Repair - Parts

VPM™

312764L
EN

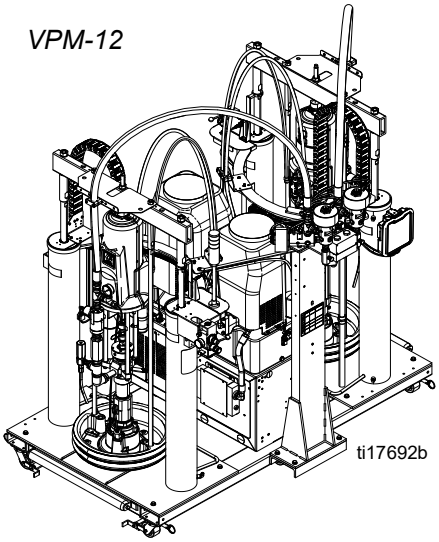
Hydraulic, Plural-Component, High-Viscosity, Variable-Ratio Proportioner.
For pouring and dispensing sealants and adhesives. For professional use only.

Not approved for use in European explosive atmosphere locations.

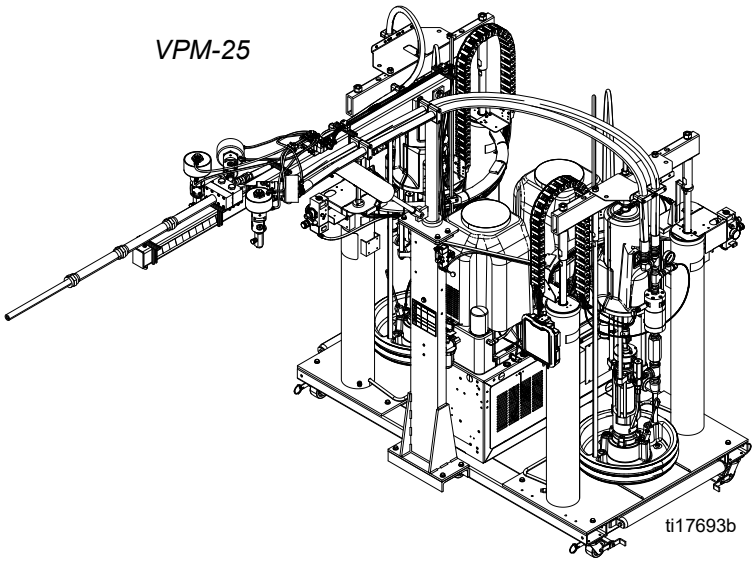
Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.

See page 4 for model information, including maximum working pressure and approvals.

VPM-12



VPM-25



Contents

Related Manuals

Manuals are available at www.graco.com.
Component manuals in English:

System Manual	
313875	VPM Operation-Setup
Power Distribution Box Manual	
3A0239	Power Distribution Boxes Instructions-Parts
Pumpline Manual	
3A0021	Vertical Hydraulic Driver Repair-Parts
Valve Manuals	
310550	1/2 in. NPT Fluid Port Ball Seat Applicator
310551	3/4 in. NPT Fluid Port Ball Seat Applicator
3A1792	DV Series
Flow Meter Manual	
309834	Helical Gear Fluid Flow Meter
Check-Mate Manual	
312375	Check-Mate® Displacement Pumps
Dura-Flow Manual	
311827	Dura-Flo™ Lowers
Accessories	
3A1937	Heated Platen Kits
Ram Repair Manual	
334198	55 Gal, 16 Gal, and 5 Gal Ram Module Repair-Parts

Models

System	Description	CE	Full Load Peak Amps Per Phase*			Voltage (phase)	System Watts	Max Flow Rate ** lb/min (kg/min)	Approximate Output per Cycle (A+B)** gal. (liter)	Hydraulic Pressure Ratio**	Maximum Fluid Working Pressure ‡ psi (MPa, bar)
			No Heat	1 Heated Platen	2 Heated Platen						
24F226	VPM-25, Boom mounted dispense valve		55 A	62 A	62 A	400 (3)	24,000 (No Heat)	55 (25)	0.2 (0.76)	1.87	3000 (21, 207)
26A113			55 A	62 A	62 A	400 (3)					
24F874			60 A	76 A	86 A	230 (3)					
24F875			55 A	62 A	62 A	400 (3)					
24J509	VPM-12, Mast mounted dispense valve, reduced flow		55 A	62 A	62 A	400 (3)	27,600 (1 Platen)	26 (12)			
24J510			60 A	76 A	86 A	230 (3)	31,200 (2 Platens)				
24J511			55 A	62 A	62 A	400 (3)					
26A117	VPM-25 No boom		55 A	62 A	62 A	400 (3)		55 (25)			

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

** *Values are dependent on installed pump size. Values shown are for largest available pump size.*

Flow rate is independent of frequency 50/60 Hz.

‡ *The maximum fluid working pressure for the base machine without hoses is 3000 psi (21 MPa, 207 bar). If hoses rated at less than 3000 psi are installed, the system maximum fluid working pressure becomes the rating of the hoses. If 2000 psi hoses were purchased and installed by Graco, the working pressure for the machine is already setup for the lower 2000 psi (14 MPa, 138 bar) working pressure by Graco. If the machine was purchased without hoses and aftermarket hoses rated at or above 3000 psi are to be installed, see the operation manual for the procedure to setup the machine for higher rated hoses. The change in working pressure is made by changing a rotary switch setting in the Motor Control Module. The minimum pressure rating for hoses is 2000 psi. Do not install hoses with a pressure rating lower than 2000 psi.*

Accessories

Heated Platen Kits

The Heated Platen kits convert the standard platen to a heated platen to enable dispensing in lower temperature environments.

Part	Description
24E267	B (Blue) Side Kit
24E268	A (Red) Side Kit

Power Distribution Box Conversion Kits

These conversion kits convert the voltage and CE approval of a system.

Part	Description
24E269	400V Non-CE Conversion Kit
24E272	400V CE Conversion Kit

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 symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

⚠ WARNING

ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

TOXIC FLUID OR FUMES HAZARD

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

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
- Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.

PERSONAL PROTECTIVE EQUIPMENT

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

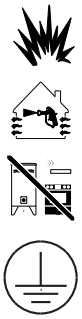
- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

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.**

- 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.

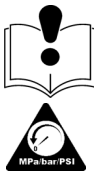
WARNING



FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. 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 arc).
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail.
- If there is static sparking or you feel a shock, **stop operation immediately.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.

- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.

WARNING

BURN HAZARD

Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.

SPLATTER HAZARD

Hot or toxic fluid can cause serious injury if splashed in the eyes or on skin. During blow off of platen, splatter may occur.

- Use minimum air pressure when removing platen from drum.

Important Two-Component Material Information

Isocyanate Conditions

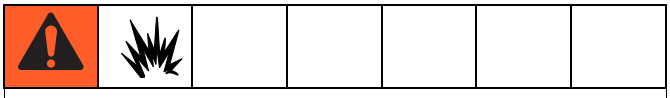
Spraying or dispensing materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.

Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.

Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.

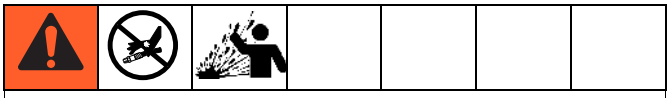
To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.

Material Self-ignition



Some materials may become self-igniting if applied too thickly. Read material manufacturer's warnings and material MSDS.

Keep Components A (Red) and B (Blue) Separate



Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination of the equipment's wetted parts, **never** interchange component A (Red) and component B (Blue) parts.

Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component foam and polyurea coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

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

To prevent exposing ISO to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the pump wet cups filled with IsoGuard Select®, part 24F516. The lubricant creates a barrier between the ISO and the atmosphere.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always lubricate threaded parts with ISO pump oil or grease when reassembling.

Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Check with your material manufacturer for chemical compatibility.
- Most materials use ISO on the A (Red) side, but some use ISO on the B (Blue) side. See the following section.

A (Red) and B (Blue) Components

IMPORTANT!

Material suppliers can vary in how they refer to plural component materials.

Be aware that when standing in front of the manifold on proportioner:

- Component A (Red) is on the left side.
- Component B (Blue) is on the right side.

For all machines:

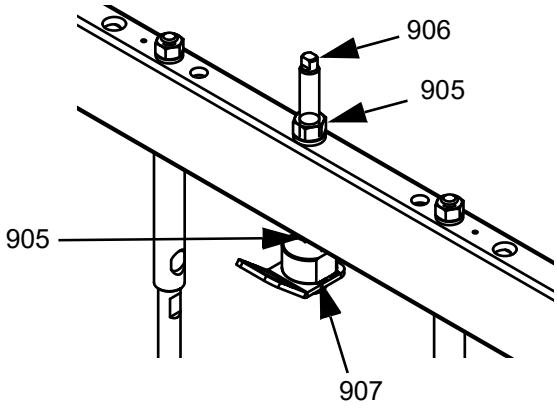
- The A (Red) side is intended for ISO, hardeners, and catalysts.
- The B (Blue) side is intended for polyols, resins, and bases.

NOTE: For machines with material volume ratios other than 1:1, the higher volume side is typically the B (Blue) side.

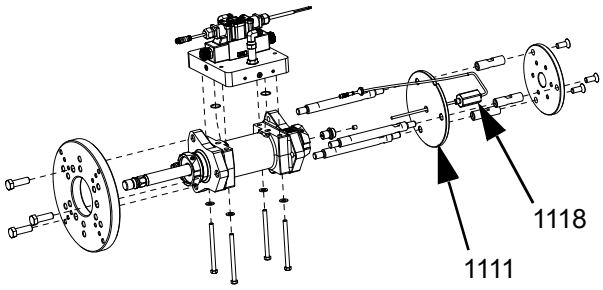
Repair

Linear Position Sensor Replacement

1. Perform **Pressure Relief Procedure** procedures. See operation manual for procedures.
2. Remove drum.
3. Use director valve to lower the platen (603) so that it rests on the machine base.
4. Break loose the two nuts (905) that lock the threaded rod (906) in place.

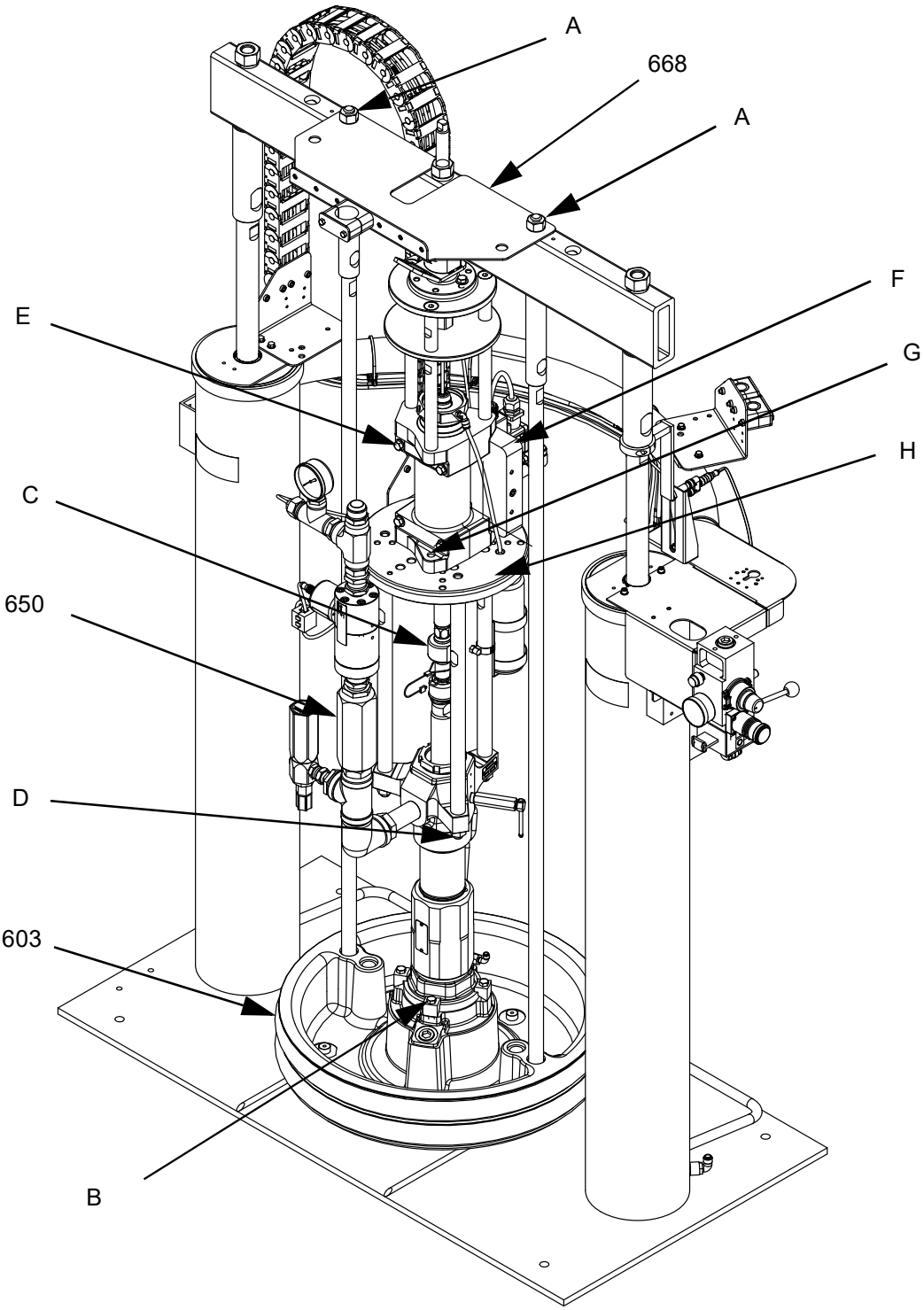


5. Place one wrench on the flats of the rod (906) and another wrench on the lift ring adapter (907).
6. Hold the adapter (907) in place and remove the rod (906).
7. Disconnect linear position sensor cable and route through the threaded rod opening.
8. Use adjustable wrench on linear position sensor (1118) to loosen from plate (1111).



9. Slide linear position sensor out of the hydraulic driver and out through the opening in the frame.
10. Install new linear position sensor in reverse order.

Vertical Driver Pump Repair



Check-Mate Lower Removal

NOTE: This procedure details how to remove the Check-Mate Lower. Rebuild information is in the Check-Mate Lower manual.

See previous page for part references.

1. Perform **Pressure Relief Procedure** procedures. See operation manual for procedures.
2. Remove drum.
3. Use director valve to lower the platen (603) so that it rests on the machine base.
4. Disconnect fluid outlet line above check valve (650).
5. Clamp the hose bracket (668) in place then remove the two nuts (A) securing the bracket.
6. Remove four bolts (B) connecting vertical driver pump to platen (603).
7. Remove air line connection at the platen.
8. Use director valve to raise pumpline a few inches. This will add room between the outlet fitting tree and the platen so that it can rotated and be removed.
9. Rotate the entire outlet fitting tree to remove from Check-Mate Lower. If the fitting tree hits the platen, raise the pumpline until clear.
10. Use the director valve to lower the pumpline so that it rests on the platen.
11. Rotate coupling (C) to disconnect the pump shaft from the hydraulic driver shaft.
12. Remove the three nuts (D) that secure the rods connecting the pump assembly to the hydraulic driver assembly.
13. Raise pumpline.
14. Remove Check-Mate Lower.

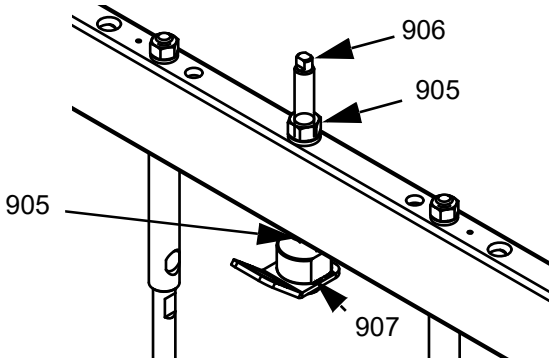
NOTE: Install Check-Mate Lower in reverse order. See notes in the applicable parts illustrations for torque and other specifications.

Hydraulic Driver Removal

NOTE: This procedure details how to remove the hydraulic driver. Hydraulic driver rebuild information is in the hydraulic driver manual.

See previous page for part references.

1. Perform **Pressure Relief Procedure** procedures. See operation manual for procedures.
2. Remove drum.
3. Use director valve to lower the platen (603) so that it rests on the machine base.
4. Break loose the two nuts (905) that lock the threaded rod (906) in place.



5. Place one wrench on the flats of the rod (906) and another wrench on the lift ring adapter (907).
6. Hold the adapter (907) in place and remove the rod (906).
7. Disconnect coupling (C).
8. Remove four bolts (E) on the hydraulic driver that secure the hydraulic driver to the vertical actuator housing (F).
9. Remove vertical actuator housing.
10. Remove four bolts (G) securing hydraulic actuator to plate (H).
11. Remove hydraulic actuator.

NOTE: Install hydraulic driver in reverse order. See notes in the applicable parts illustrations for torque and other specifications.

Servicing the Air-Powered Ram

NOTE: For repair of D60, D200, and D200s rams see manual 334198. See **Related Manuals** page 3.

Replacing Wipers

See FIG. 1.

1. To replace worn or damaged wipers (W), raise the ram plate up out of the drum. Remove the drum from the base. Wipe the fluid off the ram plate.
2. Separate the wiper butt joint and bend back the strapping covering the clamp. Loosen the clamp by unscrewing the worm gear and remove the wiper.
3. Thread the strapping through the new wiper. Install the wiper on the ram plate. Insert the end of the strap through the clamp and tighten by screwing the worm gear. Position the wipers so they are 180° apart.
4. Pound the wiper all the way around the ram plate with a rubber mallet until the ends are butted tightly together.

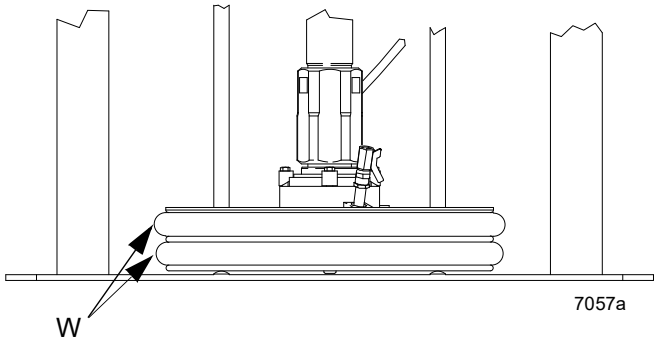
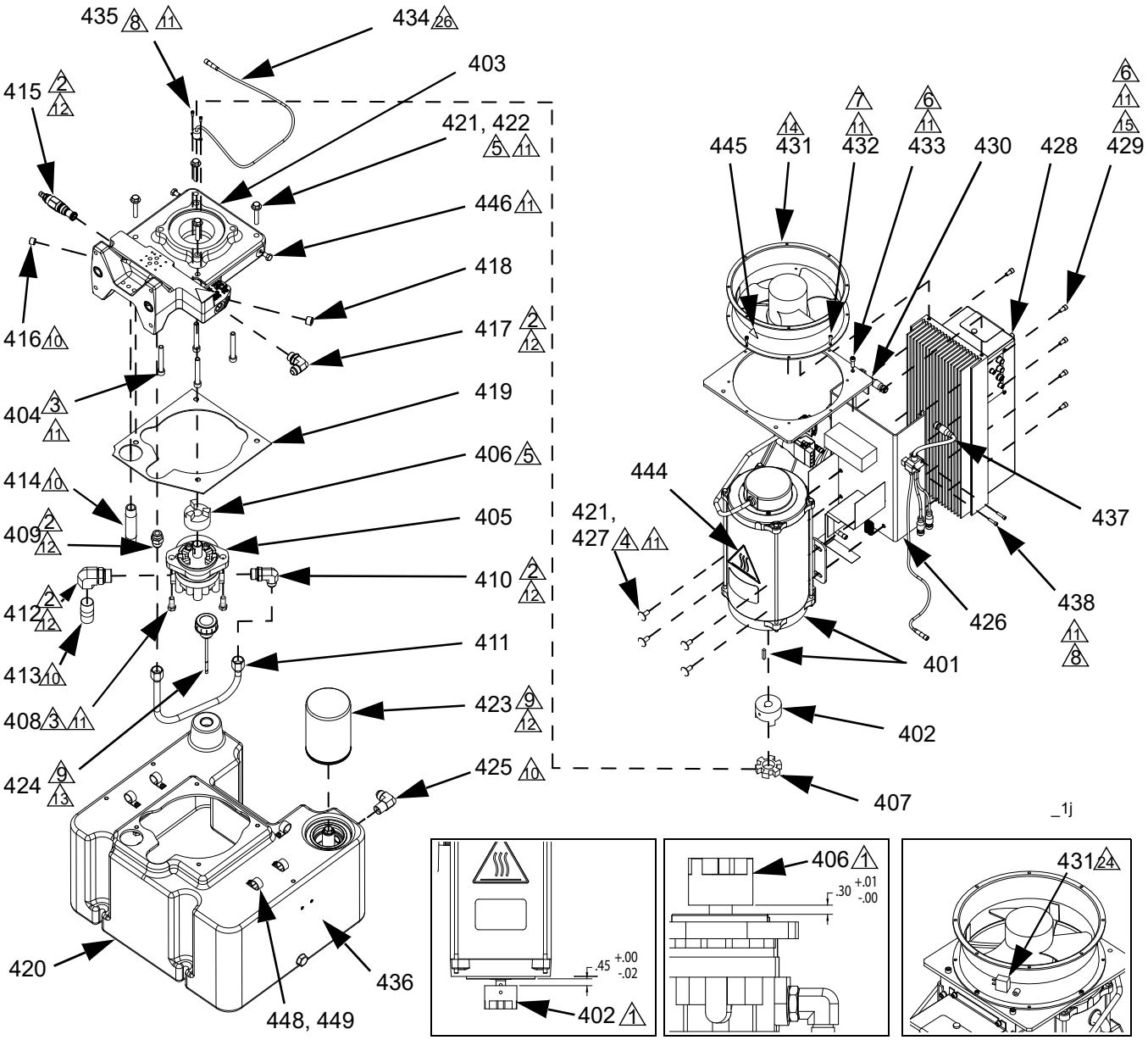


FIG. 1

Hydraulic Power Pack Repair



1 Assemble coupler to specified dimensions prior to mounting assembly to housing.

2 Torque to 40 ft-lb (54 N•m).

3 Torque to 35 ft-lb (47 N•m).

4 Torque to 20 ft-lb (27 N•m).

5 Torque to 15 ft-lb (20 N•m).

6 Torque to 10 ft-lb (14 N•m).

7 Torque to 58 in-lb (6.5 N•m).

8 Torque to 34 in-lb (3.8 N•m).

9 Torque 1/4 turn past hand-tight.

10 Apply PTFE tape on installation end only.

11 Apply sealant to threads.

12 Apply light coating of lubricant to seals.

13 Fill reservoir with hydraulic fluid.

14 Orient with airflow arrow pointing toward mounting bracket.

15 Prior to installing Ref. 428 into Ref. 426, install Ref. 429 into Ref. 428 and adjust head 1/8 in. from surface.

24 Align fan plug as shown.

26 Apply thermal lubricant to contact side.

FIG. 2: Hydraulic DC Power Pack

Remove Hydraulic Power Pack Shroud

1. Remove four screws from base of shroud.
2. Lift shroud off of Hydraulic Power Pack.

Install Hydraulic Power Pack Shroud

NOTICE

Do not over-torque any item that threads into the hydraulic tank. This will strip the threads and require tank replacement.

1. Place shroud on top of Hydraulic Power Pack.
2. Install four screws securing shroud to hydraulic tank.

Replace Hydraulic Filter

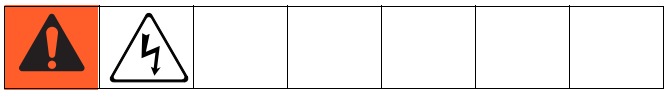
Filter is located at right rear of hydraulic power pack. See FIG. 2 on page 14.

NOTICE

If any debris falls into the hydraulic tank, the debris must be removed or machine damage will result.

1. Perform **Shutdown** procedure. See operation manual for procedure.
2. Use compressed air to remove any loose debris around the hydraulic filter.
3. Remove new filter from wrapping.
4. Apply a light coat of hydraulic fluid to the o-ring on the face of the hydraulic filter.
5. Being careful not to allow any debris into the hydraulic tank remove old filter from tank then quickly install new filter.

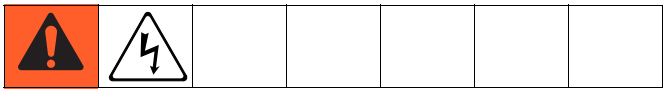
Replace Fan



See FIG. 2 on page 14.

1. Perform **Shutdown** procedure. See operation manual for procedure.
2. **Remove Hydraulic Power Pack Shroud**, see procedure on this page.
3. Remove four screws (432) connecting fan to mounting plate.
4. Remove fan and install new fan.
5. Install four screws (432) connecting fan to Motor and Motor Control Module.
6. **Install Hydraulic Power Pack Shroud**, see procedure on this page.

Remove Motor Control Module



See FIG. 2 on page 14.

1. Perform **Shutdown** procedure. See operation manual for procedure.
2. **Remove Hydraulic Power Pack Shroud**, see procedure on this page.
3. Remove two screws (433) connecting fan plate to Motor and Motor Control Module. Remove fan and mounting plate.
4. Note the location of each Motor Control Module cable then remove all electrical cables on the left and right sides of the Motor Control Module.
5. Remove six screws (429) securing Motor Control Module in place.
6. Slowly and carefully slide the Motor Control Module up until the cable on the bottom of the Motor Control Module can be accessed and removed. Disconnect the cable.
7. Slide the Motor Control Module up and remove.

