  | 296731  | RESERVOIR, lube hose assembly                  | 1          | 1      | 1      |
| 113  | 206995  | FLUID, tsl, 1 qt.                              | 2          | 2      | 2      |
| 118  | 116915  | CAP, breather filler                           | 1          | 1      | 1      |
| 119  | 247792  | FILTER, oil, 18-23 psi bypass                  | 1          | 1      | 1      |
| 120  | 15Y118  | LABEL, made in the usa                         | 1          | 1      | 1      |
| 121  | 106569  | TAPE, electrical                               | 1          | 1      | 1      |
| 122  | 125871  | TIE, cable, 7.50 inch                          | 22         | 22     | 22     |
| 123  | 17G649  | COVER, motor                                   | 1          | 1      | 1      |
| 124  | ---     | ENCLOSURE, electrical, 230v                    | 1          | 1      | 1      |
| 125  | 16W766  | COVER, control, box                            | 1          | 1      | 1      |
| 126# | 17G671  | CABLE, motor, ot switch                        | 1          | 1      | 1      |
| 127  | 17G644  | KIT, assembly, pair, inlet                     | 1          | 1      | 1      |
| 128  | 17G623  | COVER, transformer                             | 1          | 1      | 1      |
| 129  | 17G651  | COVER, main                                    | 1          | 1      | 1      |
| 130  | 17G620  | BRACKET, connector, hose                       | 1          | 1      | 1      |
| 131  | 17G652  | COVER, belt, upper                             | 1          | 1      | 1      |
| 132  | 17G679  | COVER, belt, lower                             | 1          | 1      | 1      |
| 133  | 17G622  | BRACKET, retaining, tank, shroud               | 1          | 1      | 1      |
| 134  | 17G610  | COVER, 10kw, left                              | 1          |        |        |
|      | ●17G608 | COVER, heater, right                           |            | 1      | 1      |
| 135  | 17G609  | COVER, 10kw, right                             | 1          |        |        |
|      | ●17G607 | COVER, heater, left                            |            | 1      | 1      |
| 136◆ | ---     | BAR, 55 gal chem. meas. B side                 | 1          | 1      | 1      |
| 137◆ | ---     | BAR, 55 gal chem. meas. A side                 | 1          | 1      | 1      |

| Ref. | Part   | Description                        | Quantities |        |        |
|------|--------|------------------------------------|------------|--------|--------|
|      |        |                                    | H-30       |        | H-XP2  |
|      |        |                                    | 17H031     | 17H032 | 17H062 |
| 138# | 17G686 | HARNESS, heater, B                 |            | 1      | 1      |
| 139  | 15V551 | SHIELD, membrane, adm (10 pack)    | 1          | 1      | 1      |
| 140  | 24U854 | MODULE, adm                        | 1          | 1      | 1      |
| 141  | 16W596 | LATCH, door                        | 2          | 2      | 2      |
| 142  | 127296 | SCREW, mchn, pnh, w/ext tooth wash | 4          | 4      | 4      |
| 143  | ---    | SPACER, nylon, 1/4 in. od          | 4          | 4      | 4      |
| 146  | 119865 | SCREW, mach, hex serrated          | 4          | 4      | 4      |
| 148  | ---    | LABEL, A/B                         | 1          | 1      | 1      |
| 154# | 17B856 | TERMINAL BLOCK                     |            | 1      | 1      |
| 155  | C19208 | WASHER, lock                       |            | 1      | 1      |
| 156  | 111714 | SCREW                              |            | 1      | 1      |
| 157● | ---    | WASHER, flat, nylon                |            | 4      | 4      |

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

\* Parts included in Compensator Knob Assembly Kit 17G606. Purchase separately.

◆ Parts included in Drum Level Stick Kit 24M174. Purchase separately.

● Parts included with Heater Cover Kits (134, 135). Purchase separately.

# See [Electrical Schematics, page 94](#).

# H-40, H-50, H-XP3

| Ref | Part   | Description                       |        |        |        |        |        |        |        |        |
|-----|--------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|     |        |                                   | H-40   |        |        |        | H-50   |        | H-XP3  |        |
|     |        |                                   | 17H043 | 17H044 | 17H045 | 17H046 | 17H053 | 17H056 | 17H074 | 17H076 |
| 1   | ---    | CART                              | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 2   | 17G646 | HEATER, 7.5kw, 1 zone, rtd        | 2      |        | 2      |        |        |        |        |        |
|     | 17G648 | HEATER, assy, 10.2kw, 1 zone, rtd |        | 2      |        | 2      | 2      | 2      | 2      | 2      |
| 3   | 127277 | BOLT, carriage, 1/2-13 x 3.5 l    | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      |
| 4   | 112731 | NUT, hex, flanged                 | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      |
| 8   | 115836 | GUARD, finger                     | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 2      |
| 9   | 24U847 | FAN, cooling, 120mm, 24vdc        | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 10  | 103181 | WASHER, lock ext                  | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      |
| 11  | 117683 | SCREW, mach, phil pan hd          | 4      | 4      | 4      | 4      | 4      | 4      | 4      | 4      |
| 12  | 17G680 | BLOCK, terminal, 6 pole           | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 13  | ---    | SCREW, 3/4 in, #6-32              | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 2      |
| 14  | 247786 | TRANSFORMER, 5400va (410ft, 125m) | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 15  | 111800 | SCREW, cap, hex hd                | 20     | 20     | 20     | 20     | 20     | 20     | 20     | 20     |
| 16  | 247826 | RESERVOIR, assembly, hydraulic    | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16a | 247778 | HOUSING, inlet                    | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16b | 247771 | GASKET, inlet                     | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16c | 247777 | TUBE, inlet                       | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16d | 247770 | TUBE, return                      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16e | 25D893 | FILTER, inlet                     | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16f | 255032 | PLUG                              | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 16g | 255021 | FITTING, straight                 | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 17  | 117556 | FITTING, nipple, #8 jic x 1/2 npt | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 18  | 17G621 | BRACKET, retaining, tank          | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 19  | 113796 | SCREW, flanged, hex hd            | 36     | 36     | 36     | 36     | 36     | 36     | 36     | 36     |
| 20  | ---    | ADAPTER, hydraulic gage           | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 21  | 17G624 | TUBE, gauge, pressure             | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 22  | 15H524 | ACCUMULATOR, pressure, 1/4 npt    | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 23  | 119789 | FITTING, elbow, street, 45°       | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 24  | 112567 | GAUGE, pressure, fluid            | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 25  | 247829 | COOLER, hydraulic, complete       | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 26  | 17G612 | BRACKET, mntg, pump, hyd          | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 27  | 255019 | PUMP, hydraulic                   | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 27a | 129375 | KEY, square                       | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 28* | ---    | KNOB, compensator                 | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 29* | ---    | KNOB, lock, compensator           | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 30  | 15H512 | LABEL, control                    | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |



| Ref | Part   | Description                            | H-40   |        |                        |        | H-50   |        | H-XP3  |        |
|-----|--------|--|--------|--------|------------------------|--------|--------|--------|--------|--------|
|     |        |  | 17H043 | 17H044 | 17H045                 | 17H046 | 17H053 | 17H056 | 17H074 | 17H076 |
|     |        |  | 31*    | ---    | SCREW, set, 1/4-20 sst | 1      | 1      | 1      | 1      | 1      |
| 34  | 255020 | FITTING, elbow, 1-1/16sae x 1/2tube    | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 35  | 247793 | HOSE, inlet, coupled                   | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 36  | 15G784 | HOSE, coupled                          | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 37  | 121320 | FITTING, elbow, sae x jic              | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 38  | 15T895 | HOSE, hydraulic supply                 | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 39  | 117464 | CLAMP, hose, micro 1.75 max dia.       | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 43  | 247785 | MOTOR, 7.5hp, 3ph, 230v/400v           | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 43a | 120710 | KEY, square, .25                       | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 44  | 113802 | SCREW, hex hd, flanged                 | 4      | 4      | 4                      | 4      | 4      | 4      | 4      | 4      |
| 45  | 15H256 | PULLEY, drive, vee                     | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 45a | ---    | SCREW, set, cup, 5/16-18               | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 46  | 15H207 | BRACKET, tensioner                     | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 47  | 247853 | ADJUSTER, belt, tensioner              | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 48  | 111802 | SCREW, cap, hex hd                     | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 49  | 247856 | PULLEY, fan                            | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 50  | 120087 | SCREW, set, 1/4 x 1/2                  | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 51  | 803889 | BELT, ax46                             | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 52  | 25D458 | KIT, pump, hydrl, w/iso and resin, 80  |        |        |                        |        |        |        | 1      | 1      |
|     | 25D459 | KIT, pump, hydrl, w/iso and resin, 120 | 1      | 1      | 1                      | 1      |        |        |        |        |
|     | 25D460 | KIT, pump, hydrl, w/iso and resin, 140 |        |        |                        |        | 1      | 1      |        |        |
| 53  | 15B456 | GASKET, manifold                       | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 54  | ---    | MANIFOLD, fluid                        | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 55  | 17G600 | TUBE, fluid, iso, heater, inlet        | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 56  | 17G601 | TUBE, fluid, iso, heater, outlet       | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 57  | 17G603 | TUBE, fluid, res, heater, inlet        | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 58  | 17G604 | TUBE, fluid, res, heater, outlet       | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 59  | 117677 | FITTING, reducer #6 x #10 (jic)        | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 60  | 117502 | FITTING, reducer #5 x #8 (jic)         | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 61  | 24U845 | TUBE, pressure relief                  | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 62# | 24R754 | CONNECTOR, power, male, 2 pin          | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 63# | 127290 | CABLE, 4-pin, mf, 1.3m, molded         | 1      | 1      | 1                      | 1      | 1      | 1      | 1      | 1      |
| 64  | ---    | SLEEVE, wire, .50 id                   | 3      | 3      | 3                      | 3      | 3      | 3      | 3      | 3      |
| 65# | 17G668 | NUT, wire, gray                        | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 66# | 295731 | NUT, wire                              | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |
| 67  | 118459 | FITTING, union, swivel, 3/4 in.        | 2      | 2      | 2                      | 2      | 2      | 2      | 2      | 2      |

Parts

| Ref | Part   | Description                                    | H-40   |        |                       |        | H-50   |        | H-XP3  |        |
|-----|--------|--|--------|--------|-----------------------|--------|--------|--------|--------|--------|
|     |        |  | 17H043 | 17H044 | 17H045                | 17H046 | 17H053 | 17H056 | 17H074 | 17H076 |
|     |        |  | 68     | 113161 | SCREW, flange, hex hd | 2      | 2      | 2      | 2      | 2      |
| 69  | ---    | GROMMET  | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 70  | 24W204 | ENCLOSURE, terminal block                      | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 71  | 17C258 | ENCLOSURE, cover                               | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 72  | 172953 | LABEL, designation                             | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 73  | 16X129 | SCREW, mach, phillips, tooth wash              | 8      | 8      | 8                     | 8      | 8      | 8      | 8      | 8      |
| 74  | ---    | BUSHING, strain relief, 1/2 npt                | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 75  | ---    | NUT, strain relief, 1/2 npt                    | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 76  | ---    | BUSHING, strain relief                         | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 77  | 17G645 | TIE, cable, fir tree                           | 17     | 17     | 17                    | 17     | 17     | 17     | 17     | 17     |
| 78  | 17G599 | COVER, access                                  | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 80  | 17D776 | LABEL, safety, ele encl                        | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 82  | 114269 | GROMMET, rubber                                | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 83  | ---    | SCREW, mach, serrated hex head; 1/4 in, #10-32 | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 84  | 125943 | NUT, serrated flange                           | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 85  | 101032 | BOLT, machine                                  | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 88# | 17G687 | HARNESS, overtemp, reactor, dual               | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 91  | 121309 | FITTING, adapter, sae-orb x jic                | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 93  | ---    | CAP, 9/16-18 jic cap-aluminum                  | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 94  | ---    | CAP, 1/2-20 jic cap-aluminum                   | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 95  | 111218 | CAP, tube, square                              | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 97  | 16W654 | INSULATOR, foam, heater                        | 8      | 8      | 8                     | 8      | 8      | 8      | 8      | 8      |
| 98# | 16U530 | MODULE, sys srg prot                           | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 99# | 15D906 | SUPPRESSOR, round snap ferrite .260            | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 101 | 296607 | TOOL, clevis pin extractor                     | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 102 | 24K207 | KIT, fts, rtd, single hose                     | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 103 | C19843 | SCREW, cap, sockethead                         | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 105 | C20487 | FITTING, nipple, hex                           | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 106 | 114027 | WASHER, flat                                   | 8      | 8      | 8                     | 8      | 8      | 8      | 8      | 8      |
| 107 | ---    | RIVET, pop, 5/32 dia.                          | 8      | 8      | 8                     | 8      | 8      | 8      | 8      | 8      |
| 109 | 117284 | GRILL, fan guard                               | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 110 | 296731 | RESERVOIR, lube hose assy                      | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 113 | 206995 | FLUID, tsl, 1 qt.                              | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 118 | 116915 | CAP, breather filler                           | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 119 | 247792 | FILTER, oil, 18-23 psi bypass                  | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 120 | 15Y118 | LABEL, made in the usa                         | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 121 | 106569 | TAPE, electrical                               | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |

