

# Instructions—Parts List



200 LITER (55 GALLON) DRUM SIZE  
165 MM (6.5 IN.) DUAL POST

## Air-Powered Ram Supply Unit

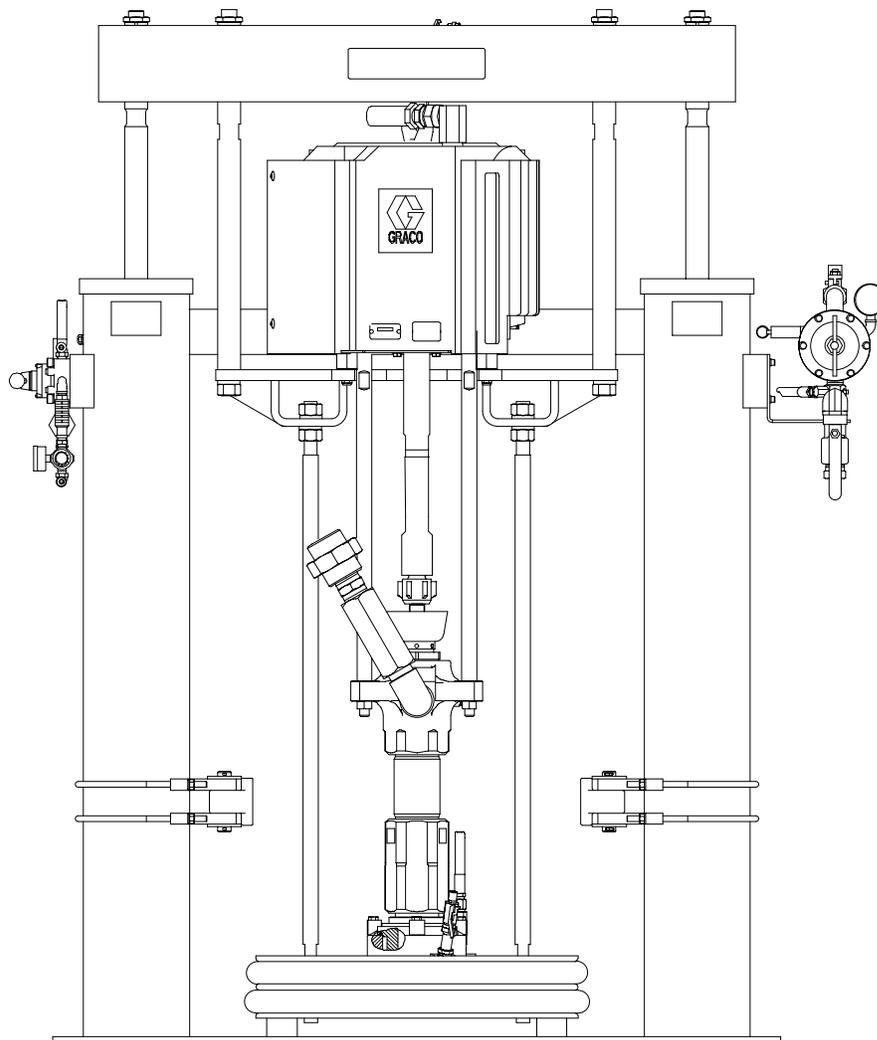
310524 rev. V



### Important Safety Instructions

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

See page 2 for Models and Table of Contents.



8934B

**Model 918316**

PROVEN QUALITY. LEADING TECHNOLOGY.

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Part Number	Air Motor	Ratio	Pump	Wiper	Max. Fluid Working Pressure	Page
* 918316	Premier™	80:1	Check-Mate 1000	EPDM	32.7 MPa, 327 bar (4800 psi)	25
* 918303	Premier	39:1	Check-Mate™ 2100	PVC	27 MPa, 269 bar (3900 psi)	27
687105	King™	65:1	Check-Mate 800	EPDM	33 MPa, 332 bar (4875 psi)	29
246966	Bulldog	31:1	Check-Mate 800	EPDM	21 MPa, 211 bar (3100 psi)	30
246967	King™	65:1	Check-Mate 800	EPDM	33 MPa, 332 bar (4875 psi)	32
* 918313	King	65:1	Check-Mate 800†	PVC	40 MPa, 403 bar (5850 psi)	35
* 234122	Senator	34:1	Check-Mate 450	EPDM	23 MPa, 234 bar (3400 psi)	35
* 918315	King	50:1	Check-Mate 1000	EPDM	31 MPa, 310 bar (4500 psi)	37
* 918597	King	65:1	Check-Mate 800	EPDM	40 MPa, 403 bar (5850 psi)	39
* 918314	Quiet King	65:1	Check-Mate 800†	EPDM	40 MPa, 403 bar (5850 psi)	41
* 918469	Premier	34:1	Dura-Flo™ 2400	PVC	23 MPa, 234 bar (3400 psi)	43
* 918481	Premier	45:1	Dura-Flo 1800	PVC	31 MPa, 310 bar (4500 psi)	45
C59702	Premier	67:1	Dura-Flo 1200†	PVC	34 MPa, 345 bar (5000 psi)	47
* 261629	Quiet King	24:1	Check-Mate 800	–	16.6 MPa, 166 bar (2400 psi)	9

\* These products are CE marked.

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# Symbols

## Warning Symbol



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

## Caution Symbol



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

## ! WARNING



INSTRUCTIONS

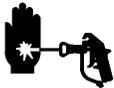


### EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, warnings, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call the distributor closest to you.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check the equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed 125 psi (8.8 bar) maximum inbound air pressure to the ram.
- Never exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **Technical Data** on page 56.
- Be sure that all spray/dispensing equipment and accessories are rated to withstand the maximum working pressure of the pump. Do not exceed the maximum working pressure of any component or accessory used in the system.
- Route the hoses away from the traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Do not use the hoses to pull the equipment.
- Use fluids and solvents that are chemically compatible with the equipment wetted parts. See the **Technical Data** sections of all the equipment manuals. Always read the material manufacturer's literature before using fluid or solvent in this pump.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturers.
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state and national fire, electrical and other safety regulations.

# WARNING



## SKIN INJECTION HAZARD

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

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate surgical treatment.**
- Do not point the gun/valve at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip/nozzle.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Always have the trigger guard on the gun when dispensing.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun/valve trigger safety operates before dispensing.
- Lock the gun/valve trigger safety when you stop dispensing.
- Follow the **Pressure Relief Procedure** on page 13 if the nozzle clogs, and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Use only Graco approved hoses. Do not remove the spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.



## FIRE AND EXPLOSION HAZARD

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

- Ground the equipment and the object being sprayed, and all other electrically conductive objects in the dispense area. Proper grounding dissipates static electricity generated in the equipment. See **Ground the System** on page 10.
- If there is any static sparking or you feel an electric shock while using the equipment, **stop dispensing immediately**. Do not use the equipment until you have identified and corrected the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvent or material.
- Do not smoke in the dispense area.
- Extinguish all open flames or pilot lights in the dispense area.
- Do not turn on or off any light switch in the dispense area.
- Keep the dispense area free of debris, including solvent, rags, and gasoline.

# WARNING



## MOVING PARTS HAZARD

Moving parts, such as the ram follower plate/pump inlet can pinch or amputate fingers.

- Do not operate the equipment with the guard removed.
- Keep clear of all moving parts when starting or operating the equipment.
- Keep hands and fingers away from the priming piston during operation and whenever the pump is charged with air.
- Keep clear of the follower plate, pump fluid inlet, and lip of the fluid container when raising or lowering the ram.
- Before checking or servicing the ram or pump, follow the **Pressure Relief Procedure** on page 13.



## TOXIC FLUID HAZARD

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

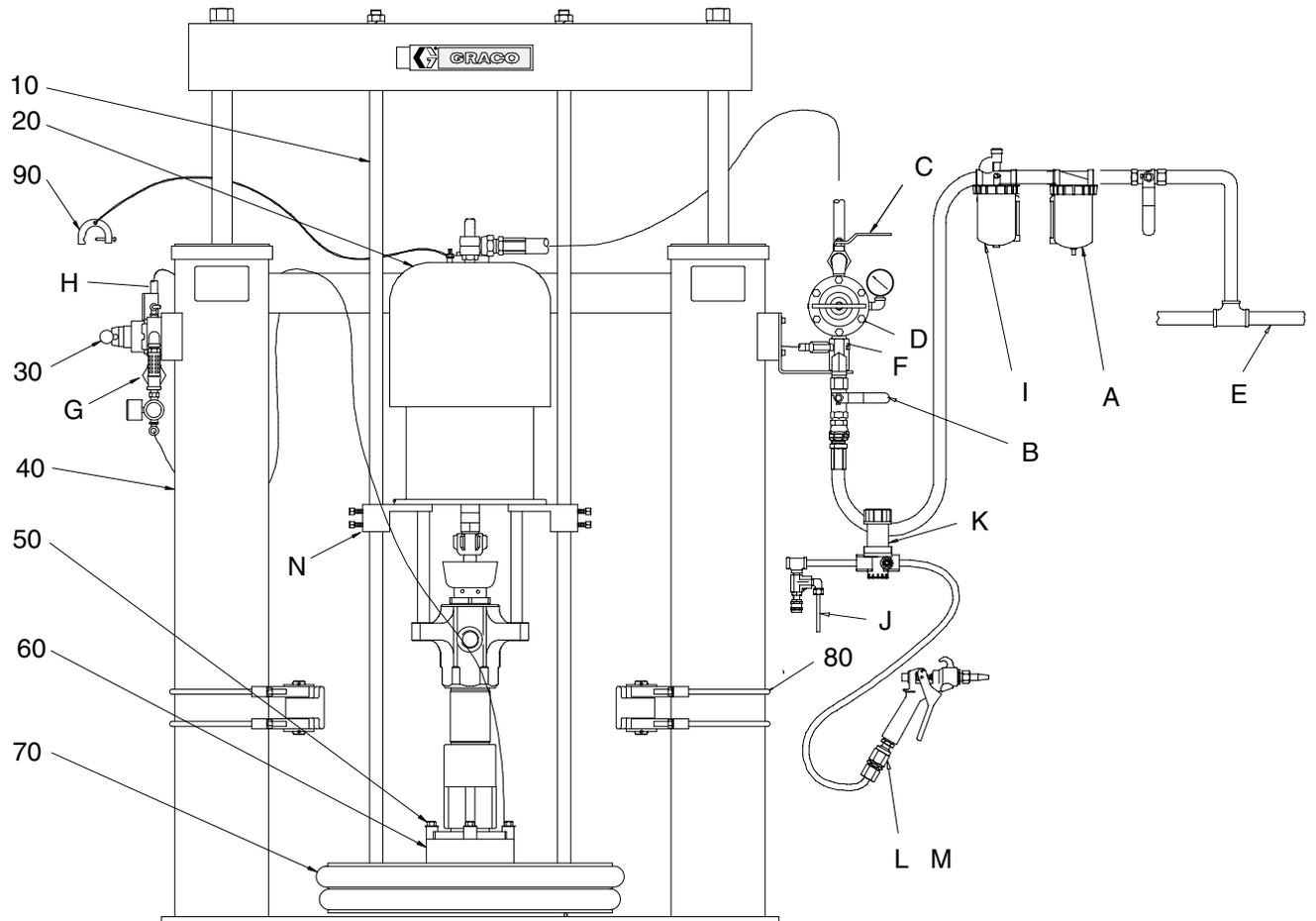
- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.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

# Pump Selection Chart

Pump Model and Description	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Part Number
34:1 Premier, DF2400, CS Lower	23 MPa, 234 bar (3400 psi)	0.7 MPa, 7 bar (100 psi)	222942
34:1 Premier, DF2400, SST Lower	23 MPa, 234 bar (3400 psi)	0.7 MPa, 7 bar (100 psi)	222943
39:1 Premier, CM2100, CS Lower	26.9 MPa, 269 bar (3900 psi)	0.7 MPa, 7 bar (100 psi)	222940
39:1 Premier, CM2100, SST Lower	26.9 MPa, 269 bar (3900 psi)	0.7 MPa, 7 bar (100 psi)	222941
45:1 Premier, DF1800, CS Lower	31 MPa, 310 bar (4500 psi)	0.7 MPa, 7 bar (100 psi)	222938
45:1 Premier, DF1800, SST Lower	31 MPa, 310 bar (4500 psi)	0.7 MPa, 7 bar (100 psi)	222939
45:1 Premier, DF1800, SST Lower	31 MPa, 310 bar (4500 psi)	0.7 MPa, 7 bar (100 psi)	234667
45:1 Premier, DF1800, SST Lower	31 MPa, 310 bar (4500 psi)	0.7 MPa, 7 bar (100 psi)	234824
80:1 Premier, CM1000, CS Lower	40 MPa, 403 bar (5850 psi)	0.5 MPa, 5 bar (73 psi)	237518
80:1 Premier, CM1000, SST Lower	40 MPa, 403 bar (5850 psi)	0.5 MPa, 5 bar (73 psi)	237520
50:1 King, CM1000, CS Lower	31 MPa, 310 bar (4500 psi)	0.6 MPa, 6.2 bar (90 psi)	237707
50:1 King, CM1000, SST Lower	31 MPa, 310 bar (4500 psi)	0.6 MPa, 6.2 bar (90 psi)	237708
65:1 King, CM800, CS Lower	40 MPa, 403 bar (5850 psi)	0.6 MPa, 6.2 bar (90 psi)	236471
65:1 King, CM800, SST Lower	40 MPa, 403 bar (5850 psi)	0.6 MPa, 6.2 bar (90 psi)	236462
31:1 Bulldog, CM800, CS Lower	21 MPa, 214 bar (3100 psi)	0.7 MPa, 7 bar (100 psi)	237261
19:1 Senator, CM800, CS Lower	13 MPa, 131 bar (1900 psi)	0.7 MPa, 7 bar (100 psi)	237264
65:1 Reduced Icing Quiet King, CM800, CS Lower	40 MPa, 403 bar (5850 psi)	0.6 MPa, 6.2 bar (90 psi)	237265
31:1 Reduced Icing Quiet Bulldog, CM800, CS Lower	21 MPa, 214 bar (3100 psi)	0.7 MPa, 7 bar (100 psi)	237274
12:1 Bulldog, CM2100, SST Lower	8 MPa, 83 bar (1200 psi)	0.7 MPa, 7 bar (100 psi)	222904
12:1 Quiet Bulldog, CM2100, SST Lower	8 MPa, 83 bar (1200 psi)	0.7 MPa, 7 bar (100 psi)	222903
24:1 King, CM2100, SST Lower	14.9 MPa, 149 bar (2160 psi)	0.6 MPa, 6.2 bar (90 psi)	222836
24:1 Quiet King, CM2100, SST Lower	14.9 MPa, 149 bar (2160 psi)	0.6 MPa, 6.2 bar (90 psi)	222905
67:1 Premier, DF1200, SST Lower	34 MPa, 345 bar (500 psi)	0.5 MPa, 5.2 bar (75 psi)	245171
Viscount Hydraulic Motor, CM2100, SST Lower	15 MPa, 156 bar (2300 psi)	N/A	222906
34:1 Senator, CM4500, CS Lower	23 MPa, 234 bar (3400 psi)	0.7 MPa, 7 bar (100 psi)	222769

# Typical Installation

A	Air Line Filter	L	Applicator Gun or Valve
B	Accessory Bleed-Type Master Air Valve (required)	M	Gun Swivel
C	Pump Bleed-Type Master Air Valve (required)	N	Mounting Plate
D	Pump Air Regulator	10	Follower Rod
E	Main Air Line Supply	20	Pump Assembly
F	Air Manifold	30	Ram Hand Valve
G	Follower Plate Blowoff Button	40	Ram Module
H	Ram Air Supply Hose	50	Follower Gasket
I	Air Line Lubricator	60	Follower Plate Assembly
J	Fluid Drain Valve (required)	70	Wiper Seals
K	Fluid Regulator	80	Drum Clamp
		90	Grounding Wire (required)



8328B

Fig. 1

# Typical Installation

The typical installation discussed below is only a guide for selecting and installing system components and accessories. Contact your Graco distributor for help in designing a system to suit your particular needs.

This air-powered ram extruder forces high viscosity fluids into the intake valve of the fluid pump. Wiper rings and other accessory equipment for use with this ram are listed in the **Accessories** section on page 54.

## Selecting a Location for the Ram

Refer to the Ram Mounting and Clearance Dimensions drawing (Fig. 14 on page 55) for ram mounting and clearance dimensions.

When selecting a location for the ram, keep the following in mind:

1. There should be sufficient space for installing and using the equipment.
  - Make sure there is sufficient overhead clearance for the pump and ram when the ram is in the fully raised position.
  - Make sure the air regulators for the pump and ram are fully accessible.
2. Make sure that you will be able to level the base of the ram using metal shims.
3. When you bolt the ram to the floor, the anchors should be long enough to prevent the unit from tipping. Refer to the Dimensional Drawing on page 55 for more information.

## System Accessories and Modules

Before you install the system you should be familiar with the parts discussed below. For more information, refer to Fig. 1, Typical Installation, on page 7.

### Air and Fluid Hoses

When installing a system, make sure:

- all air and fluid hoses are properly sized for your system.
- to use only electrically conductive air and fluid hoses.

- to use only Graco approved hoses. Do not remove the spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.

To allow the gun to move more freely, use a short whip hose between the main fluid hose and the gun.

### Air Line Modules

**⚠ WARNING**

**PRESSURIZED FLUID HAZARD AND MOVING PARTS HAZARD**

The pump bleed-type master air valve, (C) in Fig. 1, is required in your system to relieve air trapped between this valve and the pump after the pump air regulator is closed. Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury, including splashing in the eyes or on the skin and injury from moving parts.

### 3-Regulator Air Control Modules (shown in Fig. 1)

The following components are supplied with your pump:

- Pump Bleed-type Master Air Valve (C) is required in your system to relieve air trapped between it and the air motor when the valve is closed (see the **WARNING** above). Be sure the bleed valve is easily accessible from the pump, and is located downstream from the air regulator.
- Pump Air Regulator (D) controls pump speed and outlet pressure by adjusting the air pressure to the pump. Locate the regulator close to the pump, but upstream from the bleed-type master air valve.
- Ram Down Air Regulator (not shown) controls the air pressure to the ram.
- Ram Up Air Regulator (not shown) controls the air pressure to the ram.
- Ram Air Supply Hose (H) connects the ram air regulator to the air manifold.
- Air Manifold (F) divides the main air supply into separate lines for the pump and ram.