Adjust Motor Control Module Selector Switch

NOTICE

If the Motor Control Module is replaced, the selector switch must be set prior to initial startup of the Motor Control Module or damage may occur.

The Motor Control Module uses an 8-position selector switch (S) to set system maximum working pressure. See FIG. 3.

The system must be configured to have a maximum working pressure of 3000 psi (21 MPa, 207 bar). Set the selector switch according to the following table.

MCM	Switch Position
B (Blue)	3
A (Red)	4

The selector switch position will be properly set at the factory for new systems. When a motor control module is replaced, the selector switch must be set to the correct setting by the user prior to initial startup.

- Do not install components rated to less than the maximum working pressure. Doing so may lead to overpressurization and ruptured components.
- High-pressure fluid from 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.**

To set the Motor Control Module selector switch:

1. Turn machine power off.
2. Remove the access cover (D). See FIG. 3.
3. Set the selector switch (S).
4. Install access cover (D).

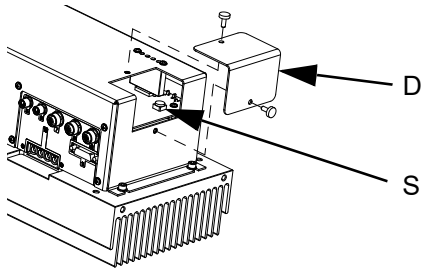


FIG. 3

Install Motor Control Module

This procedure starts assuming that the old Motor Control Module is removed from the machine. See **Remove Motor Control Module** procedure, see page 15.

See FIG. 2 on page 14.

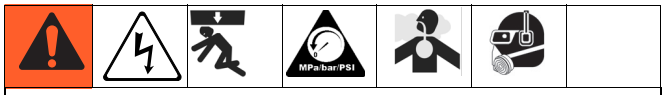
1. Perform **Adjust Motor Control Module Selector Switch** procedure on page 16.

NOTICE

Motor Control Module selector switch position must be set prior to startup of Motor Control Module or damage may occur.

2. Slide the Motor Control Module into the slot.
3. Attach the cable on the bottom of the Motor Control Module.
4. Install the six screws (429) securing Motor Control Module in place.
5. Install electrical cables on left and right sides of the Motor Control Module.
6. Install four screws (432) connecting fan to Motor and Motor Control Module. Install fan and mounting plate.
7. **Install Hydraulic Power Pack Shroud**, see procedure on page 15.

Remove Hydraulic Power Pack



The hydraulic power pack weighs up to 300 lb. To avoid serious injury due the hydraulic power pack falling, secure the hydraulic lift when raising the hydraulic power pack.

NOTICE

If any debris falls into the hydraulic tank, the debris must be removed or machine damage will result.

This procedure removes the hydraulic power pack from the machine as a single unit to enable further disassembly. User must purchase three 5/16-18 eye-bolts capable of holding 300 lb to perform this procedure.

See FIG. 2 on page 14.

1. Perform **Shutdown** procedure. See operation manual for procedure.
2. Perform **Remove Hydraulic Power Pack Shroud**, see procedure on page 15.
3. Perform **Remove Motor Control Module** procedure, see page 15.
4. Disconnect heat exchanger inlet hose and fitting from elbow fitting (417). Disconnect heat exchanger outlet hose and fitting from elbow fitting (425).
5. Remove the two bolts (446) from the fluid housing (403) and replace each with a strong 5/16-18 thread eye-bolt. Install a third strong 5/16-18 eye-bolt as indicated. See FIG. 4. See FIG. 2 on page 14 for full hydraulic power pack view.

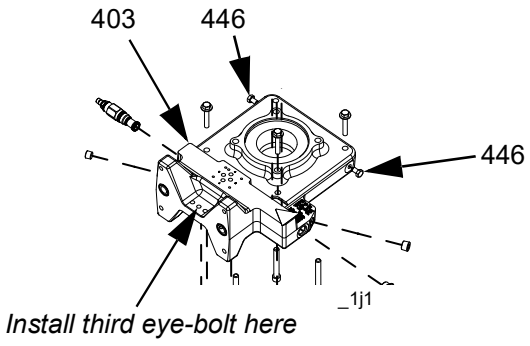


FIG. 4

6. Run a rated lifting strap or chain through the three eye-bolts and between the motor and the Motor Control Module. Secure to a hydraulic lift.
7. Remove the four bolts (304) and washers (303) securing the tank to the electrical enclosure. See **Power Pack Module** on page 25.
8. Lift the hydraulic power pack and place on a sturdy location capable of supporting up to 300 lb (136 kg).

Install Hydraulic Power Pack

NOTICE

If any debris falls into the hydraulic tank, the debris must be removed or machine damage will result.

NOTICE

Do not over-torque any item that threads into the hydraulic tank. This will strip the threads and require tank replacement.

This procedure assumes the Hydraulic Power Pack has been removed from the machine and is assembled except for the Motor Control Module.

See FIG. 2 on page 14.

1. Run a rated lifting strap or chain through the three eye-bolts and between the Motor and the Motor Control Module. Secure to a hydraulic lift.
2. Lift the Hydraulic Power Pack and place onto the electronic enclosure.
3. Align the holes with the tank then install finger-tight the four bolts (304) and washers (303) securing the tank to the electrical enclosure. Torque to 10 ft-lb (14 N•m).
4. Remove hydraulic lift and rated lifting strap or chain.
5. Remove eye-bolts. Install original bolts (446) into fluid housing (403). See FIG. 4.
6. Perform **Install Motor Control Module** procedure, see page 16.

7. Connect heat exchanger inlet hose and fitting to elbow fitting (417). Connect heat exchanger outlet hose and fitting to elbow fitting located on rear right face of tank. See **Power Pack Module** on page 25.

Replace Tank Gasket, Tank

See FIG. 2 on page 14.

1. Perform **Remove Hydraulic Power Pack** procedure, see page 17.
2. Remove hex head cap screws (422) securing hydraulic housing (403) to tank (420). Carefully remove motor (401) and hydraulic housing assembly from tank.
3. Remove tank gasket. If tank is damaged, replace tank.

NOTICE

Do not over-torque any item that threads into the hydraulic tank. This will strip the threads and require tank replacement.

4. Install thrust washers (421) onto hex head cap screws (422). Apply pipe sealant to threads of screws. Align tank gasket (419), hydraulic housing, and tank (420) then install screws. Torque to 15 ft-lb (20 N•m).
5. Perform **Install Hydraulic Power Pack** procedure, see page 17.

Remove Motor

See FIG. 2 on page 14.

1. Perform **Remove Hydraulic Power Pack** procedure, see page 17.
2. Remove four hex head cap screws (422) securing hydraulic housing (403) and motor (401) to tank (420). Carefully remove motor and hydraulic housing assembly from tank.
3. Remove four hex head cap screws (427) connecting mounting bracket (426) to motor.
4. Remove four socket head cap screws (404) securing motor to hydraulic housing. Carefully remove motor from hydraulic housing.
5. Loosen set screw for motor coupler (402) then remove motor coupler.

Install Motor

See FIG. 2 on page 14.

1. Use four hex head cap screws (427) and thrust washers (421) to install Motor Control Module mounting bracket (426) onto motor (401).
2. Install motor coupler (402) onto motor (401). Coupler must be 0.65-0.67 in. from the face of the motor. Torque motor coupler set screw to 15 ft-lb (20 N•m).
3. Install spider coupler (407) into motor coupler.
4. Use four socket head cap screws (404) to attach hydraulic housing (403) to motor. Be sure to align teeth of gear coupler with the teeth of the motor coupler. Apply pipe sealant to threads of screws. Torque to 35 ft lb (47 N•m).

NOTICE

Do not over-torque any item that threads into the hydraulic tank. This will strip the threads and require tank replacement.

5. Install thrust washers (421) onto hex head cap screws (422). Apply pipe sealant to threads of screws. Align tank gasket (419), hydraulic housing, and tank (420) then install screws. Torque to 15 ft-lb (20 N•m).
6. Perform **Install Hydraulic Power Pack** procedure, see page 17.

Remove Hydraulic Gear Pump

See FIG. 2 on page 14.

1. Perform **Remove Hydraulic Power Pack** procedure, see page 17.
2. Remove hex head cap screws (422) securing hydraulic housing (403) to tank. Carefully remove motor (401) and hydraulic housing assembly.
3. Remove tube (411).
4. Remove elbow fittings (410, 412) from gear pump (405).
5. Remove two hex head cap screws (408) securing gear pump to hydraulic housing.
6. Remove spider coupler (407).
7. Loosen set screw for gear coupler (406) then remove gear coupler from gear pump.

Install Hydraulic Gear Pump

See FIG. 2 on page 14.

1. Install gear coupler (406) onto gear pump (405). Coupler must be 0.12 to 0.13 in. from the face of the gear pump. Torque gear coupler set screw to 15 ft-lb (20 N•m).
2. Install spider coupler (407) into gear coupler.
3. Use two hex head cap screws (408) to attach gear pump to hydraulic housing. Be sure to align teeth of gear coupler with the teeth of the motor coupler. Torque screws to 35 ft-lb (47 N•m).
4. Apply a light coat of lubricant to seals of elbow fittings (410, 412). Install elbow fittings into gear pump. See FIG. 2 on page 14. for fitting alignment. Torque both fittings to 40 ft-lb (54 N•m).
5. Apply a light coating of lubricant to seals of tube (411). Install tube (411) onto elbow fitting (410) and straight fitting (409). Hand-tighten then use wrench to tighten 90 degrees further.

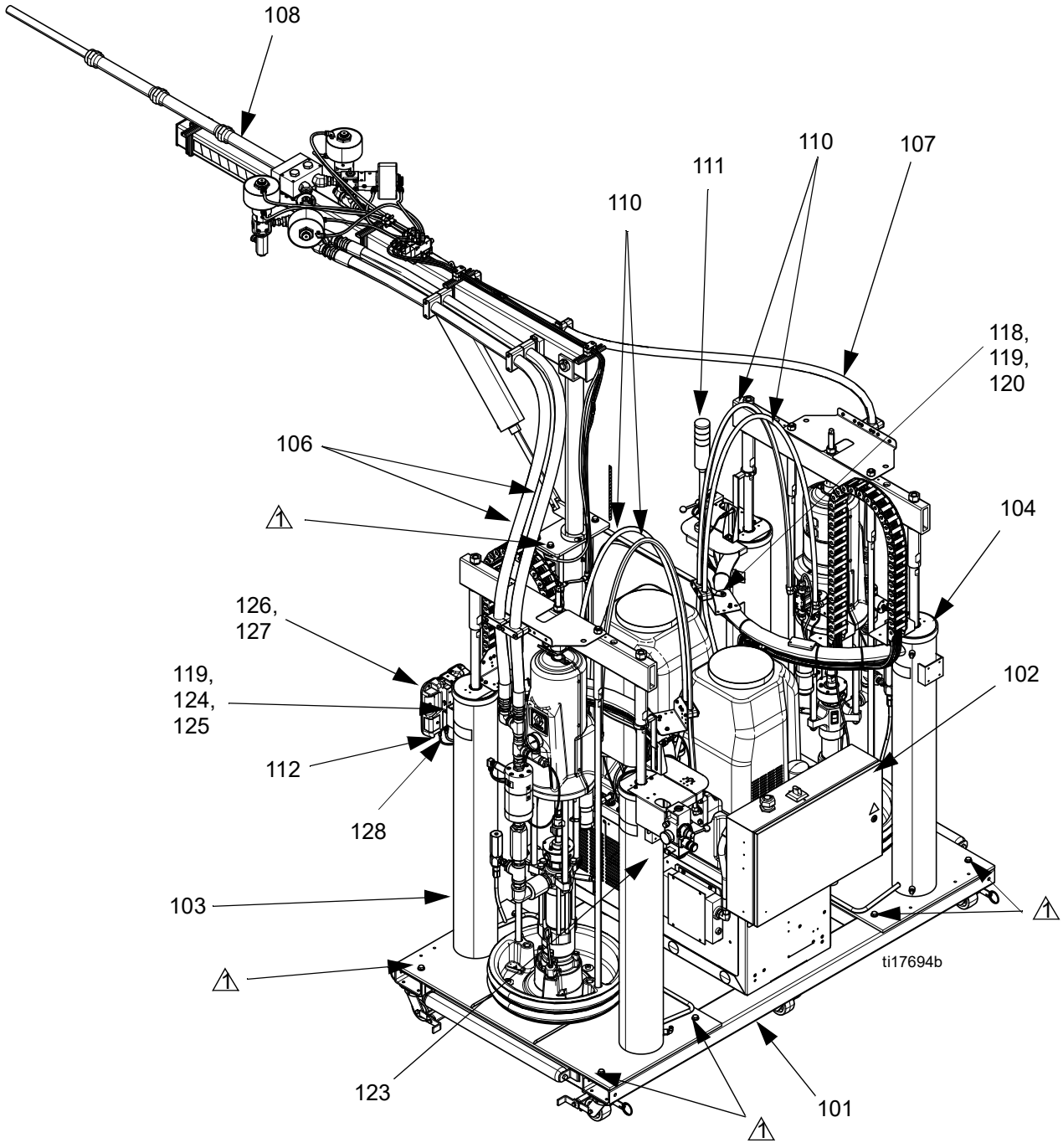
NOTICE

Do not over-torque any item that threads into the hydraulic tank. This will strip the threads and require tank replacement.

6. Install thrust washers (421) onto hex head cap screws (422). Apply pipe sealant to threads of screws. Align tank gasket (419), hydraulic housing, and tank (420) then install screws. Torque to 15 ft-lb (20 N•m).
7. Perform **Install Hydraulic Power Pack** procedure, see page 17.

Parts

Systems



⚠1 Torque bolts to 60 ft-lb (81 N•m).

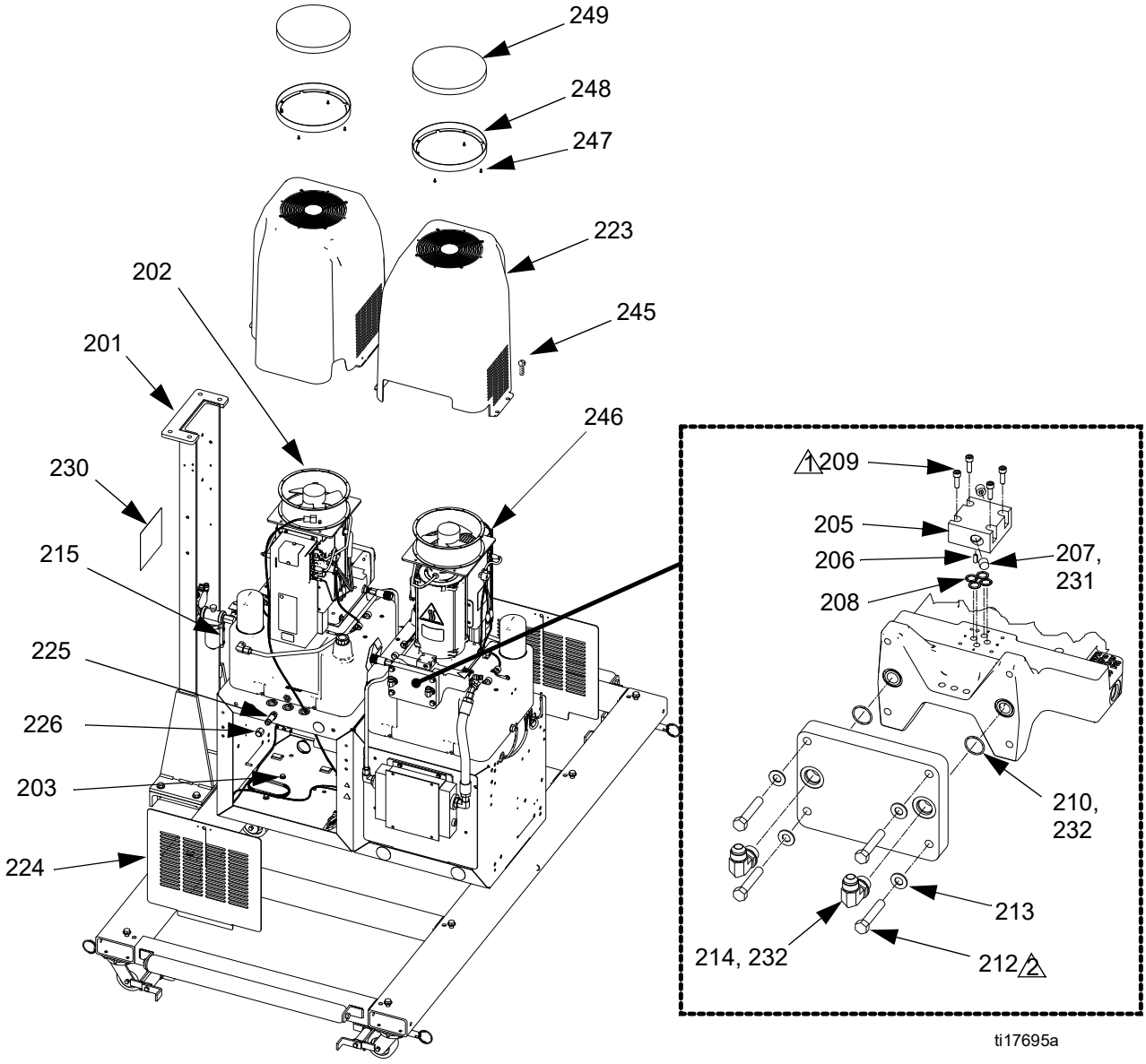
Ref	Part	Description	Quantity							
			24F226	24F874	24F875	24J509	24J510	24J511	26A113	26A117
101	24D587	BASE	1	1	1	1	1	1	1	1
102†	---	MODULE, power distribution box, 230V, non-CE		1			1			
	---	MODULE, power distribution box, 400V, CE			1			1		
	---	MODULE, power distribution box, 400V, non-CE	1			1			1	1
103	---	SUPPLY UNIT, vertical driver, L500CM, 6.5 Ram	1	1	1				1	1
	---	SUPPLY UNIT, vertical driver, L500CM, 6.5 Ram; for reduced flow systems				1	1	1		
104	---	SUPPLY UNIT, vertical driver, L250CM, 6.5 Ram	1	1	1	1	1	1		
	---	SUPPLY UNIT, vertical driver, L290SS, 6.5 Ram							1	1
106	24E258	HOSE, 1.25 in, mast				1	1	1		
	24H013	HOSE, 1.25 in, CM500, female/male, boom	1	1	1				1	
107	24E257	HOSE, 1 in, mast				1	1	1		
	24E271	HOSE, 1 in, CM250, female/male, boom	1	1	1				1	
108	24E209	APPLICATOR, boom mount	1	1	1				1	
	24E261	APPLICATOR, mast mount, 1 in.				1	1	1		
110	24F220	HOSE, coupled, 96 in. long, 1/2 ID, 3/4 JIC	4	4	4	4	4	4	4	4
111	255468	KIT, light tower	1	1	1	1	1	1	1	1
112	124415	CABLE, 5-pin, male/female, 3.0 m, molded	1	1	1	1	1	1	1	1
113	---	GUARD, spiral, 1/2 in. (not shown)	8	8	8	8	8	8	8	
118	24G610	BRACKET, mast, support	2	2	2	2	2	2	2	
119	100016	WASHER, lock	4	4	4	4	4	4	4	
120	100270	SCREW, cap, hex head	2	2	2	2	2	2	2	
123	16F920	LABEL, product	1	1	1	1	1	1	1	1
124	255235	BRACKET, mounting	1	1	1	1	1	1	1	1
125	101550	SCREW, cap	2	2	2	2	2	2	2	2
126	24E451	MODULE, ADM	1	1	1	1	1	1	1	1
127	15V551	SHIELD, membrane, ADM	1	1	1	1	1	1	1	1
128	121003	CABLE, CAN, female / female 3.0 m	1	1	1	1	1	1	1	1
129	24E273	MANIFOLD, mixer assembly, cs								1

--- Not for sale.

† *See Power Distribution Box manual. See page 3.*

See Check-Mate Pumps manual. See page 3.

VPM Base



1 Torque to 62 in-lb (7 N•m).

2 Torque to 25 ft-lb (34 N•m).

FIG. 5: Base

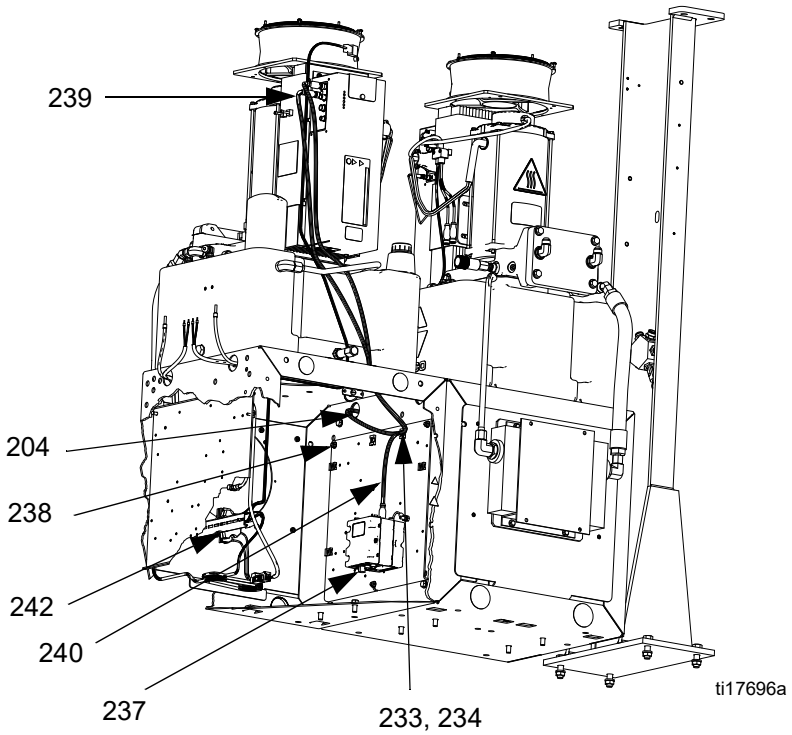


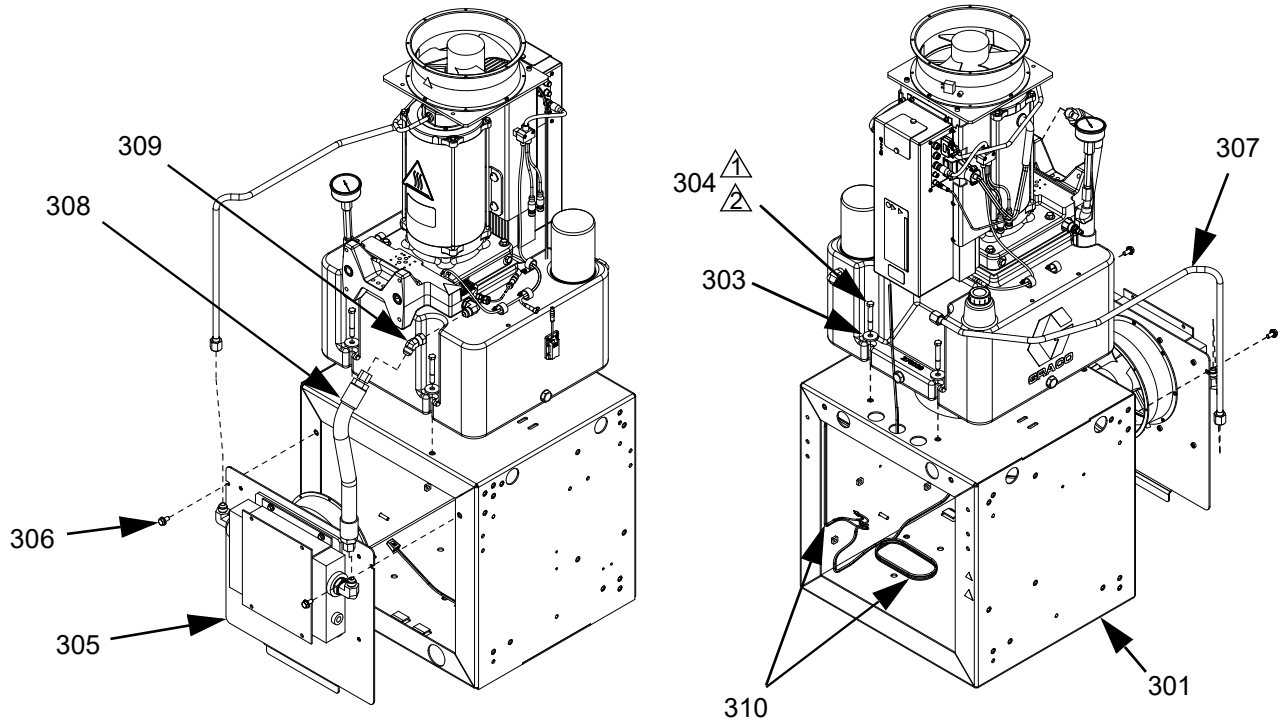
FIG. 6: Base

Ref	Part	Description	Qty
201	---	FRAME, w/mast, 86x56	1
202	---	MODULE, power pack, enclosure	1
203	112395	SCREW, cap, flange head	8
204	111800	SCREW, cap, hex head	4
205	16A599	BLOCK, diverter	2
206	123786	FASTENER, pin, roll, 5/32D x 3/8	2
207	100139	PLUG, pipe	4
208	556555	O-RING, -012 FKM-a 75 duro	8
209	104092	SCREW, cap, sch	8
210	103413	PACKING, o-ring	4
211	---	PLATE, hydraulic adapter	2
212	111803	SCREW, cap, hex head	8
213	100731	WASHER	8
214	121312	FITTING, elbow, sae x jic	4
215	24E188	KIT, inlet, air, dual	1
223	24B855	COVER, assembly	2
224	---	COVER, enclosure, slotted	2
225	122970	FITTING, adapter, JIC(08) x SAE(08), male	2
226	123140	FITTING, cap, 1/2 JIC, carbon steel	2
228	16C779	LABEL, identification, electronics	1
230	15M511	LABEL, warning, English, Spanish, French	1
231	---	SEALANT, pipe, stainless steel	1
232	---	LUBRICANT, grease	1
233	123452	HOLDER, anchor, wire tie, nylon	1
234	103833	SCREW, machine, crbh	1
236	---	SEALANT, anaerobic	1
237	---	PANEL, fluid control	1
238	115942	NUT, hex, flange head	9
239	124476	CABLE, M8, 4-pin, male/male, 3 m	1
240	121002	CABLE, CAN, female / female 1.5 m	1
241	---	FLUID, hydraulic	18
242	24E179	MODULE, electric, panels	1
243	24D086	FLUID, IsoGuard Select	1
245	124804	SCREW, hex, slotted	8
246	---	MODULE, power pack, enclosure	1
247	15U075	SCREW, cap, B 8-32 x 0.37	8
248	16G251	HOUSING, filter	2
249	16G252	FILTER, air	2

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

--- Not for sale.