| Ref  | Part   | Description                        | H-40   |        |                       |        | H-50   |        | H-XP3  |        |
|------|--------|------------------------------------|--------|--------|-----------------------|--------|--------|--------|--------|--------|
|      |        |                                    | 17H043 | 17H044 | 17H045                | 17H046 | 17H053 | 17H056 | 17H074 | 17H076 |
|      |        |                                    | 122    | 125871 | TIE, cable, 7.50 inch | 22     | 22     | 22     | 22     | 22     |
| 123  | 17G649 | COVER, motor                       | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 124  | ---    | ENCLOSURE, electrical, hf, 230v    | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 125  | 16W766 | COVER, control, box                | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 126# | 17G671 | CABLE, motor, ot switch            | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 127  | 17G644 | KIT, assembly, pair, inlet         | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 128  | 17G623 | COVER, transformer                 | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 129  | 17G651 | COVER, main                        | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 130  | 17G620 | BRACKET, connector, hose           | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 131  | 17G652 | COVER, belt, upper                 | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 132  | 17G679 | COVER, belt, lower                 | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 133  | 17G622 | BRACKET, retaining, tank, shroud   | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 134  | 17G608 | COVER, heater, right               | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 135  | 17G607 | COVER, heater, left                | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 136◆ | ---    | BAR, 55 gal chem. meas. B side     | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 137◆ | ---    | BAR, 55 gal chem. meas. A side     | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 138# | 17G686 | HARNESS, heater, B                 | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 139  | 15V551 | SHIELD, membrane, adm (10 pack)    | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 140  | 24U854 | MODULE, adm                        | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 141  | 16W596 | LATCH, door                        | 2      | 2      | 2                     | 2      | 2      | 2      | 2      | 2      |
| 142  | 127296 | SCREW, mchn, pnh, w/ext tooth wash | 4      | 4      | 4                     | 4      | 4      | 4      | 4      | 4      |
| 143  | ---    | SPACER, nylon, 1/4 in. od          | 4      | 4      | 4                     | 4      | 4      | 4      | 4      | 4      |
| 144  | 15G782 | HOSE, coupled                      | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 145  | 116793 | FITTING                            | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 146  | 119865 | SCREW, mach, hex serrated          | 4      | 4      | 4                     | 4      | 4      | 4      | 4      | 4      |
| 148  | ---    | LABEL, A/B                         | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 154# | 17B856 | TERMINAL BLOCK                     | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 155  | C19208 | WASHER, lock                       | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 156  | 111714 | SCREW                              | 1      | 1      | 1                     | 1      | 1      | 1      | 1      | 1      |
| 157● | ---    | WASHER, flat, nylon                | 4      | 4      | 4                     | 4      | 4      | 4      | 4      | 4      |

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

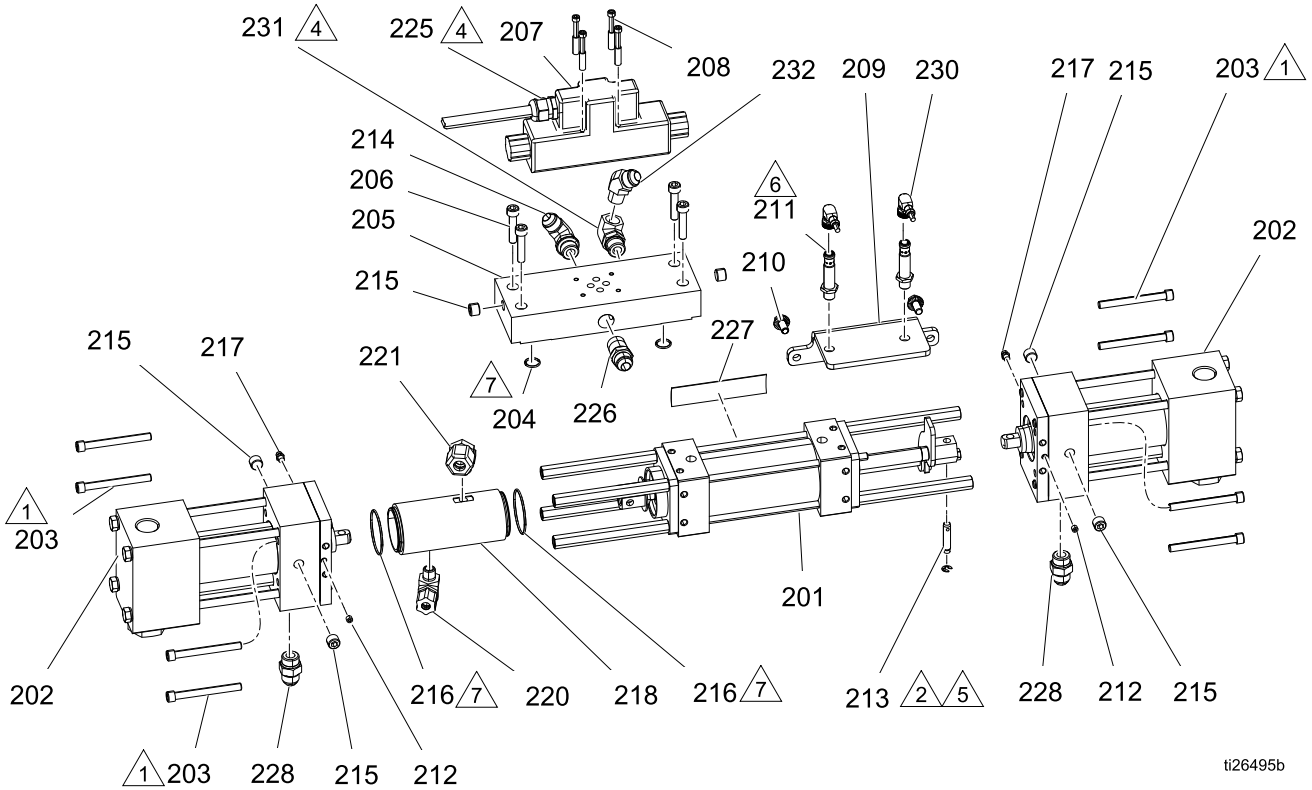
\* Parts included in Compensator Knob Assembly Kit 17G606. Purchase separately.

◆ Parts included in Drum Level Stick Kit 24M174. Purchase separately.

● Parts included with Heater Cover Kits (134, 135). Purchase separately.

# See [Electrical Schematics, page 94](#).

## Proportioner Assembly Parts



ti26495b



Torque to 200 in.-lbs (22.6 N•m).



Pin (213) to be clocked horizontal as shown.

3.

Apply sst pipe sealant to all non-swiveling pipe threads.



Remove cover from directional valve (207) and attach solenoid harness wires (225). See [Electrical Schematics, page 94](#).



Fully seat pin (213) with a hammer and punch.



Thread in proximity switch (211) all the way until it contacts the clocking plate, then back off a 1/4–1/2 turn.

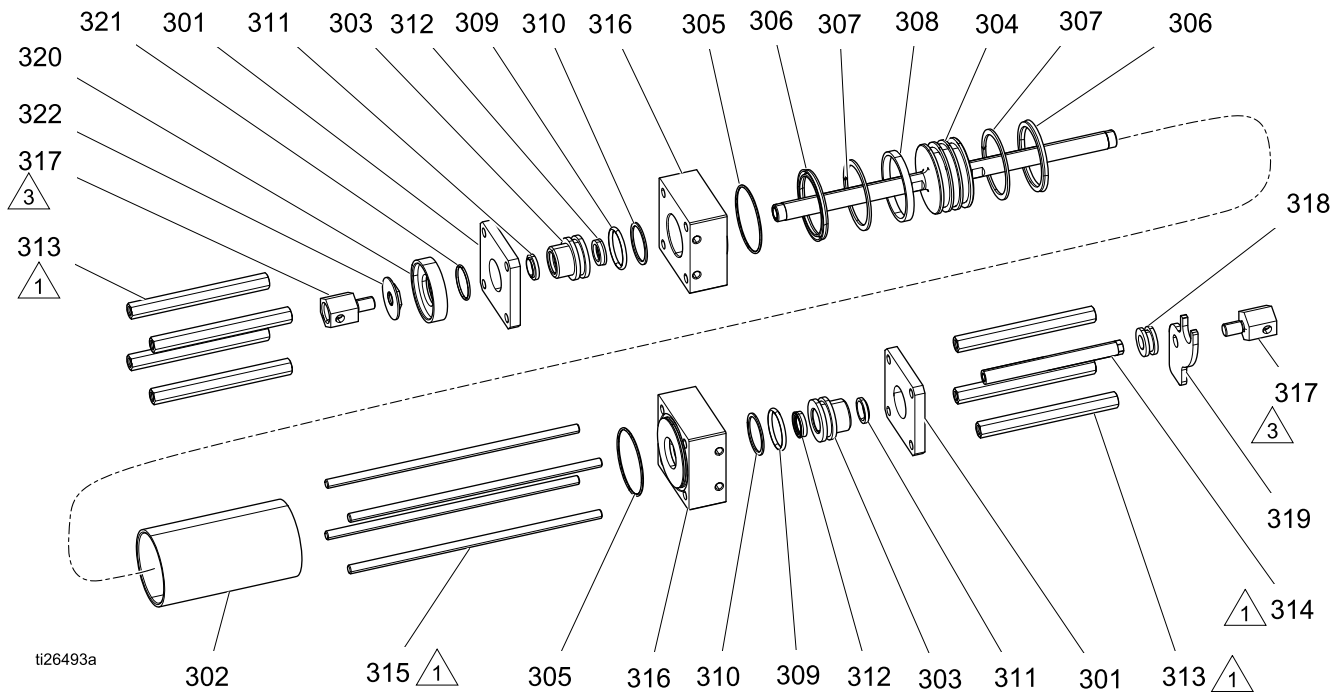




Apply grease to o-rings (204, 216) before assembly.