# Installation

## Air Line Accessories

If you have a 3-Regulator Air Control Module, install the following accessories, using adapters as necessary:

- Pump runaway valve senses when the pump is running too fast and automatically shuts off the air to the motor. A pump that runs too fast can be seriously damaged.
- Air line lubricator provides automatic air motor lubrication (standard on the 4-Regulator Air Control Module).
- Air line filter removes harmful dirt and moisture from the compressed air supply (standard on the 4-Regulator Air Control Module).
- Accessory bleed-type air valve isolates the air line accessories for servicing. Locate upstream from all other air line accessories. This isolates the accessories for servicing.

## Fluid Line Accessories (Fig. 1)

Install the following accessories in the positions shown in the Typical Installation, using adapters as necessary:

A fluid drain valve (J) is required in your system to relieve fluid pressure in the hose and gun (see the **WARNING** on page 8). When you install the fluid drain valve:

1. Screw the drain valve into the open branch of a tee mounted in the fluid line.
2. Install the drain valve pointing down, but so the handle points up when the valve is opened.

A fluid regulator (K) controls fluid pressure to the gun/valve, and dampens pressure surges.

A gun or valve (L) dispenses the fluid. The gun shown in the Typical Installation is a dispensing gun for highly viscous fluids.

A gun swivel (M) allows the gun to move more freely.

# Installation

The installation procedure includes:

- locating and installing the ram. See Form# 310523 for further information.
- grounding the system
- starting up the system
- initially loading material

## Installing the Ram

To install the ram, follow the procedure below. Refer to the Ram Mounting and Clearance Dimensions drawing (Fig. 14 on page 55) for ram mounting and clearance dimensions.

1. Select a convenient location for the equipment. Check that there is sufficient overhead clearance for the pump and ram when the ram is in the fully raised position. Make sure the air regulators for the pump and ram are fully accessible.
2. Level the base of the ram, using metal shims.
3. Using the holes in the base as a guide, drill holes for 13 mm. (1/2 in.) anchors. Bolt the ram to the floor anchors, which are long enough to prevent the unit from tipping. Refer to the Dimensional Drawing on page 55.

## Ground The System

Ground the supply unit as instructed here and in the individual component manuals.

### WARNING



#### **FIRE AND EXPLOSION HAZARD**

When installing the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 4.

To reduce the risk of static sparking, ground the pump, object being sprayed, and all other spraying/dispensing equipment used or located in the spraying/dispensing area. Check your local electrical code for detailed grounding instructions for your area and type of equipment.

1. *Pump*: connect a ground wire and clamp to a true earth ground as shown in Fig. 2.
  - a. Loosen the grounding lug locknut (W) and washer (X).
  - b. Insert one end of a 1.5 mm<sup>2</sup> (12 ga) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely.
  - c. Connect the other end of the wire to a true earth ground.

To maintain grounding continuity when flushing or relieving pressure, always hold a metal part of the spray gun/dispensing valve firmly to the side of a grounded metal pail, then trigger the gun/valve.

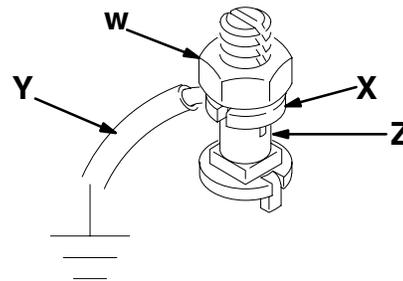


Fig. 2

2. *Fluid and air hoses*: use only electrically conductive materials and air hoses, and fluid hoses.
3. *Air compressor*: follow the manufacturer's recommendations.

# Installation

## Ground The System *(continued)*

### Material Drums

Ground material drums according to your local code. Use only metal drums, which are conductive, placed on a grounded surface. Do not place the drum on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

### Maintain Grounding Continuity When Purging Or Relieving Pressure

Follow the instructions in your separate gun manual for safely grounding your gun while purging.

## Starting Up the System

### **WARNING**



**PRESSURIZED EQUIPMENT HAZARD**  
To help reduce the risk of injury or equipment damage:

- Make sure all material hose connections are secure.
- Do not pressurize the system until you have verified the system is ready and it is safe to do so.

1. Check all material hoses and fittings to insure tightness and to prevent any material leakage.
2. Check all system air lines. Make sure that all routing of air lines will not interfere with any moving components within the fixture.
3. Raise the ram, using the following procedure:
  - a. Close all air regulators.
  - b. Move the ram hand valve lever to the UP position.
  - c. Slowly open the air appropriate regulator(s) until the ram starts to move up.
  - d. When the follower plate is above the height of the material drum to be used, move the ram hand valve lever to OFF.

# Installation

## Initial Material Loading

**⚠ WARNING**

**⚠ PRESSURIZED FLUID HAZARD**  
To reduce the risk of serious bodily injury, such as fluid injection or splashing fluid in the eyes or on the skin, **ALWAYS** wear eye protection and protective clothing when installing, operating, or servicing this dispensing system.

**⚠ MOVING PARTS HAZARD**  
Moving equipment parts can cause personal injury, including severing of hands or fingers. Make sure all personnel are clear of moving parts before operating the equipment.

**⚠ CAUTION**

**The use of a non-compatible lubricant can cause material contamination or inadequate performance.** Use only a lubricant compatible with the material to be pumped. Check with the material supplier for a recommended lubricant.

**To help avoid damage to equipment,** *do not* use a drum of material that has been dented or otherwise damaged; damage to the follower wipers may result.

**An empty drum clamp can interfere with up and down operation of the ram.** When raising or lowering the ram, make sure the drum clamp stays clear of the follower assembly.

For information about specific air pressure settings, refer to the Graco system documentation.

1. Raise the follower plate high enough to put a drum of material under it. Make sure the drum clamp stays clear of the follower assembly.
  2. Open a drum of the proper material and place it under the elevated follower plate.
- NOTE:** Whenever drum changes are required, remove the cover from a drum of new material by holding it level and lifting it straight up. Tipping the cover may allow accumulated dirt to spill into the drum, which may result in damage to the equipment.
3. Lubricate the follower wipers with a lubricant compatible with the material to be pumped. Check with your material supplier for compatibility.
  4. Before lowering the pump into the drum, make sure that nothing is between the follower plate and the drum, or between the ram tie bar and the top of the ram posts.
  5. Lower the pump and follower into the drum of material:
    - a. Move the hand valve lever to the **DOWN** position and lower the ram until the follower plate is just ready to enter the drum, then move the valve to **OFF**. If necessary, reposition the drum so the wipers will not hit the drum lip, then open the vent valve (not shown) on the follower plate.
    - b. Move the ram hand valve lever to the **DOWN** position and slowly open the air regulator.
    - c. As the follower enters the drum, loosen the bleed stick. Loosening the bleed stick allows trapped air between the follower plate and the top of the material to escape.
    - d. When air stops exhausting from the bleed stick port, replace and tighten the bleed stick.
  6. Place a material waste container under the dispense gun.
  7. **Slowly** adjust the pump air regulator. This will start the pump and fill the material passage.

# Operation

## Pressure Relief Procedure

This procedure describes how to relieve pressure for the supply unit. Use this procedure whenever you shut off the dispenser/sprayer and before checking or adjusting any part of the system, to reduce the risk of serious injury.

### WARNING



#### MOVING PARTS HAZARD

Follow this **Pressure Relief Procedure** before checking or repairing the ram or any other part of the system, and when shutting down the system. Keep hands and fingers away from the follower plate, fluid pump inlet, and lip of the fluid container when raising or lowering the ram to reduce the risk of pinching or amputating hands or fingers.

During operation, also keep hands and fingers away from limit switches to reduce the risk of pinching or amputating hands or fingers.



#### SKIN INJECTION HAZARD

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

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



#### PRESSURIZED FLUID HAZARD

Do not operate the 80:1 Premier above 5 bar (73 psi) air pressure. The CM1000 lower is rated to 403 bar (5850 psi) Maximum Fluid Working Pressure. The pump supply unit is equipped with a pressure relief valve to prevent the user from operating the pump air pressure regulator above the recommended 5 bar (73 psi). For further technical assistance, contact your Graco distributor.

1. Lock the gun/valve trigger safety.
2. Shut off the main air supply to the pump.
3. Close all air bleed valves.
4. Unlock the gun/valve trigger safety.
5. Hold a metal part of the gun/valve firmly to the side of a grounded metal drum, and trigger the gun/valve to relieve pressure.
6. Lock the gun/valve trigger safety.
7. Have a container ready to catch the drainage, then open the drain valve or pump bleed valve.
8. Leave the drain valve open until you are ready to spray/dispense again.

**NOTE:** *If you suspect that the spray tip/nozzle or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Then clear the tip/nozzle or hose.*

9. If you want to relieve pressure in the ram, see the **Ram Pressure Relief Procedure** on page 18.

# Operation

## Raising and Lowering the Ram

### CAUTION

An empty drum clamp can interfere with up and down operation of the ram. When raising or lowering the ram, make sure the drum clamp stays clear of the follower assembly.

Fig. 1. The ram hand valve (30) on the ram air control has 3 positions:

- Ram UP raises the ram
- Ram DOWN lowers the ram
- Ram OFF puts the ram in “neutral.” Moving the hand valve to OFF does not change the position of the ram, but it stops the air pressure from attempting to move the ram either up or down.

## Changing Empty Drums

### WARNING



#### **MOVING PARTS HAZARD**

To reduce risk of injury or damage to equipment, take care when adjusting blow off pressure. Too much pressure can cause the follower plate to rise very quickly or burst the drum. Too little pressure can cause the ram to lift the entire drum from the ground.



#### **PRESSURIZED FLUID HAZARD**

**Bursts of material and air will exit the bleed port!** To reduce risk of injury or damage to equipment, wear eye protection, gloves and protective clothing whenever working with this supply system.

### CAUTION

#### **To help avoid damage to equipment:**

- Be sure to reload the empty supply unit with a full drum of material immediately. Do not allow the supply units to operate when empty, which would cause a pump runaway and cause damage to the system.
- Do not raise the ram and remove the follower plate from the empty drum until you are ready to immediately install the new drum.
- Do not use a drum of material that has been dented or otherwise damaged; damage to the follower wipers may result.

**An empty drum clamp can interfere with up and down operation of the ram.** When raising or lowering the ram, make sure the drum clamp stays clear of the follower assembly.

# Operation

## Changing Empty Drums (*continued*)

**Read all warnings and instructions before attempting this procedure!**

When a drum of material is empty, follow this procedure to load a new drum of material:

1. Stop the pump by closing the pump's bleed-type master air valve.
  2. Raise the follower out of the drum:
    - a. Leave the ram down regulator to 6.8 (100 psi).
    - b. Set the ram UP air regulator to 0.68–1.02 bar (10–15 psi).
    - c. Move the ram hand valve lever to the UP position. Adjust the ram up regulator to make the ram slowly raise. At the same time, open and close the follower blow-off valve carefully to equalize the pressure in the drum. If more air line pressure is needed for the follower blower-off, then carefully increase the pressure at the air inlet regulator.
  3. With the follower completely out of the drum, remove the empty drum from the ram.
  4. Being careful not to damage the follower wiper, scrape any material or material build-up from the follower plate and wiper.
  5. Apply a lubricant to the wipers. The lubricant should be compatible with the material to be pumped. (Check with the material supplier for a compatible lubricant.)
  6. Place the new drum in the ram:
    - a. Remove the cover from a drum of appropriate material.
    - b. Remove any other packing from the drum, to expose the material. Make sure that there are no foreign objects on the material surface.
- NOTE:** Whenever drum changes are required, remove the cover from a drum of new material by holding it level and lifting it straight up. Tipping the cover may allow accumulated dirt to spill into the drum, which may result in damage to the equipment.
- c. Place the drum under the raised follower plate.
  7. Lower the follower into the drum:
    - a. Move the ram hand valve lever to the DOWN position.
    - b. Check the drum position as the follower lowers. If necessary, stop lowering the follower before contacting the drum, and adjust the drum and/or clamp positions to align the drum with the follower plate.
    - c. Continue lowering the follower. As the follower enters the drum, loosen the air bleed stick. Loosening the bleed stick allows trapped air between the follower plate and the top of the material to escape.
    - d. When air stops exhausting from the bleed stick port, replace and tighten the bleed stick.
  8. Adjust the ram air pressure for normal operation.
  9. Bleed, from the material pump, the air that was introduced during the drum change:
    - a. Place a waste container under the pump bleed port.
    - b. Open the bleed port and turn on pump air pressure.
    - c. Allow material to flow from the bleed port until it is air-free.
    - d. Shut off air to the pump and close the bleed port.
    - e. Turn air on to the pump and set the pump air regulator for normal operation.
  10. Resume normal operation.

# Operation

## Shutdown

To shut down the supply unit:

1. Fig. 1. Move the ram hand valve (30) to the OFF position. Shut off the air supply to the ram and pump.

### **⚠ WARNING**

To reduce the risk of serious injury, whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

2. **Relieve the pressure.**

## Emergency Stop

1. Fig. 3. Stop the pump by closing the Pump's Bleed-type Master Air Valve closest to the motor's air inlet (C).

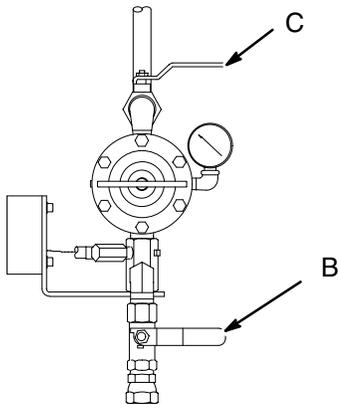


Fig. 3

2. Stop the ram from moving by:
  - a. Closing the master accessory air valve (B).
  - b. Moving the ram hand valve lever to the OFF position.

## Flushing Safety

### **⚠ WARNING**

Use fluids and solvents that are chemically compatible with the equipment wetted parts. See the **Technical Data** sections of all the equipment manuals. Always read the material manufacturer's literature before using fluid or solvent in this pump.

1. Before flushing, be sure the entire system and flushing drums are properly grounded. Refer to **Ground The System**, on page 10.

### **⚠ WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

2. **Relieve the pressure.**

### **⚠ WARNING**



#### **PRESSURIZED FLUID HAZARD**

Always use the lowest possible fluid pressure, and maintain firm metal-to-metal contact between the gun/valve and the drum during flushing to reduce the risk of fluid injection injury, static sparking and splashing.

3. Remove the spray tip/nozzle from the spray gun/dispensing valve.

# Troubleshooting

PROBLEM	CAUSE	SOLUTION
Ram won't raise or lower	Closed main air valve or clogged air line	Open air valve, clean air line
Ram won't raise or lower	Not enough air pressure	Increase ram pressure
	Worn or damaged piston	Replace piston. See procedure in Form #310523.
	Hand valve closed or clogged	Open, clear hand valve or exhaust
Ram raises or lowers too fast	Ram air pressure too high	Decrease ram air pressure
Air leaks around cylinder rod	Worn rod seal	Replace o-rings in guide sleeve. See procedure in form #310523.
Fluid squeezes past follower plate wipers	Ram air pressure too high	Decrease ram air pressure
	Worn or damaged wipers	Replace wipers. See procedure on page 19
Material pump won't prime properly, only pumps air.	Closed main air valve or clogged air line	Open air valve, clear air line
	Not enough pump air pressure	increase pump pressure
	Worn or damaged piston	Replace piston. See procedure in Form # 310523.
	Hand valve closed or clogged	Open, clear hand valve or exhaust
	Hand valve dirty, worn or damaged	Clean, service hand valve
	Bent drum has stopped follower	Replace drum
Air pressure won't hold drum down or push plate up	Closed main air valve or clogged air line	Open air valve, clear air line
	Not enough ram air pressure	Increase ram air pressure
	Valve passage clogged	Clean valve passage
	Worn piston seal	Replace seal

# Service

To relieve ram air pressure, follow the procedure below. For more information about servicing the ram, see Form# 310523, **165 mm (6.5 in.) Global Ram Module**.

## Ram Pressure Relief Procedure

### **WARNING**

To reduce the risk of serious injury whenever you service the ram, always follow the procedure below.

To relieve air pressure in the ram:

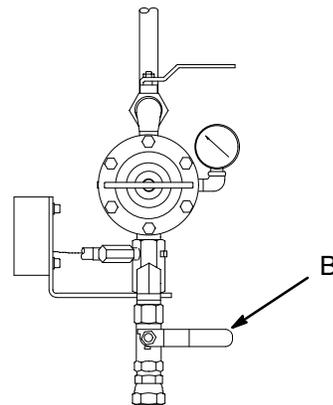
#### 1. Relieve the supply unit pressure.

### **WARNING**

To reduce the risk of serious injury, whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

2. Fig. 1. Using the ram hand valve (30) on the air control, move the ram to the DOWN position.
3. When the ram reaches the full down position, move the ram hand valve lever to OFF.
4. On the air regulator panel, set the ram regulator pressure for:
  - RAM UP to 0 (zero)
  - RAM DOWN to 0 (zero).

5. Exhaust air from both sides of the ram:
  - a. Move the ram hand valve lever to the DOWN position until all air is exhausted from one side of the ram.
  - b. Move the ram hand valve lever to the UP position until all air is exhausted from the other side of the ram.
6. Fig. 4. Close the bleed-type master accessory air valve (B).



**Fig. 4**

# Service

## Removing a Material Drum from the Supply Unit

**⚠ WARNING**



**PRESSURIZED FLUID HAZARD**  
**Bursts of material and air will exit the bleed port!** To reduce risk of injury or damage to equipment, wear eye protection, gloves and protective clothing whenever working with this supply system.

Before you perform the procedures in this section, remove the material drum from the supply unit. Observe the cautions and warnings, then follow steps 1 through 4 of the procedure for **Changing Empty Drums** on page 14.

## Servicing the Follower

This section describes how to service the wipers without removing the follower plate from the supply unit.