Power Pack Module



1 Torque to 10 ft-lb (14 N•m).

2 Apply sealant to threads.

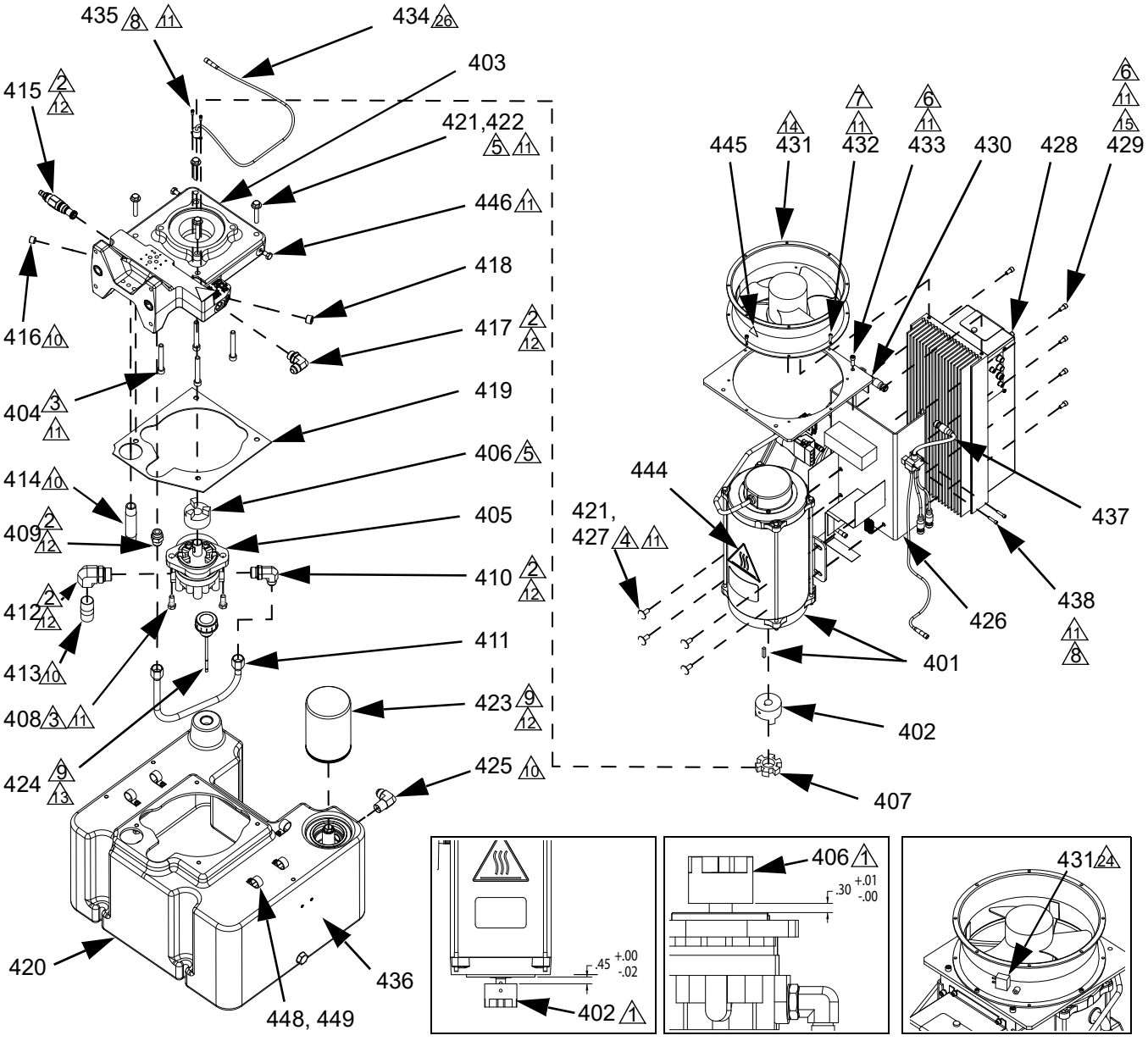
Ref	Part	Description	Qty
301	---	ENCLOSURE, frame	1
302	---	MODULE, hydraulic power	1
303	U90205	WASHER, flat, 3/8, 0.41 x 1.25 x 0.13, mild steel	4
304	802277	SCREW	4
305	---	COVER, enclosure, heat exchanger	1
306	111800	SCREW, cap, button head	2
307	15Y935	TUBE, heat exchanger, outlet	1
308	24C621	HOSE, heat exchanger, inlet	1
309	123528	FITTING, elbow, swivel, 45, JIC08, female/male, 6k	1
310	24C518	CORD, fan, heat exchanger, Motor Control Module	2
311	---	SEALANT, anaerobic	1
312	189930	LABEL, caution, electric shock (not shown)	1
313	15H108	LABEL, pinch point (not shown)	1
314	16G014	BUSHING	4

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

--- *Not for sale.*

Power Pack Module Sub-Assemblies

Hydraulic DC Power Pack Module



1. Assemble coupler to specified dimensions prior to mounting assembly to housing.
2. Torque to 40 ft-lb (54 N•m).
3. Torque to 35 ft-lb (47 N•m).
4. Torque to 20 ft-lb (27 N•m).
5. Torque to 15 ft-lb (20 N•m).
6. Torque to 10 ft-lb (14 N•m).
7. Torque to 58 in-lb (6.5 N•m).
8. Torque to 34 in-lb.
9. Torque 1/4 turn past hand-tight.
10. Apply PTFE tape on installation end only.
11. Apply sealant to threads.
12. Apply light coating of lubricant to seals.
13. Fill reservoir with hydraulic fluid.
14. Orient with airflow arrow pointing toward mounting bracket.
15. Prior to installing Ref. 428 into Ref. 426, install Ref. 429 into Ref. 428 and adjust head 1/8 in. from surface.
24. Align fan plug as shown.
26. Apply thermal lubricant to contact side.

FIG. 7: Hydraulic DC Power Pack

Ref	Part	Description	Qty
401	---	MOTOR, power connector, assembly	1
402	16A951	COUPLER, motor	1
403	---	HOUSING, hydraulic, module	1
404	123338	SCREW, socket head cap, 3/8-16 x 2.75	4
405†	122295	PUMP, gear, hydraulic, H39	1
	125022	PUMP, gear, hydraulic, H31	1
406	16A952	COUPLER, pump	1
407	16A953	COUPLER, spider	1
408	123942	SCREW, cap, hex head	2
409	121309	FITTING, adapter, SAE-ORB x JIC	1
410	122520	FITTING, elbow, male, SAE x JIC	1
411	---	TUBE, pump to tube outlet	1
412	122606	FITTING, elbow, male, female	1
413	100627	NIPPLE, short	1
414	101353	FITTING, nipple, pipe	1
415	122527	VALVE, relief, t-10a cavity, 0-25g	1
	124274	VALVE, relief, fast acting	1
416	100721	PLUG, pipe	1
417	121312	FITTING, elbow, SAE x JIC	1
418	101754	PLUG, pipe	1
419	---	GASKET, housing, to, tank	1
420	---	RESERVOIR, 8 gallon	1
421	101971	WASHER, thrust	4
422	111302	SCREW, cap, hex head	4
423	15J937	FILTER, oil, 18-23 psi bypass	1
424	116915	CAP, breather filler	1
425	121486	FITTING, elbow, male, 1/2 JIC x 1/2 npt	1
426	15Y912	BRACKET, Motor Control Module mounting	1
427	100057	SCREW, cap hex head	4
428	257396	MODULE, motor control	1
429	101550	SCREW, cap, socket head	7
430	---	PLATE, mounting, fan	1
431	122301	FAN, 220v	1
432	112310	SCREW, cap, socket head	8
433	100644	SCREW, cap, socket head	2
434	123367	HARNESS, M8 x thermal switch, 4-pin	1
435	102410	SCREW, cap socket head	1
436	---	FLUID, hydraulic (gallon)	8
437	123303	HARNESS, N12	2
438	295709	SCREW, socket head	4
439	---	LUBRICANT, grease	1
440	---	SEALANT, pipe, stainless steel	1
441	---	SEALANT, pipe, stainless steel	1
443	189285	LABEL, caution	1
444	121208	LABEL, hot surface	1
445	15H108	LABEL, pinch point	1
446	109468	SCREW, cap, hex head	2
447	---	LUBRICANT, thermal	1
448	123601	CLAMP, wire, harness, nylon, 3/4	5
449	103833	SCREW, cross-recessed pan head	5

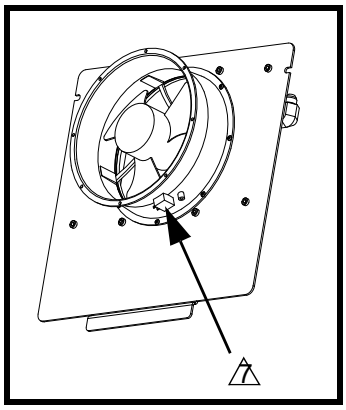
† *To determine which hydraulic gear pump to order, check the label on top of the hydraulic housing (403). If the part number shown on the label is 24H588, order H31 hydraulic gear pump 125022. If the part number shown is 257442, order H39 hydraulic gear pump 122295.*

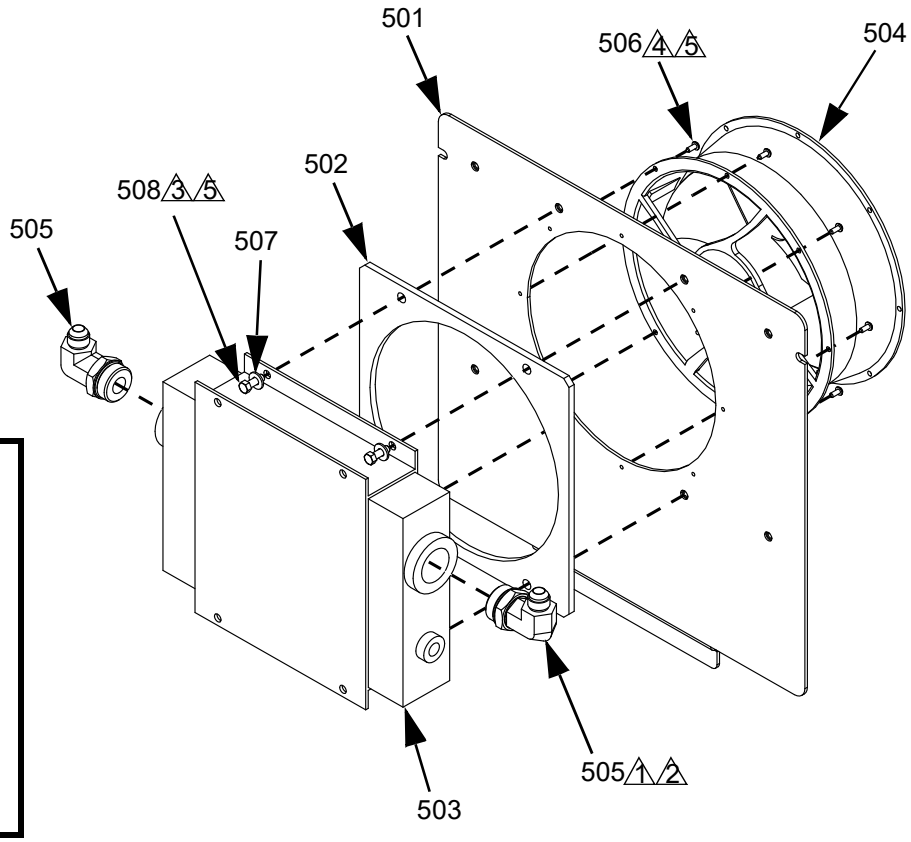
Replacement Danger and Warning labels, tags and cards are available at no cost.

To determine which hydraulic gear pump to order, check the label on top of the hydraulic housing (403). If the part number shown on the label is 24H588, order relief valve 122527. If the part number shown is 257442, order relief valve124274.

--- *Not for sale.*

Heat Exchanger Assembly





1 Torque to 65 ft-lb (88 N•m).

2 Apply lubricant to o-rings before assembling.

3 Torque to 8 ft-lb (11 N•m).

4 Torque to 2.5 ft-lb (3.4 N•m).

5 Apply sealant to threads.

6 Orient fan with airflow arrow pointing toward cover.

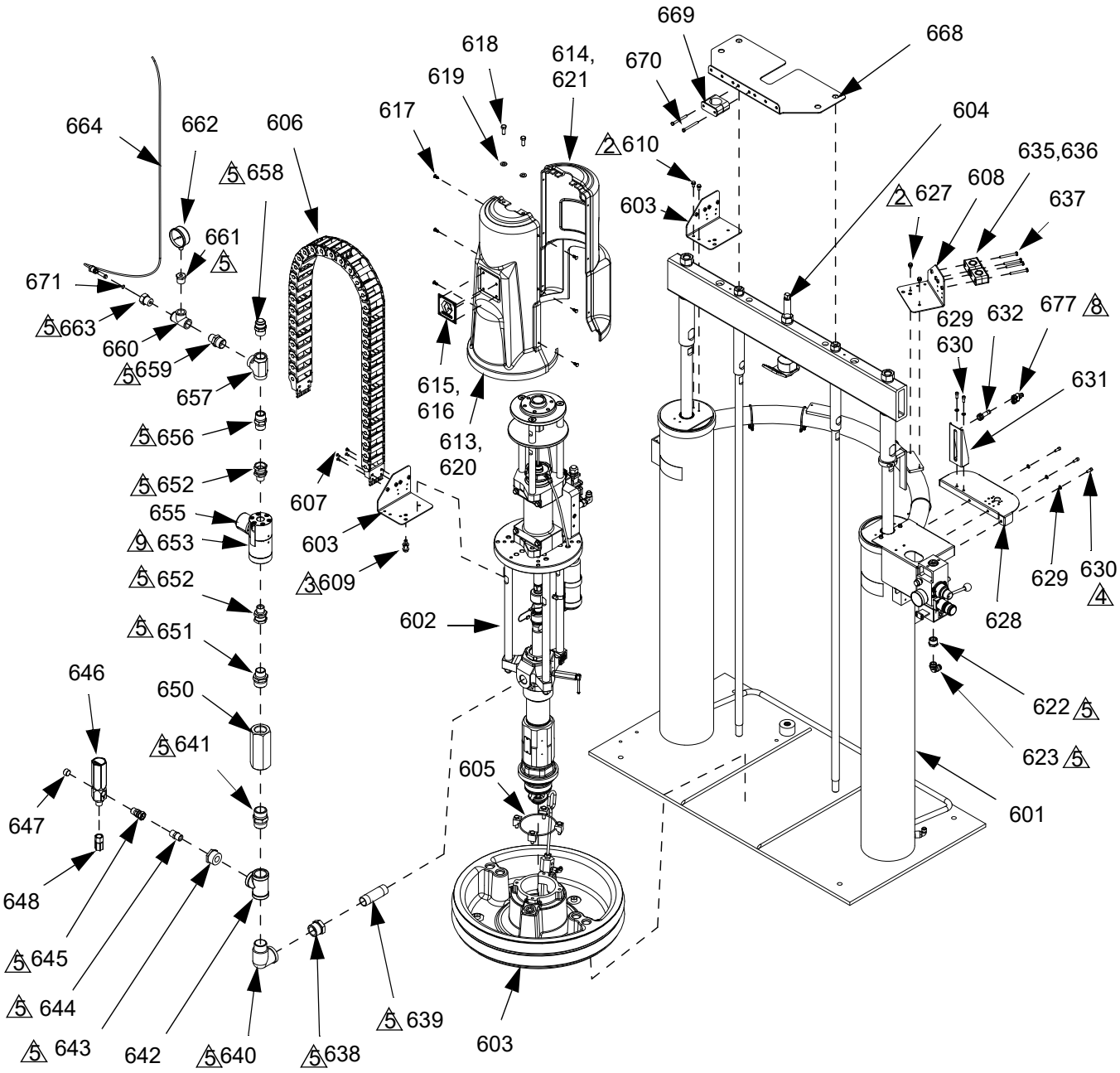
7 Align fan plug as shown.

Ref	Part	Description	Qty
501	---	COVER, enclosure, heat exchanger	1
502	---	GASKET, fan, mounting	1
503	122300	EXCHANGER, heat, m-4	1
504	122301	FAN, 220v	1
505	122842	FITTING, elbow, SAE x JIC	2
506	15U075	SCREW, cap, button head, 8-32 x 0.37	8
507	110755	WASHER, plain	4
508	100022	SCREW, cap, hex head	4
510	---	LUBRICANT, thread	1
511	---	SEALANT, anaerobic	1

--- Not for sale.

Supply Units

250 cc and 290 cc Supply Unit



2 Apply medium strength thread sealant and torque to 10 ft-lb (14 N•m).

3 Apply medium strength thread sealant and torque to 30 ft-lb (41 N•m).

4 Apply medium strength thread sealant and torque to 16 ft-lb (22 N•m).

5 Apply pipe sealant and PTFE tape to all non-swiveling and non o-ring threads.

6 Wrap cable around suppressor as shown.

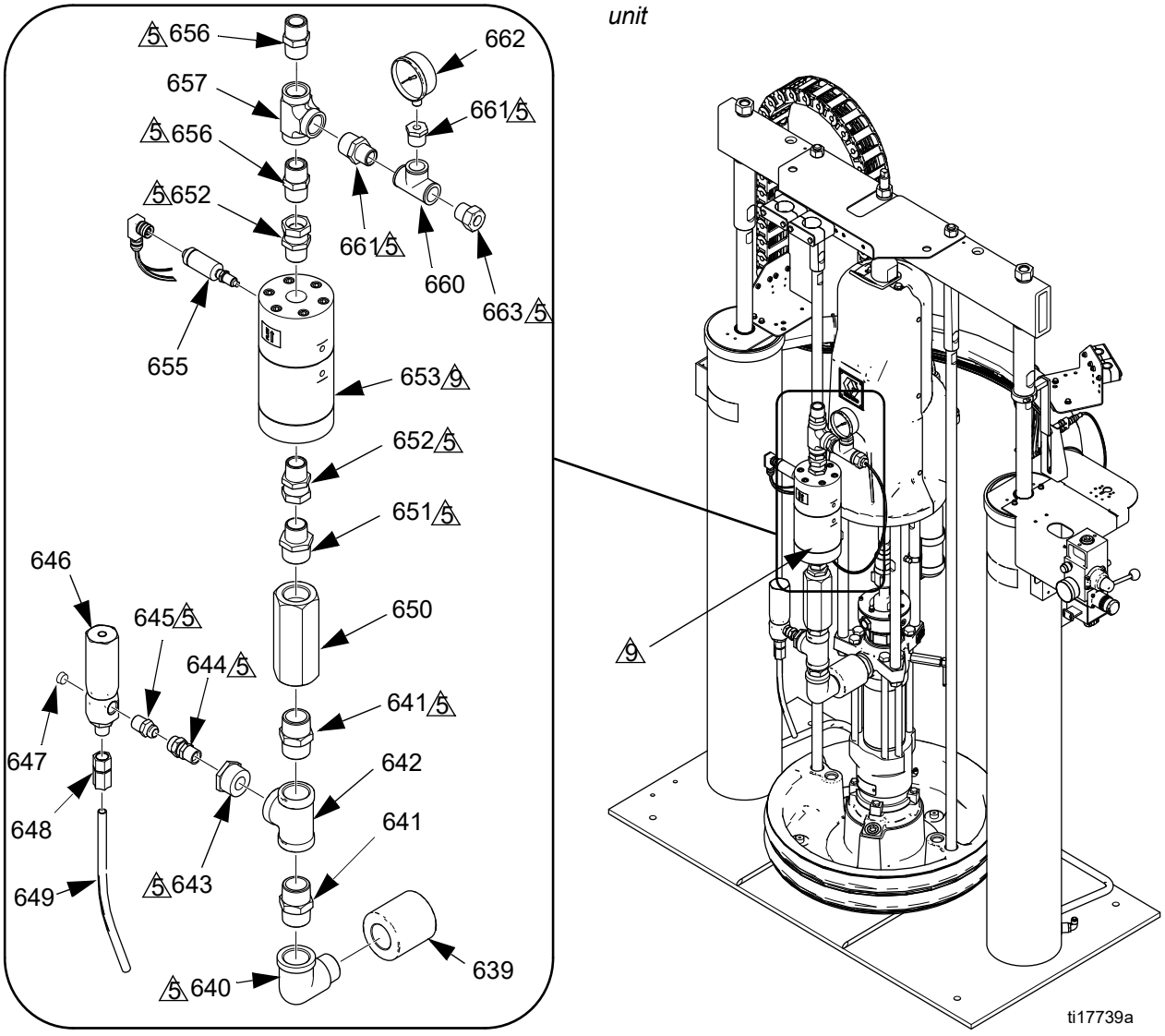
7 Place approximately as shown.

8 Connect port 2 of splitter to sensor.

9 Verify that fitting tree is completely inside footprint of platen.

500 cc Supply Unit for VPM-25 Systems

NOTE: *Reference numbers for all parts not identified on this page are the same as the 250 cc supply unit*



2 Apply medium strength thread sealant and torque to 10 ft-lb (14 N•m).

3 Apply medium strength thread sealant and torque to 30 ft-lb (41 N•m).

4 Apply medium strength thread sealant and torque to 16 ft-lb (22 N•m).

5 Apply pipe sealant and PTFE tape to all non-swiveling and non o-ring threads.

6 Wrap cable around suppressor as shown.

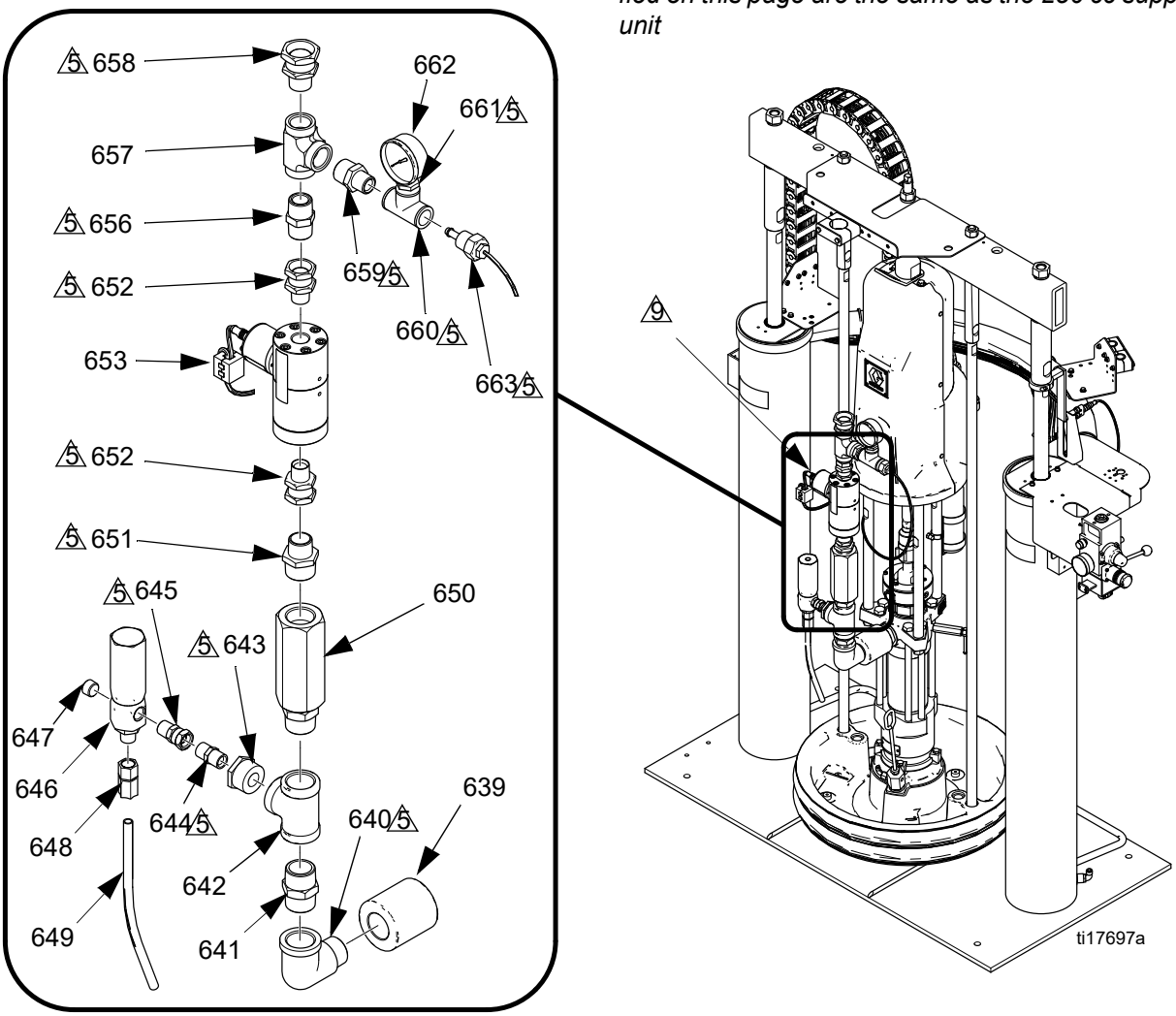
7 Place approximately as shown.