## Proportioner Assembly Parts

| Ref. | Part   | Description                                  | Qty | Ref. | Part   | Description                                | Qty |
|------|--------|--|-----|------|--------|--|-----|
| 201  | 17G499 | CYLINDER, hydraulic, with spacers            | 1   | 214  | 121312 | FITTING, elbow, sae x jic                  | 2   |
| 202  | 17G597 | PUMP, proportioner, #120 (H-40 only)         | 2   | 215  | 295225 | PLUG, pipe, flush                          | 6   |
|      | 17G598 | PUMP, proportioner, #140 (H-50, H-30 only)   | 2   | 216  | 106258 | PACKING, o-ring                            | 2   |
|      | 17G596 | PUMP, proportioner, # 80 (H-XP2, H-XP3 only) | 2   | 217  | 295229 | FITTING, grease, 1/4-28                    | 2   |
| 203  | 295824 | SCREW, cap, sh, 5/16 x 3                     | 8   | 218  | - - -  | CYLINDER, lube (included in kit 261863)    | 1   |
| 204  | 112793 | PACKING, o-ring                              | 3   | 219  | 295829 | FITTING, plug, 3/8 mpt x .343 lg           | 1   |
| 205  | 17G531 | MANIFOLD, hydraulic                          | 1   | 220  | 295826 | FITTING, elbow, 90, 1/4 mpt x 3/8 in.      | 1   |
| 206  | 113467 | SCREW, cap, socket hd                        | 4   | 221  | 295397 | FITTING, elbow, 3/8 mpt x 1/2 in.          | 1   |
| 207  | 120299 | VALVE, directional, hydraulic                | 1   | 225  | 17G690 | HARNESS, valve, solenoid, hr2              | 1   |
| 208  | C19986 | SCREW, cap, socket, hd                       | 4   | 226  | 121319 | FITTING, adapter, npt x jic                | 1   |
| 209  | - - -  | BRACKET, proximity switch                    | 1   | 228  | 121309 | FITTING, adapter, sae-orb x jic            | 2   |
| 210  | 111800 | SCREW, cap, hex hd                           | 2   | 230  | 17G669 | CABLE, gca, m12 (m), m12( f/f), 2 m, s/r/r | 1   |
| 211  | 17G605 | SENSOR, proximity, switch                    | 2   | 231  | 120807 | FITTING, elbow; 3/4-16 x 3/8-18 npt(f)     | 1   |
| 212  | M70430 | SCREW, set, socket, 1/4 28 x .19             | 2   | 232  | 122533 | FITTING, 45, elbow; #8 JIC x 3/8 npt       | 1   |
| 213  | 296653 | PIN, clevis                                  | 2   |      |        |  |     |

## Hydraulic Cylinder Parts, 17G499

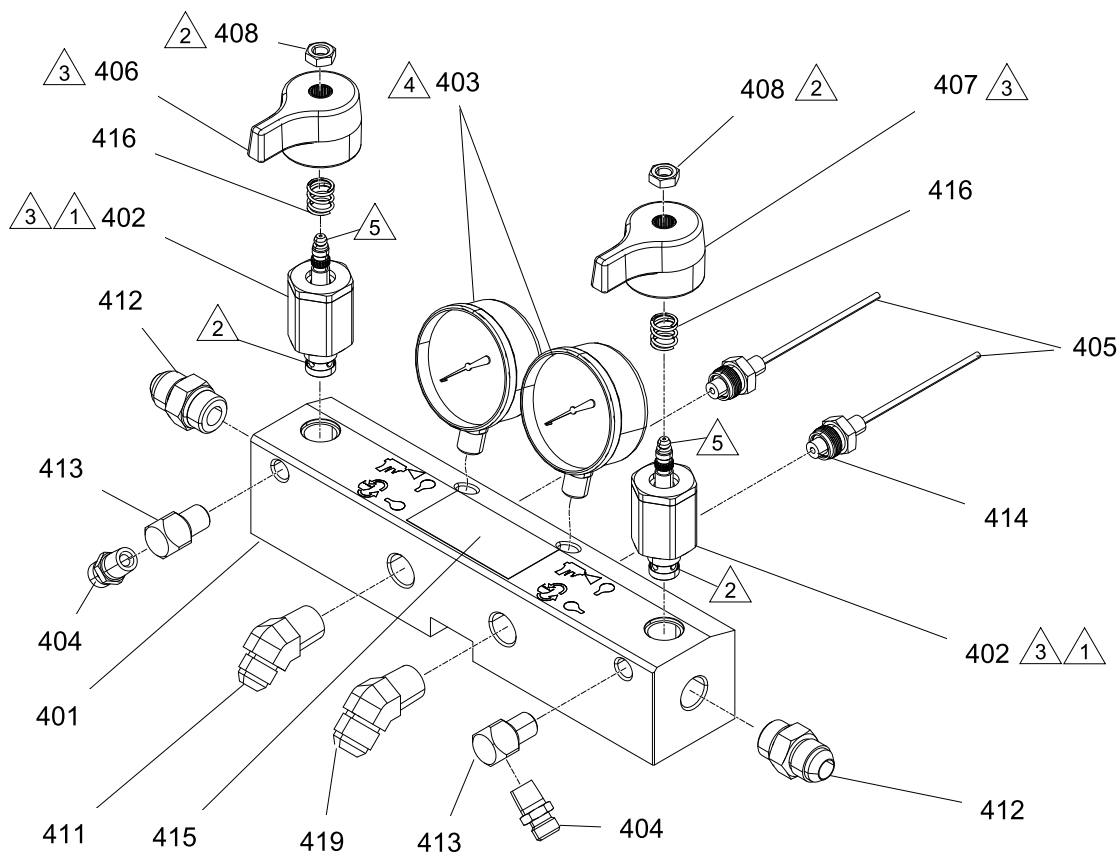


-  Torque spacers (313, 314) and rod (315) to 200 in-lbs (22.5 N·m).
-  Torque to 40 +/- 5 ft-lbs (345 +/- 54 N·m)
- 4. Apply grease to all soft parts before assembly.




| Ref. | Part   | Description                 | Qty | Ref. | Part   | Description                                      | Qty |
|------|--------|-----------------------------|-----|------|--------|--|-----|
| 301  | 295029 | PLATE, retainer             | 2   | 313  | 295032 | SPACER, proportioner                             | 7   |
| 302  | 295030 | CYLINDER                    | 1   | 314  | 261502 | SPACER, reversing switch                         | 1   |
| 303* | 295031 | BUSHING, rod                | 2   | 315  | 295034 | ROD, tie   | 4   |
| 304  | 296642 | PISTON, cylinder, hydraulic | 1   | 316  | 295035 | BLOCK, port                                      | 2   |
| 305* | 295640 | O-RING                      | 2   | 317  | 261864 | CLEVIS, hex                                      | 2   |
| 306* | 295641 | SEAL, u-cup                 | 2   | 318  | 17G527 | BUSHING, clocking                                | 1   |
| 307* | 295642 | RING, back-up               | 2   | 319  | 17G529 | PLATE, clocking, driver                          | 1   |
| 308* | 296643 | RING, wear                  | 1   | 320  | ---    | ADAPTER, lube, cylinder (included in kit 261863) | 1   |
| 309* | 158776 | PACKING, o-ring             | 2   | 321  | 177156 | PACKING, o-ring                                  | 1   |
| 310* | 295644 | RING, back-up               | 2   | 322  | 295852 | NUT, jam, baffle                                 | 1   |
| 311* | 295645 | WIPER, rod                  | 2   |      |        |  |     |
| 312* | 296646 | SEAL, shaft                 | 2   |      |        |  |     |




\* Parts are also included in Hydraulic Cylinder Repair Kit 296785. Purchase separately.

## Fluid Manifold



ti26517a

-  Torque to 355–395 in.-lbs (40–44.6 N•m)
-  Apply sealant (113500) to threads.
-  Valve must be closed with handle position as shown on drawing.

-  Apply PTFE tape and thread sealant to gauge threads.
-  Apply grease on valve.
-  Apply PTFE tape or thread sealant to all tapered threads.

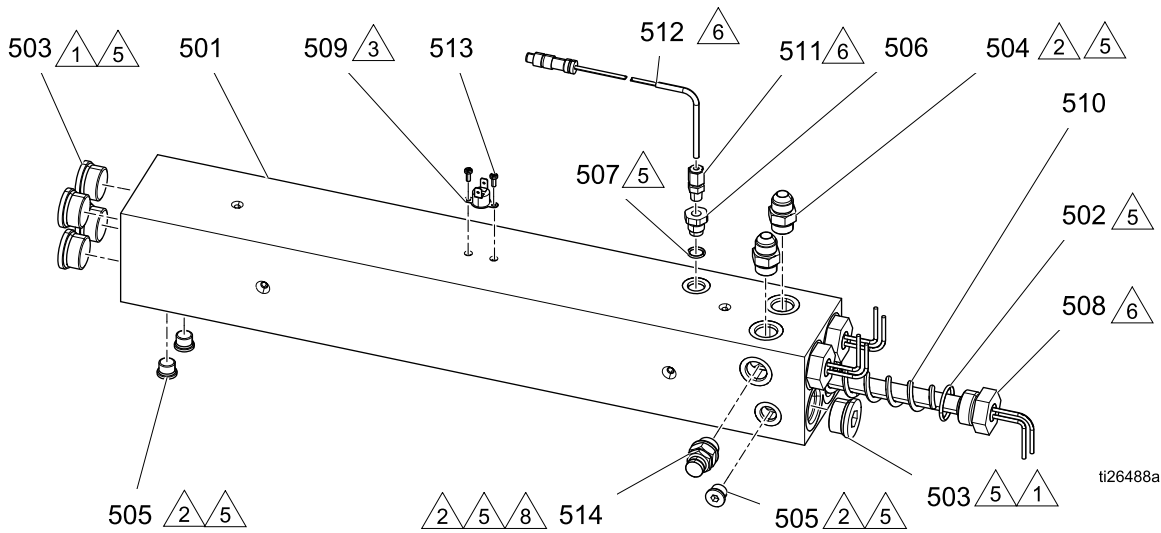
| Ref   | Part   | Description                    | Qty | Ref  | Part   | Description                | Qty |
|-------|--------|--------------------------------|-----|------|--------|----------------------------|-----|
| 401   | 255228 | MANIFOLD, fluid                | 1   | 412  | 121309 | FITTING, 3/4 SAE x 1/2 JIC | 2   |
| 402◇  | 247824 | KIT, valve, cartridge, drain   | 2   | 413  | 100840 | FITTING, elbow, street     | 2   |
| 402a◇ | 158674 | O-RING, BUNA-N (not shown)     | 1   | 414  | 111457 | O-RING, PTFE               | 2   |
| 402b◇ | 247779 | SEAL, seat, valve (not shown)  | 1   | 415▲ | 189285 | LABEL, hot surface         | 1   |
| 403   | 102814 | GAUGE, press, fluid            | 2   | 416  | 150829 | SPRING, compression        | 2   |
| 404   | 162453 | FITTING, 1/4 NPSM X 1/4 NPT    | 2   | 419  | 117557 | NIPPLE, #10 JIC x 1/2 NPT  | 1   |
| 405   | 15M669 | SENSOR, pressure, fluid outlet | 2   |      |        |                            |     |
| 406   | 247788 | HANDLE, red                    | 1   |      |        |                            |     |
| 407   | 247789 | HANDLE, blue                   | 1   |      |        |                            |     |
| 408   | 112309 | NUT, hex, jam                  | 2   |      |        |                            |     |
| 411   | 117556 | NIPPLE, #8 JIC x 1/2 NPT       | 1   |      |        |                            |     |

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

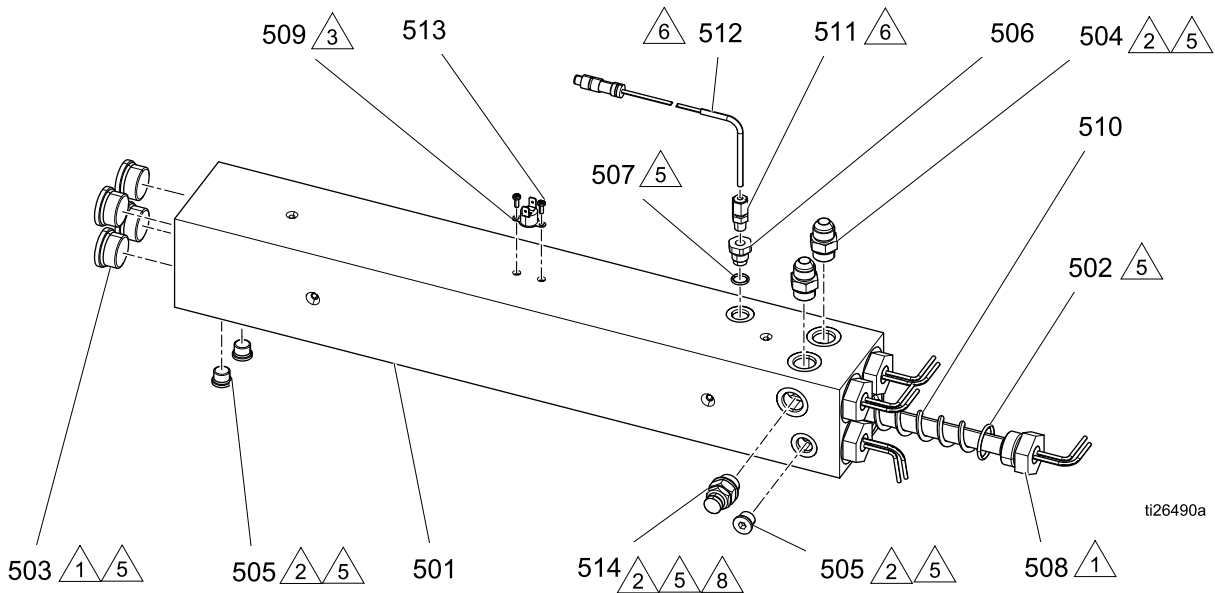
◇ Included in the following complete valve kits:  
 ISO Valve Kit (left/red) handle 255149.  
 Resin Valve Kit (right/blue handle) 255150.  
 Valve Set Kit (both handles and grease gun) 255148.