### Servicing Wipers

For replacing T-Wipers (243279), see Graco form 309161. To replace worn or damaged wipers (w):

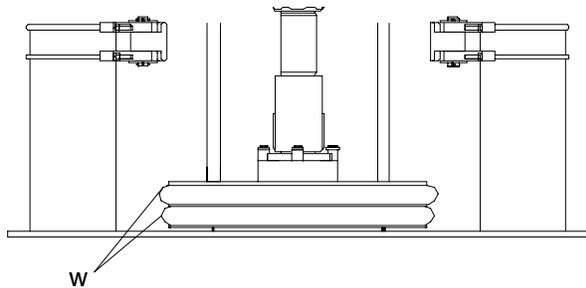


Fig. 5

1. Raise the follower plate up out of the drum by observing the cautions and warnings, then following steps 1 through 4 of the procedure for **Changing Empty Drums** on page 14.
2. Separate the wiper butt joint and bend back the strapping that covers the clamp. Loosen the clamp by unscrewing the worm gear, then remove the wiper.
3. Thread the strapping through the new wiper.
4. Install the wiper on the follower plate.
  - a. Position the wipers so the butt joints are 180° apart (Fig. 5).
  - b. Insert the end of the strap through the clamp and tighten.
5. Pound the wiper all the way around the follower plate, with a rubber mallet, until the ends are butted tightly together.
6. Repeat steps 2–5 for the second wiper.
7. Apply a lubricant to the wipers. The lubricant should be compatible with the material to be pumped. (Check with the material supplier for a compatible lubricant.)

# Service

## Removing/Re-installing the King, Senator, or Bulldog Pump from the Ram

### Removing the Pump Assembly

Fig. 6. Remove pump assembly from ram as follows:

**NOTE:** The pump assembly consists of the air motor (A) and the pump (B). It is not necessary to remove the entire pump assembly just to remove the pump. See the next section, **Separating the Pump from the Air Motor** to just remove the pump.

1. If material drum has already been removed from supply unit, go to step 2. To remove material drum, observe cautions and warnings, then follow steps 1 through 4 of procedure for **Changing Empty Drums** on page 14.
2. Make sure ram hand valve is in OFF position.

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

3. **Relieve the supply unit pressure.**

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve ram pressure, always follow the **Ram Pressure Relief Procedure** (page 18).

4. **Relieve the ram air pressure.**
5. Bleed off pressure in system and excess material by opening dispense gun and catching material in waste container.

6. Make note of air and material hose connections and routings. Use note when re-installing hoses.
7. Disconnect all air and material hoses.
8. Using capable hoist, secure pump assembly to hoist.
9. Remove four screws (47) and lockwashers (48) securing pump assembly to mounting plates (32).
10. Remove four screws (27) and lugs (26) attaching pump assembly to follower plate (10).

**NOTE:** If necessary for pump clearance, loosen set screws (31) and slide two mounting plates (32) down and away from pump.

11. Using hoist, lift and remove pump assembly from ram and follower plate. Take care not to damage o-ring (29), used on some units, located between pump assembly and follower plate.
12. Inspect and lubricate o-ring (29) when reinstalling pump assembly, replace if damaged.
13. Service pump assembly as needed. To remove the pump from air motor, go to next section, **Separating the Pump from the Air Motor**. See pump manual for further servicing information.

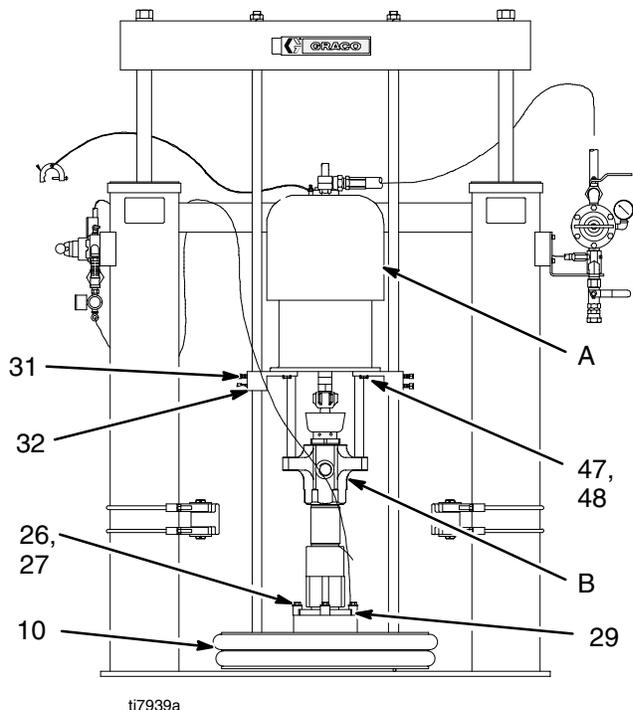


Fig. 6

# Service

## Separating the Pump from the Air Motor

For more information, see pump manual, or call Graco technical support representative.

Fig. 7. Separate pump from air motor as follows:

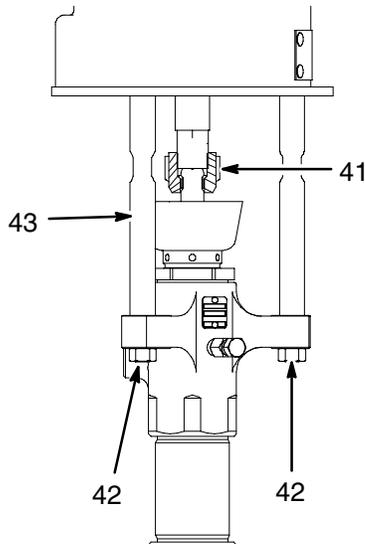


Fig. 7

## **⚠ WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

**NOTE:** To remove only the pump from the ram perform steps 1 through 5 of the previous section, **Removing/ Re-installing the King, Senator, or Bulldog Pump from the Ram**. Then complete the following steps:

1. Remove material hoses from pump.
2. Remove the coupling nut (41), which attaches the pump to the air motor. Be careful not to lose the collar couplings.
3. Remove the nuts (42) from the stand-off rods (43). You can now separate the pump from the air motor.

## Re-attaching the Air Motor to the Pump

Reverse the above procedure to re-attach the pump to the air motor.

Be sure that when you reinsert the collar couplings into the coupling nut (41), the large flanges point upwards.

1. Torque the nuts (42) to 68–81 N.m (50–60 ft-lbs).
2. Torque the coupling nut (41) to 196–210 N.m (145–155 ft-lbs).
3. Attach material hoses.

## Removing the Follower from the Pump

To remove the follower from the pump assembly:

1. Remove the pump assembly by following the steps in the **Removing the Pump Assembly** procedure.
2. Remove the air line from the blow-off valve.
3. Remove the screws and washers from the follower adapter.
4. Slide off the follower.

## Re-attaching the Follower to the Pump

Reverse the above procedure to reattach the follower to the pump.

If your pump/follower configuration has an o-ring:

1. Lubricate the o-ring.
2. Replace the o-ring
3. Slide the follower back onto the pump.

If your pump/follower configuration has a gasket, be sure to replace the gasket before sliding the follower back onto the pump.

# Service

## Removing/Re-installing the Premier Pump from the Ram

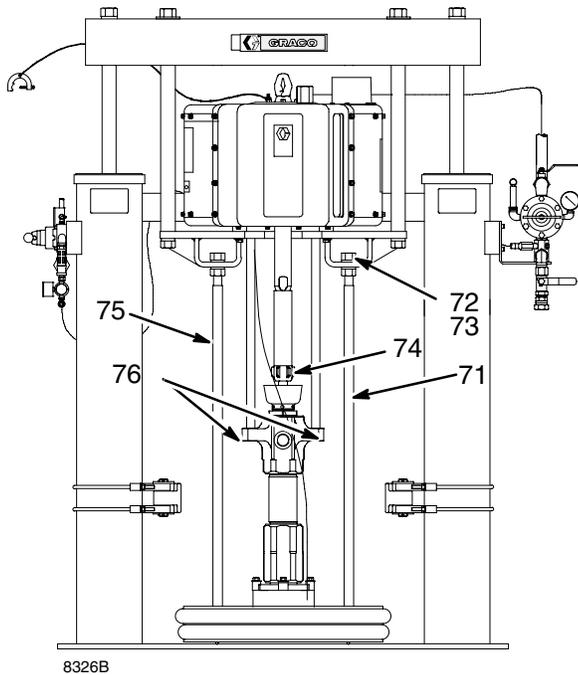


Fig. 8

### Removing the Pump Assembly

To remove the pump assembly from the ram, follow this procedure:

1. If the material drum has already been removed from the supply unit, go to step 2. If you need to remove the material drum, observe the cautions and warnings, then follow steps 1 through 4 of the procedure for **Changing Empty Drums** on page 14.
2. Make sure the ram hand valve is in the OFF position.

### **⚠ WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 13).

3. **Relieve the supply unit pressure.**
4. Bleed off pressure in the system and excess material by opening the dispense gun and catching the material in a waste container.
5. Disconnect all material hoses.
6. Remove the nuts and washers (72, 73) from the lower tie rods (71). See Fig. 8.
7. Remove the coupling nut (74), which attaches the pump to the air motor. Be careful not to lose the collar couplings.
8. Remove the nuts (76) from the tie rods (75). You can now separate the pump from the air motor.
9. Raise the ram so that the air motor assembly is clear of the lower pump assembly.
10. Remove the pump and service it as needed. To remove the follower from the pump, go to the section, **Removing the Follower from the Pump** below.

### Re-attaching the Pump Assembly to the Air Motor

Reverse the above procedure to re-attach the pump assembly to the air motor.

Be sure that when you reinsert the collar couplings into the coupling nut (74), the large flanges point upwards.

1. Torque the nuts (72) to 129–142 N.m (95–105 ft-lbs).
2. Torque the coupling nut (74) to 312–340 N.m (230–250 ft-lbs).
3. Make sure the tie rod nuts (76) are torqued to 312–340 N.m (230–250 ft-lbs).

### Removing the Follower from the Pump

To remove the follower from the pump assembly:

1. Remove the pump assembly by following the **Removing the Pump Assembly** procedure.
2. Remove the air line from the blow-off valve.
3. Remove the screws and washers from the follower adapter.
4. Slide off the follower.

# Service

## Re-attaching the Follower to the Pump

Reverse the above procedure, on page 22, to reattach the follower to the pump.

If your pump/follower configuration has an o-ring:

1. Lubricate the o-ring.
2. Replace the o-ring
3. Slide the follower back onto the pump.

If your pump/follower configuration has a gasket, be sure to replace the gasket before sliding the follower back onto the pump.

## Inspection Frequency

### Ram

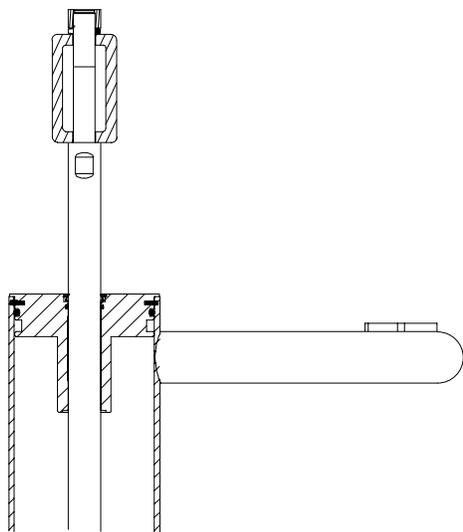
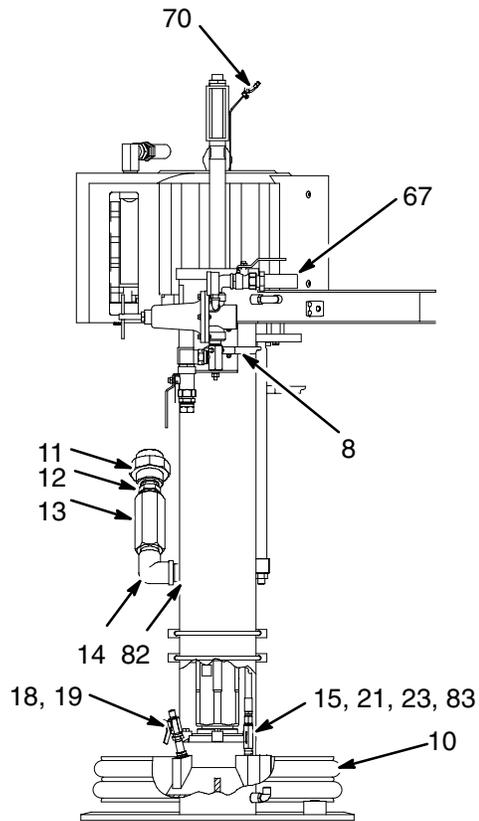
Periodically (once a year), inspect the ram guide sleeves, rods and cylinders for wear or damage, replace all worn parts. See the **Service** section of Form# 310523 for instructions on replacing worn parts.

### Material Pump

See the material pump's instructions for its inspection frequency.

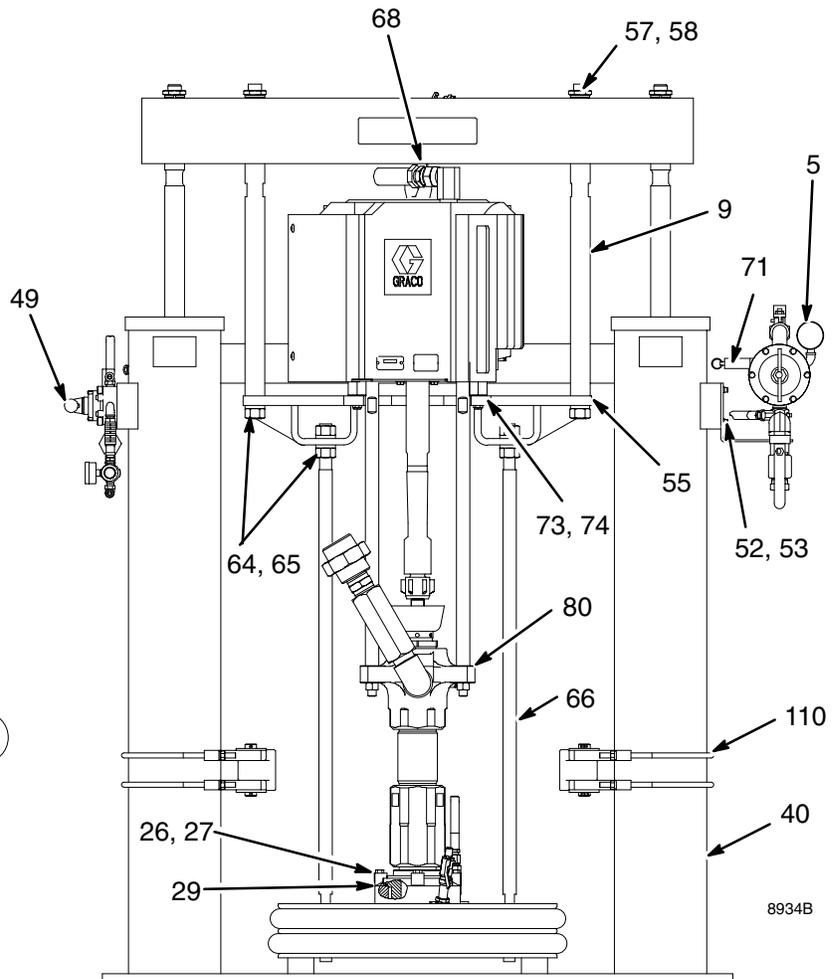
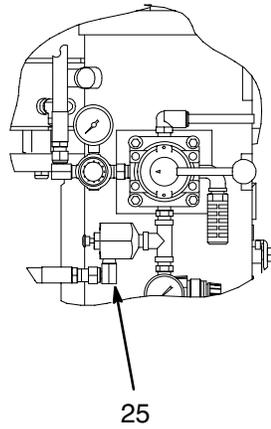
# Parts

Model 918316 Series B, 165 mm (6.5 in.) Ram, 80:1 Premier Motor, Check-Mate 1000 Pump, EPDM Wipers



ti7942a

**Series B**



8934B

**Series A Shown**

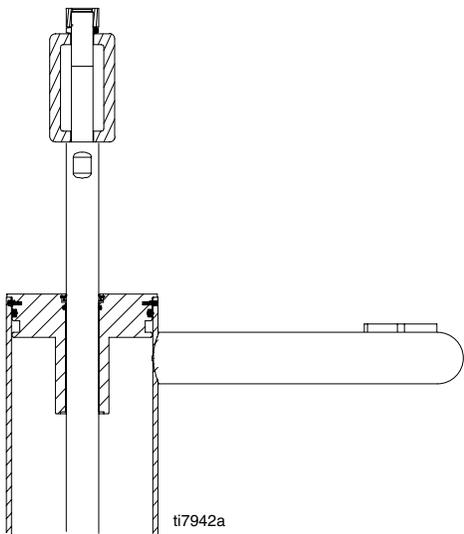
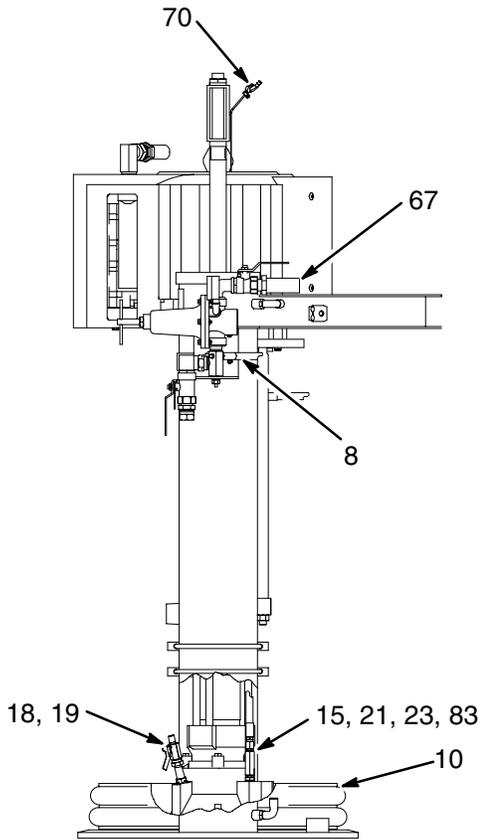
# Parts