8 Connect port 2 of splitter to sensor.

9 Verify that fitting tree is completely inside footprint of platen.

500 cc Supply Unit for VPM-12 Systems

NOTE: *Reference numbers for all parts not identified on this page are the same as the 250 cc supply unit*



2 Apply medium strength thread sealant and torque to 10 ft-lb (14 N•m).

3 Apply medium strength thread sealant and torque to 30 ft-lb (41 N•m).

4 Apply medium strength thread sealant and torque to 16 ft-lb (22 N•m).

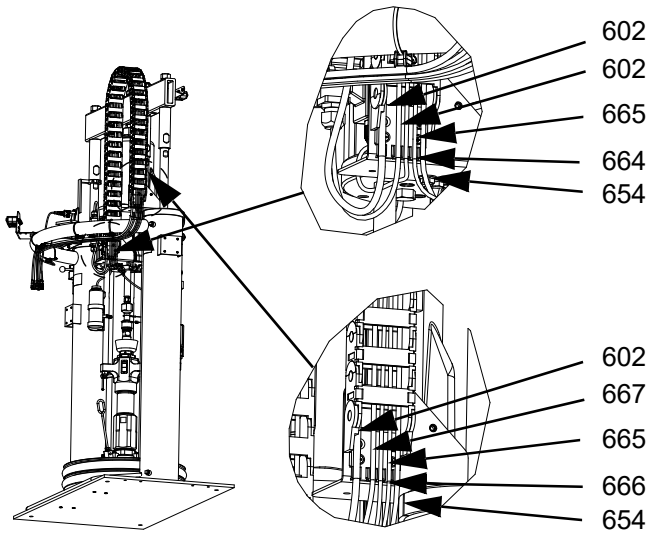
5 Apply pipe sealant and PTFE tape to all non-swiveling and non o-ring threads.

6 Wrap cable around suppressor as shown.

7 Place approximately as shown.

8 Connect port 2 of splitter to sensor.

9 Verify that fitting tree is completely inside footprint of platen.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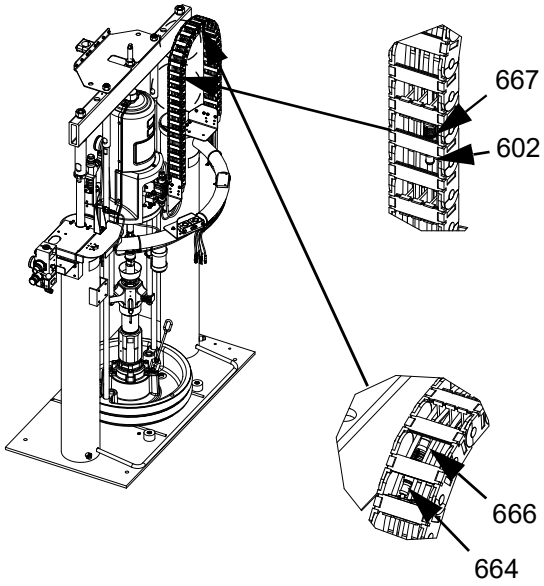
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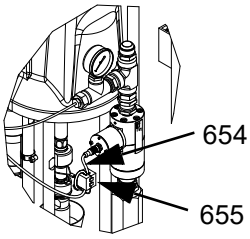
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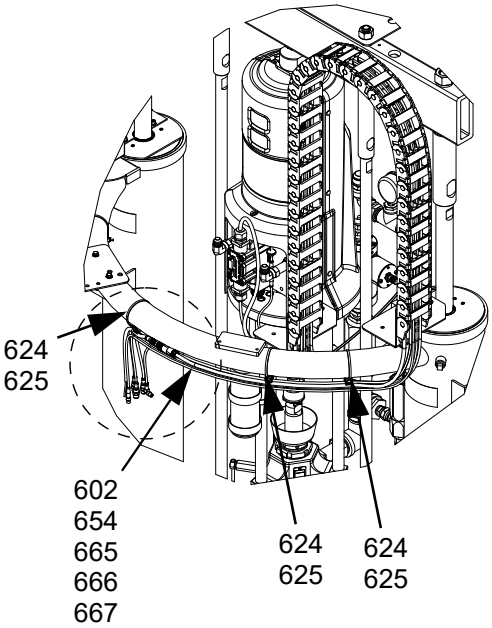
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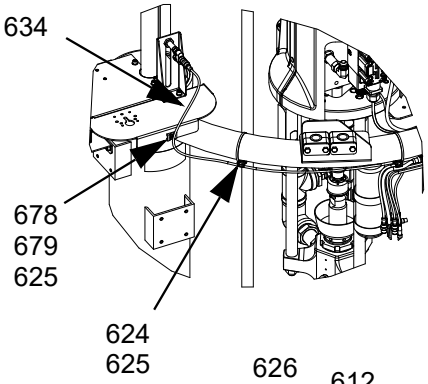
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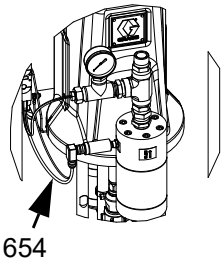
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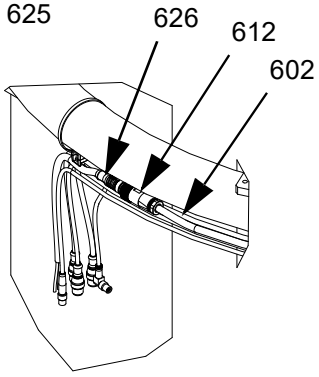
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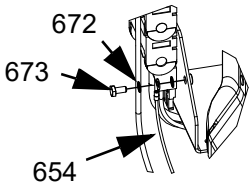
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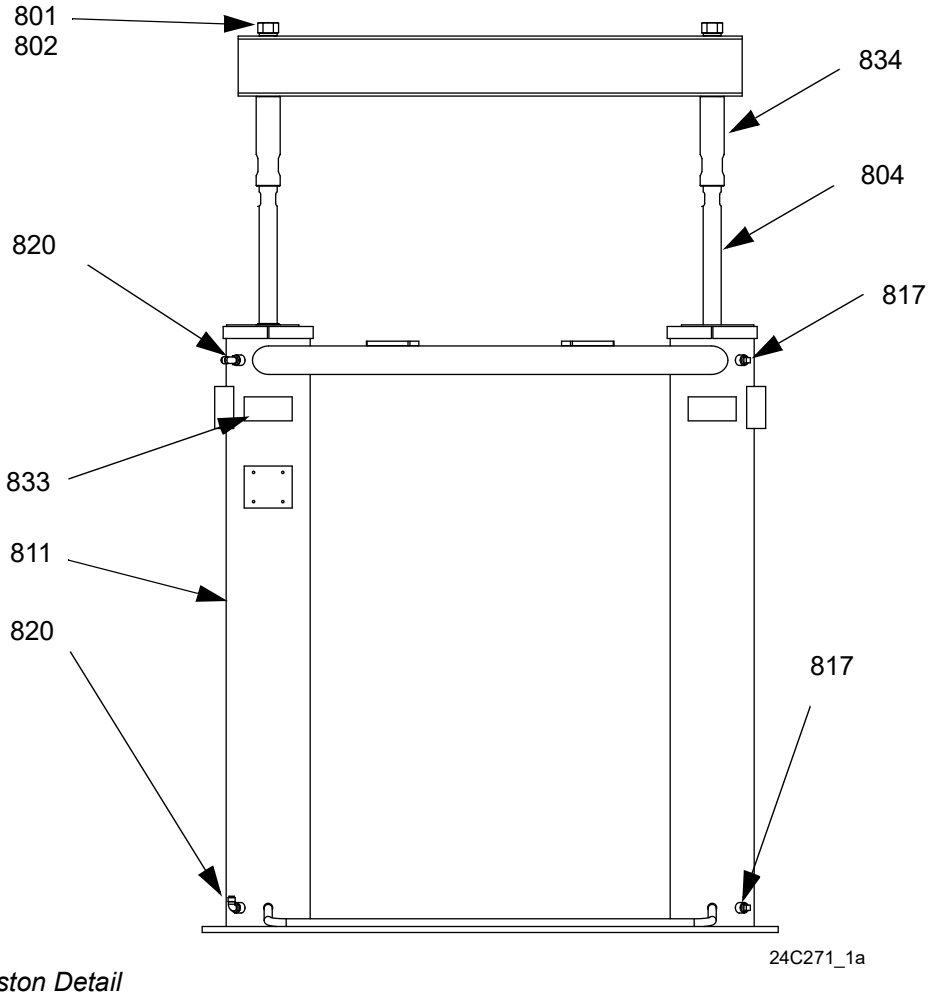
Ref	Part	Description	Quantity			
			SUPPLY UNIT, L250CM, 6.5 ram	SUPPLY UNIT, L290CM, 6.5 ram	SUPPLY UNIT, L500CM, 6.5 ram	SUPPLY UNIT, L500CM,6.5 ram;
601	---	RAM, pneumatic, 6.5 in, vertical driver	1		1	1
602	---	PUMP, vertical driver, L250CM	1			
	---	PUMP, vertical driver, L290CM		1		
	---	PUMP, vertical driver, L500CM			1	1
603	255319	PLATE, wiper 55 gallon EPDM	1	1	1	1
604	---	KIT, mating, vert driver, 6.5 in., 55 gallon	1	1	1	1
605	255392	KIT, mounting, Check-mate lower	1	1	1	1
606	---	CABLE, track, ram, vertical driver	1	1	1	1
607	111904	SCREW, machine, flat head	8	8	8	8
608	24C473	BRACKET, mating, ram	3	3	3	3
609	113802	SCREW, hex head, flanged	2	2	2	2
610	113161	SCREW, flange, hex head	2	2	2	2
612	---	CONNECTOR, M12, 4-pin, standard key, field	1	1	1	1
613	16A702	COVER, front, driver	1	1	1	1
614	16A703	COVER, back, driver	1	1	1	1
615	---	PLATE, name, valve cover p3	1	1	1	1
616	120060	CLIP, speed, tubular	4		4	4
617	123347	CLIP, tree, removable	6	6	6	6
618	123942	FASTENER, screw, cap, hex head	2	2	2	2
619	100731	WASHER	2	2	2	2
620	---	STRIP, polyurethane foam	3	3	3	3
621	15F674	LABEL, safety, motor	1	1	1	1
622	100896	FITTING, bushing, pipe	1	1	1	1
623	114110	FITTING, elbow, male, swivel	1	1	1	1
624	---	HOLDER, cable tie, rotating	4	4	4	4
625	114958	STRAP, tie	9	9	9	9
626	---	CABLE, M12, f/n, 18awg, 10 ft, 3-wire	1	1	1	1
627	119865	SCREW, machine, hex serrated	2	2	2	2
628	15R108	BRACKET, light tower	1	1	1	1
629	100016	WASHER, lock	5	5	5	5
630	101682	SCREW, cap, sch	5	5	5	5
631	255382	BRACKET, sensor, low/empty	1	1	1	1
632	122716	SENSOR, inductive, M12	1	1	1	1
633	24D006	ACTUATOR, sensor, low/empty,	1	1	1	1
634	121694	CABLE, M12 x M8, 4-pin, female x male, straight x right angle, 3 m	1	1	1	1
635	124456	CLAMP, hose clamp 1/2 in.	2	2	2	2
636	---	COVER, plate	2	2	2	2
637	104429	SCREW, cap, hex head	4	4	4	4
638	C19662	BUSHING, 1-1/4 x 1 npt, carbon steel	1	1		
639	516772	FITTING, nipple	1	1		
	C38457	FITTING, coupling, reducing			1	1
640	C38324	FITTING, elbow, street	1	1	1	1
641	C20490	FITTING, nipple, hex	1	1	2	2
642	C19490	FITTING, tee, plain	1	1	1	1
643	C19660	FITTING, 1-1/4 x 1/2	1	1	1	1
644	158491	FITTING, nipple	1	1	1	1
645	156684	FITTING, union, adapter	1	1	1	1
646	237062	VALVE, relief	1	1	1	1
647	103778	PLUG, pipe	1	1	1	1
648	113187	CONNECTOR, female, tube	1	1	1	1
649	590570	TUBE, polyethylene, 1/2 in. OD	1	1	1	1
650	521850	VALVE, check	1	1	1	1
651	C20465	FITTING, reducing nipple	1	1	1	1
652	123349	FITTING, union, swivel, 1 npt, male/female, stainless steel			2	
	511975	FITTING, union, swivel, straight	2	2		2
653	124474	METER, flow, 100CG, stainless steel, 1 npt			1	
	246190	METER, helical gear, with sensor	1	1		1

Ref	Part	Description	Quantity			
			SUPPLY UNIT, L250CM, 6.5 ram	SUPPLY UNIT, L290CM, 6.5 ram	SUPPLY UNIT, L500CM, 6.5 ram	SUPPLY UNIT, L500CM,6.5 ram;
654	123657	CABLE, 5-pin, male/female, 3.5m	1	1		1
	24F374	HARNESS, wire, flow-meter			1	
655	121901	SUPPRESSOR, box snap, ferrite	1	1		1
	124475	SENSOR, pickup, flow-meter			1	
656	C38302	FITTING, nipple, carbon steel, 1 in. npt	1	1	2	1
657	123890	FITTING, tee, 1 npt x 1 npt x 1 nptf, female/female/female	1	1	1	1
658	124918	FITTING, swivel, 1 npt x1-1/4 nps, carbon steel				1
	C20586	FITTING, male connec-tor	1	1		
659	158555	FITTING, nipple, 1 x 3/4 npt	1	1	1	1
660	166466	FITTING, tee, pipe, female	1	1	1	1
661	100615	BUSHING, hex steel	1	1	1	1
662	102814	GAUGE, pressure, fluid	1	1	1	1
663	16A293	ADAPTER, pressure transducer, stainless steel	1	1	1	1
664	16A093	SENSOR, pressure, fluid outlet	1	1	1	1
665	124277	CABLE, M8, 4-pin, male/female, 3.6	1	1	1	1
666	124409	CABLE, cordset, reverse key	1	1	1	1
667	124415	CABLE, 5-pin, male/female, 3.0 m	1	1	1	1
668	24F477	BRACKET, hose	1	1	1	1
669	124930	CLAMP, pipe, 1.75 in.,			2	1
	U5A008	CLAMP, hose, 1 in. ID	1	1		
670	103547	SCREW, machine, hex head	2			
	115506	SCREW, machine, hex wash head		2	4	2
671	111457	PACKING, o-ring	1	1	1	1
672	100028	WASHER, lock			1	
673	555357	SCREW, hex head, 1/4 x 0.500			1	
674	---	SEALANT, anaerobic	1	1	1	1
675	---	SEALANT, pipe, stain-less steel	1	1	1	1
676	---	TAPE, tfe, sealant	1	1	1	1
678	123452	HOLDER, anchor, wire tie, nylon	1	1	1	1
679	103833	SCREW, machine, cross-recessed pan head	1	1	1	1
680	124927	COVER, plate, 1.75 in., pipe clamp			2	1

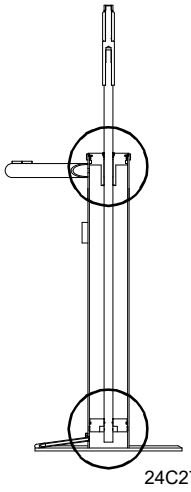
Replacement Danger and Warning labels, tags and cards are available at no cost.

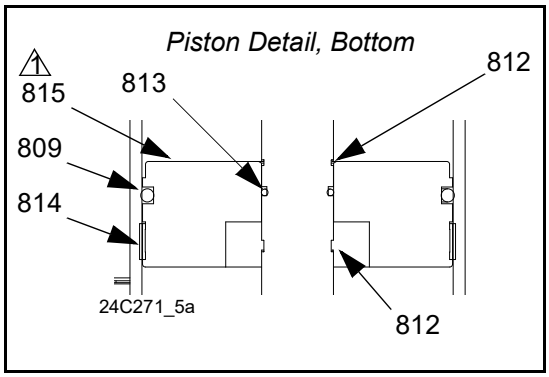
--- Not for sale.

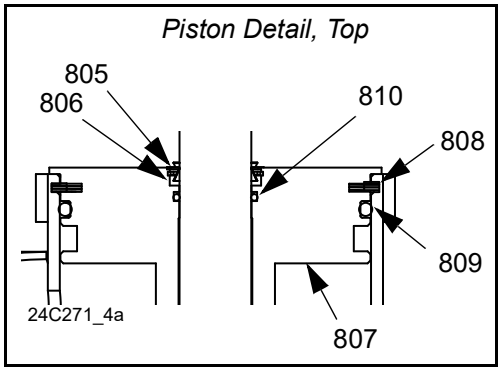
Ram



See Piston Detail







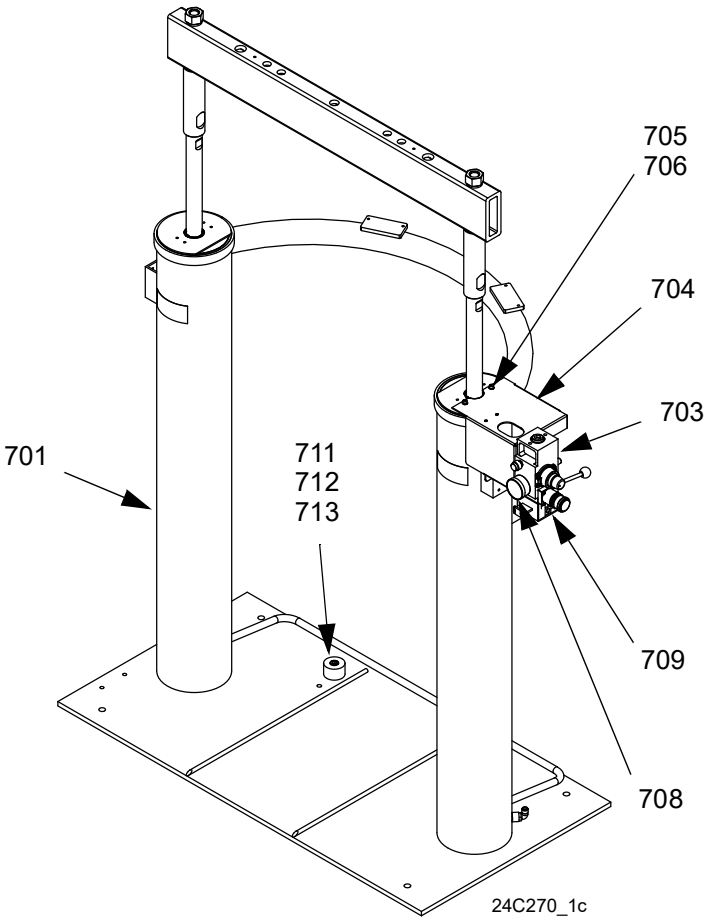
1 Add 3 oz of oil per cylinder after inserting the piston.

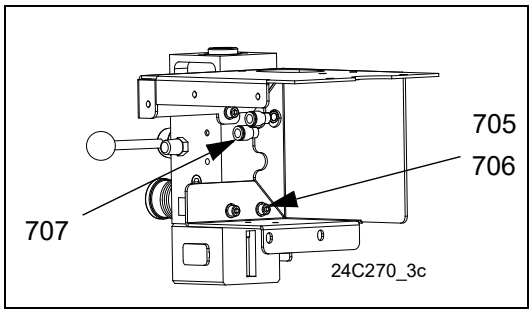
Ref	Part	Description	Qty
801	113939	NUT, jam, hex	2
802	113993	WASHER, lock, helical	2
803	15M538	BEAM, tie 6.5 in. Ram	1
804	C32401	ROD	2
805	C03043	RING, snap	2
806	C31001	WIPER, rod	2
807	25T845	SLEEVE, guide, 6-1/2 in. Ram	2
808	C32409	RING, retaining	2
809	C38132	PACKING, o-ring	4
810	156593	PACKING, o-ring	2
811	255373	RAM, 6.5 in. weldment	1
812	C20417	RING, retaining	4
813	158776	PACKING, o-ring	2
814	C32408	BAND, guide	2
815	C32405	PISTON, elevator air, 6.5 in.	2
817	100040	PLUG, pipe	2
818	---	LUBRICANT, grease	1
820	114153	FITTING, elbow, male, swivel	2
821	---	LUBRICANT, oil	6
833	15J074	LABEL, safety, crush & pinch	4
834	---	EXTENSION, driver, hydraulic, vertical	2

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

--- *Not for sale.*

Pneumatic Ram

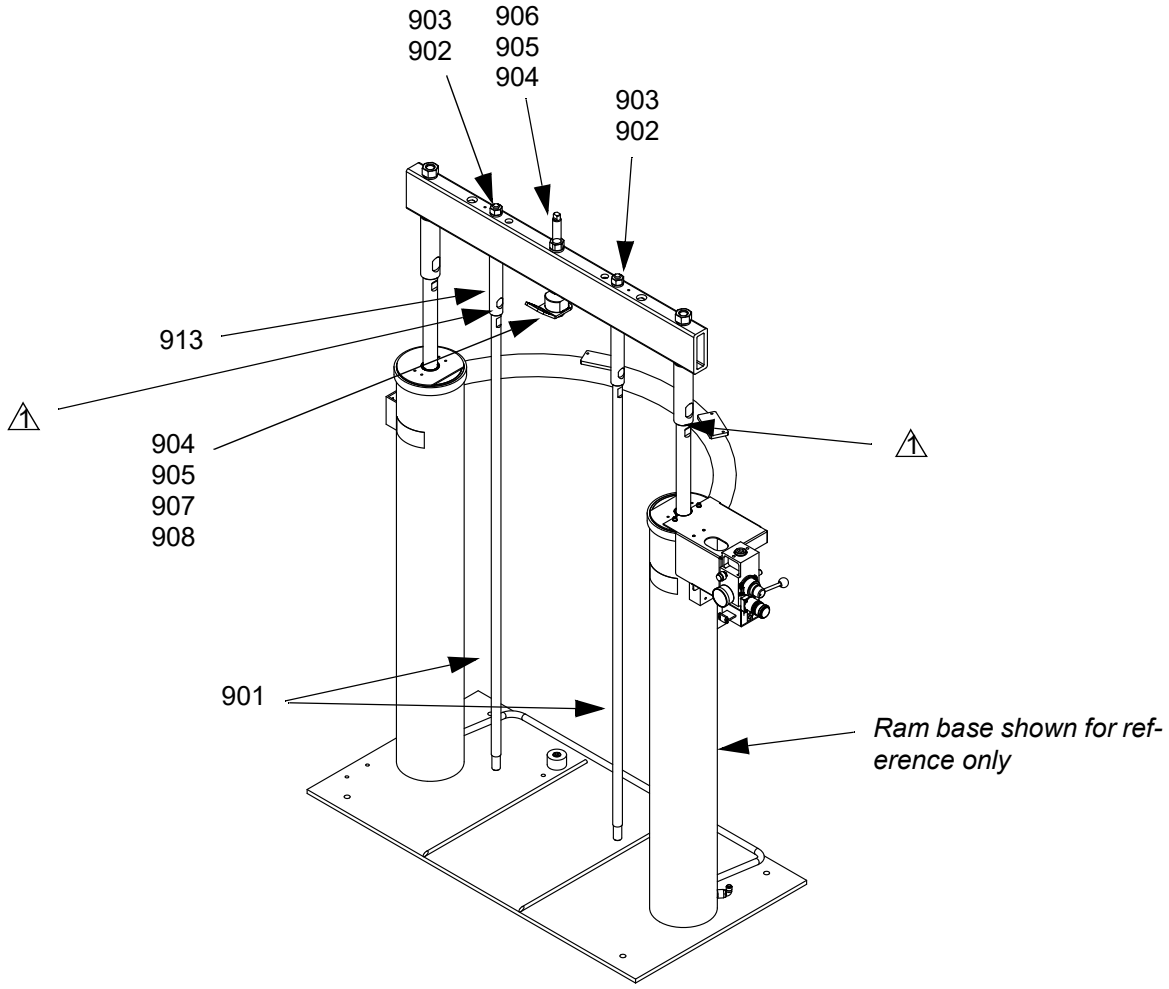




Ref	Part	Description	Qty
701	---	RAM, 6.5 in, vertical driver	1
702	C12509	TUBE, nylon, round	19.5
703	---	CONTROL, air, Ram, hydraulic driver	1
704	---	BRACKET, mounting	1
705	101682	SCREW, cap, socket head	8
706	100016	WASHER, lock	8
707	113318	FITTING, elbow	2
708	101689	GAUGE, press, air	2
709	---	LABEL, valve, shutoff, air-control	1
711	C32467	STOP, drum	2
712	C19853	SCREW, cap, socket head	2
713	C38185	WASHER, lock	2

--- Not for sale.