## Heater Parts

### 17G646, 7.5kw Single Zone Heater



### 17G648, 10.2 kw Single Zone Heater



1 Torque to 120 ft-lbs (163 N•m).

2 Torque to 23 ft-lbs (31 N•m).

3 Apply thermal paste.

4. Apply pipe sealant and PTFE tape to all non-swiveling threads and threads without o-rings.

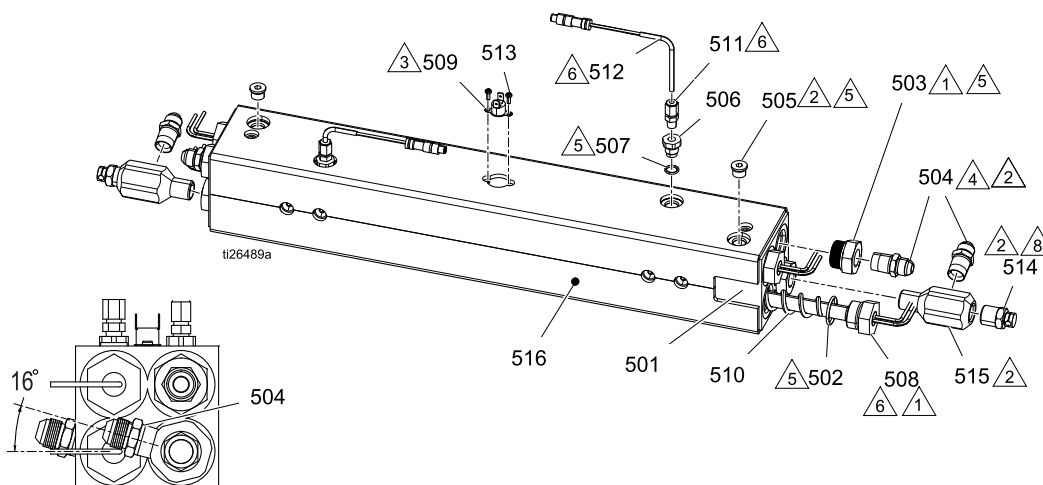
5 Apply lithium grease lubricant to o-rings before assembling in block (501).

6 Orientate sensor as shown. Insert probe until it bottoms on heating element. Tighten ferrule on sensor probe one turn past finger tight or 180 in-lbs (20.3 N•m).

8 Orient rupture disc housing (514) with exhaust hole pointing away from fitting (508).



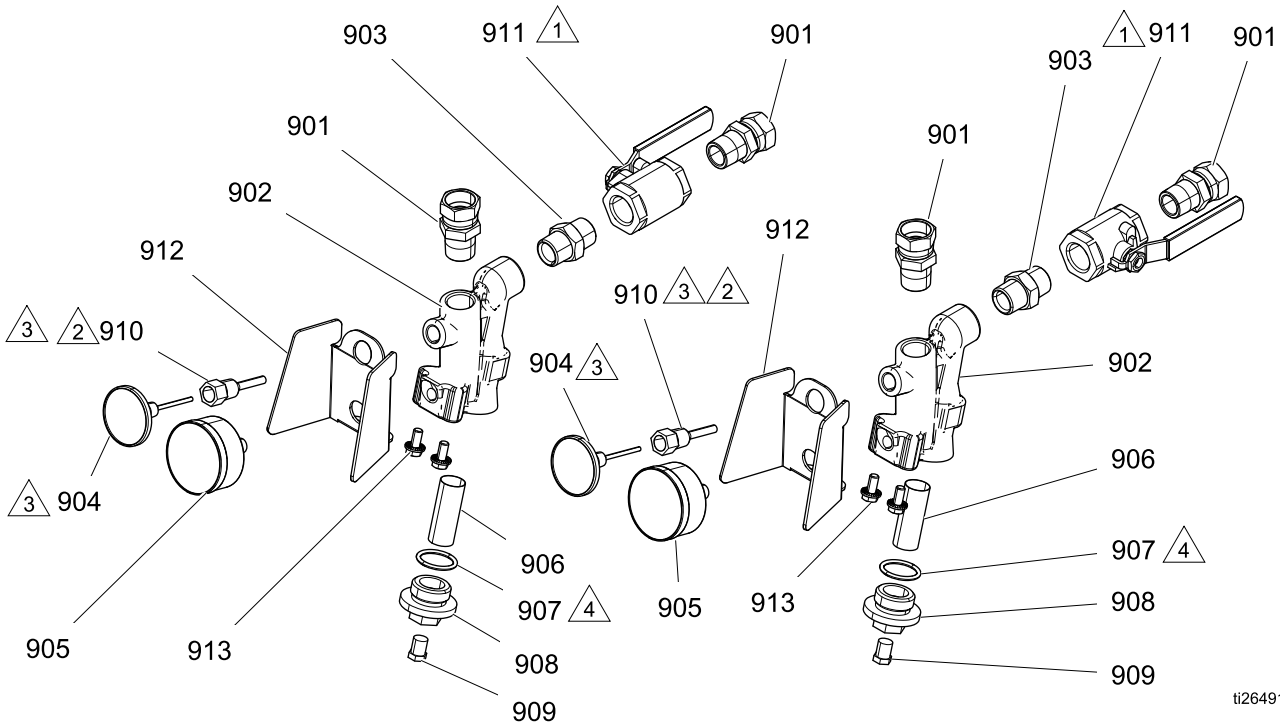
# 17G647, 10.2 kW Dual Zone Heater



- 1 Torque to 120 ft-lbs (163 N•m).
- 2 Torque to 23 ft-lbs (31 N•m).
- 3 Apply thermal paste.
- 4. Apply pipe sealant and PTFE tape to all non-swiveling threads and threads without o-rings.
- 5 Apply lithium grease lubricant to o-rings before assembling in block (501).
- 6 Orientate sensor as shown. Insert probe until it bottoms on heating element. Tighten ferrule on sensor probe one turn past finger tight or 180 in-lbs (20.3 N•m).
- 8 Orient rupture disc housing (514) with exhaust hole pointing away from fitting (505).

| Ref | Part   | Description   | Quantities |        |        |
|-----|--------|---|------------|--------|--------|
|     |        |   | 17G646     | 17G648 | 17G647 |
| 501 | - - -  | HEATER, housing   | 1          | 1      | 1      |
| 502 | 124132 | O-RING  | 3          | 4      | 4      |
| 503 | 15H305 | FITTING, plug hollow hex 1-3/16 sae                         | 5          | 4      |        |
|     | 15H302 | FITTING, 1/2-14 npt(f) x 3/16-12 UN-2A                      |            |        | 4      |
| 504 | 121309 | FITTING, adapter, sae-orb x jic                             | 2          | 2      |        |
|     | 121319 | FITTING, adapter, npt x JIC                                 |            |        | 4      |
| 505 | 15H304 | FITTING, plug 9/16 sae                                      | 3          | 3      | 2      |
| 506 | 15H306 | ADAPTER, thermocouple, 9/16 x 1/8                           | 1          | 1      | 2      |
| 507 | 120336 | O-RING, packing   | 1          | 1      | 2      |
| 508 | 16A110 | HEATER, immersion, (2550w, 230v)                            | 3          | 4      | 4      |
| 509 | 15B137 | SWITCH, over temperature                                    | 1          | 1      | 1      |
| 510 | 15B135 | MIXER, immersion heater                                     | 3          | 4      | 4      |
| 511 | 123325 | FITTING, compression, 1/8npt, ss                            | 1          | 1      | 2      |
| 512 | 124262 | SENSOR, rtd, 1kohm, 90deg, 4pin, tip                        | 1          | 1      | 2      |
| 513 | - - -  | SCREW, mach, pnh, .375 in, #6-32                            | 2          | 2      | 2      |
| 514 | 247520 | HOUSING, rupture disc                                       | 1          | 1      |        |
|     | 248187 | HOUSING, rupture disc                                       |            |        | 2      |
| 515 | 15R873 | FITTING, tee, 1/2-14 npt(m) x 1/2-14 npt(f) x 1/2-14 npt(f) |            |        | 1      |
| 516 | 15M177 | INSULATOR, foam, heater                                     |            |        | 1      |

## Fluid Inlet Kits 17G644, Standard



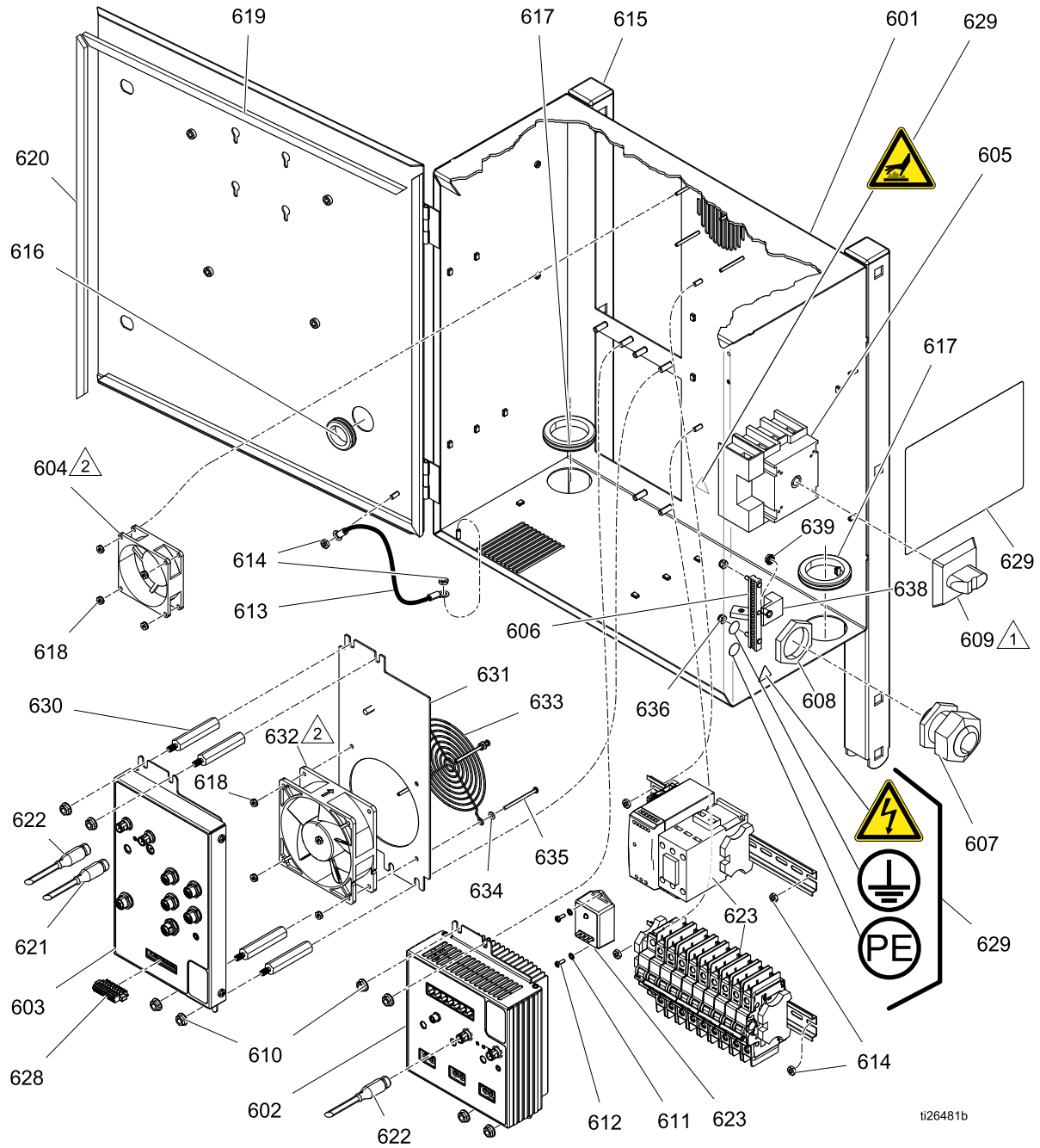
ti26491a

- 1 Orientate ball valves as shown.
- 2 Apply tape to threads of housing.
- 3 Apply thermal lubricant completely covering thermometer probe (904) before inserting in to housing (910).
- 4 Apply grease to o-ring (907).