## Model 918316 Series B, 165 mm (6.5 in.) Ram, 80:1 Premier Motor, Check-Mate 1000 Pump, EPDM Wipers

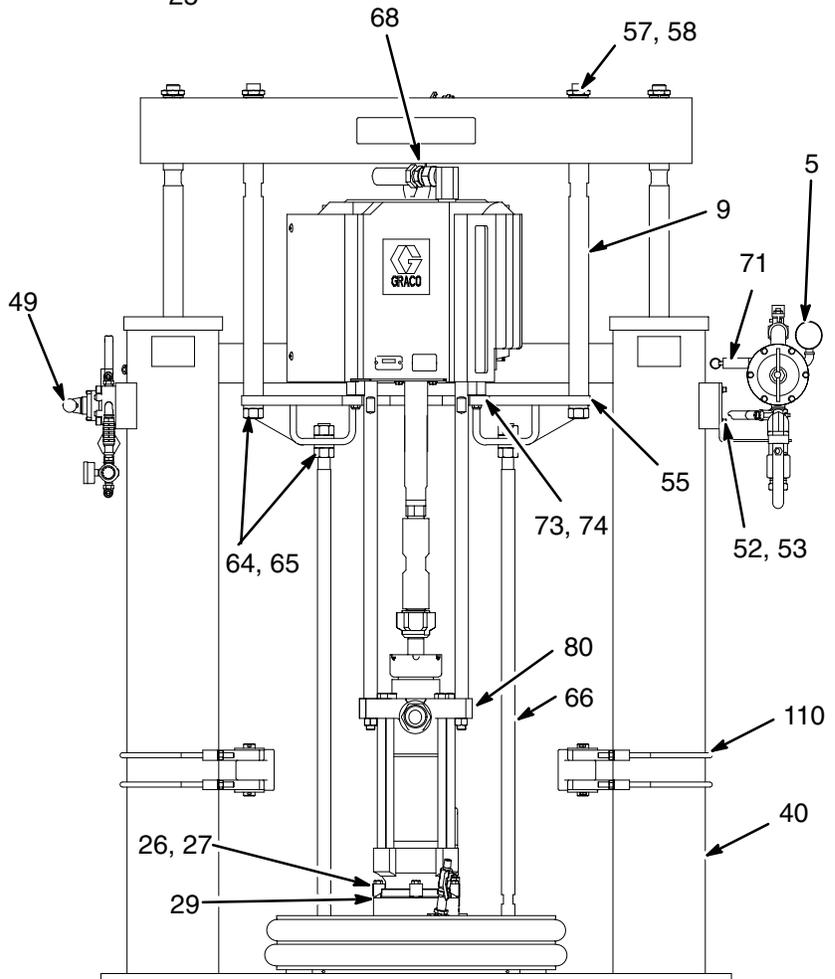
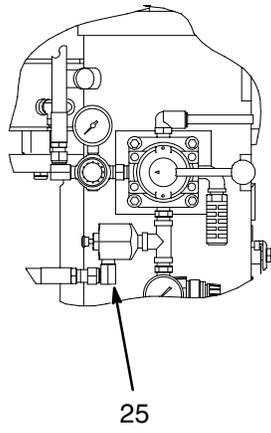
Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	918306	CONTROL ASSY, ram and motor air	1	53	100016	WASHER, lock	4
8	918467	HOSE	1	55	617193	PLATE, pump mounting	1
9	617275	ROD, upper tie	2	57	113993	WASHER, lock	2
10	238929	PLATE, ram	1	58	113939	NUT, hex	2
11	521975	FITTING, union, pipe	1	61	100132	WASHER, flat (not shown)	4
12	C20490	NIPPLE	1	62	100464	SCREW, lag (not shown)	4
13	521850	VALVE, check	1	64	101533	WASHER, lock	6
14	C38324	ELBOW	1	65	101535	NUT, hex	6
15	156849	NIPPLE; 3/8 npt	1	66	617274	ROD, lower tie	2
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	67	208610	HOSE	1
19	208391	VALVE, ball; 3/8 npt (m x f)	1	68	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
21	114243	VALVE, check	1	70	237569	GROUND WIRE ASSY	1
23	C12014	HOSE	1	71	110065	VALVE, safety relief	1
25	155541	UNION, swivel	1	73	100023	WASHER, flat	3
26	276025	LUG	4	74	101566	NUT, lock	3
27	102637	SCREW, cap, hex hd	4	80	237518	PUMP, Premier motor and CM1000 assy	
29	109495	O-RING	1			See 308355 and 308213 for parts	1
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	82	C38306	NIPPLE, reducing	1
49	244072	CONTROL ASSY, ram air	1	83	159841	ADAPTER	1
52	C19800	SCREW, socket hd	4	110	C32463	CLAMP, saddle assy	2

# Parts

Model 918303 Series B, 165 mm (6.5 in.) Ram, 39:1 Premier Motor, Check-Mate 2100 Pump, PVC Wipers



Series B



Series A Shown

8933B

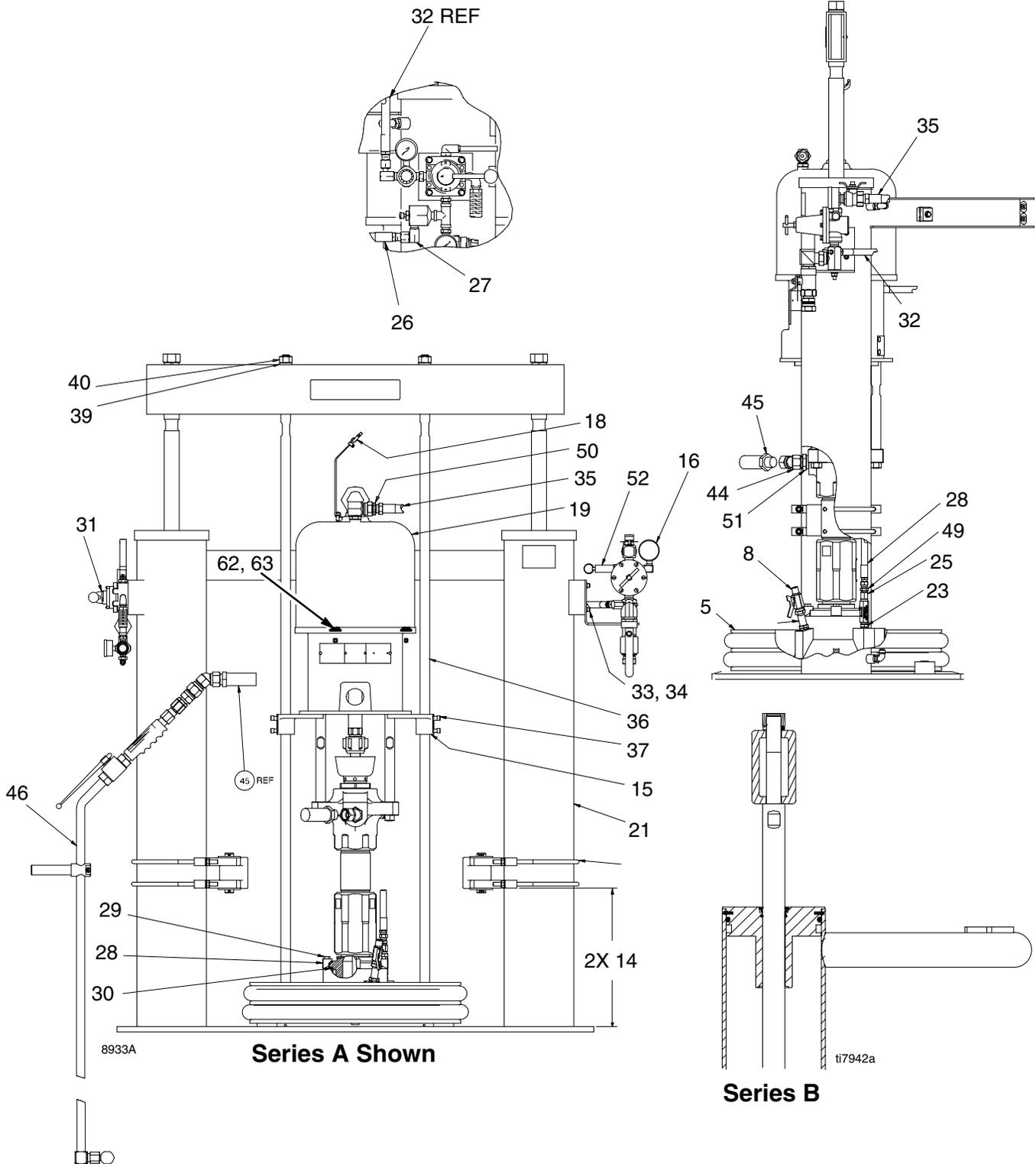
# Parts

## Model 918303 Series B, 165 mm (6.5 in.) Ram, 39:1 Premier Motor, Check-Mate 2100 Pump, PVC Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	918306	CONTROL ASSY, ram and motor air	1	53	100016	WASHER, lock	4
8	918467	HOSE	1	55	617193	PLATE, pump mounting	1
9	617275	ROD, upper tie	2	57	113993	WASHER, lock	2
10	241251	PLATE, ram	1	58	113939	NUT, hex	2
15	156849	NIPPLE; 3/8 npt	1	64	101533	WASHER, lock	6
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	65	101535	NUT, hex	6
19	208391	VALVE, ball; 3/8 npt (m x f)	1	66	617274	ROD, lower tie	2
21	114243	VALVE, check	1	67	208610	HOSE	1
23	C12014	HOSE	1	68	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
25	155541	UNION, swivel	1	70	237569	GROUND WIRE ASSY	1
26	276025	LUG	4	71	103347	VALVE, safety relief	1
27	102637	SCREW, cap, hex hd	4	73	100023	WASHER, flat	3
29	109495	O-RING	1	74	101566	NUT, lock	3
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	80	222940	PUMP, Premier motor and CM2100 assy See 308149 and 308213 for parts	1
49	244072	CONTROL ASSY, ram air	1	83	159841	ADAPTER	1
52	C19800	SCREW, socket hd	4	110	C32463	CLAMP, saddle assy	2

# Parts

Model 687105 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, EPDM Wipers



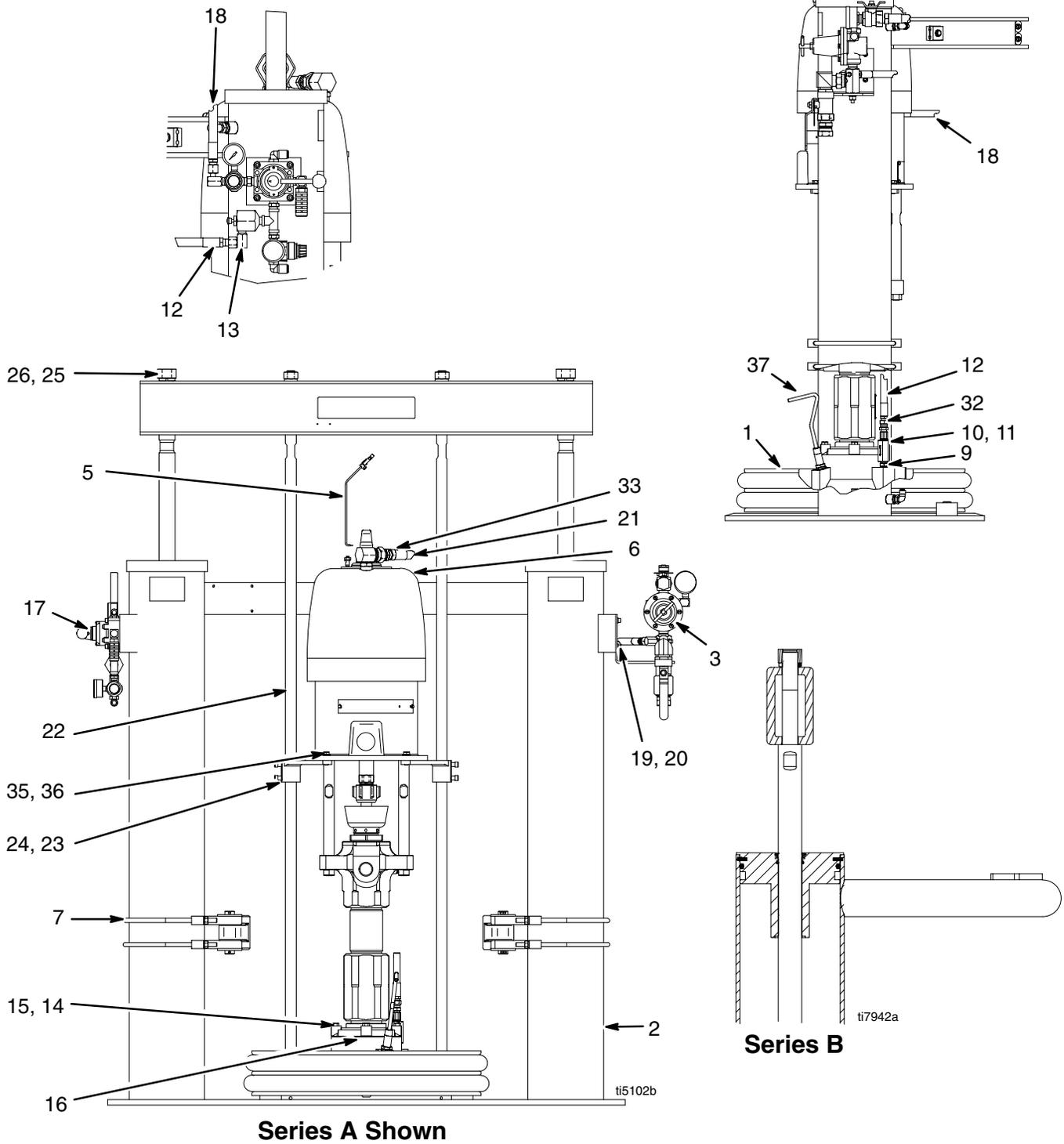
# Parts

## Model 687105 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	238929	PLATE, 55 gallon ram	1	32	918467	HOSE	1
7	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	33	100016	WASHER, lock	4
8	208391	VALVE, ball; 3/8 npt (m x f)	1	34	C19800	SCREW, socket hd	4
15	233087	RAM; 165 mm (6.5 in.)	1	35	205418	HOSE, coupled	1
		See 310523 for parts	1	36	617277	ROD, follower	2
16	C32438	REGULATOR, ram & motor 5 in. King	1	37	161822	PLATE, mounting	1
18	237569	WIRE, ground, 25 ft.	1	38	100672	SCREW, set	1
19	236471	PUMP, King motor and CM800 assy	1	39	101015	WASHER, lock	6
		See 308352 and 309347 for parts	1	40	C19187	NUT, hex	6
21	C32463	CLAMP, saddle assy	2	44	105281	UNION, swivel, 45 deg.	1
23	156849	NIPPLE; 3/8 npt	1	45	215240	HOSE, coupled	1
24	114243	VALVE, check	1	46	948065	KIT, repair	1
25	159841	ADAPTER	1	49	156823	UNION, swivel	1
26	C12014	HOSE	1	50	100896	FITTING, bushing,	1
27	155541	UNION, swivel	1	51	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
28	276025	LUG	4	52	108124	VALVE, safety	1
29	102637	SCREW, cap, hex hd	4	62	100101	SCREW, cap, hex hd	4
30	109495	O-RING	1	63	100133	WASHER, lock	4
31	244072	VALVE, control, ram	1				

# Parts

Model 246966 Series B, 165 mm (6.5 in.) Ram, 31:1 Bulldog Motor, Shovel Pump, EPDM Wipers



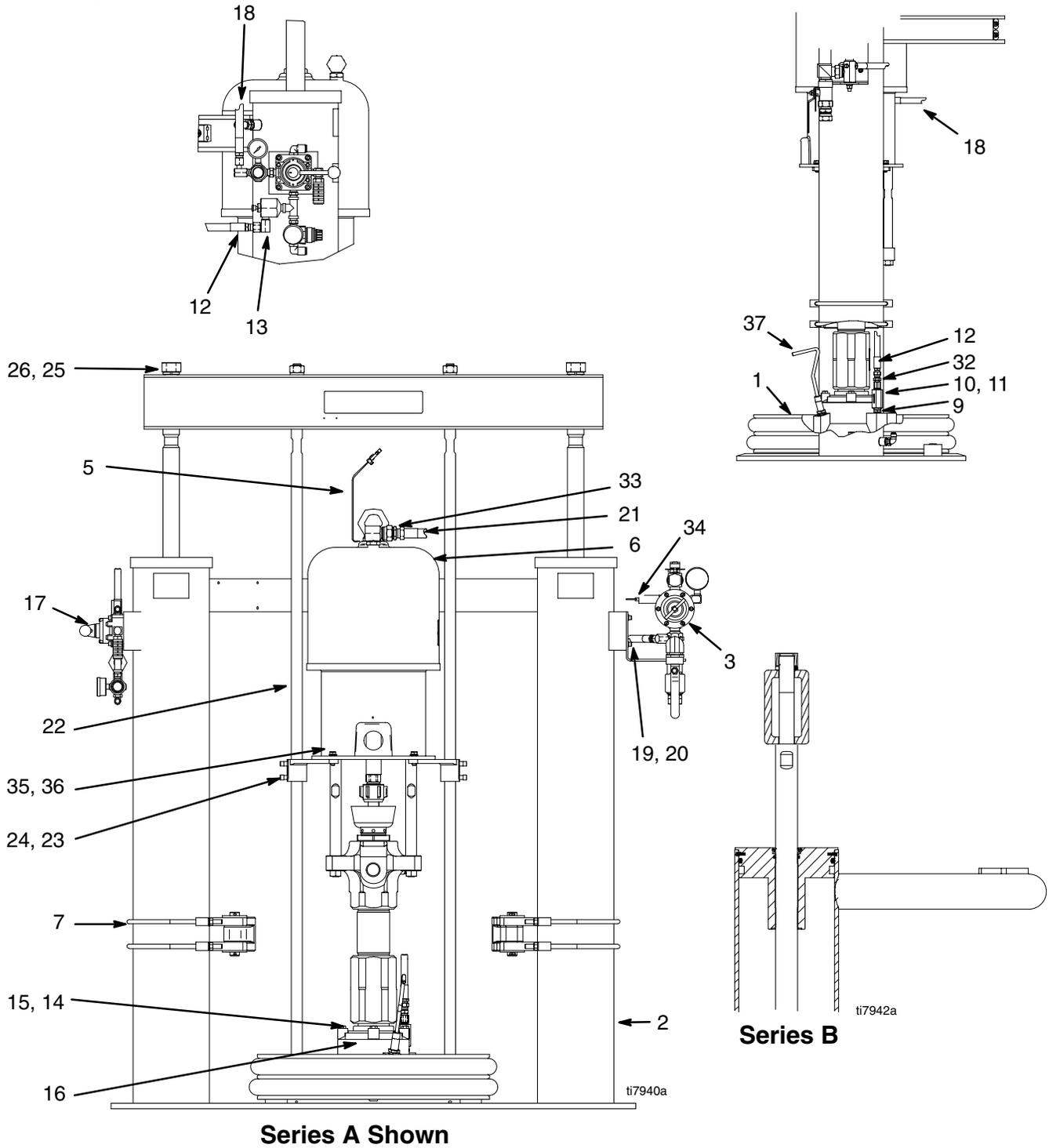
# Parts

## Model 246966 Series B, 165 mm (6.5 in.) Ram, 31:1 Bulldog Motor, Shovel Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	238929	PLATE, 55 gallon ram	1	18	918467	HOSE, 1/4 ID x 63 in.	1
2	233087	MODULE, ram 6.5 in.; pneumatic	1	19	100016	WASHER	4
3	C32438	REGULATOR	1	20	C19800	SCREW, cap	4
5	237569	WIRE ASSY. 25 ft	1	21	205418	HOSE	1
6	237261	PUMP, Bulldog, 31:1	1	22	617277	ROD	2
7	C32463	CLAMP	2	23	161822	PLATE	2
9	156849	NIPPLE	1	24	100672	SCREW SET	4
10	114243	VALVE, check	1	25	101015	WASHER	2
11	159841	ADAPTER	1	26	C19187	NUT	2
12	C12014	HOSE	1	32	156823	UNION	1
13	155541	UNION, swivel 90°	1	33	100896	FITTING, bushing	1
14	276025	CLAMP	4	35	100101	SCREW, cap, hex	4
15	102637	SCREW, cap	4	36	100133	WASHER	4
16	109495	PACKING	1	37	237771	HANDLE, bleed assy.	1
17	244072	VALVE, control	1				