Vertical Driver Mating Kit

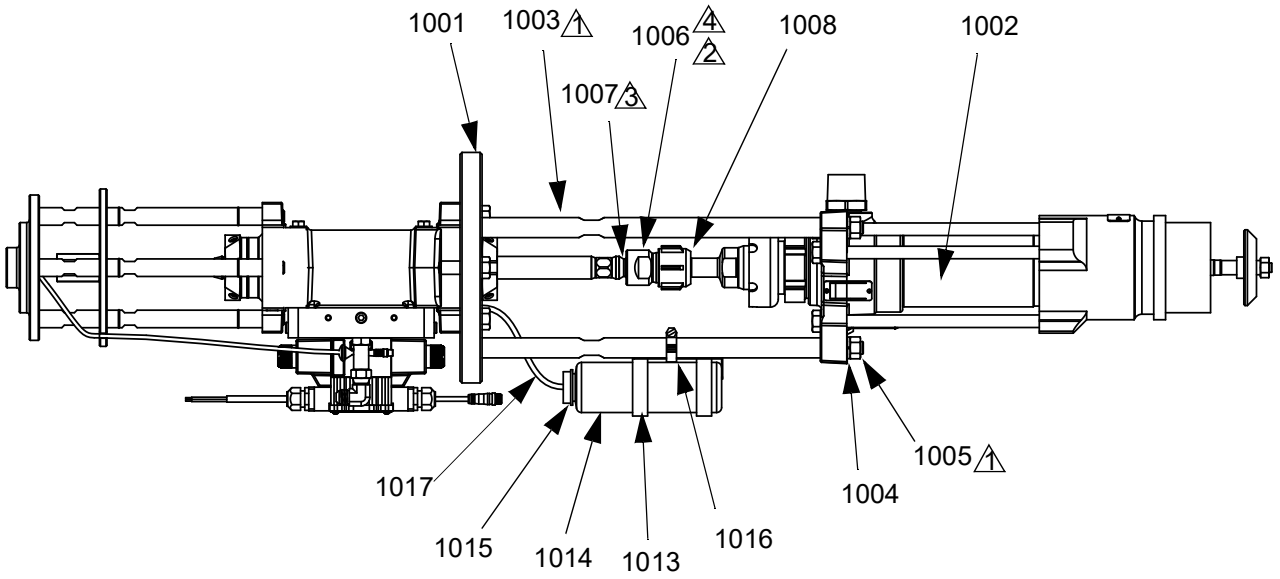


1 Apply lubricant.

Ref	Part	Description	Qty
901	15M531	ROD, follower	2
902	101015	WASHER, lock	2
903	C19187	NUT, hex	2
904	101533	WASHER, spring lock	2
905	101535	NUT, full hex	2
906	16F702	ROD, threaded, 12 in., 7/8-9 thread	1
907	15J991	ADAPTER, lift ring	1
908	15J993	RING, lift, plate	1
909	---	LUBRICANT, anti-seize	1
913	---	EXTENSION, rod, follower	2

--- *Not for sale.*

500 cc Vertical Driver Pump



1 Torque to 50-60 ft-lb (68-81 N•m).

2 Torque to 124-155 ft-lb (196-210 N•m).

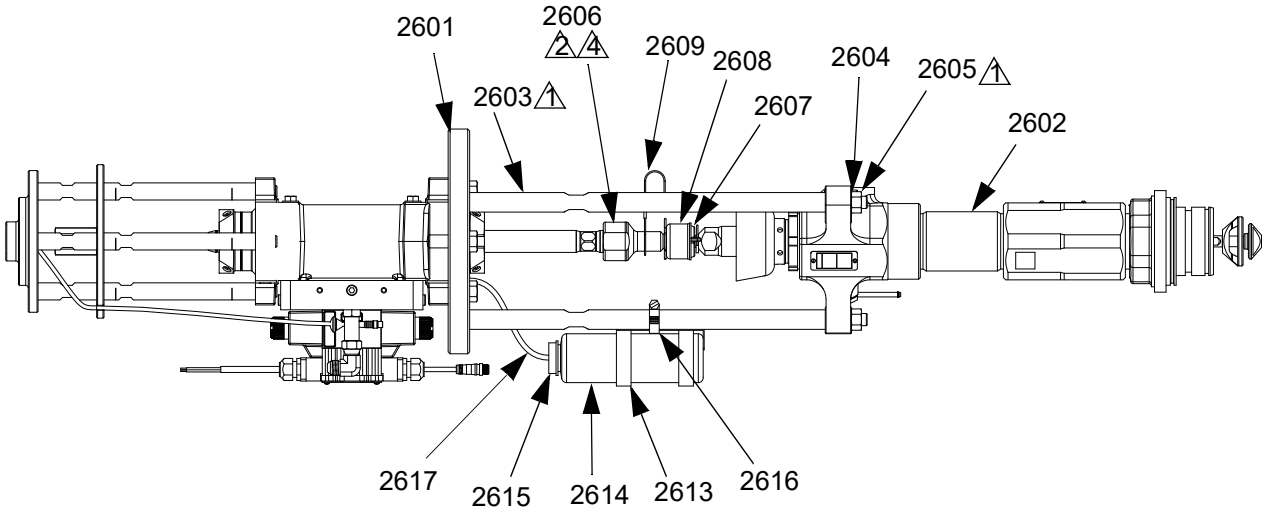
3 Apply thread lubricant.

4 Apply thread sealant.

Ref	Part	Description	Qty
1001	---	ACTUATOR, vertical, hydraulic	1
1002	L500CM	LOWER, CM500 severe duty	1
1003	---	ROD, tie, NXT® to Checkmate lower	3
1004	108098	WASHER, lock, spring	3
1005	106166	NUT, hex	3
1006	15Y953	ADAPTER, 1-1/4-12 UNF to 1-12 UNF	1
1007	184129	COLLAR, coupling	2
1008	186925	NUT, coupling	1
1010	---	ADHESIVE, anaerobic	1
1011	---	LUBRICANT, thread	1
1012	184278	TOOL, wrench, packing nut	1
1013	236272	HOLDER, bottle	1
1014	112279	BOTTLE	1
1015	189221	BOTTLE, drain	1
1016	103927	CLAMP, hose	1
1017	---	TUBE, nylon	27 ft

--- Not for sale.

250 cc Vertical Driver Pump



1 Torque to 50-60 ft-lb (68-81 N•m).

2 Torque to 124-155 ft-lb (196-210 N•m).

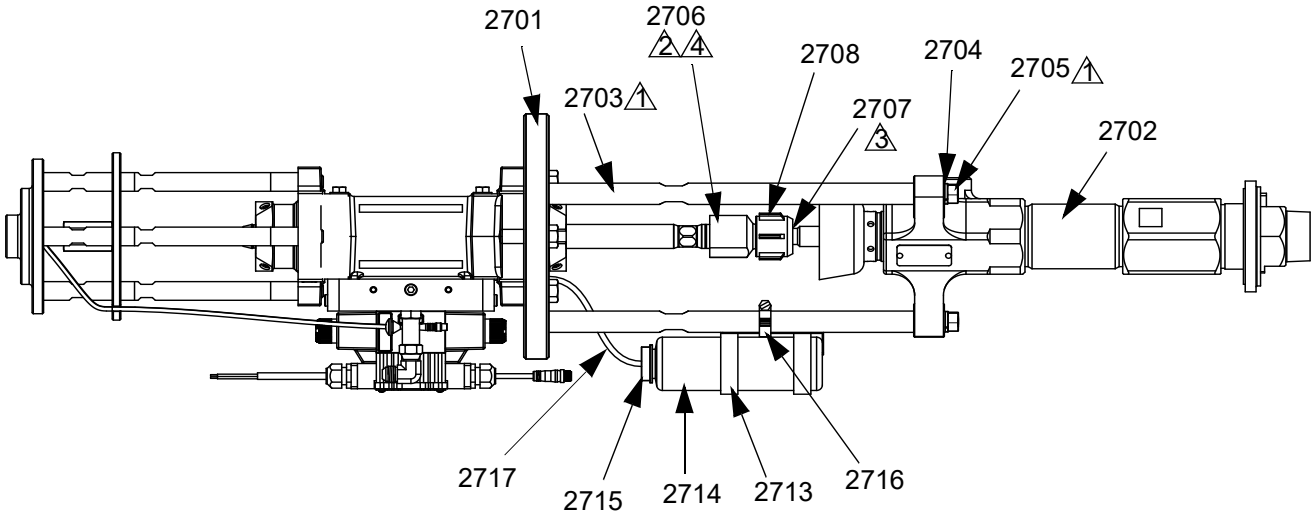
3 Apply thread lubricant.

4 Apply thread sealant.

Ref	Part	Description	Qty
2601	---	ACTUATOR, vertical, hydraulic	1
2602	L250CM	LOWER, CM250 severe duty	1
2603	---	ROD, tie, vertical driver, CM250 lower	3
2604	108098	WASHER, lock, spring	3
2605	106166	NUT, hex	3
2606	16A220	ROD, adapter, vertical driver	1
2607	244819	COUPLING, assembly	1
2608	197340	COVER, coupler	1
2609	244820	CLIP, hairpin (w/ lanyard)	1
2610	---	ADHESIVE, anaerobic, loctite 2760	1
2612	112887	WRENCH, spanner	1
2613	236272	HOLDER, bottle	1
2614	112279	BOTTLE	1
2615	189221	BOTTLE, drain	1
2616	103927	CLAMP, hose	1
2617	054175	TUBE, nylon, round	27 ft

--- *Not for sale.*

290 cc Vertical Driver Pump



1 Torque to 50-60 ft-lb (68-81 N•m).

2 Torque to 124-155 ft-lb (196-210 N•m).

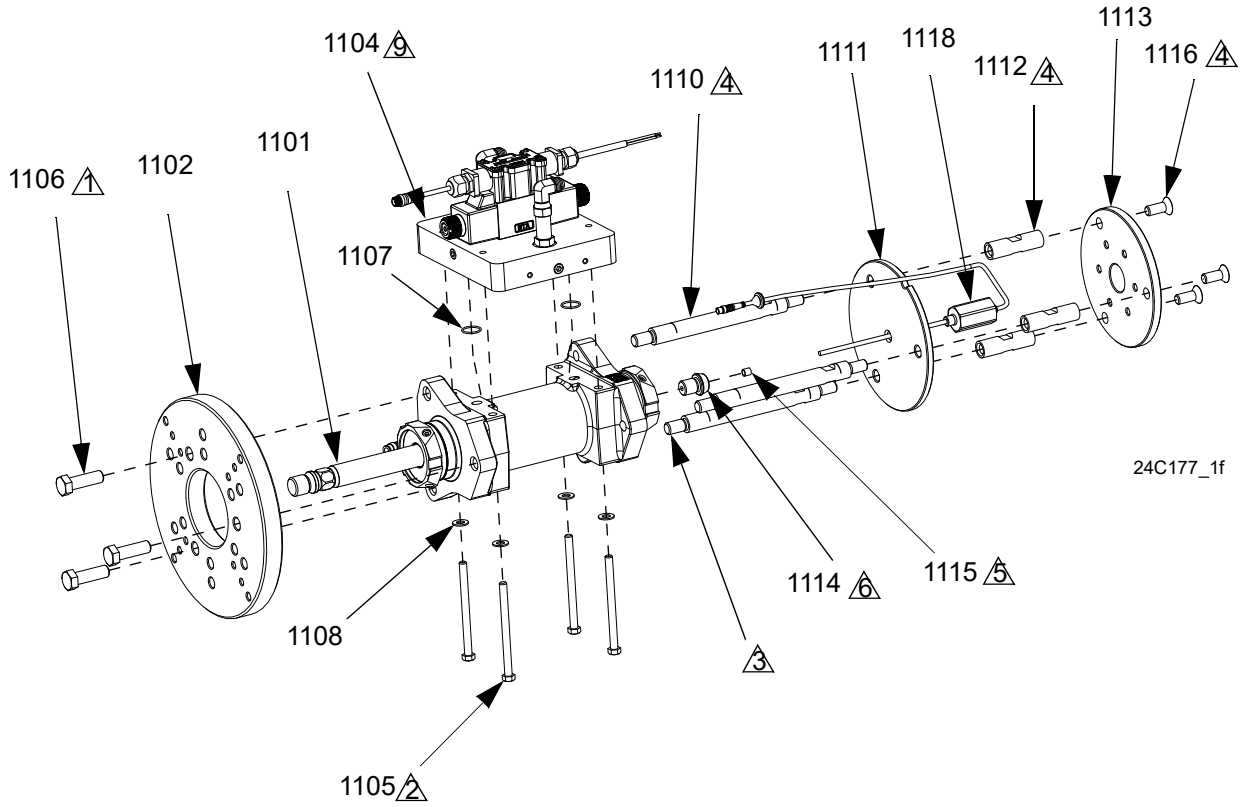
3 Apply thread lubricant.

4 Apply thread sealant.

Ref	Part	Description	Qty
2701	---	ACTUATOR, vertical, hydraulic	1
2702	L290SS	PUMP, recip, displ	1
2703	---	ROD, tie	3
2704	108098	WASHER, lock, spring	3
2705	106166	NUT, mach, hex	3
2706	17L283	ADAPTER, 1 1/4-12 unf to 1-12 unf	1
2707	184129	COLLAR, coupling	2
2708	186925	NUT, coupling	1
2710	---	ADHESIVE, anaerobic, loctite 2760	1
2712	184278	TOOL, wrench, combo	1
2713	236272	HOLDER, bottle	1
2714	112279	BOTTLE,	1
2715	189221	BOTTLE, drain	1
2716	103927	CLAMP, hose	1
2717	054175	TUBE, nylon, rd	27 ft

--- *Not for sale.*

Hydraulic Vertical Actuator



1 Torque to 100 in-lb(11.3 N•m).

2 Torque to 350 in-lb (40 N•m).

3 Apply a light coating of lubricant to seals and surfaces specified.

4 Torque to 50-60 ft-lb (68-81 N•m).

5 Apply adhesive to surfaces specified.

6 Torque to 10-12 in-lb (1.1-1.4 N•m).

7 Apply thread sealant to threads.

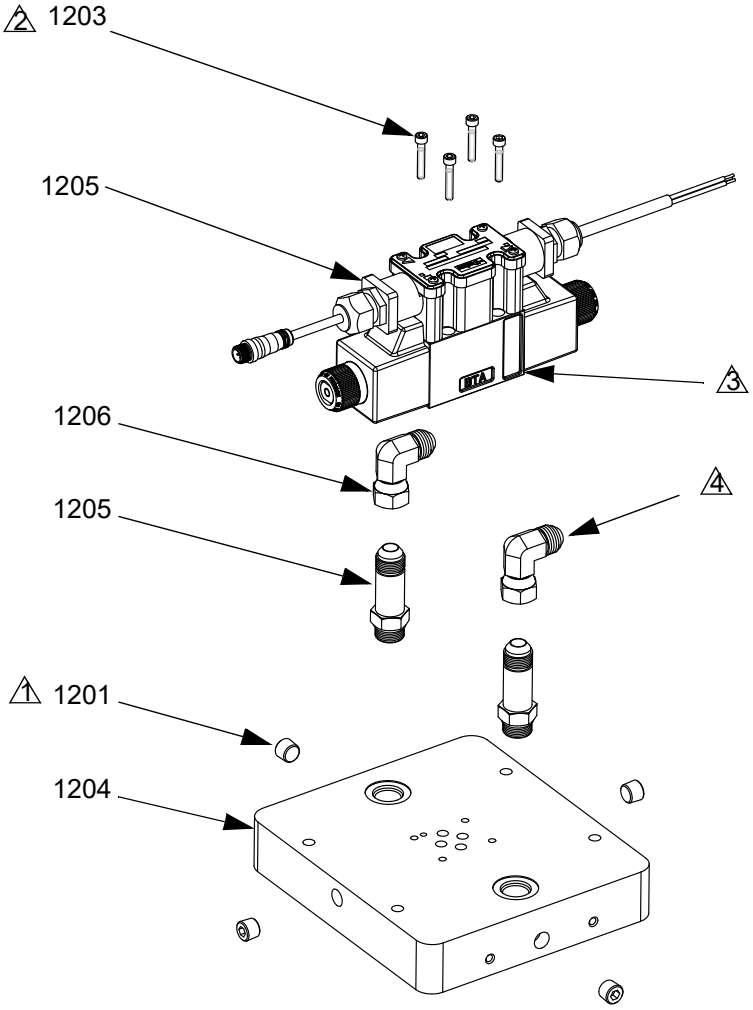
8 Torque to 30-36 ft-lb (41-49 N•m).

9 Orient to location shown in reference to the date code stamp on cylinder housing of driver.

Ref	Part	Description	Qty
1101	---	DRIVER, hydraulic, vertical, 4.75 in. stroke	1
1102	---	PLATE, base	1
1104	---	HOUSING, vertical, actuator	1
1105	123389	SCREW, hex head cap, 3/8-16 x 5 in., Grade 5	4
1106	113820	SCREW, cap, hex head	3
1107	103413	PACKING, o-ring	2
1108	100731	WASHER	4
1110	15Y715	ROD, tie, 10 in. long	3
1111	15Y756	PLATE, mounting	1
1112	15Y726	ROD, tie, 3 in. long	3
1113	15Y745	PLATE, top, diameter 7.25	1
1114	16D023	HOUSING, magnet	1
1115	15G747	MAGNET, linear sensor	1
1116	122988	SCREW, cap, socket, flat	3
1118	258669	SENSOR, assembly	1
1119	---	LUBRICANT, grease	1
1120	---	ADHESIVE, retaining, loctite638	1
1121	---	ADHESIVE, anaerobic	1

--- *Not for sale.*

Vertical Actuator Housing



1 Apply pipe sealant to pipe threads.

2 Torque to 61 in-lb (7 N•m).

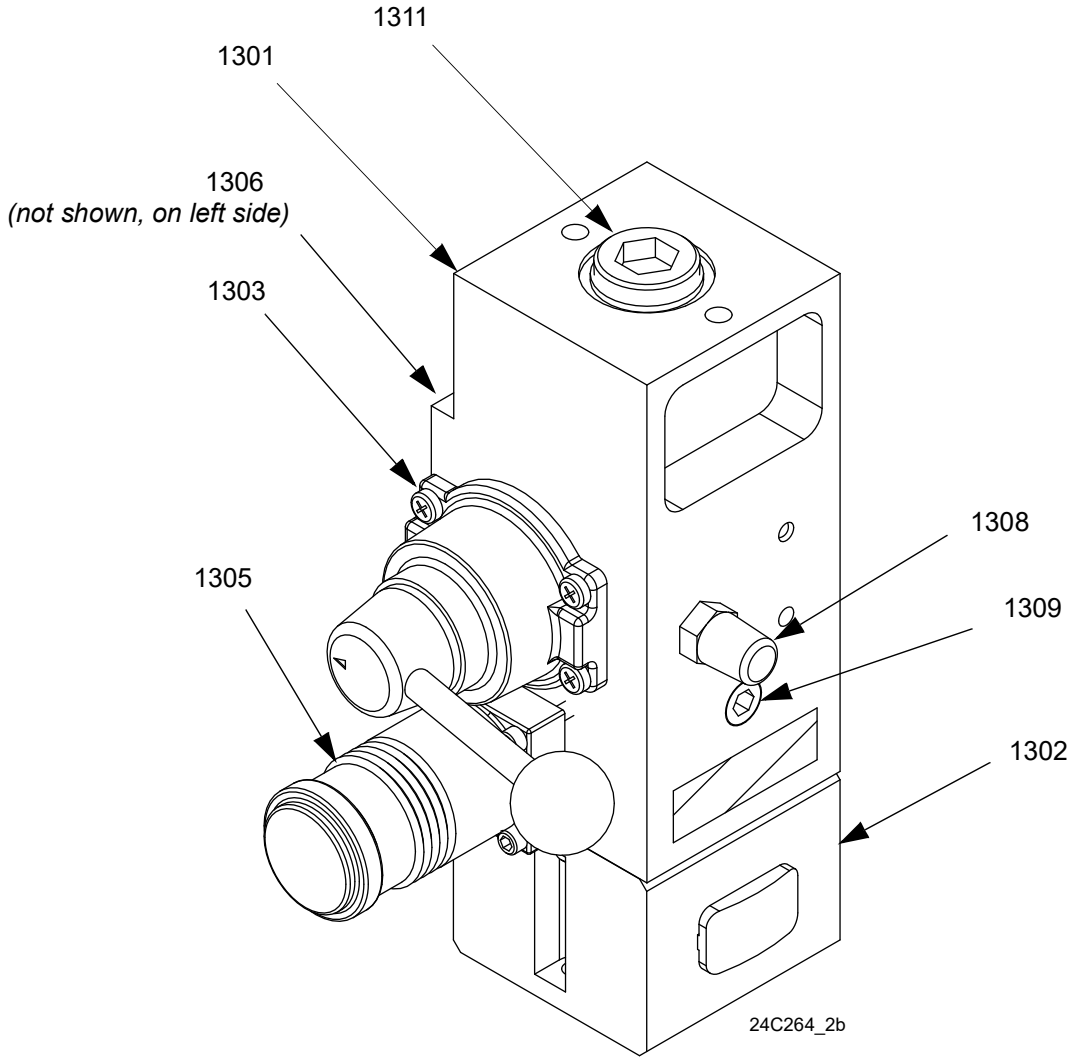
3 Incoming pressure side of valve stamped with letter “P”.

4 Orientation of fitting varies with installation on upper level machine assembly.

Ref	Part	Description	Qty
1201	101754	PLUG, pipe	4
1202	122970	FITTING, adapter, JIC(08) x SAE(08), male	2
1203	123366	SCREW, cap, socket, head	4
1204	---	PLATE, vertical pump	1
1205	123313	VALVE, directional, hydraulic	1
1206	122967	FITTING, elbow, swivel, 90, JIC(08), female/male	2
1207	---	SEALANT, pipe, stainless steel	1

--- Not for sale

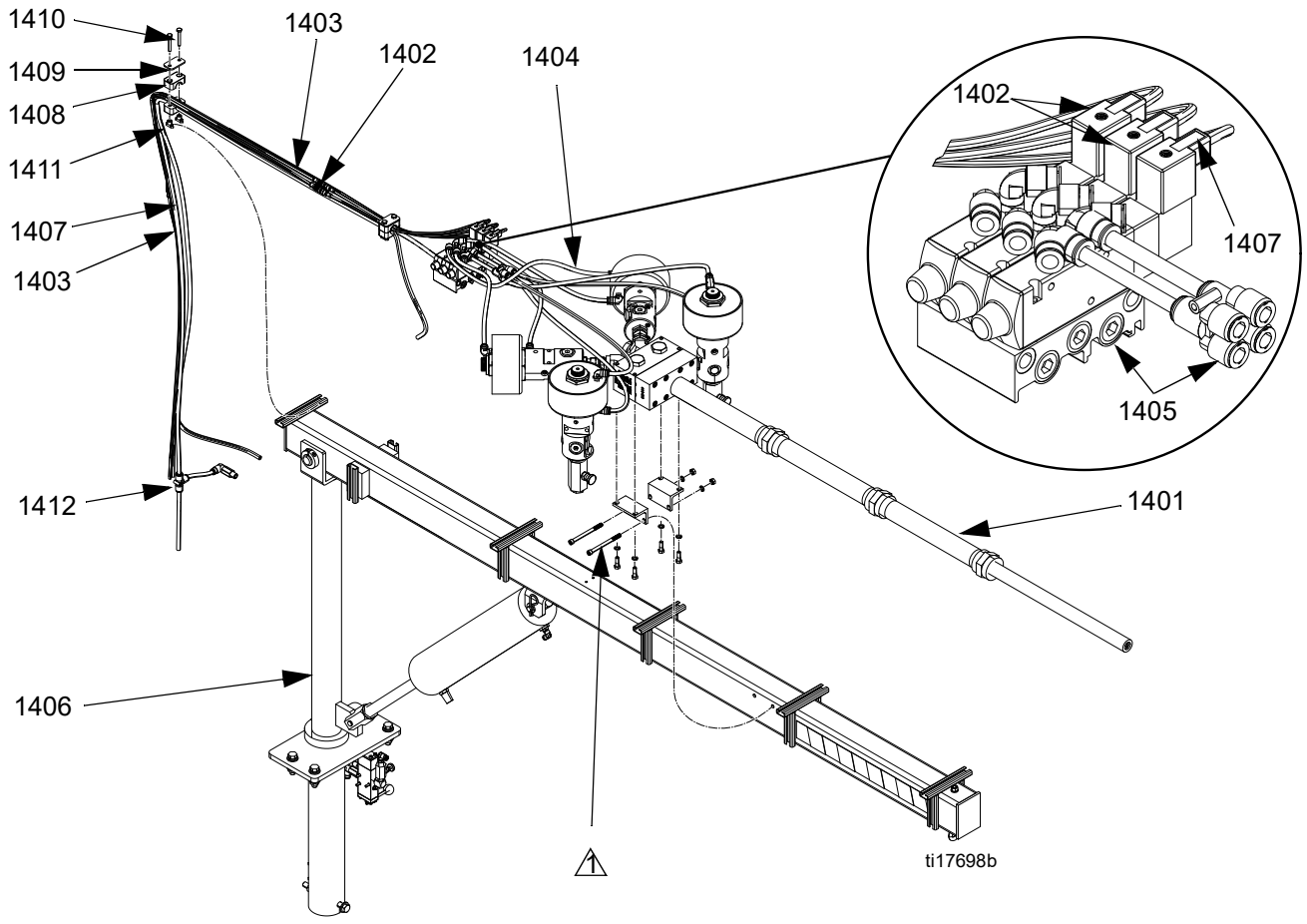
Ram Air Control



Ref	Part	Description	Qty
1301	---	MANIFOLD, Ram package	1
1302	---	VALVE, shut-off, modular	1
1303	---	VALVE, control, manifold mounting	1
1304	---	O-RING	1
1305	---	REGULATOR, manifold mounting	1
1306	---	VALVE, blow-off	1
1307	121112	SCREW, cap, socket head	2
1308	517449	MUFFLER, sintered, 1/4 npt	1
1309	100721	PLUG, pipe	1
1310	120602	FITTING, cartridge, 1/4	3
1311	102726	PLUG, pipe headless	1