- 5. Apply sealant to all tapered pipe threads. Apply sealant to female threads. Brush into, at least, the first four threads and approximately 1/4 turn wide.
- 6. Orientate gauges vertically within assembly.

| Ref. | Part   | Description                       | Qty. | Ref. | Part   | Description                             | Qty. |
|------|--------|-----------------------------------|------|------|--------|---|------|
| 901  | 118459 | FITTING, union, swivel<br>3/4 in. | 4    | 908  | 16V879 | CAP, filter                             | 2    |
| 902  | 16W714 | MANIFOLD, strainer,<br>inlet      | 2    | 909  | 555808 | PLUG, 1/4 mp with hex<br>hd             | 2    |
| 903  | C20487 | FITTING, nipple, hex              | 2    | 910  | 15D757 | HOUSING, thermometer                    | 2    |
| 904  | 16W117 | THERMOMETER, dial                 | 2    | 911  | 109077 | VALVE, ball 3/4 npt                     | 2    |
| 905  | 16T872 | GAUGE, pressure, fluid            | 2    | 912  | 253481 | GUARD, gauge,<br>y-strainer             | 2    |
| 906  | 180199 | FILTER, replacent                 | 2    | 913  | 111800 | SCREW, cap, hex hd;<br>5/8 in., 5/16-18 | 4    |
| 907  | 128061 | PACKING, o-ring, FX75             | 2    |      |        |   |      |

# Electrical Enclosure



- 1 Install disconnect switch (609) so that up is ON and left is OFF.
- 2 Mount fans (604, 632) with arrows pointing towards the panel.

ti26481b

Parts

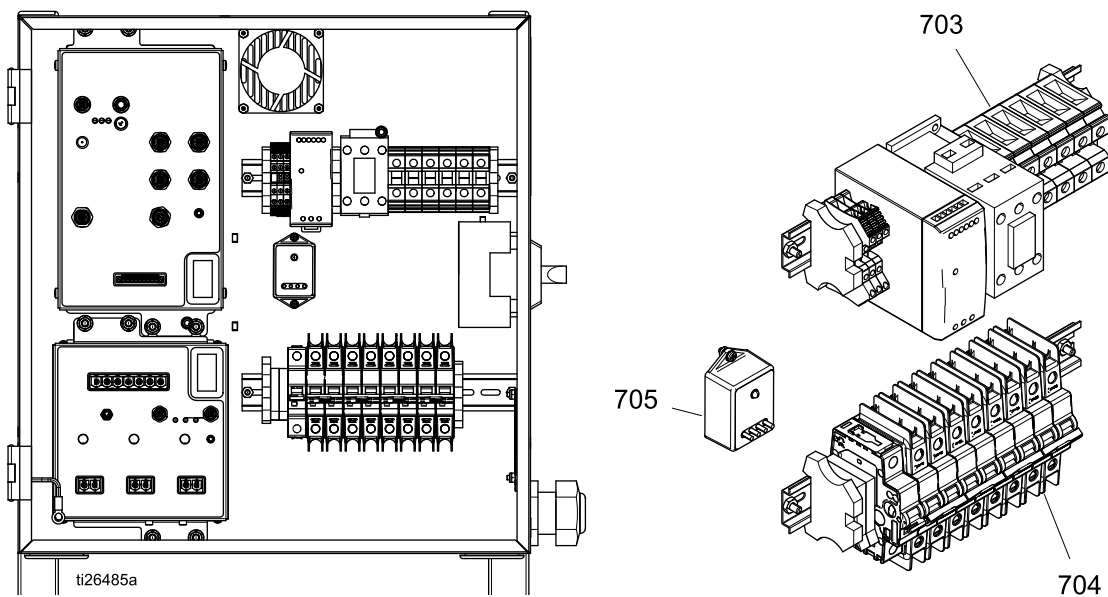
| Ref  | Part   | Description                             | Quantity    |                          |                          |
|------|--------|---|-------------|--------------------------|--------------------------|
|      |        |   | H-30, H-XP2 | H-40, H-50, H-XP3 (230V) | H-40, H-50, H-XP3 (400V) |
| 601  | - - -  | ENCLOSURE, electrical                   | 1           | 1                        | 1                        |
| 602  | 24U855 | MODULE, TCM                             | 1           | 1                        | 1                        |
| 603  | 24Y263 | MODULE, HCM                             | 1           | 1                        | 1                        |
| 604  | 24U848 | FAN, cooling, 80mm, 24vdc               | 1           | 1                        | 1                        |
| 605  | 24R736 | SWITCH, disconnect, door mounted        | 1           | 1                        | 1                        |
| 606  | 17G653 | BAR, ground, kit                        | 1           | 1                        | 1                        |
| 607  | 255047 | BUSHING, strain relief, m40 thread      | 1           | 1                        | 1                        |
| 608  | 255048 | NUT, strain relief, m40 thread          | 1           | 1                        | 1                        |
| 609  | 123967 | KNOB, operator disconnect               | 1           | 1                        | 1                        |
| 610  | 115942 | NUT, hex, flange head                   | 8           | 8                        | 8                        |
| 611  | 103181 | WASHER, lock ext                        | 2           | 2                        | 2                        |
| 612  | - - -  | SCREW, mach, pnh, .375 in, #6-32        | 2           | 2                        | 2                        |
| 613  | 194337 | WIRE, grounding, door                   | 1           | 1                        | 1                        |
| 614  | 113505 | NUT, keps, hex hd                       | 6           | 6                        | 6                        |
| 615  | 111218 | CAP, tube, square                       | 2           | 2                        | 2                        |
| 616  | 114269 | GROMMET, rubber                         | 1           | 1                        | 1                        |
| 617  | - - -  | GROMMET, 1.75 id x .12 groove           | 2           | 2                        | 2                        |
| 618  | 127278 | NUT, keps, hex                          | 4           | 8                        | 8                        |
| 619  | 16W925 | GASKET, enclosure, foam                 | 2           | 2                        | 2                        |
| 620  | 16W926 | GASKET, enclosure, foam                 | 2           | 2                        | 2                        |
| 621* | 24R735 | CABLE, can power, m12 fem, pigtail      | 1           | 1                        | 1                        |
| 622* | 127068 | CABLE, can, female/female 1.0m          | 2           | 2                        | 2                        |
| 623* | - - -  | KIT, din rail and harness module        | 1           |                          |                          |
|      | - - -  | KIT, din rail and harness module, 400V  |             |                          | 1                        |
|      | - - -  | KIT, din rail and harness module, 230V  |             | 1                        |                          |
| 627* | 17G689 | HARNESS, hcm ground                     | 1           | 1                        | 1                        |
| 628  | 17G670 | CONNECTOR, 9 pin, sprg cg, retain screw | 1           | 1                        | 1                        |
| 629  | 16X049 | LABEL, safety                           | 1           | 1                        | 1                        |
| 630  | 17G625 | SPACER, hex, mf, 1/4-20, 2.5 in.        |             | 4                        | 4                        |
| 631  | - - -  | BRACKET, fan, adapter, hcm              |             | 1                        | 1                        |
| 632  | 17G650 | FAN, 120 mm, 24 vdc, 158 cfm            |             | 1                        | 1                        |
| 633  | 115836 | GUARD, finger                           |             | 1                        | 1                        |
| 634  | 151395 | WASHER, flat                            |             | 4                        | 4                        |
| 635  | 117723 | SCREW, mach, x rec, panhd               |             | 4                        | 4                        |
| 636  | 109466 | NUT, lock, hex                          | 2           | 2                        | 2                        |
| 637  | 17D776 | LABEL, electrical enclosure; not shown  |             | 1                        | 1                        |
|      | 17D775 | LABEL, electrical enclosure; not shown  | 1           |                          |                          |
| 638  | 117666 | TERMINAL, ground                        | 1           | 1                        | 1                        |
| 639  | 115942 | NUT, hex, flange head                   | 1           | 1                        | 1                        |

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

\* See [Electrical Schematics, page 94](#).

## System Din Rail and Harness Module Kits

### H-30, H-XP2 Din Rail and Harness Module Kit



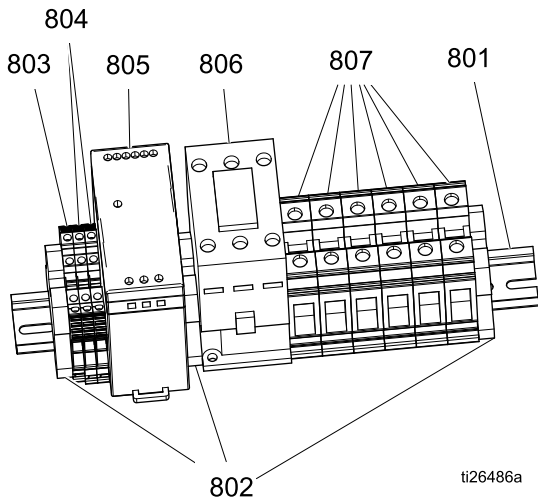
| Ref  | Part   | Description                        | Qty. |
|------|--------|------------------------------------|------|
| 701* | 17G691 | HARNESS, breaker module            | 1    |
| 702* | 17G692 | HARNESS, hose out                  | 1    |
| 703◇ | - - -  | MODULE, din rail, power supply     | 1    |
| 704● | - - -  | MODULE, din rail, circuit breakers | 1    |
| 705  | 16U530 | MODULE, system surge protector     | 1    |
| 709* | 17G693 | HARNESS, motor, low flow, 4 HP     | 1    |

\* See *Electrical Schematics, page 94.*

◇ See *H-30, H-XP2 Power Supply and Terminal Block Module, page 90.*

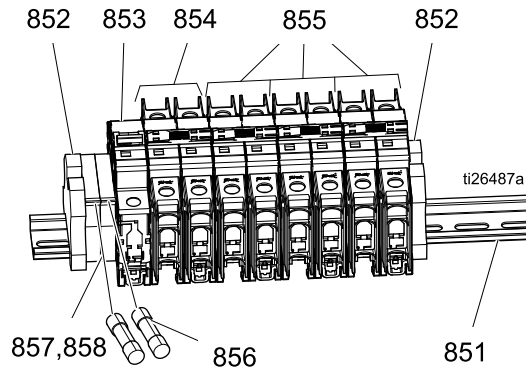
● See *H-30, H-XP2 System Circuit Breaker Module, page 90.*

### H-30, H-XP2 Power Supply and Terminal Block Module



| Ref. | Part   | Description                  | Qty. |
|------|--------|------------------------------|------|
| 801  | ---    | RAIL, mount, 18 mm slot      | 1    |
| 802  | 255045 | BLOCK, clamp end             | 3    |
| 803  | 24R722 | BLOCK, terminal PE, quad, AB | 1    |
| 804  | 24R723 | BLOCK, terminal, quad M4, AB | 2    |
| 805  | 126453 | POWER SUPPLY, 24V            | 1    |
| 806  | 255022 | RELAY, contactor, 65A, 3p    | 1    |
| 807  | 24R724 | BLOCK, terminal, UT35        | 6    |

### H-30, H-XP2 System Circuit Breaker Module

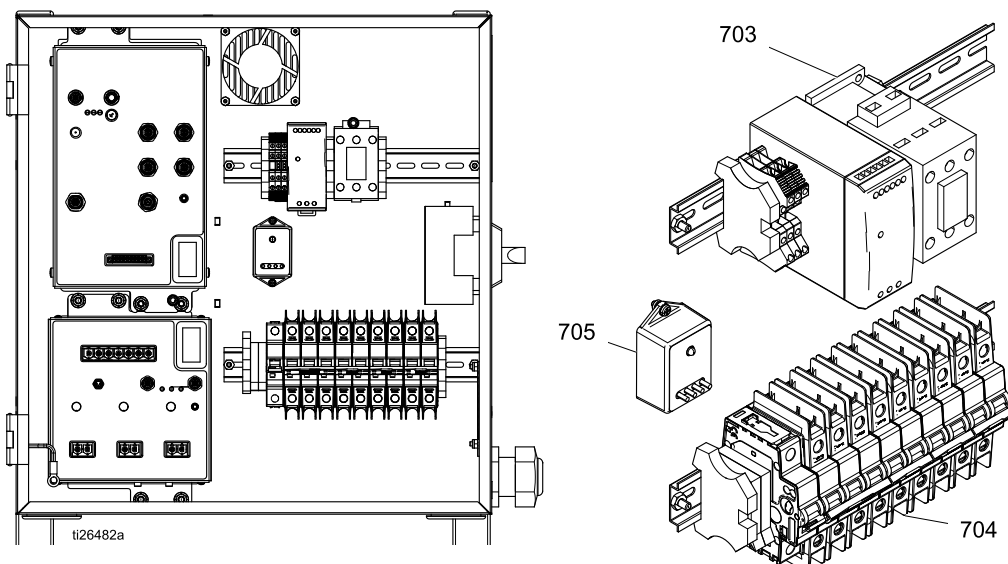


| Ref. | Part   | Description                            | Qty. |
|------|--------|--|------|
| 851  | ---    | RAIL, mount, 18 mm slot                | 1    |
| 852  | 255045 | BLOCK, clamp end                       | 2    |
| 853  | 17A319 | CIRCUIT, breaker, 1P, 50A, UL1077, AB  | 1    |
| 854  | 17A314 | CIRCUIT, breaker, 2P, 20A, UL489, AB   | 1    |
| 855  | 17A317 | CIRCUIT, breaker, 2P, 40A, UL489, AB   | 3    |
| 856  | 17G667 | FUSE, 2.5 amp, 250V, time-lag          | 2    |
| 857  | 255043 | HOLDER, fuse terminal block, 5 x 20 mm | 2    |
| 858  | ---    | COVER, end, fuse block                 | 1    |