# Parts

Model 246967 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Standard King Pump, EPDM Wipers



# Parts

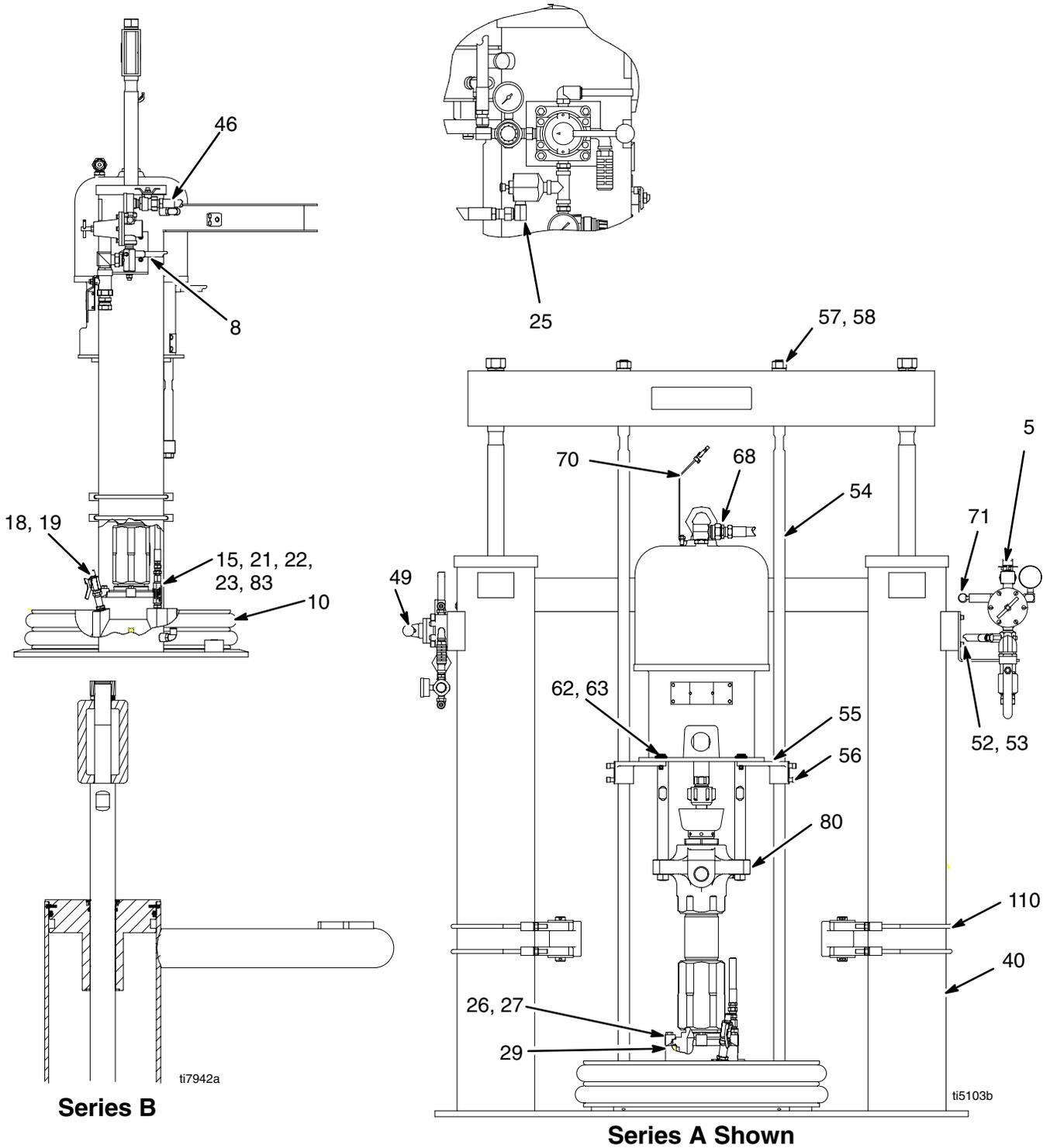
## Model 246967 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Standard King Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	238929	PLATE, 55 gallon ram	1	19	100016	WASHER	4
2	233087	MODULE, ram 6.5 in.; pneumatic	1	20	C19800	SCREW, cap	4
3	C32438	REGULATOR	1	21	205418	HOSE	1
5	237569	WIRE ASSY. 25 ft	1	22	617277	ROD	2
6	236471	PUMP, King, 65:1	1	23	161822	PLATE	2
7	C32463	CLAMP	2	24	100672	SCREW SET	4
9	156849	NIPPLE	1	25	101015	WASHER	2
10	114243	VALVE, check	1	26	C19187	NUT	2
11	159841	ADAPTER	1	32	156826	UNION	1
12	C12014	HOSE	1	33	100896	FITTING, bushing	1
13	155541	UNION, swivel 90°	1	34	108124	VALVE, safety	1
14	276025	CLAMP	4	35	100101	SCREW, cap, hex	4
15	102637	SCREW, cap	4	36	100133	WASHER	4
16	109495	PACKING	1	37	237771	HANDLE, bleed assy.	1
17	244072	VALVE, control	1				
18	918467	HOSE, 1/4 ID x 63 in.	1				

# Parts

**Model 918313 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, PVC Wipers**

**Model 234122 Series B, 165 mm (6.5 in.) Ram, 34:1 Senator Motor, Check-Mate 450 Pump, EPDM Wipers**



# Parts

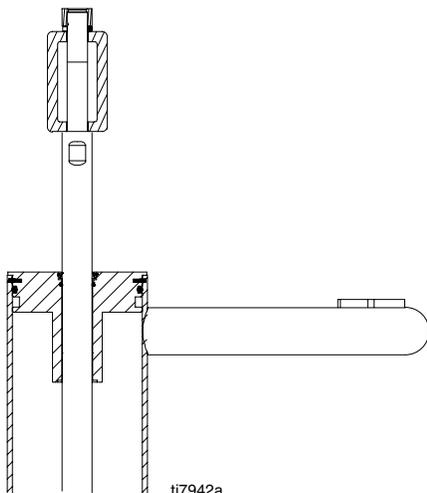
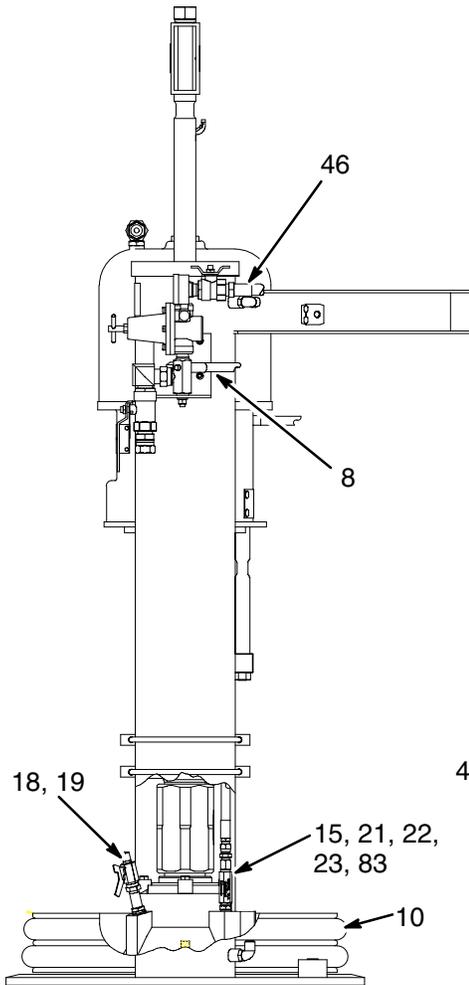
## Model 918313 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, PVC Wipers

## Model 234122 Series B, 165 mm (6.5 in.) Ram, 34:1 Senator Motor, Check-Mate 450 Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	C32438	CONTROL ASSY, ram and motor air	1	53	100016	WASHER, lock	4
8	918467	HOSE	1	54	617277	ROD, follower cold	2
10	241251	Plate, 55 gallon ram, PVC (918313 only)	1	55	161822	PLATE, mounting	2
	238929	Plate, 55 gallon ram, EPDM (234122 only)	1	56	100672	SCREW, set	4
				57	101015	WASHER, lock	2
15	156849	NIPPLE; 3/8 npt	1	58	C19187	NUT	2
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	62	100101	SCREW, cap, hex hd (918313 only)	4
19	208391	VALVE, ball; 3/8 npt (m x f)	1		111803	SCREW, cap, hex hd (234122 only)	4
21	114243	VALVE, check	1	63	100133	WASHER, lock	4
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	68	100896	BUSHING	1
23	C12014	HOSE	1	70	237569	GROUND WIRE ASSY	1
25	155541	UNION, swivel	1	71	103347	VALVE, safety relief (918313 only)	1
26	276025	LUG	4	80	236462	PUMP, King motor and CM800 assy (918313 only)	
27	102637	SCREW, cap, hex hd	4			See 308352 and 309347 for parts	1
29	109495	O-RING	1		238929	PUMP, Senator motor and CM450 assy (234122 only)	
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1			See 308017 and 307592 for parts	1
46	205418	HOSE, air; 1/4 npt	1	83	156823	UNION, swivel	1
49	244072	CONTROL ASSY, ram air	1	110	C32463	CLAMP, saddle assy	2
52	C19800	SCREW, socket hd	4				

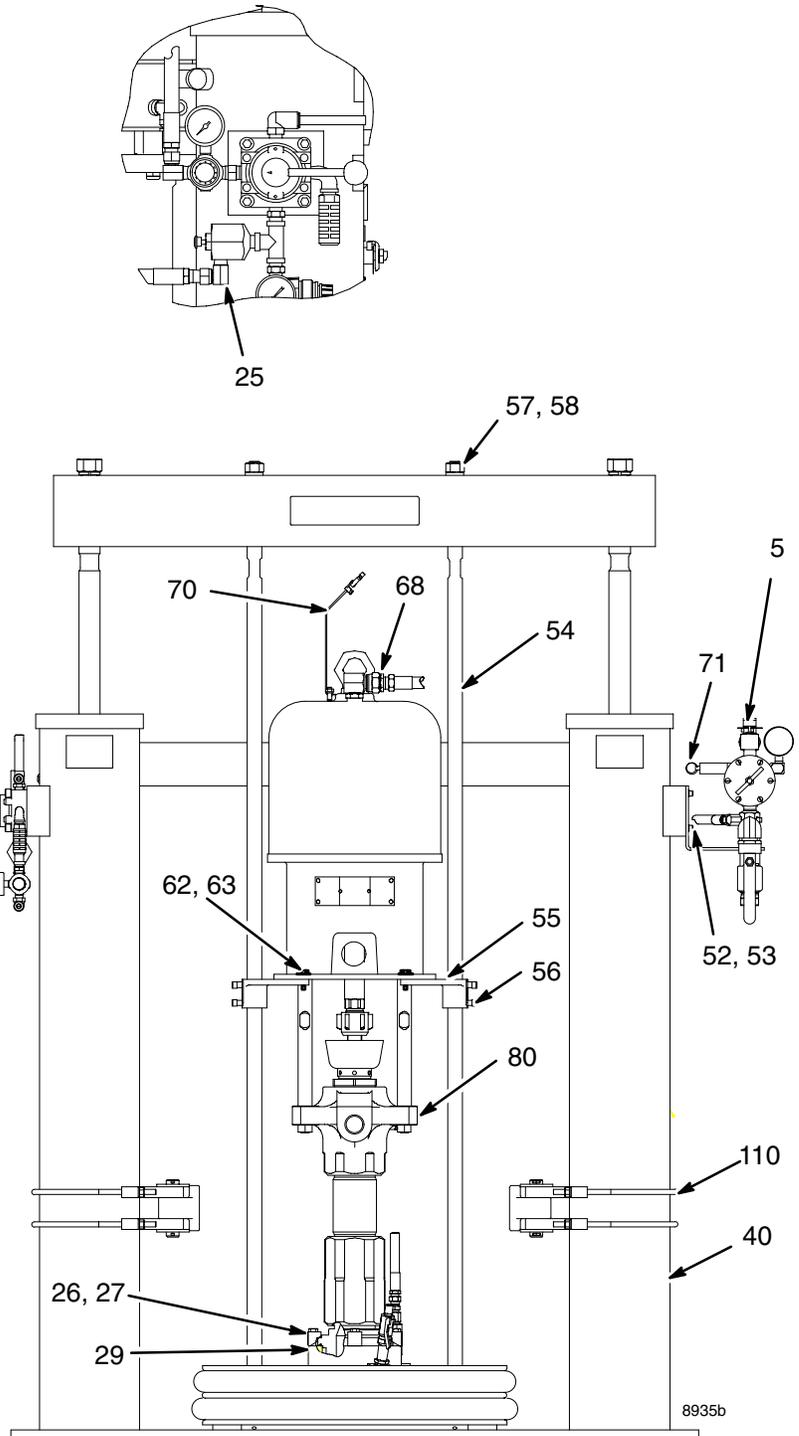
# Parts

Model 918315 Series B, 165 mm (6.5 in.) Ram, 50:1 King Motor, Check-Mate 1000 Pump, EPDM Wipers



Series B

ti7942a



Series A Shown

8935b

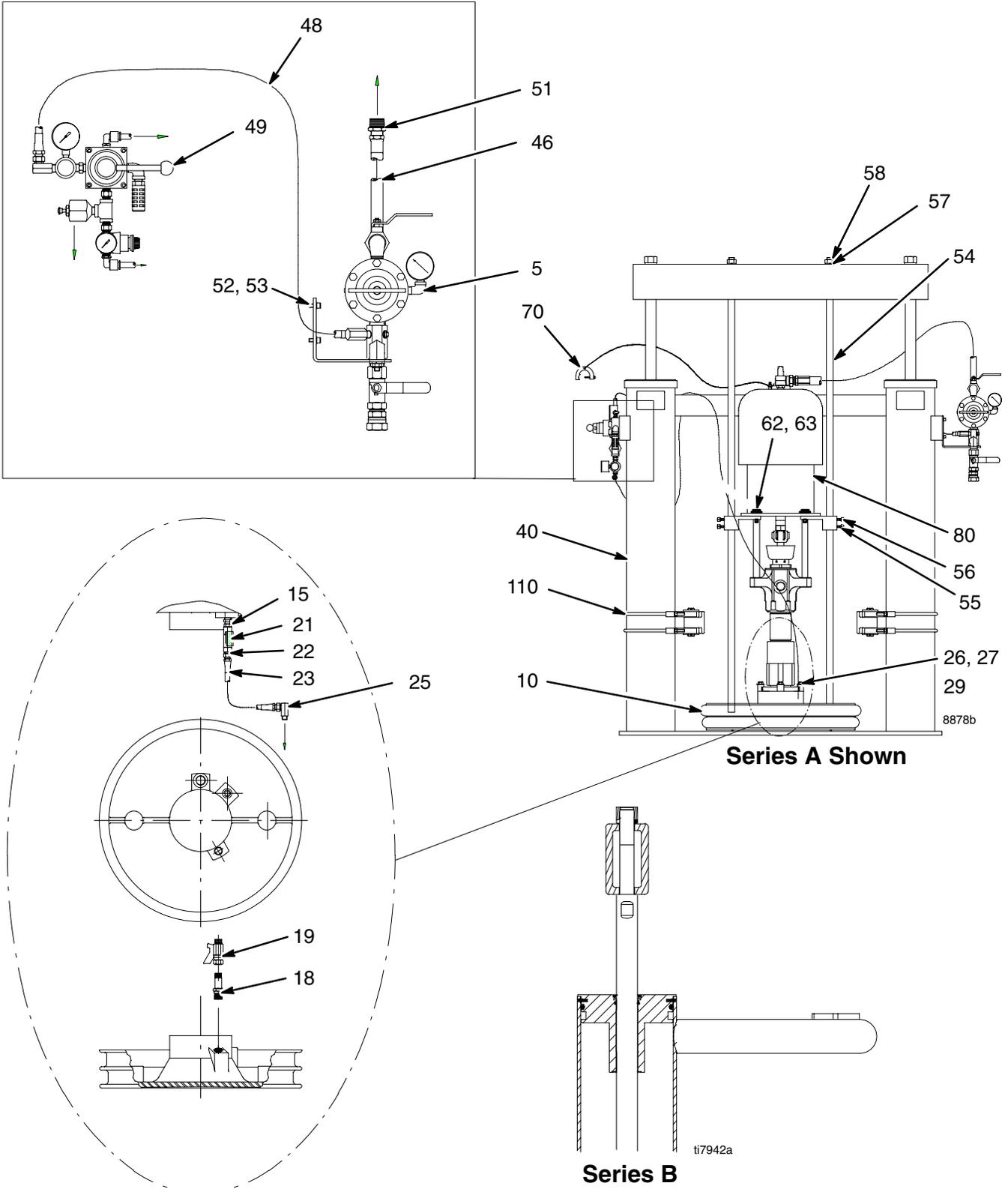
# Parts

## Model 918315 Series B, 165 mm (6.5 in.) Ram, 50:1 King Motor, Check-Mate 1000 Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	C32438	CONTROL ASSY, ram and motor air	1	52	C19800	SCREW, socket hd	4
8	918467	HOSE	1	53	100016	WASHER, lock	4
10	238929	PLATE, ram	1	54	617277	ROD, follower cold	2
15	156849	NIPPLE; 3/8 npt	1	55	161822	PLATE, mounting	2
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	56	100672	SCREW, set	4
19	208391	VALVE, ball; 3/8 npt (m x f)	1	57	101015	WASHER, lock	2
21	114243	VALVE, check	1	58	C19187	NUT	2
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	62	100101	SCREW, cap, hex hd	4
23	C12014	HOSE	1	63	100133	WASHER, lock	4
25	155541	UNION, swivel	1	68	100896	BUSHING	1
26	276025	LUG	4	70	237569	GROUND WIRE ASSY	1
27	102637	SCREW, cap, hex hd	4	71	103347	VALVE, safety relief	1
29	109495	O-RING	1	80	237707	PUMP, King motor and CM1000 assy	1
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1			See 308355 and 309347 for parts	1
46	205418	HOSE, air; 1/4 npt	1	83	156823	UNION, swivel	1
49	244072	CONTROL ASSY, ram air	1	110	C32463	CLAMP, saddle assy	2