--- *Not for sale.*

Boom Mount Applicator, 24E209

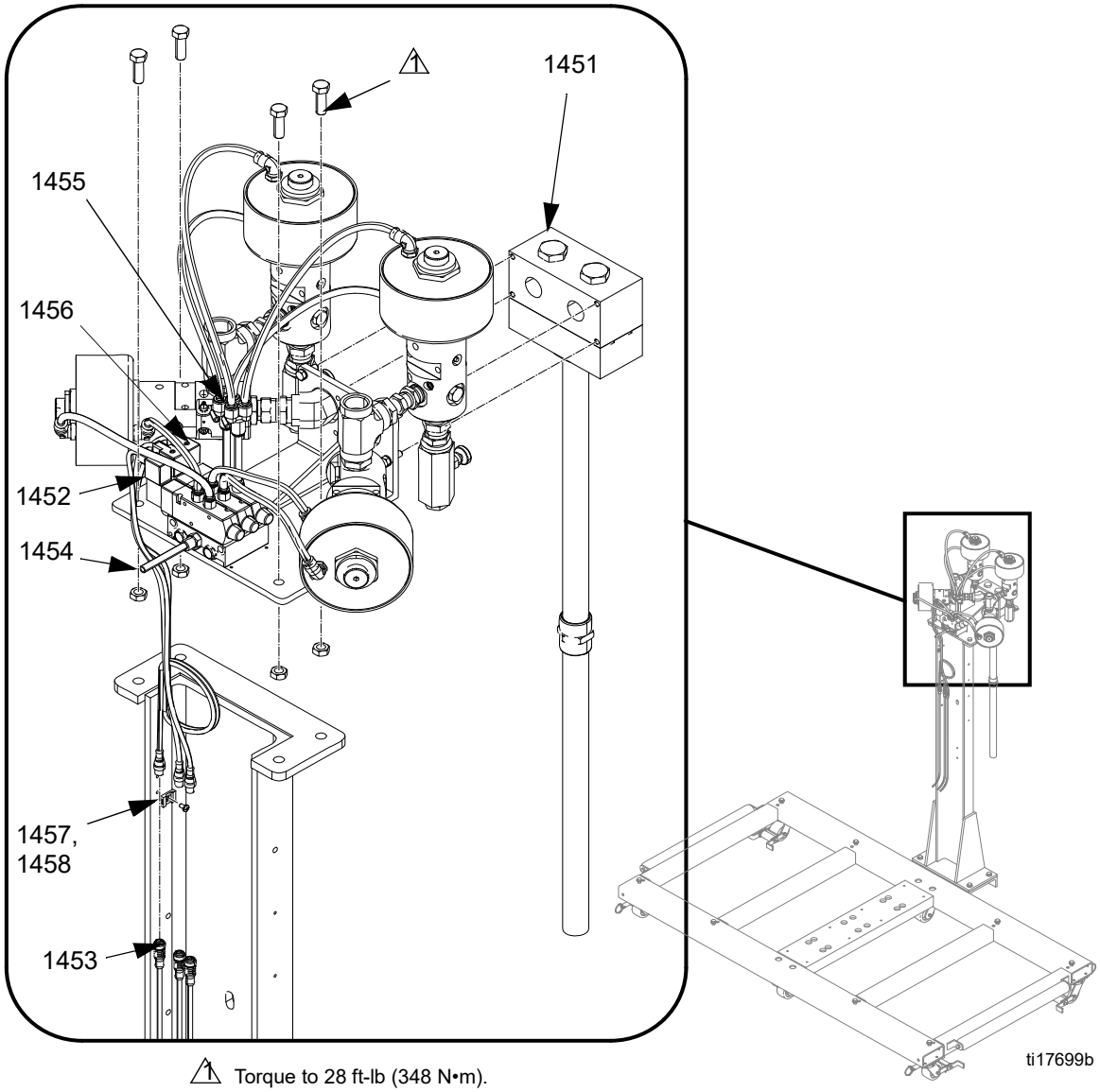


1 Torque to 25 ft-lb (34 N•m).

Ref	Part	Description	Qty
1401	---	MANIFOLD, mix, high viscosity, boom mount	1
1402	122955	HARNESS, M12 x mini din	2
1403	24E899	CABLE, 5-pin, male/female, 3.5 m	3
1404	---	TUBE, polyethylene 0.375 OD	12
1405	U70058	FITTING, union, “y”, 3/8 tube, press	2
1406	---	ARM, pneumatic boom	1
1407	123395	HARNESS, power valve, tank	1
1408	123100	CLAMP, hose, boom, 7/8 in.	2
1409	123070	COVER, plate	2
1410	102313	SCREW, cap, hex, 1/4	4
1411	122643	NUT, rail	4

--- *Not for sale.*

Mast Mount Applicator, 24E261

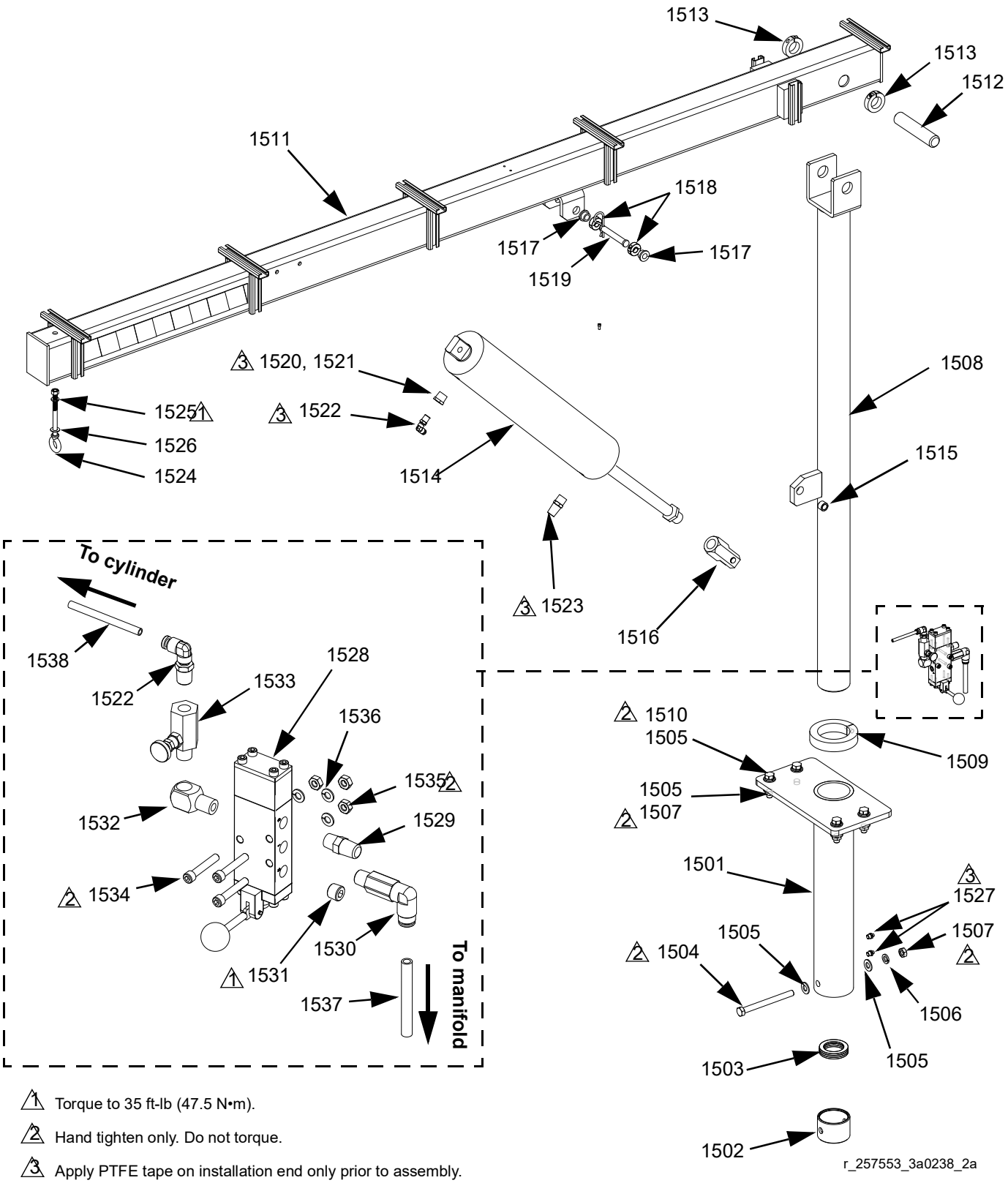


1 Torque to 28 ft-lb (348 N•m).

Ref	Part	Description	Qty
1451	24E262	MANIFOLD, mix, high viscosity, mast mount	1
1452	122955	HARNESS, M12 x mini din	2
1453	123656	CABLE, 5-pin, male/female	3
1454	---	TUBE, polyethylene, 0.375 OD	12
1455	U70058	FITTING, union, “y”, 3/8 tube, press	2
1456	123395	HARNESS, power valve, tank	1
1457	123452	HOLDER, anchor, wire tie, nylon	1
1458	103833	SCREW, machine, crbh	1

--- *Not for sale.*

Pneumatic Boom Arm



1 Torque to 35 ft-lb (47.5 N•m).

2 Hand tighten only. Do not torque.

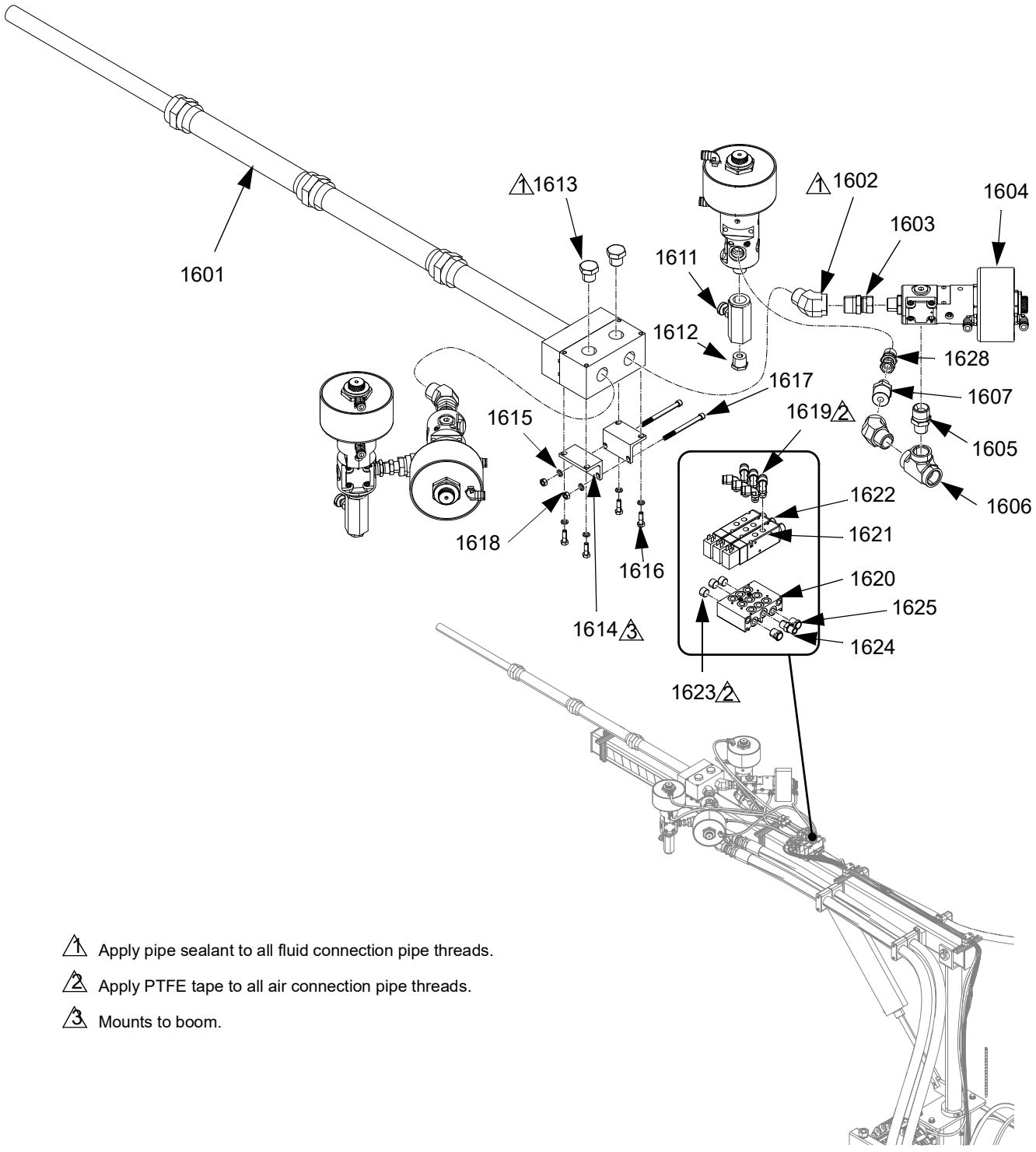
3 Apply PTFE tape on installation end only prior to assembly.

Pneumatic Boom Arm

Ref. No.	Part	Description	Qty
1501	---	BASE, boom assembly	1
1502	---	BEARING, thrust, 45 x 65 x 14	1
1503	15Y044	BEARING, support	1
1504	113470	BOLT, hex	1
1505	109570	WASHER, plain	10
1506	100018	WASHER, lock, spring	5
1507	100338	NUT, jam	5
1508	---	POST, boom assembly	1
1509	122634	COLLAR, 2.875 clamp 1 piece	1
1510	100096	SCREW, cap, hex head; 1/2-13 x 2	4
1511	---	ARM, boom assembly	1
1512	15Y045	PIN, pivot, arm, boom	1
1513	122633	COLLAR, 1.125 clamp 1 piece	2
1514	122653	CYLINDER, air, with nut	1
1515	122640	BEARING, bronze,1/2 x 3/4 x 1/2	1
1516	122652	ROD, clevis, with pin	1
1517	122646	BEARING, flange,1/2 x 3/4, bronze	2
1518	122635	COLLAR, 1/2 clamp 1 piece	2
1519	122637	PIN, clevis,1/2 x 3-1/2, stainless steel	1
1520	15Y065	BUSHING, 1/2 x 1/4 npt, male/female, stainless steel, 6k, 316	1
1521	15Y064	FITTING, plug, 1/4 npt, modified	1
1522	116654	FITTING, tube, swivel, male elbow	2
1523	122648	MUFFLER, 1/2 npt	1
1524	122638	BOLT, EYE, 0.38-16 x 4-1/4	1
1525	100133	WASHER, lock	1
1526	100731	WASHER	6
1527	100054	FITTING, lubrication, steel	3
1528	122650	VALVE, solenoid, 4-way 3-position with lever	1
1529	517449	MUFFLER, sintered, 1/4 npt	1
1530	121643	FITTING, elbow, 1/4 x 1/4 npt, swivel	1
1531	100721	PLUG, pipe	2
1532	103893	ELBOW, street	1
1533	122651	VALVE, bleed	1
1534	15B588	SCREW, socket head cap; 1/4-20 x 1.5	3
1535	100015	NUT, hex	3
1536	100016	WASHER, lock	3
1537	54106	TUBE, polyethylene 0.375 OD	12
1538	54118	TUBE, polyethylene	7
1539	U70068	LABEL, stripe, 2in.,yellow/black	2

--- *Not for sale.*

Boom Mounted Mix Manifold



1 Apply pipe sealant to all fluid connection pipe threads.

2 Apply PTFE tape to all air connection pipe threads.

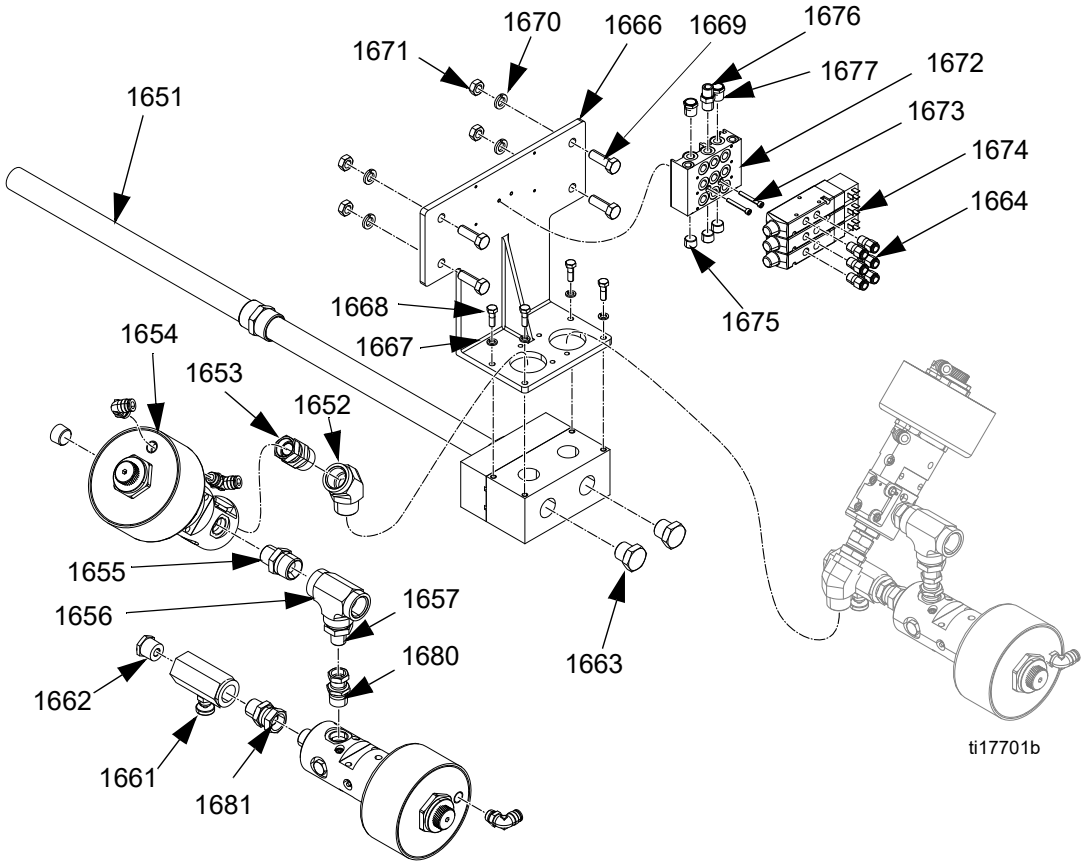
3 Mounts to boom.

ti17700b

Ref	Part	Description	Qty
1601	24E273	MANIFOLD, mixer assembly	1
1602	123888	FITTING, elbow, 45, 1 npt, male/female, carbon steel, 4.2k	4
1603	202965	FITTING, union, adapter	2
1604	V1M350	VALVE, ball, 3/4 in.	4
1605	158555	FITTING, nipple, 1 x 3/4 npt	2
1606	123890	FITTING, tee, 1 npt x 1 npt x 1nptf, female/female/female c	2
1607	C20463	FITTING, nipple, 1 x 3/4 npt	2
1611	U70023	VALVE, needle, 3/4 npt, female, mild steel	2
1612	100615	BUSHING, hex steel	2
1613	512334	FITTING, plug, pipe	2
1614	15T755	BRACKET, mix block, boom	2
1615	100214	WASHER, lock	6
1616	100450	SCREW, cap hex head	4
1617	261126	SCREW, 5/16-18 x 4 socket head cap	2
1618	100188	NUT, heavy hex	2
1619	121018	FITTING, elbow, male, swivel, 1/4 npt	6
1620	---	MANIFOLD, 3-station, air	1
1621	104472	SCREW, cap	2
1622	120900	VALVE, solenoid, 3 way	3
1623	101754	PLUG, pipe	3
1624	123550	FITTING, 3/8 tube x 3/8 npt, female/male	2
1625	111881	MUFFLER	2
1626	---	SEALANT, pipe, stainless steel	1
1627	---	TAPE, ptfe, sealant	1
1628	121282	FITTING, swivel, straight, 1/2 female x 3/4 male	2

--- *Not for sale.*

Mast Mounted Mix Manifold, 24E262



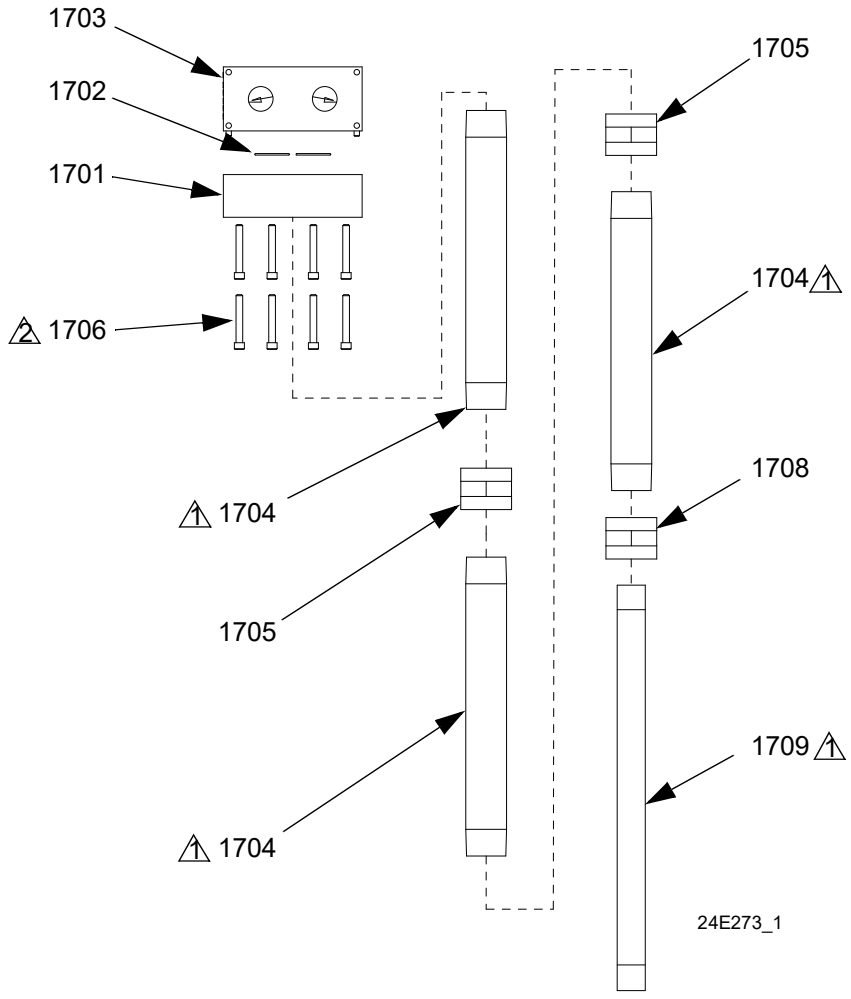
1 Apply pipe sealant to all fluid connection pipe threads.

2 Apply PTFE tape to all air connection pipe threads.

Ref	Part	Description	Qty
1651	24E274	MANIFOLD, mixer	1
1652	123888	FITTING, elbow, 45, 1 npt, male/female, carbon steel	2
1653	202965	FITTING, union, adapter	2
1654	V1M350	VALVE, ball, 3/4 in.	4
1655	158555	FITTING, nipple, 1 x 3/4 npt	2
1656	123890	FITTING, tee, 1 npt x 1 npt x 1 nptf, female/female/female	2
1657	C20463	FITTING, nipple, reducing, hex	2
1661	U70023	VALVE, needle, 3/4 npt, female	2
1662	100615	BUSHING, hex steel	2
1663	512334	FITTING, plug, pipe	2
1664	113319	FITTING, air	6
1666	256444	PLATE, mount, mixer, painted	1
1667	100214	WASHER, lock	4
1668	100450	SCREW, cap hex head	4
1669	100017	SCREW, cap, hex head	4
1670	100018	WASHER, lock, spring	4
1671	100111	NUT	4
1672	---	MANIFOLD, 3-station, air	1
1673	104472	SCREW, cap	2
1674	120900	VALVE, solenoid, 3-way	3
1675	101754	PLUG, pipe	3
1676	123550	FITTING, 3/8 tube x 3/8 npt, female/male	1
1677	111881	MUFFLER	2
1678	---	SEALANT, pipe, stainless steel	1
1679	---	TAPE, PTFE, sealant	1
1680	121282	FITTING, swivel, straight, 1/2 female x 3/4 male	2
1681	123082	FITTING, swivel, 3/4NPSx3/4NPT, female x male	2

--- *Not for sale.*

Mixer



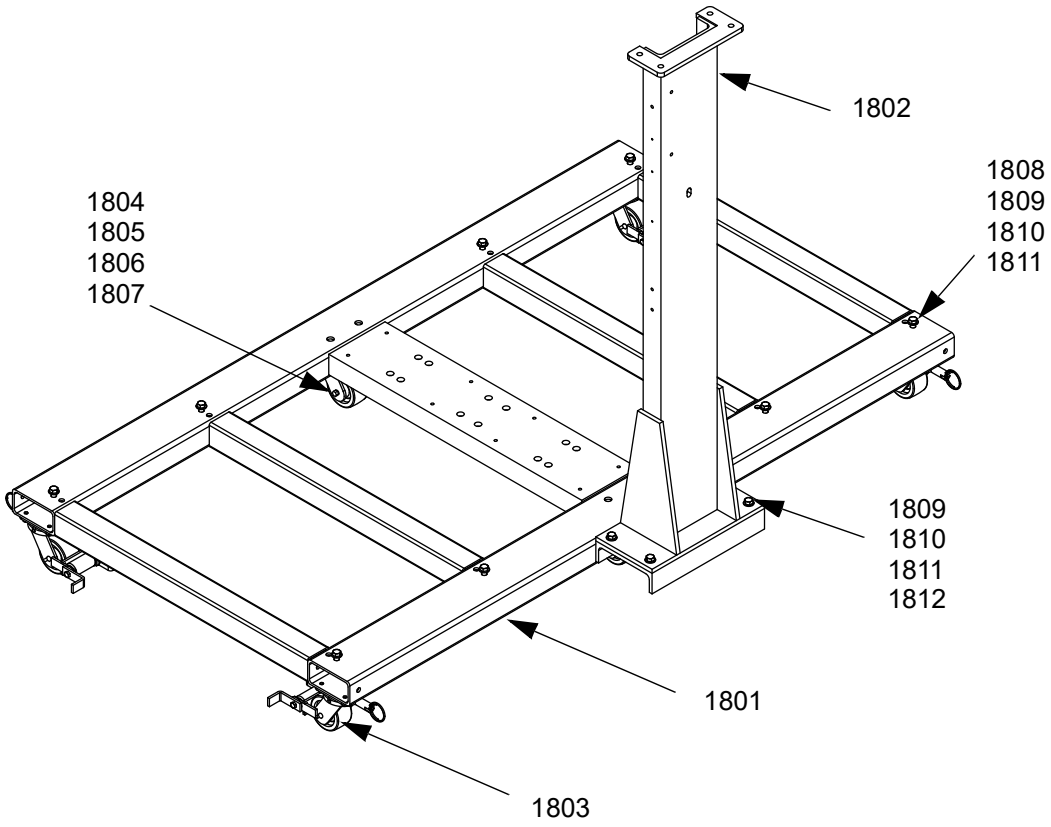
1 Apply pipe sealant to threads.