## H-40, H-50, H-XP3 Din Rail and Harness Module Kits

H-40, H-50, H-XP3 (200–240V)

H-40, H-50, H-XP3 (350–415V)



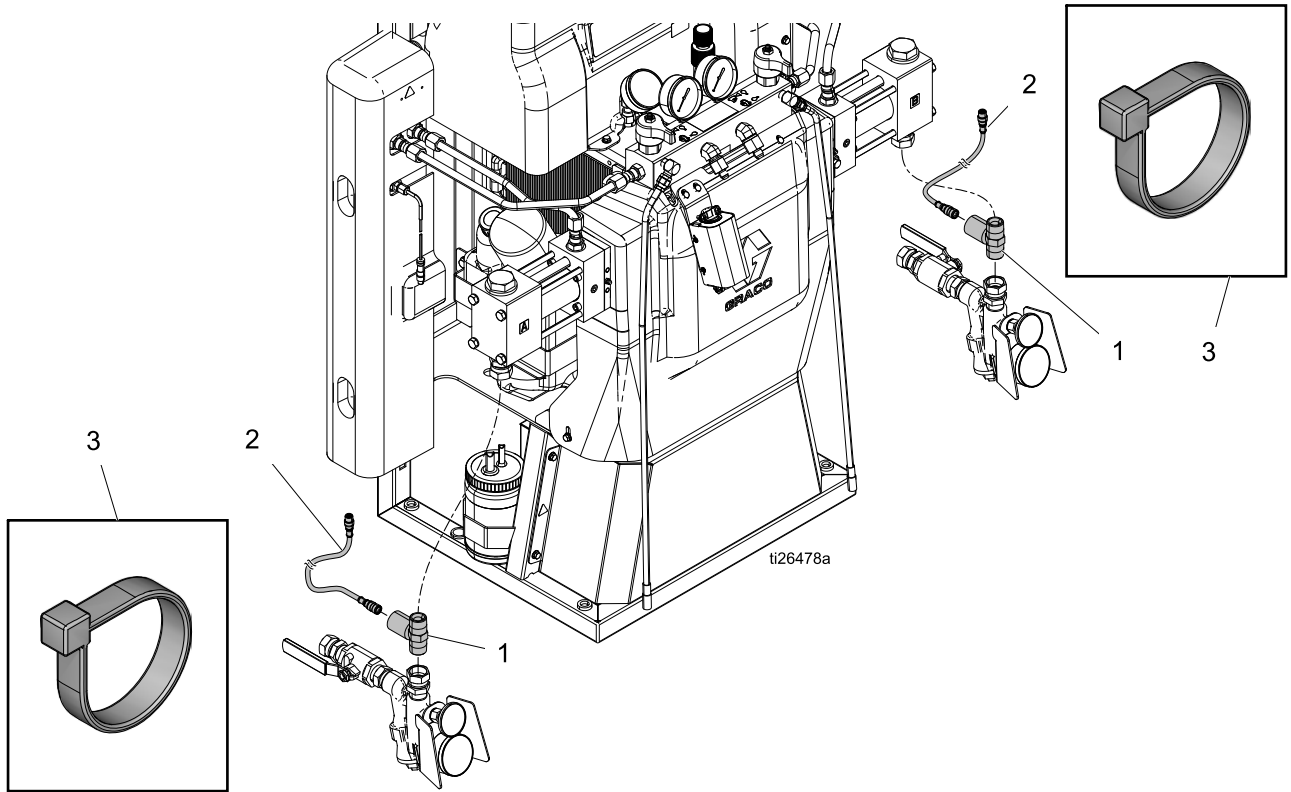
| Ref  | Part   | Description                        | Quantity  |           |
|------|--------|------------------------------------|-----------|-----------|
|      |        |                                    | 200–240 V | 350–415 V |
| 701* | 17G691 | HARNESS, breaker module            | 1         | 1         |
| 702* | 17G692 | HARNESS, hose out                  | 1         | 1         |
| 703★ | - - -  | MODULE, din rail, power supply     | 1         | 1         |
| 704● | - - -  | MODULE, din rail, circuit breakers | 1         | 1         |
| 705  | 16U530 | MODULE, system surge protector     | 1         | 1         |
| 709* | 17G688 | HARNESS, motor, 7.5 HP             | 1         | 1         |

\* See *Electrical Schematics, page 94.*

★ See *H-40, H-50, H-XP3 Power Supply and Terminal Block Module, page 93.*

● See *H-40, H-50, H-XP3 System Circuit Breaker Module, page 93.*

## Inlet Sensor Kit

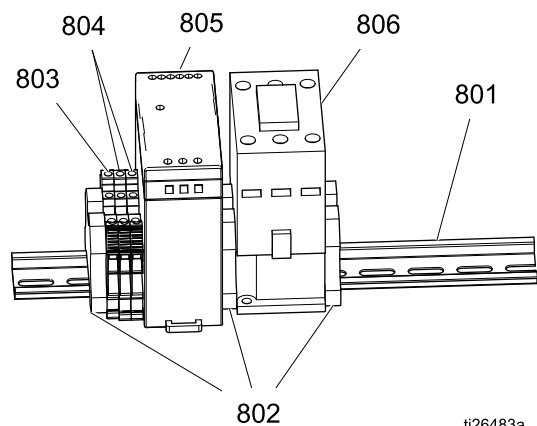


### 17F837

| Ref. | Part   | Description                                 | Qty. |
|------|--------|---|------|
| 1    | ----   | ASSEMBLY, transducer;<br>includes 1a and 1b | 2    |
| 1a   | 624545 | FITTING, nipple, pipe                       | 2    |
| 1b   | 24U851 | TRANSDUCER,<br>includes foam                | 2    |
| 2    | 16W130 | CABLE, M12 5p, f x m,<br>2.0 m              | 2    |
| 3    | 125871 | TIE, cable, 7.5 in.                         | 8    |



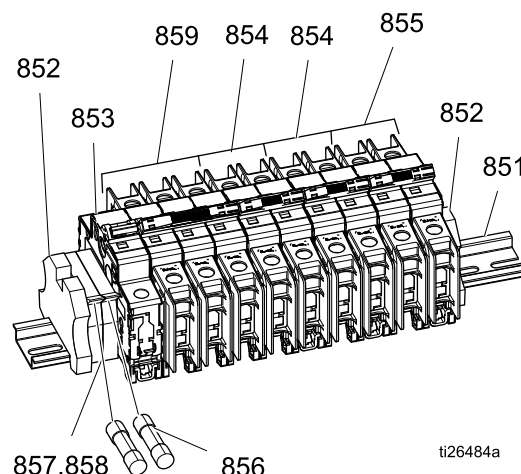
### H-40, H-50, H-XP3 Power Supply and Terminal Block Module



ti26483a

| Ref. | Part   | Description                  | Qty. |
|------|--------|------------------------------|------|
| 801  | ---    | RAIL, mount, 18 mm slot      | 1    |
| 802  | 255045 | BLOCK, clamp end             | 3    |
| 803  | 24R722 | BLOCK, terminal PE, quad, AB | 1    |
| 804  | 24R723 | BLOCK, terminal, quad M4, AB | 2    |
| 805  | 126453 | POWER SUPPLY, 24V            | 1    |
| 806  | 255022 | RELAY, contactor, 65A, 3p    | 1    |

### H-40, H-50, H-XP3 System Circuit Breaker Module



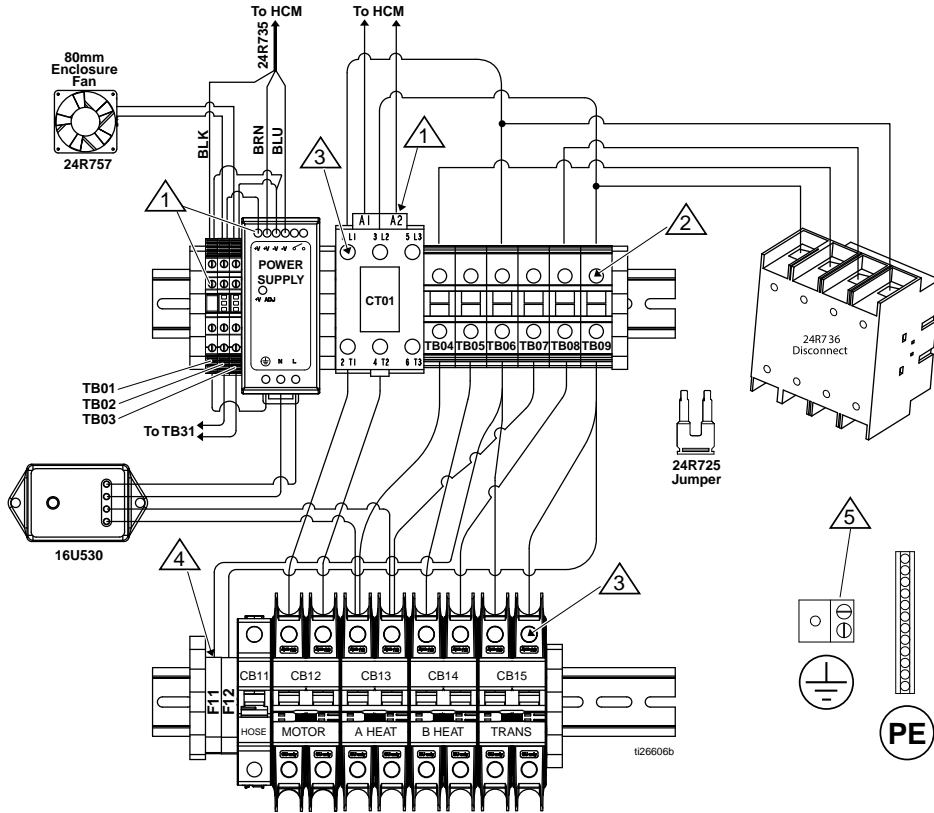
ti26484a

| Ref. | Part   | Description                            | Qty. |
|------|--------|--|------|
| 851  | ---    | RAIL, mount, 18 mm slot                | 1    |
| 852  | 255045 | BLOCK, clamp end                       | 2    |
| 853  | 17A319 | CIRCUIT, breaker, 1P, 50A, UL1077, AB  | 1    |
| 854  | 17G723 | CIRCUIT, breaker, 2P, 60A, UL489, AB   | 2    |
| 855  | 17A317 | CIRCUIT, breaker, 2P, 40A, UL489, AB   | 1    |
| 856  | 17G667 | FUSE, 2.5 amp, 250V, time-lag          | 2    |
| 857  | 255043 | HOLDER, fuse terminal block, 5 x 20 mm | 2    |
| 858  | ---    | COVER, end, fuse block                 | 1    |
| 859  | 17G724 | CIRCUIT, breaker, 3P, 20A, UL489, AB   | 1    |

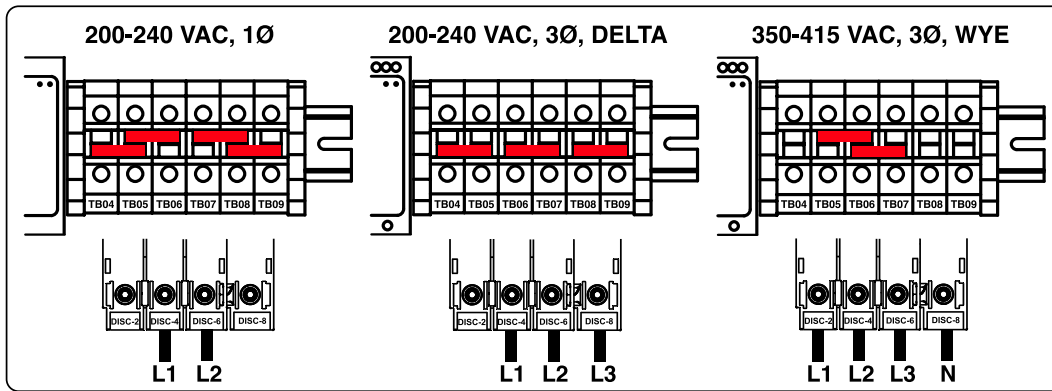
# Electrical Schematics

## H-30, H-XP2 DIN Assembly Schematic

See [System Din Rail and Harness Module Kits, page 89](#), for additional part numbers.