# Parts

**Model 918597 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, EPDM Wipers**



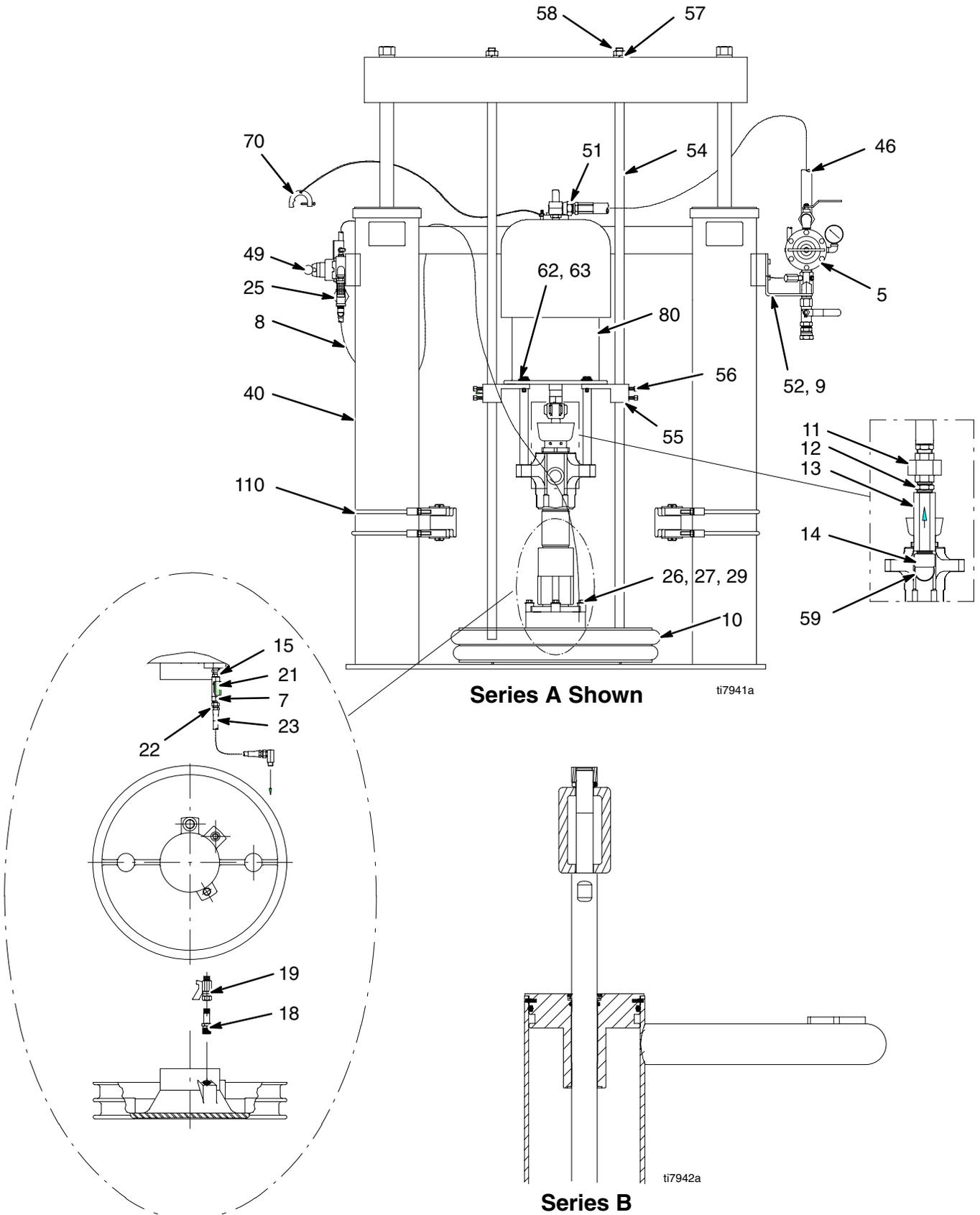
# Parts

## Model 918597 Series B, 165 mm (6.5 in.) Ram, 65:1 King Motor, Check-Mate 800 Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	C32438	CONTROL ASSY, ram and motor air see page 46	1	48	200033	HOSE, air; 1/2 npt	1
10	238929	PLATE, ram, with EPDM wipers	1	49	244072	CONTROL ASSY, ram air	1
15	156849	NIPPLE; 3/8 npt	1	51	100896	BUSHING; 3/4 npt(m) x 1/2 npt(f)	1
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	52	C19800	SCREW, socket hd	4
19	208391	VALVE, ball; 3/8 npt (m x f)	1	53	100016	WASHER, lock	4
21	114243	VALVE, check	1	54	617277	ROD, follower cold	2
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	55	161822	PLATE, mounting	2
23	C12014	HOSE	1	56	100672	SCREW, set	4
25	155541	UNION, swivel	1	57	101015	WASHER, lock	2
26	276025	LUG	4	58	C19187	NUT, hex	2
27	102637	SCREW, cap, hex hd	4	62	100101	SCREW, cap, hex hd	4
29	109495	O-RING	1	63	100133	WASHER, lock	4
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	70	237569	GROUND WIRE ASSY	1
46	205418	HOSE, air; 1/4 npt	1	80	240945	PUMP, King motor and CM800 assy See 308351 and 309347 for parts	1
				110	C32463	CLAMP, saddle assy	2

# Parts

Model 918314 Series B, 165 mm (6.5 in.) Ram, 65:1 Quiet King Motor, Check-Mate 800 Pump, EPDM Wipers



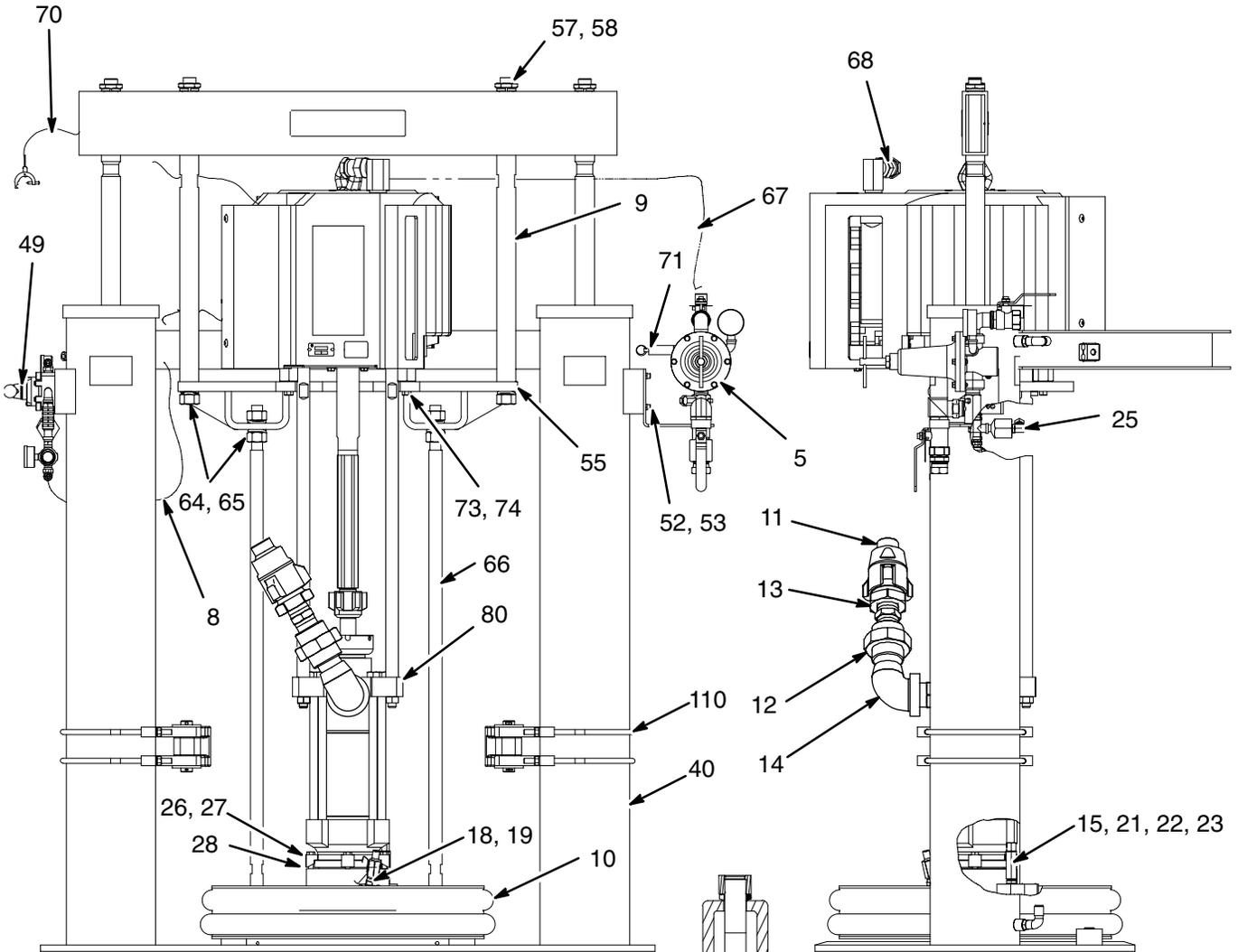
# Parts

## Model 918314 Series B, 165 mm (6.5 in.) Ram, 65:1 Quiet King Motor, Check-Mate 800 Pump, EPDM Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	C32438	CONTROL ASSY, ram and motor air	1	46	205418	HOSE, air; 1/4 npt	1
7	156823	UNION, swivel; 1/4 npt(m) x 1/4 npsm(f)	1	49	244072	CONTROL ASSY, ram air	1
8	918467	HOSE	1	51	100896	BUSHING; 3/4 npt(m) x 1/2 npt(f)	1
9	C19209	WASHER, lock	4	52	C19800	SCREW, socket hd	4
10	238929	PLATE, ram	1	54	617277	ROD, follower cold	2
11	521975	FITTING, union, pipe	1	55	161822	PLATE, mounting	2
12	C20490	NIPPLE	1	56	100672	SCREW, set	4
13	521850	VALVE, check	1	57	101015	WASHER, lock	2
14	C38324	ELBOW	1	58	C19187	NUT	2
15	156849	NIPPLE; 3/8 npt	1	59	C38306	NIPPLE, reducing	1
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	62	100101	SCREW, cap, hex hd	4
19	208391	VALVE, ball; 3/8 npt (m x f)	1	63	100133	WASHER, lock	4
21	114243	VALVE, check	1	70	237569	GROUND WIRE ASSY	1
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	80	241519	PUMP, Quiet King motor and CM800 assy	
23	C12014	HOSE	1			See 308352 and 309348 for parts	1
25	155541	UNION, swivel	1	110	C32463	CLAMP, saddle assy	2
26	276025	LUG	4	121	100132	WASHER, flat (not shown)	4
27	102637	SCREW, cap, hex hd	4	122	100464	SCREW, lag (not shown)	4
29	109495	O-RING	1				
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1				

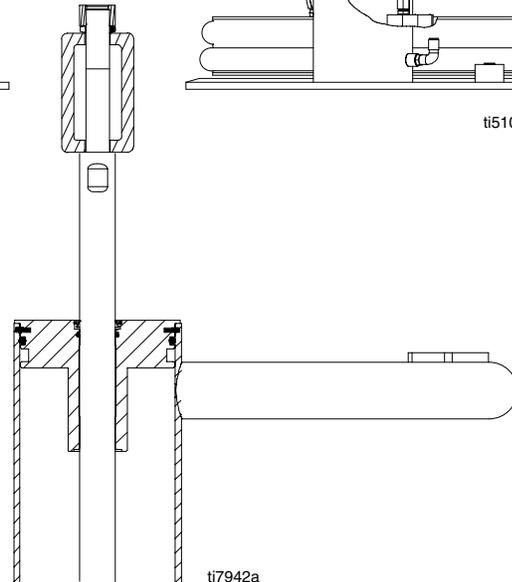
# Parts

Model 918481 Series B, 165 mm (6.5 in.) Ram, 45:1 Premier Motor, Dura-Flo 1800 Pump, PVC Wipers



Series A Shown

ti5104b



ti7942a

Series B

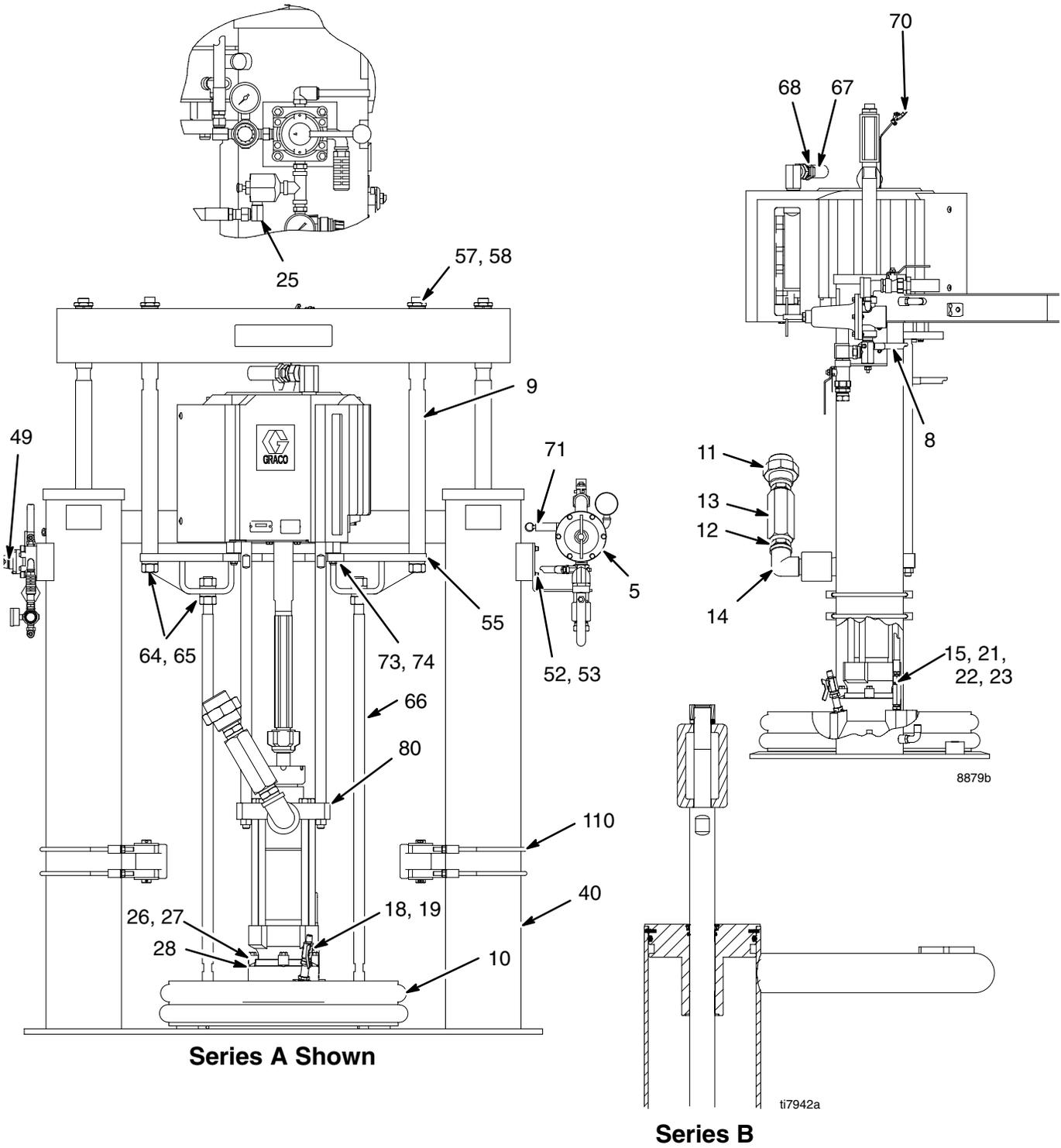
# Parts

## Model 918481 Series B, 165 mm (6.5 in.) Ram, 45:1 Premier Motor, Dura-Flo 1800 Pump, PVC Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	918306	CONTROL ASSY, ram and motor air	1	49	244072	CONTROL ASSY, ram air	1
8	918467	HOSE	1	52	C19800	SCREW, socket hd	4
9	617275	ROD, upper tie	2	53	100016	WASHER, lock	4
10	241251	KIT, PVC wiper and clamp	1	55	617193	PLATE, pump mounting	1
11	521975	FITTING, union, pipe	1	57	113993	WASHER, lock	2
12	C20490	NIPPLE	2	58	113939	NUT, hex	2
13	246929	VALVE, check	1	61	100132	WASHER, flat (not shown)	4
14	115463	ELBOW	1	62	100464	SCREW, lag (not shown)	4
15	159841	NIPPLE; 3/8 npt	1	64	101533	WASHER, lock	6
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	65	101535	NUT, hex	6
19	208391	VALVE, ball; 3/8 npt (m x f)	1	66	617274	ROD, lower tie	2
21	114243	VALVE, check	1	67	208610	HOSE	1
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	68	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
23	C12014	HOSE	1	70	237569	GROUND WIRE ASSY	1
25	155541	UNION, swivel	1	71	103347	VALVE, safety relief	1
26	276025	LUG	4	73	100023	WASHER, flat	3
27	102637	SCREW, cap, hex hd	4	74	101566	NUT, lock	3
28	109495	GASKET	1	80	234824	PUMP, Premier motor and DF1800 assy	1
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	110	C32463	See 308148 and 308213 for parts CLAMP, saddle assy	2