2 Torque to 29 ft-lb (39 N•m).

Ref	Part	Description	Qty
1701	16D466	MANIFOLD, mix, outlet, carbon steel	1
1702	107078	PACKING, o-ring	2
1703	16D465	MANIFOLD, mix, inlet, carbon steel	1
1704	124130	MIXER, 1-1/2 x 6 element	3
1705	123248	FITTING, coupling, 1.5 npt, carbon steel	2
1706	U70036	SCREW, socket head cap, 5/16-18 x 2.25	8
1707	---	SEALANT, pipe	1
1708	123250	FITTING, coupling, 1.5 npt x 1 npt, carbon steel	1
1709	123588	MIXER, static, assy, 1 in. x 12 element	1

--- *Not for sale.*

Frame with Mast

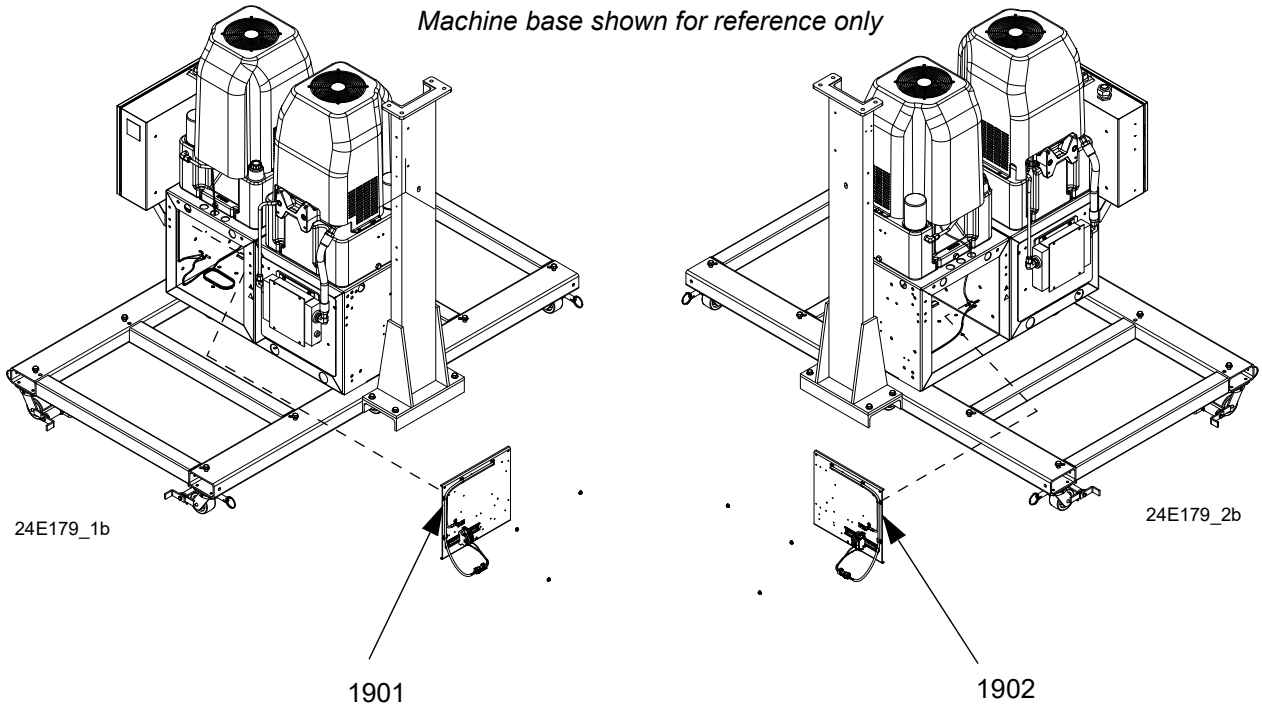


Ref	Part	Description	Qty
1801	---	BASE, frame, 86 x 56 x 3	1
1802	---	BASE, arm, floor mount	1
1803	U70013	CASTER, swivel, 4 in. diameter x 2 in. wide, brake, lock	4
1804	U70012	CASTER, swivel, 4 in. diameter x 2 in. wide, 700 lb	2
1805	123284	SCREW, hex head cap, 3/8-16 x 0.75	24
1806	100731	WASHER	24
1807	100133	WASHER, lock	24
1808	100017	SCREW, cap, hex head	8
1809	109570	WASHER, plain	12
1810	100018	WASHER, lock, spring	12
1811	100338	NUT, jam	12
1812	100060	SCREW, cap, hex head	4

--- *Not for sale.*

Electrical Panels, 24E179

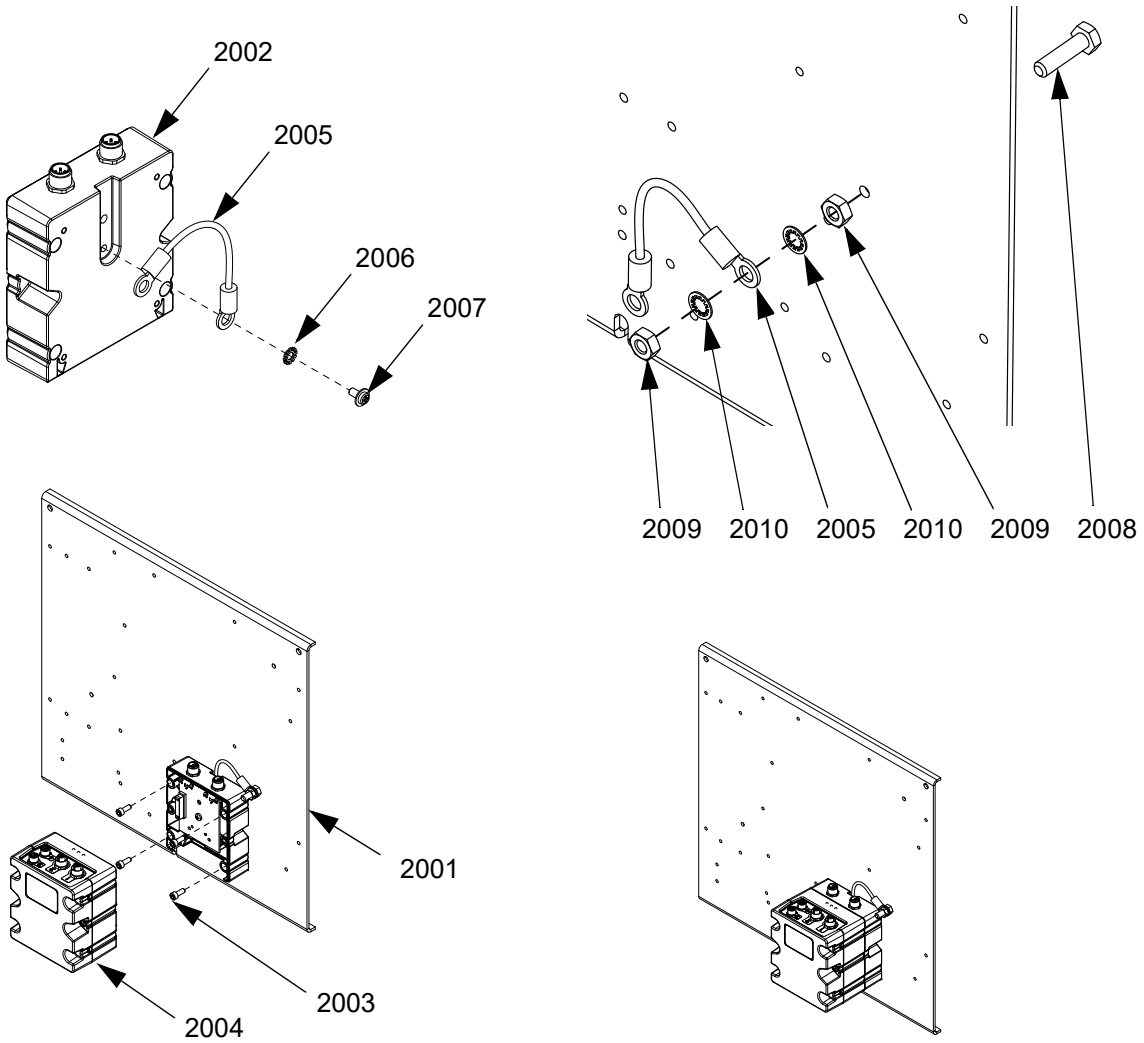
Machine base shown for reference only



Ref	Part	Description	Qty
1901	---	MODULE, panel, power	1
1902	---	MODULE, panel, power	1

--- *Not for sale.*

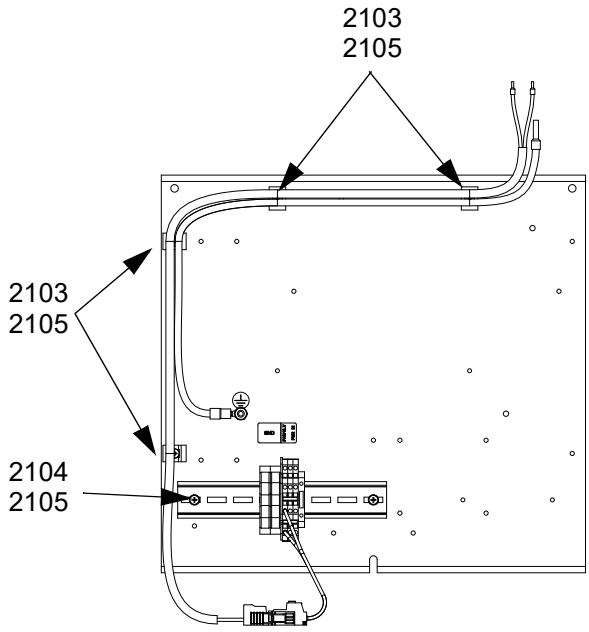
Fluid Control Panel

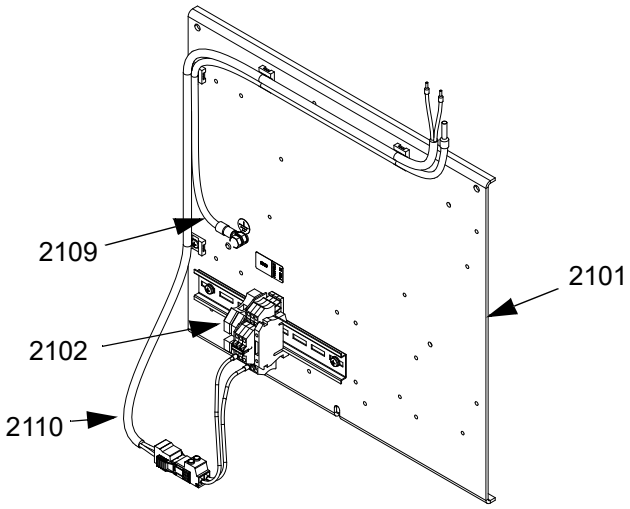


Ref	Part	Description	Qty
2001	---	PANEL, electric, heat	1
2002	289697	MODULE, cube, base	1
2003	102598	SCREW, cap, socket head	4
2004	289696	MODULE, fluid control	1
2005	24C476	HARNESS, wire, ground, terminal, 4 in.	1
2006	102063	WASHER, lock	1
2007	114993	SCREW, pan wash head	1
2008	100021	SCREW, cap hex head	1
2009	100015	NUT, hex	2
2010	100028	WASHER, lock	2

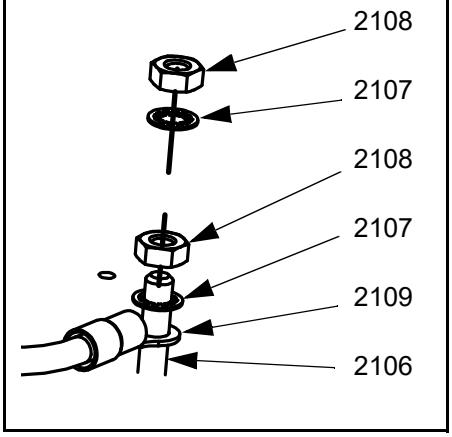
--- Not for sale.

Power Panel





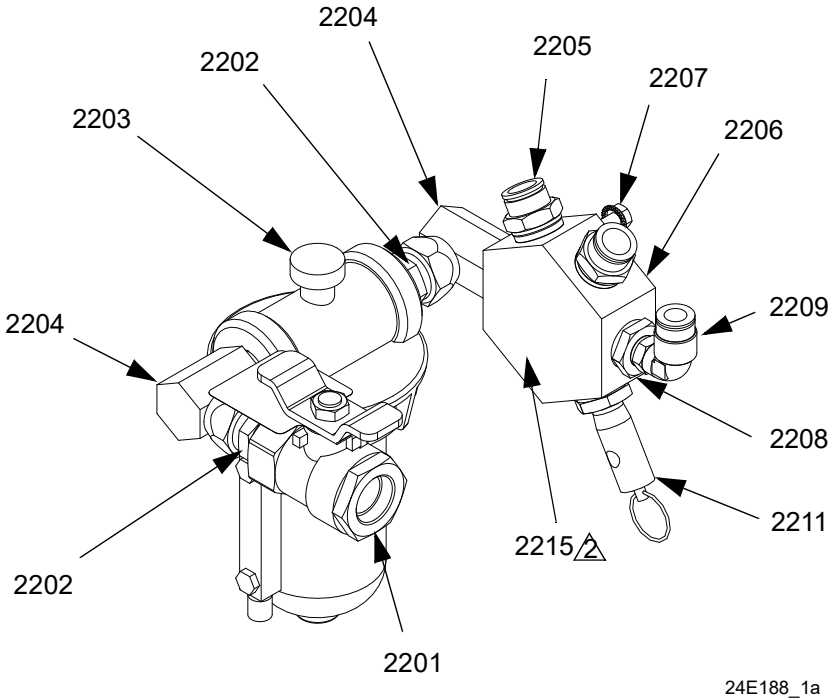
Grounding Detail



Ref	Part	Description	Qty
2101	---	PANEL, electric, heat	1
2102	---	MODULE, power, no heat	1
2103	123452	HOLDER, anchor, wire tie, nylon	4
2104	116876	WASHER, flat	2
2105	103833	SCREW, cross-recessed pan head	6
2106	100021	SCREW, cap hex head	1
2107	100028	WASHER, lock	2
2108	100015	NUT, hex	2
2109	24F073	HARNESS, wire, ground, 8 AWG	1
2110	24F071	HARNESS, wire, male, 2-pin, 16/2	1

--- *Not for sale.*

Dual Air Inlet Kit, 24E188



1 Apply sealant to all pipe threads.

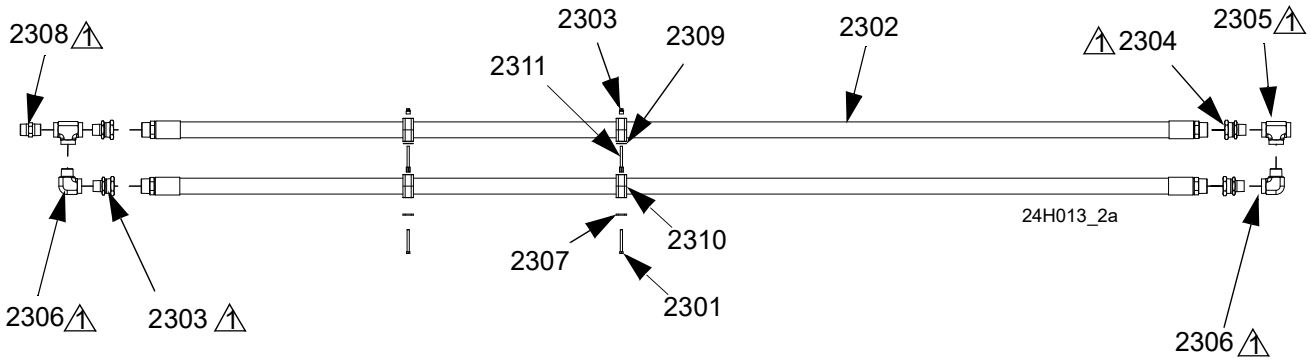
2 Pipe plug is installed in the remaining port.

Ref	Part	Description	Qty
2201	110225	VALVE, vented 2-way	1
2202	158491	FITTING, nipple	2
2203	106149	FILTER, air, 1/2 npt	1
2204	155470	FITTING, swivel, union, 90 degree	2
2205	114111	FITTING, connector, male	2
2206	177117	MANIFOLD, air	1
2207	113796	SCREW, flanged, hex head	2
2208	100206	BUSHING, pipe	2
2209	121018	FITTING, elbow, male, swivel, 1/4 npt	1
2211	113498	VALVE, safety, 110 psi	1
2212	590570	TUBE, polyethylene, 1/2 in. OD	12
2213	---	SEALANT, pipe, stainless steel	1
2214	---	TAPE, tfe, sealant	1
2215	100361	PLUG, pipe	1

--- Not for sale.

Boom Hose Assemblies

1.25 in. Hose Assembly, 24H013



Apply pipe sealant.

Ref	Part	Description	Qty
2301	103547	SCREW, hex head	4
2302	521973	HOSE, coupled, 10 ft	2
2303	122643	NUT, rail	4
2304	124918	FITTING, swivel, 1 in. npt x 1-1/4 in. nps, carbon steel	4
2305	123890	FITTING, tee, 1 npt x 1 npt x 1nptf, female/ female/ female	2
2306	123889	FITTING, elbow, 90, 1 npt, male/female, carbon steel, 4.2k	2
2307	124927	COVER, plate, 1.75 in. pipe clamp, carbon steel	2
2308	C38302	FITTING, nipple, carbon steel, 1 in. npt	1
2309	124929	COVER, plate, locking, 1.75 in. clamp	2
2310	124930	CLAMP, pipe, 1.75 in.	4
2311	124931	BOLT, stacking, clamp, 1/4-20	4
2312	---	SEALANT, pipe, stainless steel	1

--- *Not for sale.*

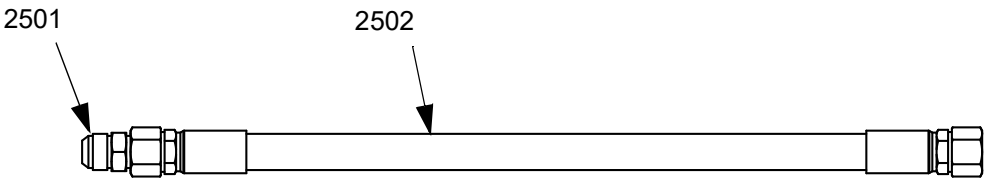
1 in. Hose Assembly, 24E271

Apply pipe sealant.

Ref	Part	Description	Qty
2401	24E259	HOSE, 1in, male/female, 12ft	1
2403	124434	FITTING, swivel, 1 npt in. x 16 JIC, male/female, carbon steel	1
2404	U5A008	CLAMP, hose, 1 in. ID	2
2412	---	SEALANT, pipe, stainless steel	1

--- *Not for sale.*

Hose Sub-Assemblies



24E259 shown.

Ref	Part	Description	Quantity	
			24E258, HOSE, VPM, 1.25 in., mast	24E259, HOSE, 1 in, male/female, 12 ft
2501	120249	ADAPTER, JIC to JIC		1
	124918	FITTING, swivel, 1 in. npt x 1-1/4 in. nps	1	
2502	24F541	HOSE, coupled, 144 in. long, 1id, 1-5/15 JIC		1
	521973	HOSE, coupled, 10 ft	1	
2503	---	SEALANT, pipe	1	

--- Not for sale.