### INCOMING POWER DIAGRAM

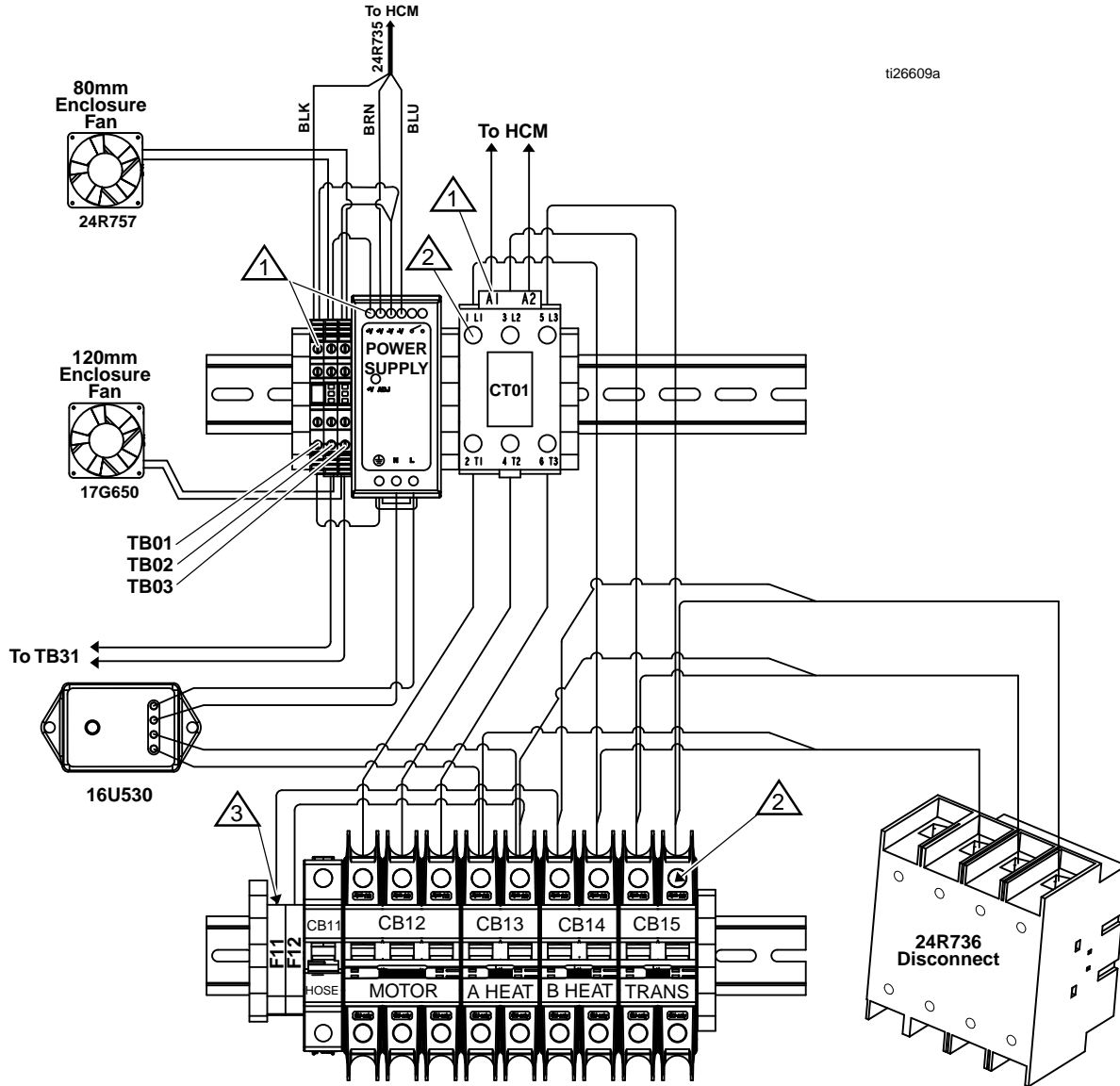


17D775

- 1 Torque to 6–8 in.-lbs (0.7– 0.9 N•m)
- 2 Torque to 28–33 in.-lbs (3.1– 3.8 N•m)
- 3 Torque to 23–26 in.-lbs (2.6–2.9 N•m)
- 4 Torque to 3–5 in.-lbs (0.3–0.6 N•m)
- 5 Connect customer-supplied ground wire.

# H-40, H-50, H-XP3 DIN Assembly Schematics (200–240V)

See [System Din Rail and Harness Module Kits](#), page 89, for additional part numbers.



ti26609a

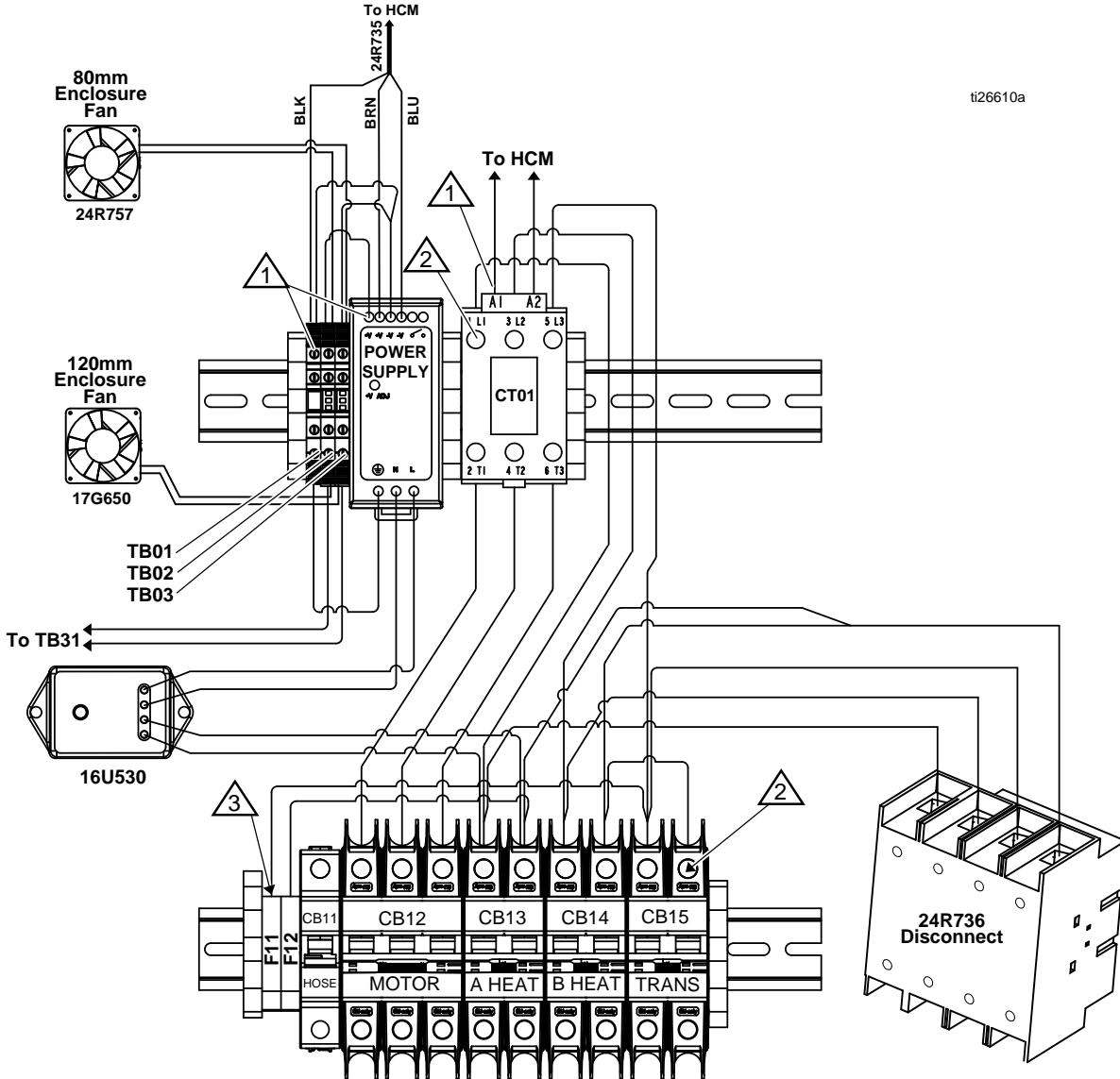
1 Torque to 6–8 in.-lbs (0.7– 0.9 N•m).

2 Torque to 23–26 in.-lbs (2.6–2.9 N•m).

3 Torque to 3–5 in.-lbs (0.3– 0.6 N•m).

## H-40, H-50, H-XP3 DIN Assembly Schematics (350–415V)

See [System Din Rail and Harness Module Kits](#), page 89, for additional part numbers.