# Parts

Model 918469 Series B, 165 mm (6.5 in.) Ram, 34:1 Premier Motor, Dura-Flo 2400 Pump, PVC Wipers



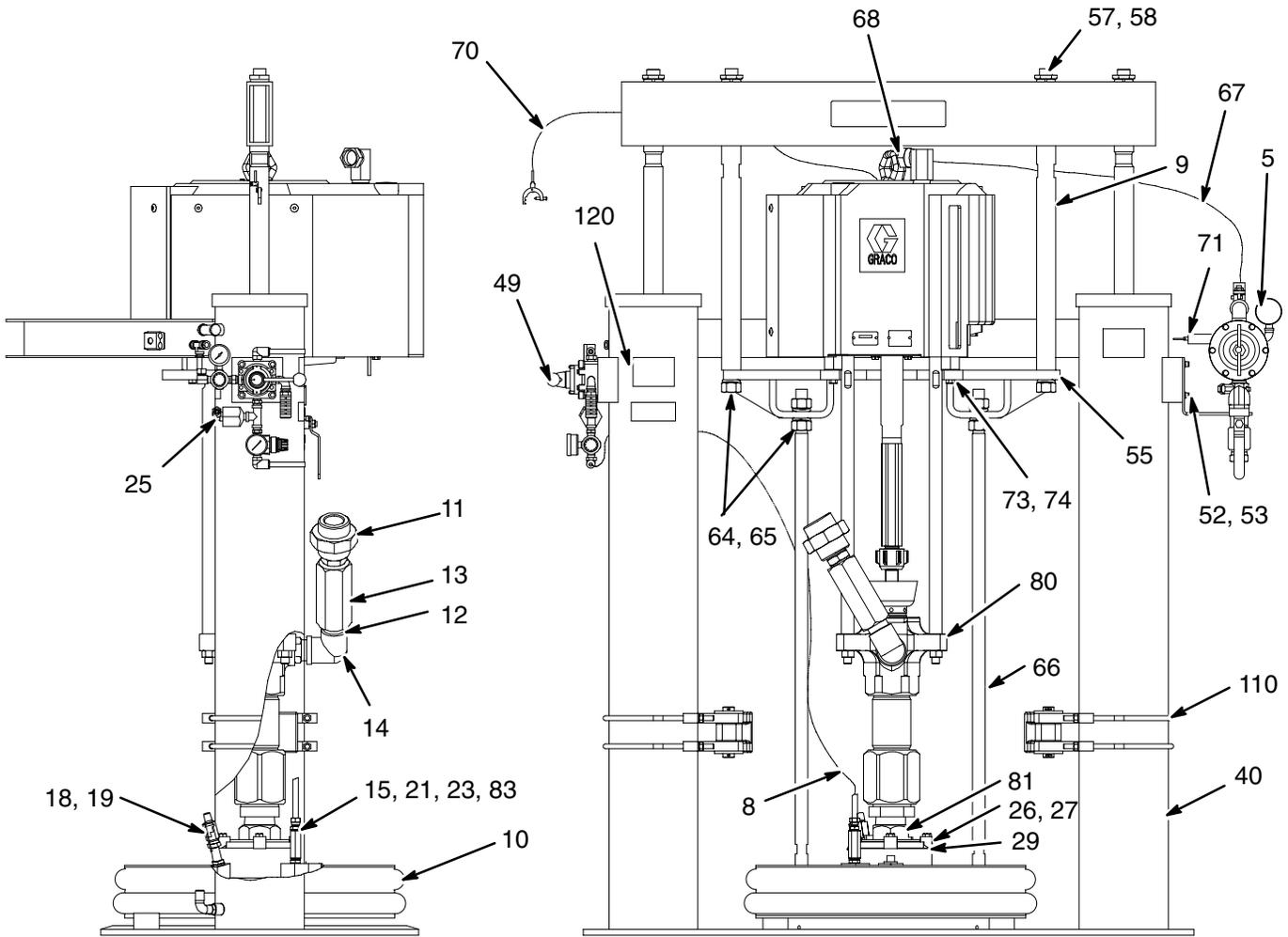
# Parts

## Model 918469 Series B, 165 mm (6.5 in.) Ram, 34:1 Premier Motor, Dura-Flo 2400 Pump, PVC Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	918306	CONTROL ASSY, ram and motor air	1	49	244072	CONTROL ASSY, ram air	1
8	918467	HOSE	1	52	C19800	SCREW, socket hd	4
9	617275	ROD, upper tie	2	53	100016	WASHER, lock	4
10	241251	KIT, PVC wiper and clamp	1	55	617193	PLATE, pump mounting	1
11	521975	FITTING, union, pipe	1	57	113993	WASHER, lock	2
12	C20490	NIPPLE	2	58	113939	NUT, hex	2
13	521850	VALVE, check	1	61	100132	WASHER, flat (not shown)	4
14	115463	ELBOW	1	62	100464	SCREW, lag (not shown)	4
15	156849	NIPPLE; 3/8 npt	1	64	101533	WASHER, lock	6
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	65	101535	NUT, hex	6
19	208391	VALVE, ball; 3/8 npt (m x f)	1	66	617274	ROD, lower tie	2
21	114243	VALVE, check	1	67	208610	HOSE	1
22	159841	BUSHING; 3/8 npt(m) x 1/4 npt(f)	1	68	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
23	C12014	HOSE	1	70	237569	GROUND WIRE ASSY	1
25	155541	UNION, swivel	1	71	103347	VALVE, safety relief	1
26	276025	LUG	4	73	100023	WASHER, flat	3
27	102637	SCREW, cap, hex hd	4	74	101566	NUT, lock	3
28	109495	GASKET	1	80	241506	PUMP, Premier motor and DF2400 assy	1
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	110	C32463	See 308151 and 308213 for parts CLAMP, saddle assy	2

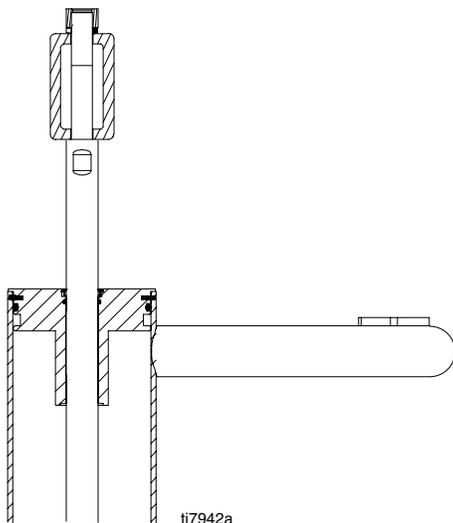
# Parts

Model C59702 Series C, 165 mm (6.5 in.) Ram, 67:1 Premier Motor, Dura-Flo 1200 Pump, PVC Wipers



Series A Shown

8881b



ti7942a

Series C

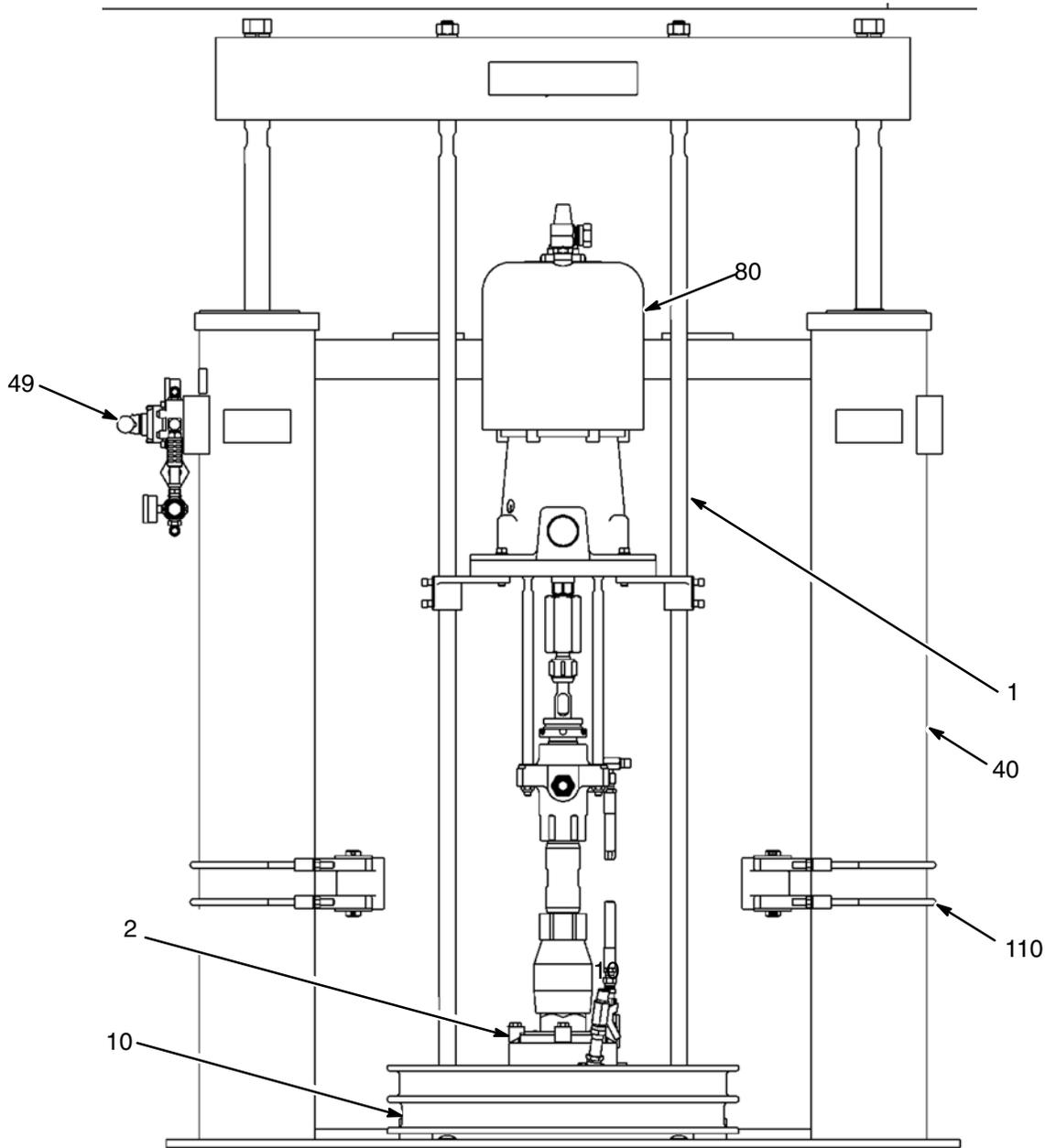
# Parts

## Model C59702 Series C, 165 mm (6.5 in.) Ram, 67:1 Premier Motor, Dura-Flo 1200 Pump, PVC Wipers

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
5	918306	CONTROL ASSY, ram and motor air	1	55	617193	PLATE, pump mounting	1
8	918467	HOSE	1	57	113993	WASHER, lock	2
9	617275	ROD, upper tie	2	58	113939	NUT, hex	2
10	241251	KIT, PVC wiper and clamp	1	61	100132	WASHER, flat (not shown)	4
11	521975	FITTING, union, pipe	1	62	100464	SCREW, lag (not shown)	4
12	C20490	NIPPLE	2	64	101533	WASHER, lock	6
13	521850	VALVE, check	1	65	101535	NUT, hex	6
14	C38324	ELBOW	1	66	617274	ROD, lower tie	2
15	156849	NIPPLE; 3/8 npt	1	67	208610	HOSE	1
18	158979	NIPPLE, reducing; 1/2 x 3/8 npt	1	68	158586	BUSHING; 1 in. npt(m) x 3/4 npt(f)	1
19	208391	VALVE, ball; 3/8 npt (m x f)	1	70	237569	GROUND WIRE ASSY	1
21	114243	VALVE, check	1	71	108124	VALVE, safety relief	1
23	C12014	HOSE	1	73	100023	WASHER, flat	3
25	155541	UNION, swivel	1	74	101566	NUT, lock	3
26	276025	LUG	4	80	245171	PUMP, Premier motor and DF1200 assy See 308812, 308360, and 308213 for parts	1
27	102637	SCREW, cap, hex hd	4				
29	109495	O-RING	1				
40	233087	RAM; 165 mm (6.5 in.) See 310523 for parts	1	81	190166	CYLINDER, intake	1
49	244072	CONTROL ASSY, ram air	1	82	C38306	NIPPLE, reducing	1
52	C19800	SCREW, socket hd	4	83	156823	UNION, swivel	1
53	100016	WASHER, lock	4	110	C32463	CLAMP, saddle assy	2

# Parts

## Model 261629 Series B, 165 mm (6.5 in.) Ram, 24:1 Quiet King Motor, Check-Mate 800 Pump

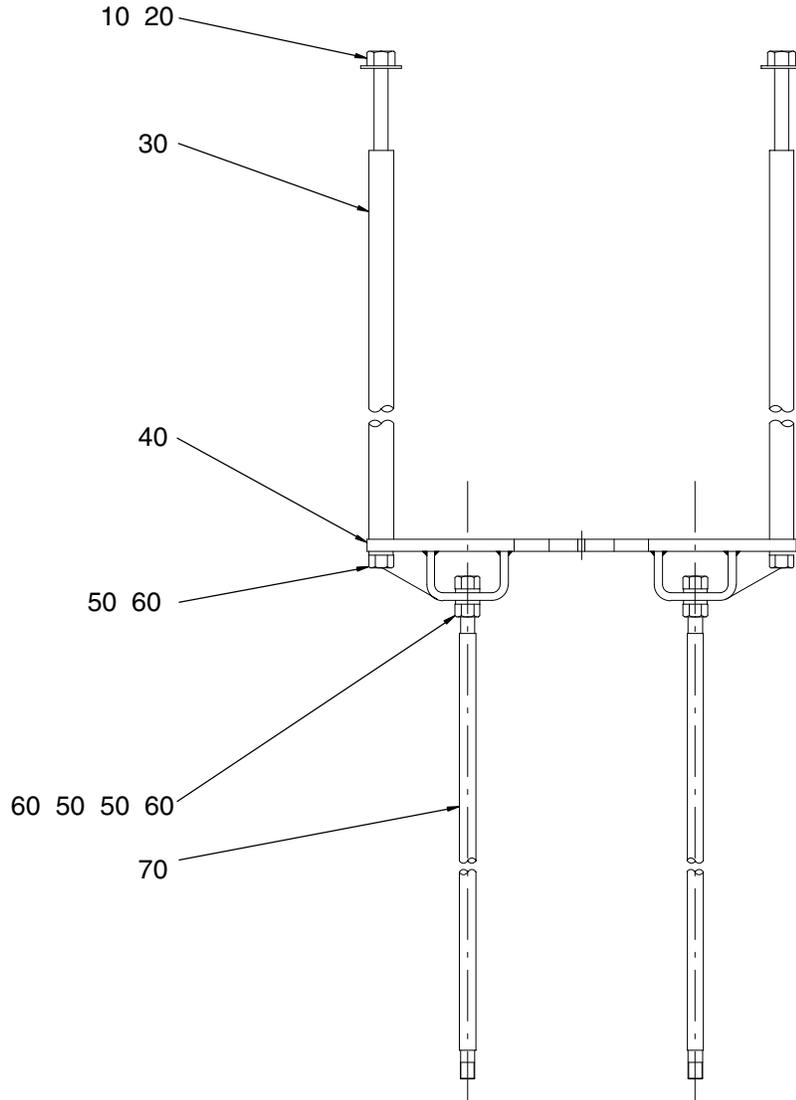


Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	918309	KIT, mounting, cold pump (see page 50)	1	40	233087	RAM; 165 mm (6.5 in.), pneumatic See 310523 for parts	1
2	222776	KIT, repair, mounting	1	49	244072	CONTROL ASSY, ram air (see page 53)	1
10	918305	PLATE, ram, 55-gallon (see page 54)	1	80	222905	PUMP, Quiet King 24:1	1
				110	C32463	CLAMP, saddle assembly (see page 54)	2
<b>48</b>	<b>310524</b>						

# Parts

## Model 918304, Cold Pump Mounting Kit for Checkmate Pumps

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
10	113939	Nut, Hex, 1-8 unc	2	40	617193	Plate, pump mounting	1
20	113993	Washer, lock, 1 in.	2	50	101533	Washer, lock, 0.88	6
30	617275	Rod, upper tie, 647.7 mm (25.5 in.)	2	60	101535	Nut, hex, 7/8-9 unc	6
				70	617274	Rod, lower tie, 1028.7 mm (40.5 in.)	2



8329A

Fig. 9

# Parts

## Model 918309, Cold Pump Mounting Kit

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
10	617277	Rod, follower cold	2	40	101015	Washer, lock, for 3/4	2
20	161822	Plate, motor mounting	2	50	C19187	Nut, hex, 3/4-10 unc	2
30	100672	Screw, set, 3/8-16 unc x 1	4	60	100101	SCREW, cap, hex hd	4
				70	100133	WASHER, lock	4