Logic Drawings

B (Blue) Hydraulic Power Pack

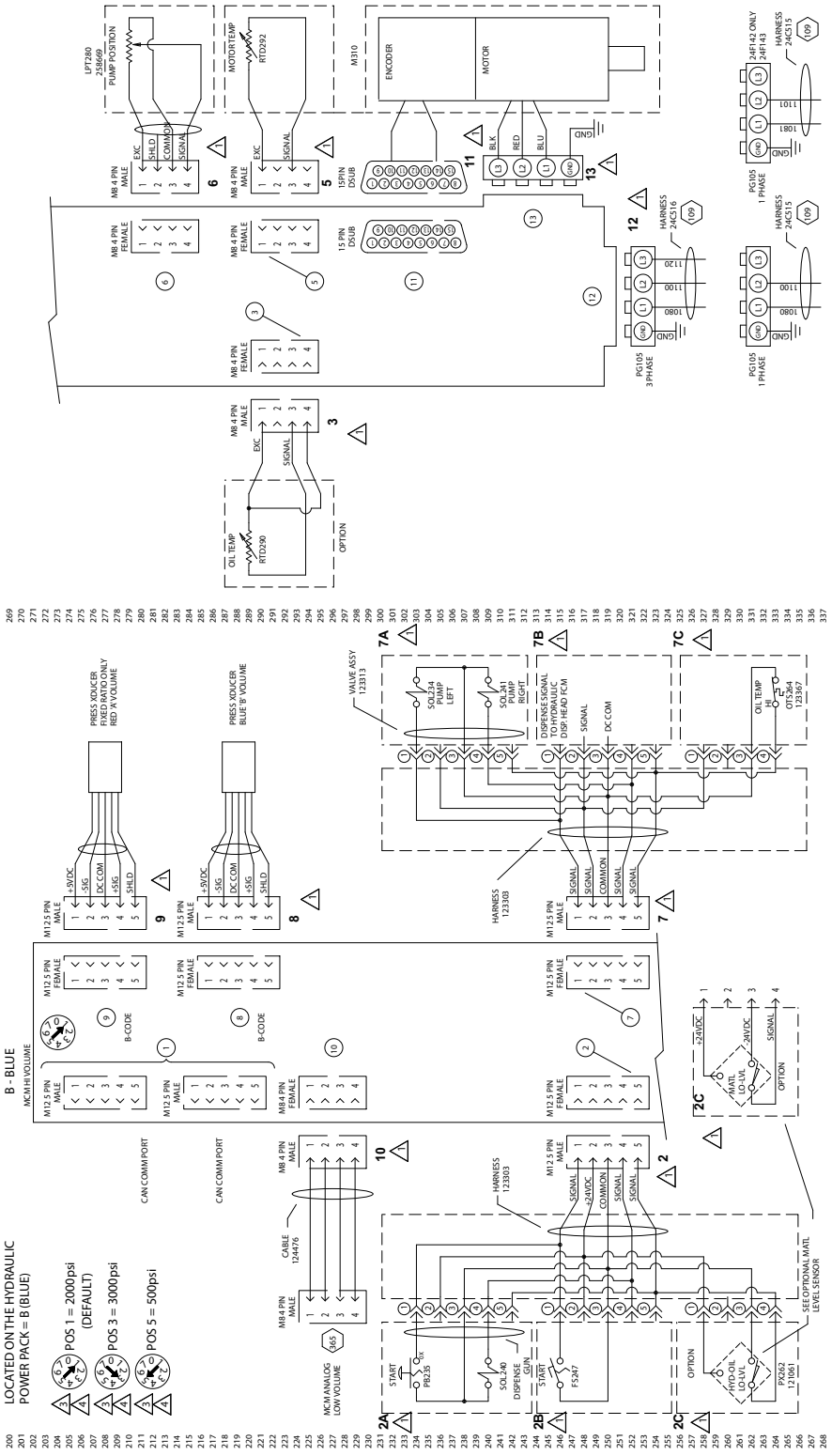


FIG. 8: Logic Drawings, Page 1

A (Red) Hydraulic Power Pack

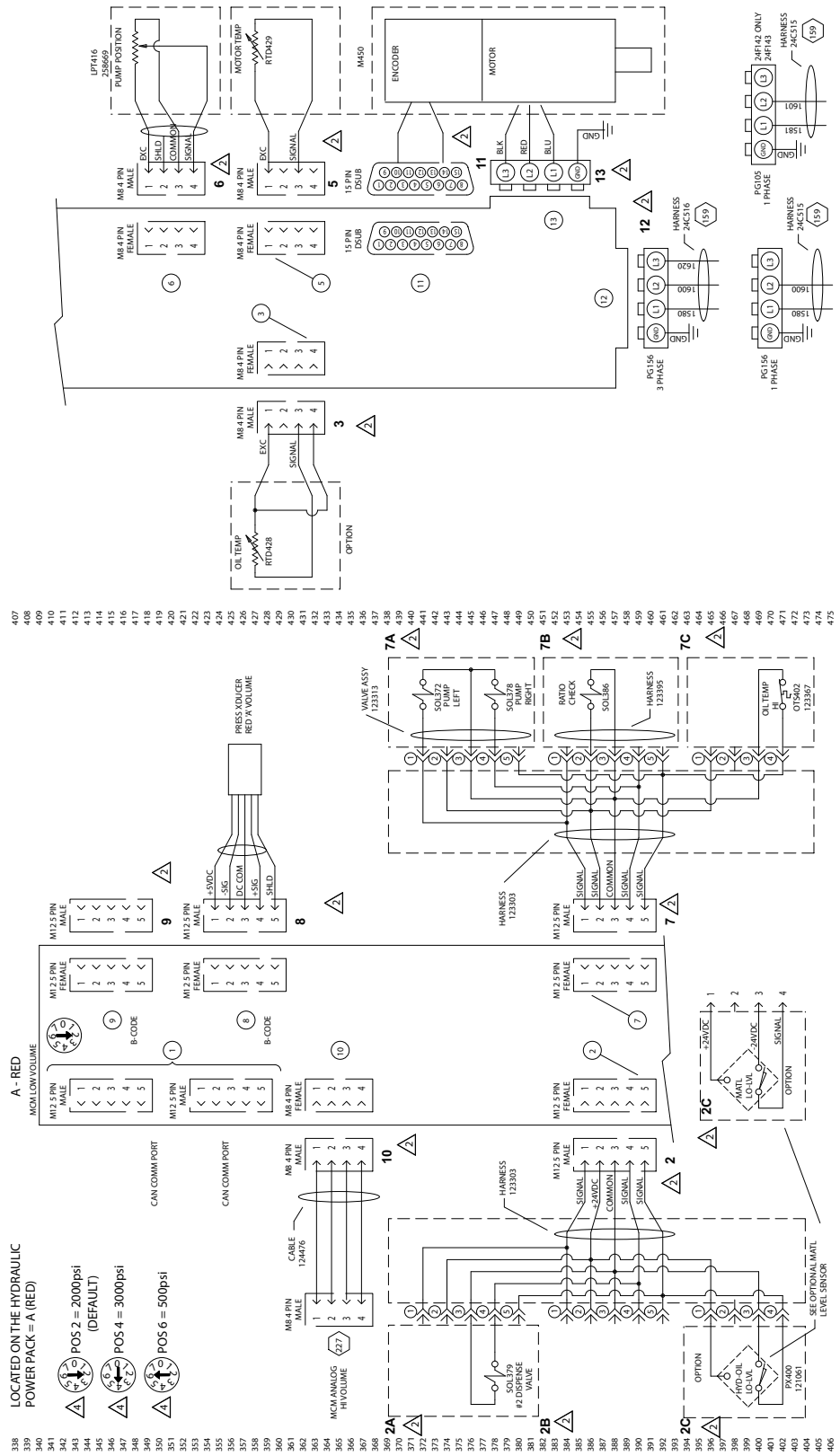


FIG. 9: Logic Drawings, Page 2

Electrical Enclosure

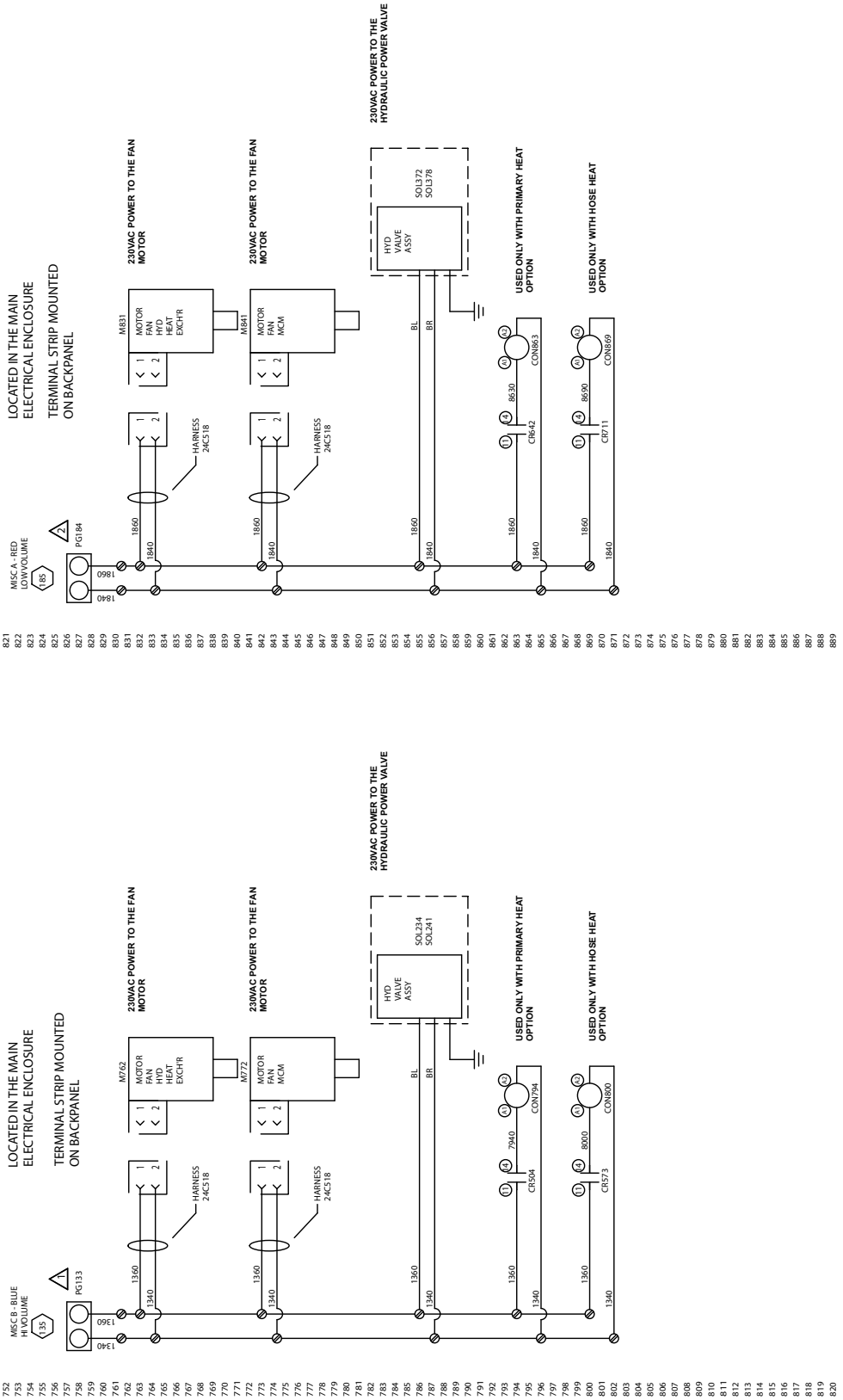


FIG. 10: Logic Drawings, Page 3

Dispense Head Pneumatics and Primary Hydraulic Power Pack

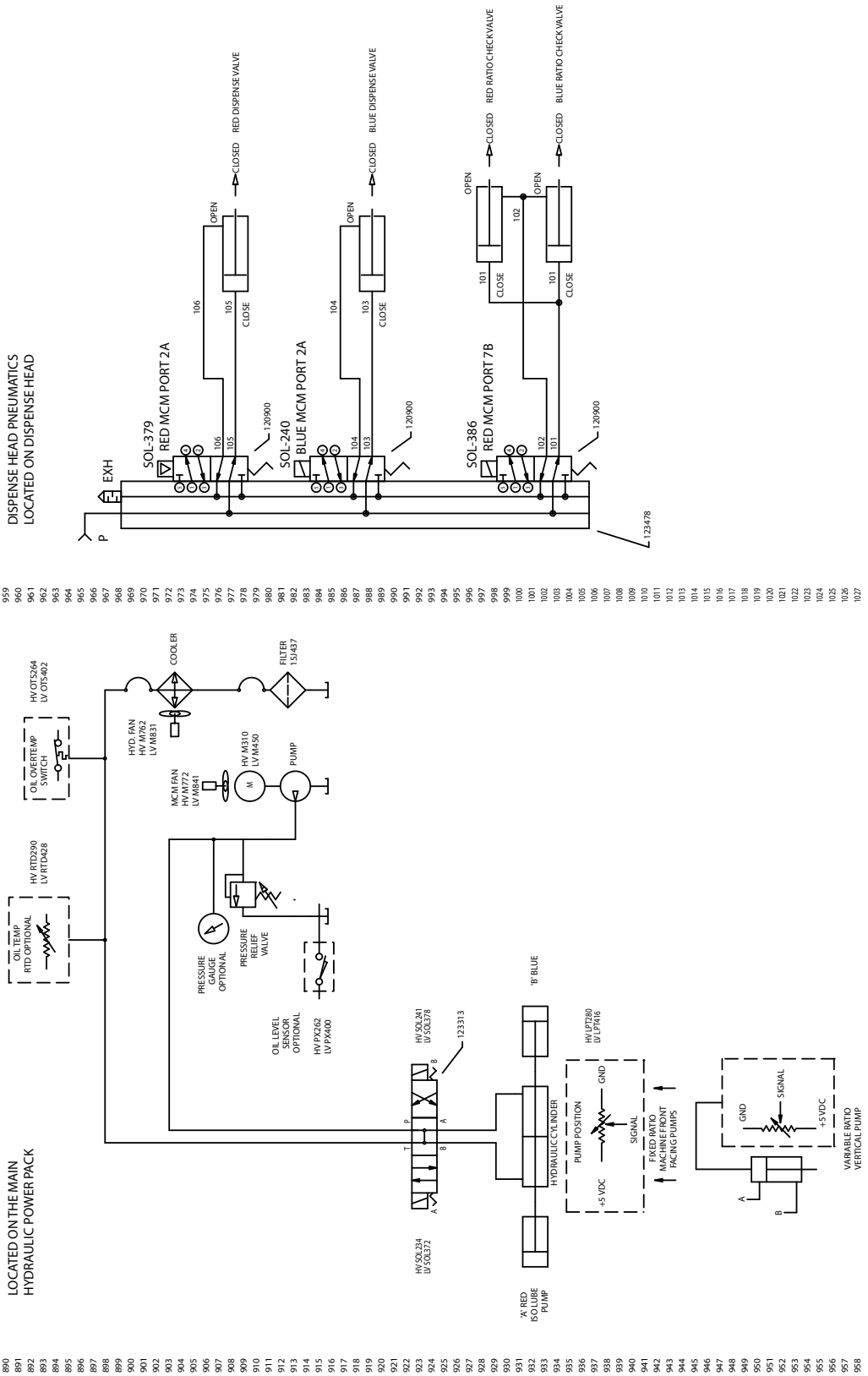


FIG. 11: Logic Drawings, Page 4

Power Distribution Box for 400V CE Models

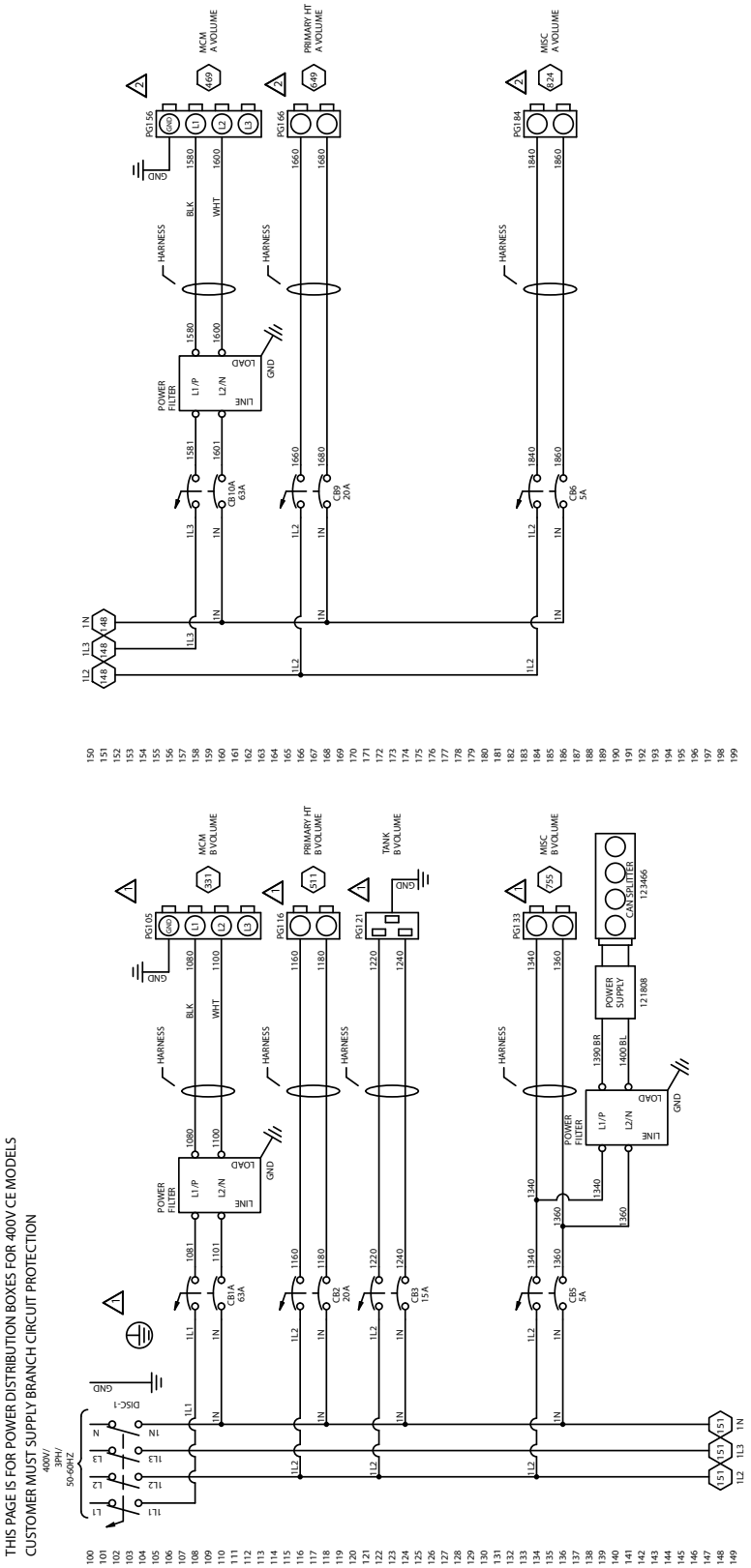


FIG. 12: Logic Drawings, Page 5

Power Distribution Box for 400V Non-CE Models

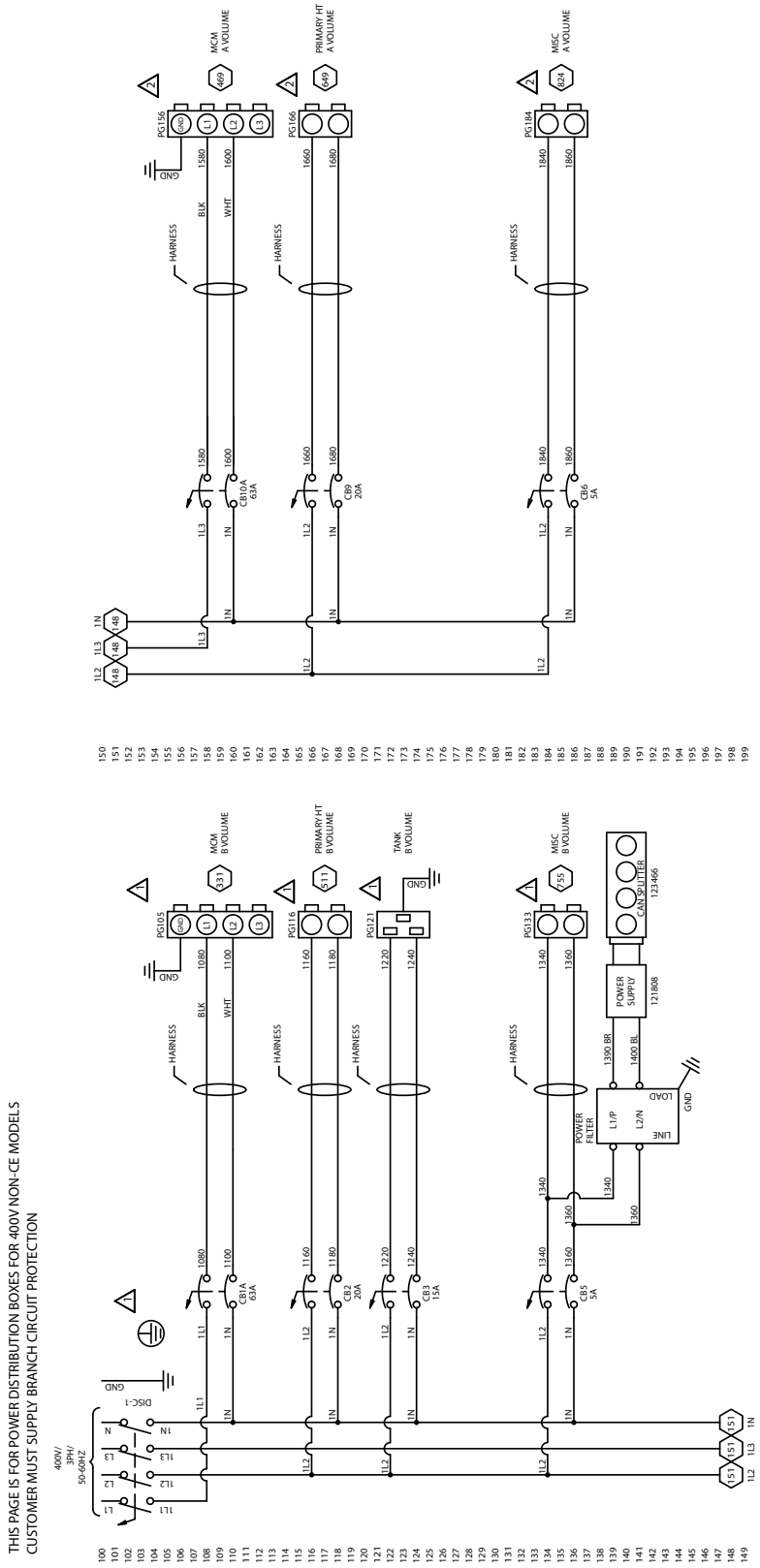


FIG. 13: Logic Drawings, Page 6

Power Distribution Box for 230V Models

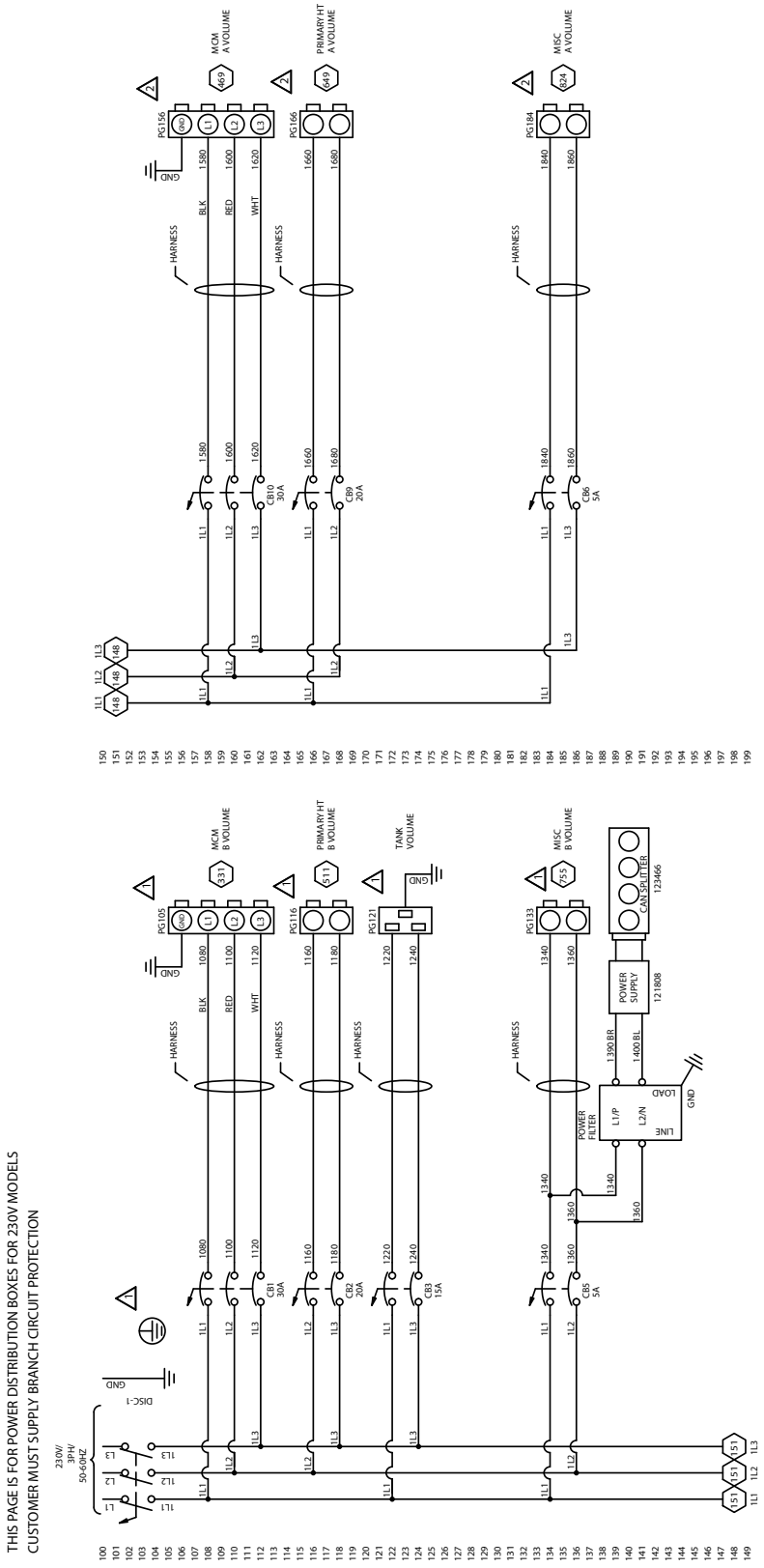


FIG. 14: Logic Drawings, Page 7

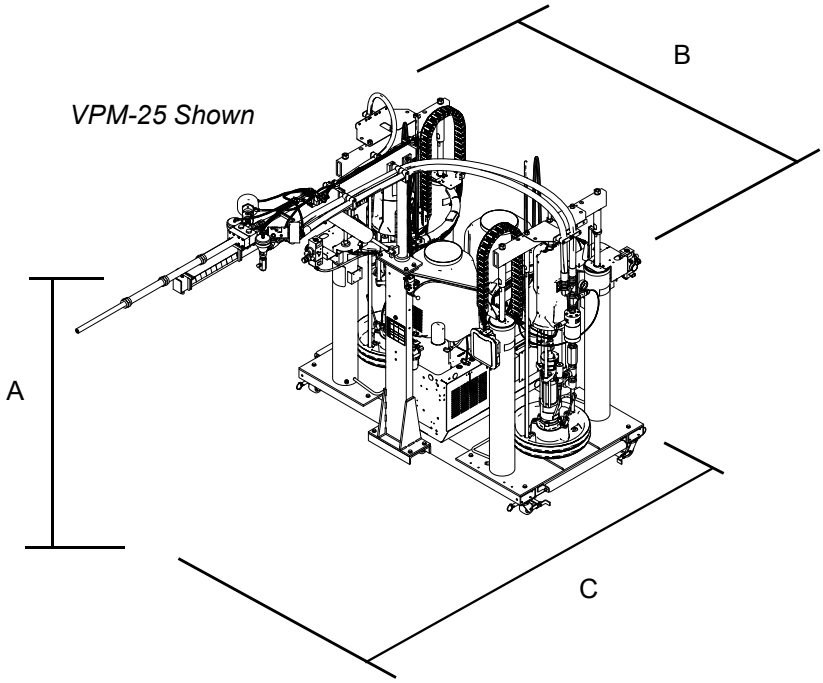
Technical Data

Air Inlet Pressure	85-100 psi (590-690 kPa, 5.9-6.9 bar)
Wetted Parts	Stainless steel, UHMW, carbon steel
Fluid Viscosity Range	Paste
Fluid Flow Range	*VPM-25:* 12-25 kg/min (26-55 lb/min) *VPM-12:* 10-12 kg/min (22-26 lb/min)
Hydraulic Reservoir Capacity	8 gal. (30 liters) each
Recommended Hydraulic Fluid	Citgo A/W Hydraulic Oil, ISO Grade 46

Dimensions

The dimensions of the machine vary by machine layout.

Ref	VPM-25	VPM-12
A (Height)	Ram in the lowered position: 9 ft 3 in. (2.82 m) Ram in the raised position: 11 ft 4 in. (3.45 m)	Ram in the lowered position: 9 ft 3 in. (2.82 m) Ram in the raised position: 11 ft 4 in. (3.45 m)
B (Width)	7 ft 8 in. (2.34 m)	7 ft 8 in. (2.34 m)
C (Depth)	15 ft 10 in. (4.83 m)	6 ft 1 in. (1.86 m)



VPM-25 Shown

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