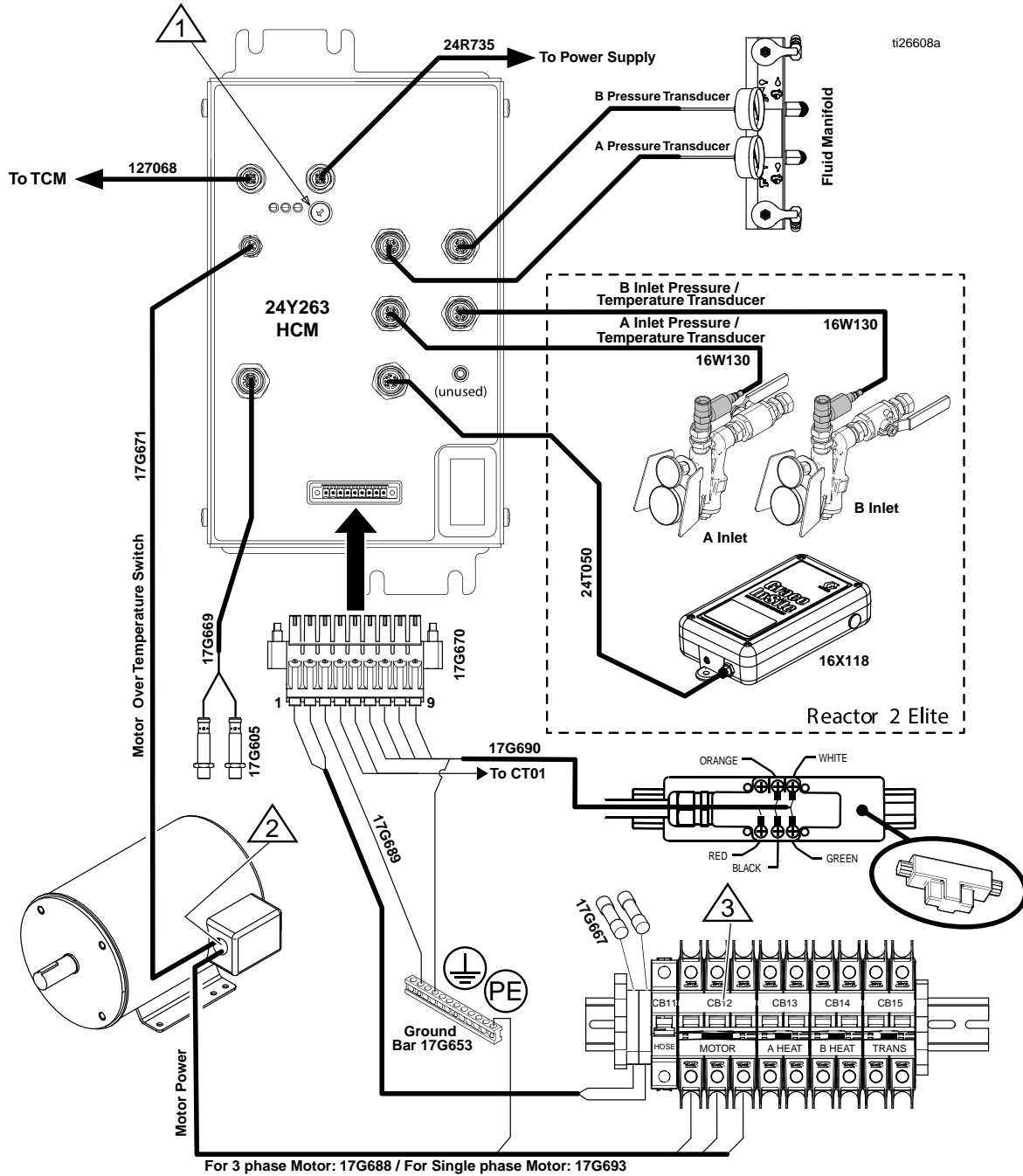
ti26610a

1 Torque to 6–8 in.-lbs (0.7– 0.9 N•m).

2 Torque to 23–26 in.-lbs (2.6–2.9 N•m).

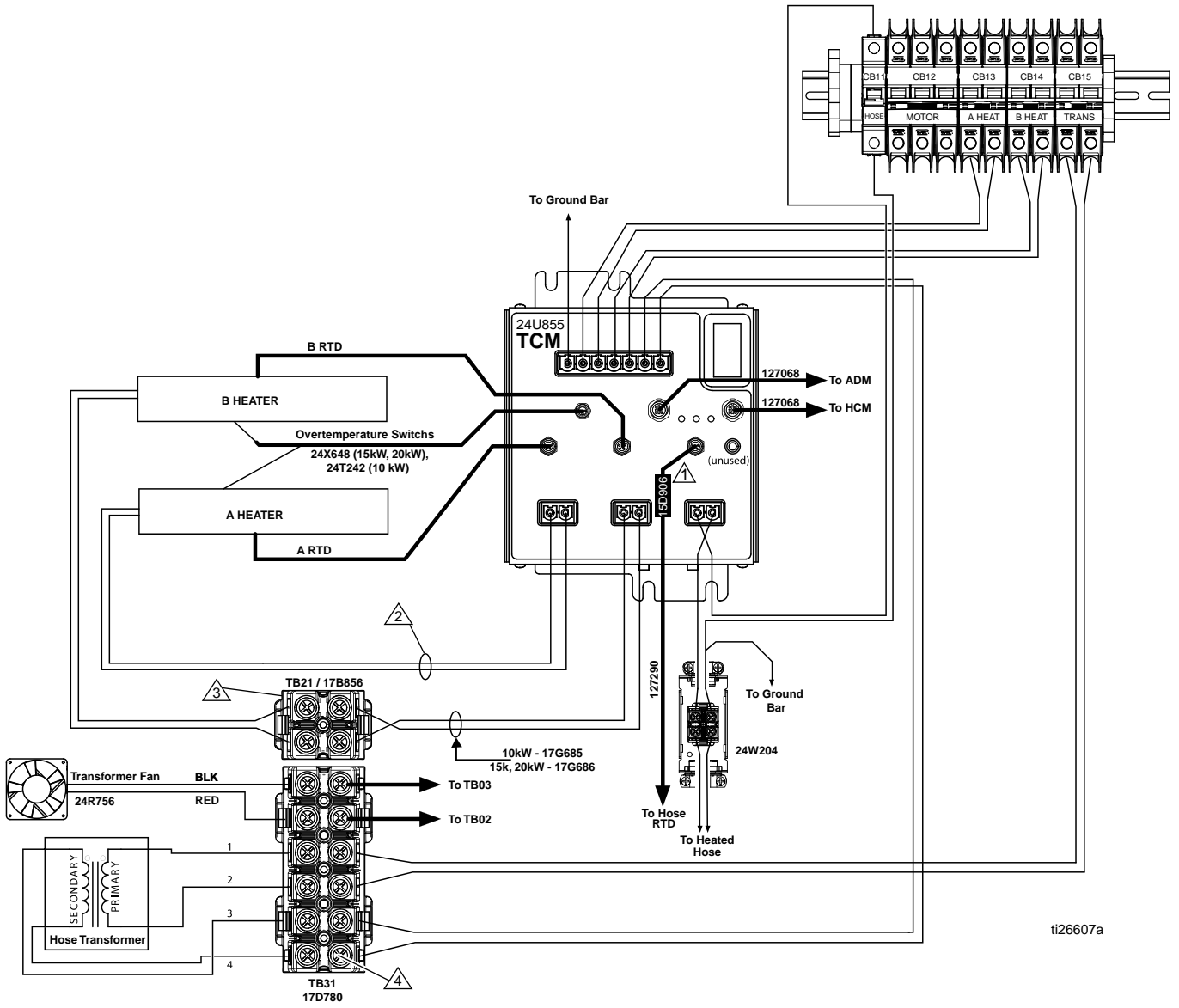
3 Torque to 3–5 in.-lbs (0.3–0.6 N•m).

# HCM Schematic



- 1 See [Replace HCM, page 66](#) for setting the rotary switch position.
- 2 Connect the blue and brown wires to the motor over-temperature wires inside the motor junction box.
- 3 Three pole version of CB12 shown. H-30 and H-XP2 uses a two pole version of CB12.

# TCM Schematic



ti26607a

- 1 Locate near TCM.
- 2 Direct connect heater elements to TCM for 15kW and 20kW systems. Harness 17G684 and splice connectors (255716) used for 10kW systems.
- 3 Terminal block TB21 only used in 15kW and 20kW systems. Use splice connectors 255716 for 10kW systems.
- 4 Torque to 35–45 in.-lbs. (4–5 N•m).

# Hydraulic Reactor 2 Repair Spare Parts Reference

## Recommended Common Spare Parts

| Ref         | Part   | Description  | Part of Assembly |
|-------------|--------|--|------------------|
| 202         | 261854 | H-XP2 and H-XP3 Cylinder Seal Kit  | Pump             |
| 202         | 261852 | H-40 Cylinder Seal Kit   | Pump             |
| 202         | 247581 | H-30 and H-50 Cylinder Seal Kit  | Pump             |
| 202         | 261847 | H-XP2 and H-XP3 Piston Seal Kit  | Pump             |
| 202         | 261845 | H-40 Piston Seal Kit   | Pump             |
| 202         | 247579 | H-30 and H-50 Piston Seal Kit  | Pump             |
| 906,<br>907 | 24V020 | Y-Strainer Filter and Gasket Kit<br>(pack of two each)                     | Y-Strainer       |
| 402         | 247824 | Drain Valve Cartridge  | Fluid Manifold   |
| 403         | 102814 | Fluid Pressure Gauge   | Fluid Manifold   |
| 405         | 15M669 | Pressure Sensor  | Fluid Manifold   |
| 511,<br>512 | 24L973 | RTD Repair Kit   | Heater           |
| --          | 24K207 | Hose FTS   | Hose             |
| --          | 24N450 | RTD Cable (50 ft. replacement)   | Hose             |
| --          | 24N365 | RTD Cable Test Kit (To assist measuring<br>RTDs and RTD cable resistances) | Hose             |

# Technical Specifications

| <b>Reactor 2 Hydraulic Proportioning System</b>              |  |  |
|--|--|--|
|  | <b>U.S.</b>                                  | <b>Metric</b>                          |
| <b>Maximum Fluid Working Pressure for Bare Proportioners</b> |  |  |
| Models H-30, H-40, and H-50                                  | 2000 psi                                     | 13.8 MPa, 138 bar                      |
| Models H-XP2 and H-XP3                                       | 3500 psi                                     | 24.1 MPa, 241 bar                      |
| <b>Minimum Fluid Working Pressure for Bare Proportioners</b> |  |  |
| H-30   | 700 psi                                      | 4.8 MPa, 48 bar                        |
| H-40, H-50   | 600 psi                                      | 4.1 MPa, 41 bar                        |
| H-XP2  | 1200 psi                                     | 8.2 MPa, 82 bar                        |
| H-XP3  | 850 psi                                      | 5.8 MPa, 58 bar                        |
| <b>Fluid: Oil Pressure Ratio</b>                             |  |  |
| Model H-40   | 1.91 : 1                                     |  |
| Models H-30 and H-50   | 1.64 : 1                                     |  |
| Models H-XP2 and H-XP3                                       | 2.79 : 1                                     |  |
| <b>Fluid Inlets</b>  |  |  |
| Component A (ISO)  | 3/4 npt(f), 300 psi maximum                  | 3/4 npt(f), 2.07 MPa, 20.7 bar maximum |
| Component B (RES)  | 3/4 npt(f), 300 psi maximum                  | 3/4 npt(f), 2.07 MPa, 20.7 bar maximum |
| <b>Fluid Outlets</b>   |  |  |
| Component A (ISO)  | #8 1/2 in. JIC, with #5 5/16 in. JIC adapter |  |
| Component B (RES)  | #10 5/8 in. JIC, with #6 3/8 in. JIC adapter |  |
| <b>Fluid Circulation Ports</b>                               |  |  |
| 1/4 npsm(m)  | 250 psi                                      | 1.75 MPa, 17.5 bar                     |
| <b>Maximum Fluid Temperature</b>                             |  |  |
|  | 190° F                                       | 88° C                                  |
| <b>Maximum Output (10 weight oil at ambient temperature)</b> |  |  |
| Model H-30   | 28 lb/min (60 Hz)                            | 13 kg/min (60 Hz)                      |
| Model H-XP2  | 1.5 gpm (60 Hz)                              | 5.7 liter/min (60 Hz)                  |
| Model H-50   | 52 lb/min (60 Hz)                            | 24 kg/min (60 Hz)                      |
| Model H-40   | 45 lb/min (60 Hz)                            | 20 kg/min (60 Hz)                      |
| Model H-XP3  | 2.8 gpm (60 Hz)                              | 10.6 liter/min (60 Hz)                 |
| <b>Output Per Cycle (A and B)</b>                            |  |  |
| Model H-40   | 0.063 gal.                                   | 0.24 liter                             |
| Models H-30 and H-50   | 0.074 gal.                                   | 0.28 liter                             |
| Models H-XP2 and H-XP3                                       | 0.042 gal.                                   | 0.16 liter                             |



| <b>Supply Voltage Tolerance</b>   |  |             |
|---|--|-------------|
| 200–240V nominal, 1 phase<br>(H-30, H-XP2 only)   | 195–264 VAC, 50/60 Hz  |             |
| 200–240V nominal, 3 phase   | 195–264 VAC, 50/60 Hz  |             |
| 350–415V nominal, 3 phase   | 338–457 VAC, 50/60 Hz  |             |
| <b>Amperage Requirement (phase)</b>   |  |             |
| See the Models listing in the manual.   |  |             |
| <b>Heater Power (A and B heaters total)</b>   |  |             |
| See the Models listing in the manual.   |  |             |
| <b>Hydraulic Reservoir Capacity</b>   |  |             |
|   | 3.5 gal.   | 13.6 liters |
| <b>Recommended Hydraulic Fluid</b>  |  |             |
|   | Citgo, A/W Hydraulic Oil, ISO Grade 46   |             |
| <b>Sound Power, per ISO 9614–2</b>  |  |             |
|   | 90.2 dB(A)   |             |
| <b>Sound Pressure 1 m From Equipment</b>  |  |             |
|   | 82.6 dB(A)   |             |
| <b>Weight</b>   |  |             |
| H-40, H-50, H-XP3,  | 600 lb   | 272 kg      |
| H-30, 10 kW   | 544 lb   | 247 kg      |
| H-30, H-XP2, 15 kW  | 556 lb   | 252 kg      |
| <b>Wetted Parts</b>   |  |             |
|   | Aluminum, stainless steel, zinc-plated carbon steel, brass, carbide, chrome, fluoroelastomer, PTFE, ultra-high molecular weight polyethylene, chemically resistant o-rings |             |
| <i>All other brand names or marks are used for identification purposes and are trademarks of their respective owners.</i> |  |             |

# Graco Extended 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. Graco will, for a period as defined in the table below 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.

| Part            | Description                | Warranty Period                                       |
|-----------------|----------------------------|---|
| 24U854          | Advanced Display Module    | 36 Months or 2 Million Cycles (whichever comes first) |
| 24Y263          | Hydraulic Control Module   | 36 Months or 2 Million Cycles (whichever comes first) |
| 24U855          | Temperature Control Module | 36 Months or 2 Million Cycles (whichever comes first) |
| All Other Parts |                            | 12 Months   |

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.

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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.

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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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Original Instructions. This manual contains English. MM **334946**

**Graco Headquarters:** Minneapolis

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

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