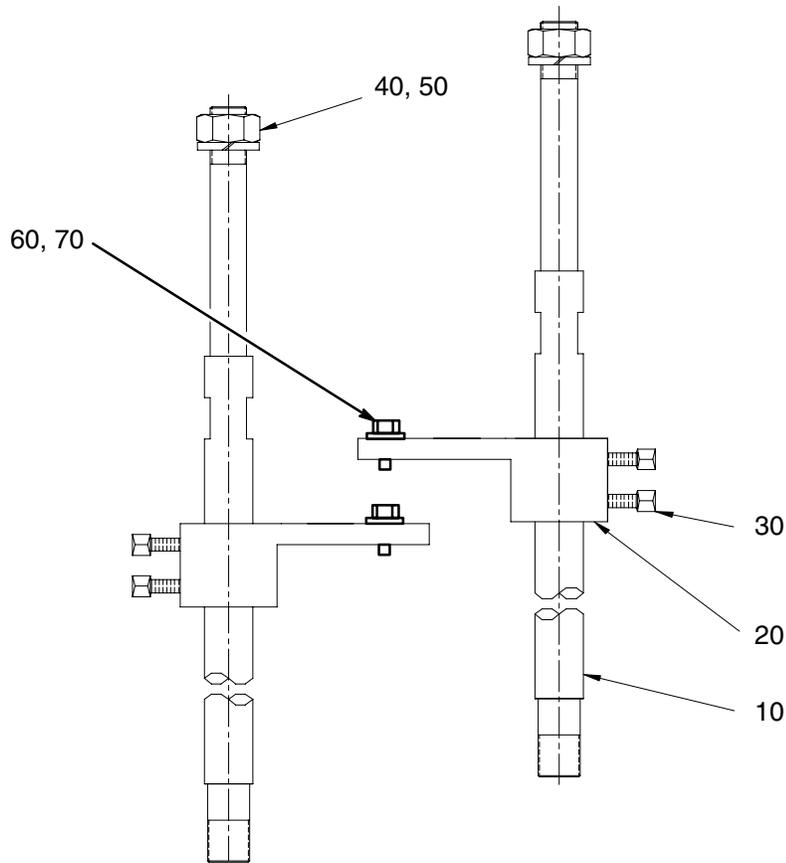


Fig. 10

# Parts

## Model C32438, Ram Air Control Module for King, Bulldog & Senator

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
20	100133	Washer, lock, for 3/8	1	120	100509	Plug, pipe, 1/4 npt	1
50	100307	Nut, hex, 3/8-16 unc	1	130	187357	Elbow, street, 1/4 npt	1
60	617468	Bracket, regulator mounting	1	140	101180	Gauge, pressure, 13.6 bar (200 psi)	1
70	C19041	Washer, lock int. tooth, 3/8	1	150	206197	Regulator, air See 308168 for parts	1
80	206205	Manifold, air, 1/2 nptm x 3/4 nps	1	160	158683	Elbow, street, 1/2 npt	1
90	617466	Elbow, 90°, 3/4 npt	1	170	107142	Valve, air, 1/2 npt	1
100	113332	Valve, ball vented, 3/4 nptf	1	190	155541	Union, swivel 90°, 1/4 npt	1
110	157785	Union, swivel, adapter male, 3/4 nptm	1	220	100403	Plug, pipe, 1/8 npt	1

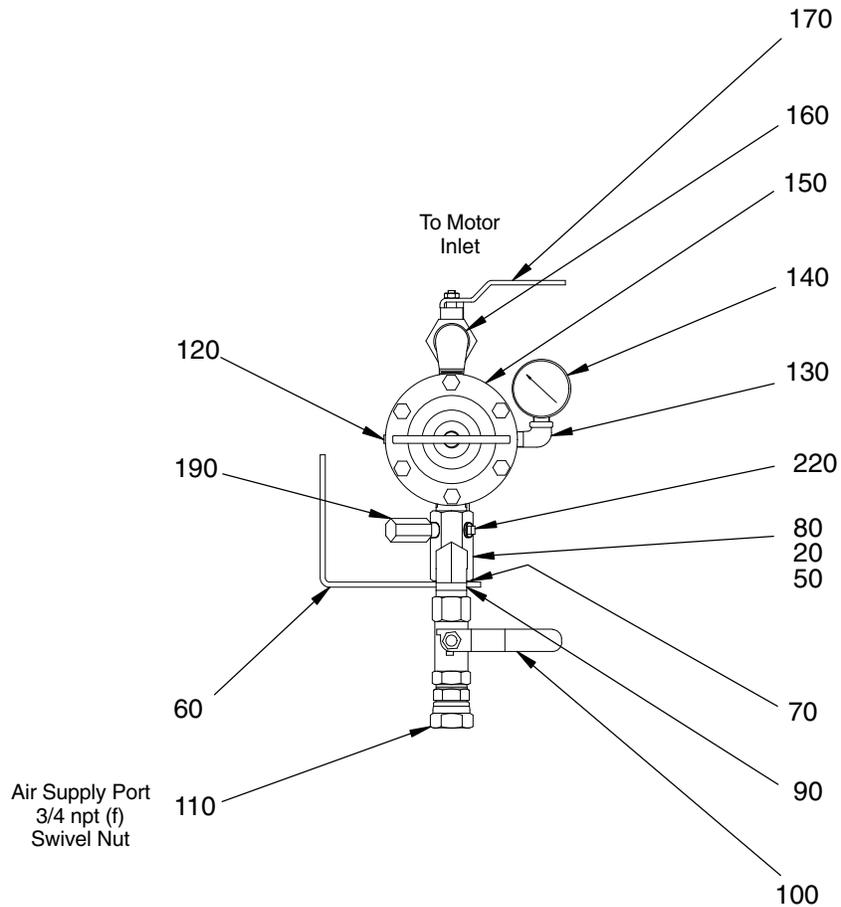


Fig. 11

8332A

# Parts

## Model 918306, Ram Air Control Module for Premier

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
20	C19213	Washer, lock, for 3/8	1	150	113332	Valve, ball vented, 3/4 nptf x 3/4 nptf	1
50	C19192	Nut, hex, 3/8-16 unc	1	160	617466	Nipple, hex, 3/4 npt	1
70	C19041	Washer, lock int. tooth, 3/8	1	170	207675	Manifold, air	1
80	155541	Union, swivel °, 1/4 npt	1	180	C19445	Elbow, street, 1/4 npt	1
90	207755	Regulator, air See 308168 for parts	1	190	101180	Gauge, pressure, 14 bar (200 psi)	1
100	100509	Plug, pipe, 1/4 npt	1	200	100549	Elbow, street, 3/4 npt	1
140	C19027	Union, swivel, adapter male, 3/4 nptm	1	210	107141	Valve, shut-off, 3/4 npt	1
				230	100403	Plug, pipe, 1/8 npt	1

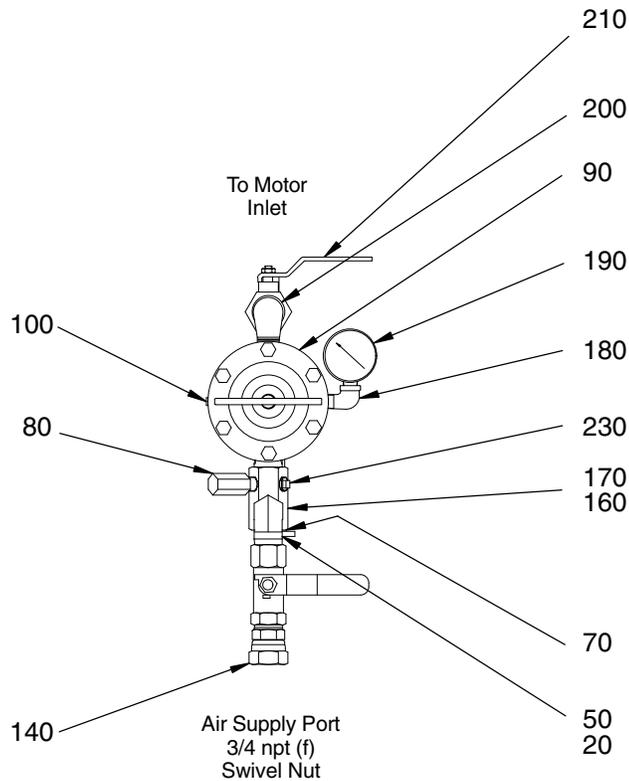


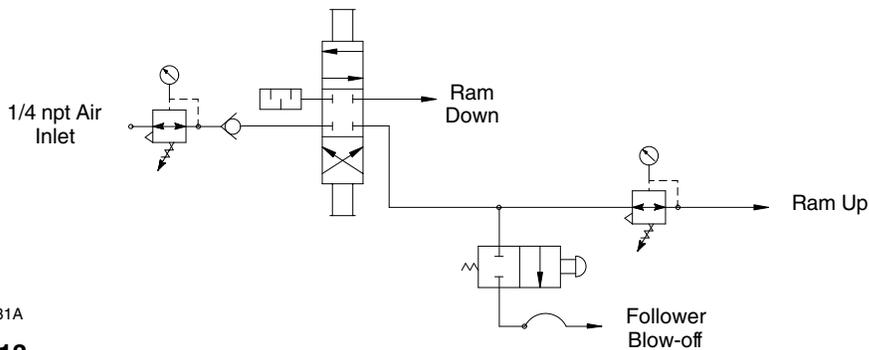
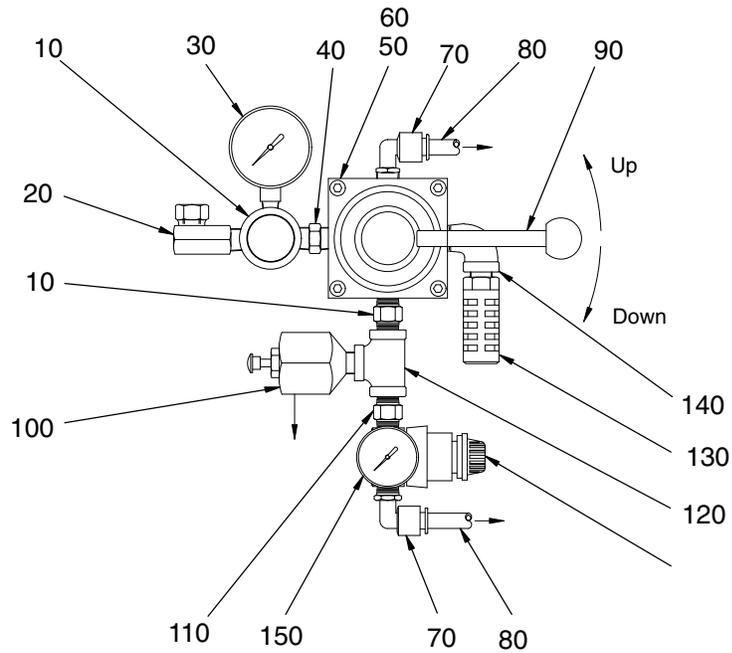
Fig. 12

8332A

# Parts

## Model 244072, Air Control Assembly

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
10	C11023	Regulator, pressure, 130 psi / 1/4 npt	1	80	054776	Tubing, nylon, 5/16	17
20	155541	Swivel, 90°, 1/4 npt	1	90	C06015	Valve, hand	1
30	111598	Gauge, pressure, 160 psi / 1/4 npt	1	100	918108	Valve, relief	1
40	617817	Valve, check, 1/4 npt	1	110	C20479	Nipple, hex, 1/4 npt	1
50	C19812	Screw, soc. hd. cap, 1/4-20 x 1.5	4	120	C19469	Tee, plain, 1/4 npt	1
60	100016	Washer, lock, 1/4	4	130	C36183	Muffler	1
70	155948	Elbow, connector 5/16T x 1/4P	2	140	C19445	Elbow, street, 1/4 npt	1
				150	108190	Gauge, pressure	1



8331A

Fig. 13

# Accessories

*Use Only Genuine Graco Parts and Accessories*

<b>Description</b>	<b>Part No.</b>
<b>UNHEATED 55-GALLON FOLLOWER PLATE ASSEMBLY</b> 560mm (22 in.) O.D. Order wiper rings separately	<b>918305</b>
<b>55-GALLON FOLLOWER WIPER RINGS KITS</b> 560mm (22 in.) O.D. Kit contains upper and lower hoses and clamp	
<b>PVC, Unheated applications</b>	<b>C03059</b>
<b>EPDM, Unheated applications</b>	<b>918312</b>
<b>Neoprene, Unheated applications</b>	<b>C03228</b>
<b>AIR CONTROL MODULES FOR RAM AND AIR CONTROL</b> 3 Regulator module contains controls for ram and motor 4 Regulator module contains controls for ram up, ram down, blow-off and motor 8.8 bar (125 psig) <i>MAXIMUM WORKING PRESSURE</i> for Ram	
<b>3-Regulator air control module for Premier air motors</b>	<b>918306</b>
<b>3-Regulator air control module for King/Bulldog/Senator air motors</b>	<b>C32438</b>
<b>DRUM CLAMP MODULE STANDARD</b> (Two required per ram) Attach to ram cylinders to center drum in place and prevent drum from moving	<b>C32463</b>
<b>DRUM CLAMP, HEAVY DUTY</b> (Includes all hardware to attach to ram cylinders) Attach to ram cylinders to center drum in place and prevent drum from moving. The heavy duty drum clamp is used in applications where excessive material adhesion may be a problem.	<b>918395</b>
<b>AUTOMATIC CROSSOVER KIT</b> Switches ram operation to alternate ram, automatically	<b>918393</b>
<b>LOW LEVEL DRUM KIT</b> Lights a red beacon signal when the drum is empty	<b>918394</b>
<b>PUMP MOUNTING KIT</b> Used to connect the follower plate to the tie bar. Pumps mount on the brackets.	
<b>King/Bulldog/Senator Unheated applications</b>	<b>918309</b>
<b>Premier w/Checkmate pumps</b>	<b>918304</b>
<b>HOSE SUPPORT KIT</b> Supports hose to ram to prevent hose kinks	<b>C34220</b>
<b>RAM REPAIR KIT</b> Kit contains hardware for replacing components used with the ram's rods.	<b>918432</b>

# Dimensions

## Ram Mounting and Clearance Dimensions

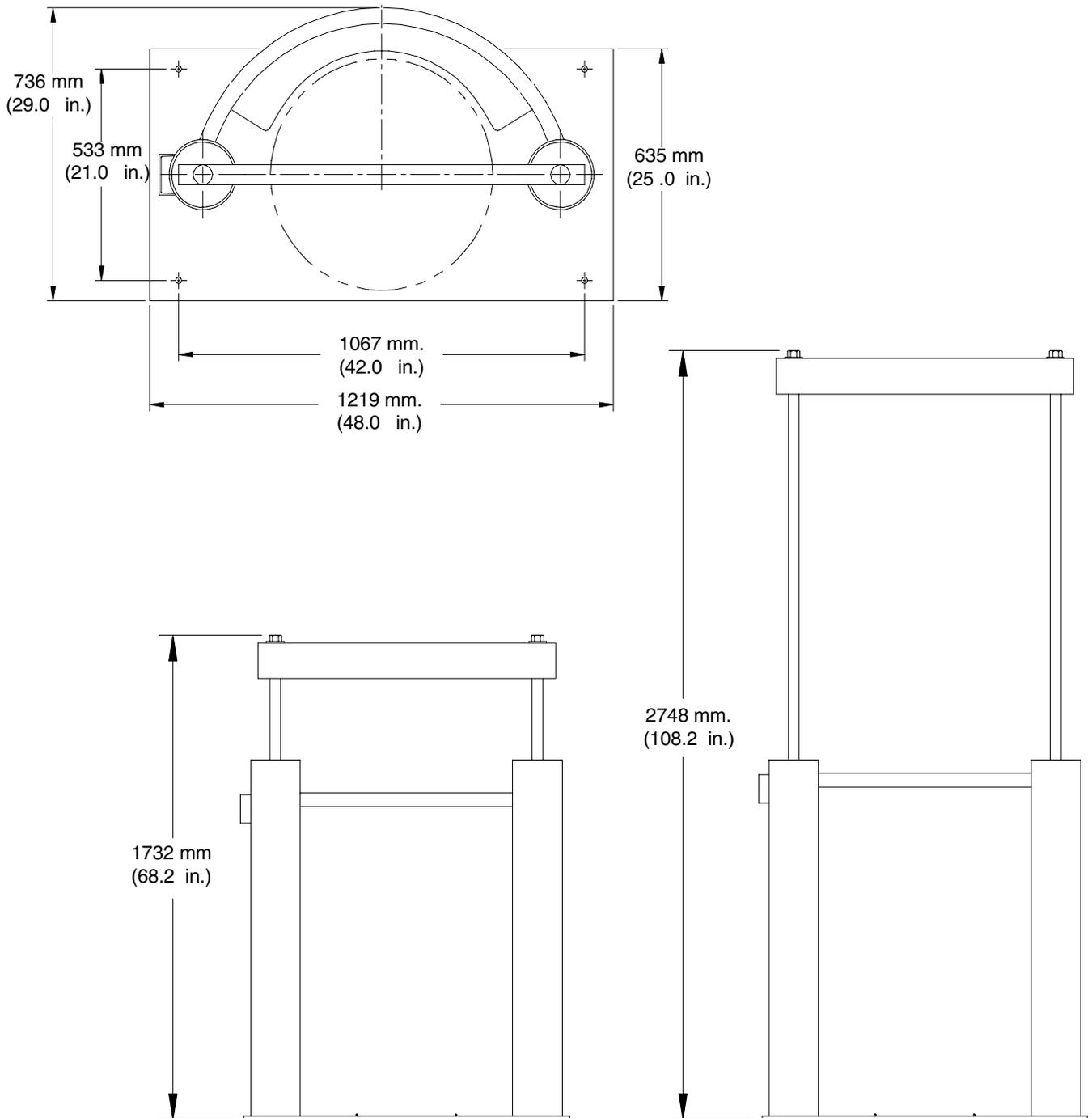


Fig. 14



# Related Publications

<b>Form Name</b>	<b>Form#</b>
165 mm (6.5 in.) Global Ram Module	310523
Bulldog Air Motor	307049
King Air Motor	309347
Premier Air Motor	308213
Check-Mate 2100 Pumps	308149
Check-Mate 1000 Pumps	308355
Check-Mate 800 Pumps, Carbon Steel Lower	308351
Check-Mate 800 Pumps, Stainless Steel Lower	308352
Dura-Flo 2400 Pumps	308147
Dura-Flo 1800 Pumps	308151
Dura-Flo 1800 Pumps	308148
Dura-Flo 1200 Pumps, Stainless Steel Lower	308812 and 308360
Check-Mate 450 Pumps	308017

# Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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# Graco Information

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

**1-800-328-0211 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

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