

Instructions-Parts List



20 Liter (5 Gallon Pail Size) and 30 Liter 76 mm (3") Dual Post

310525P

Air-Powered Ram Module

EN

For use with high-pressure extrusion pumps.

125 psi (8.8 bar, 0.88 MPa) Maximum Working Pressure

918405

Ram module without 5 gallon ram air control assembly.

918495

Ram module 918405 with 5 gallon ram air control assembly.

241086

Ram module without 30 liter ram air control assembly.

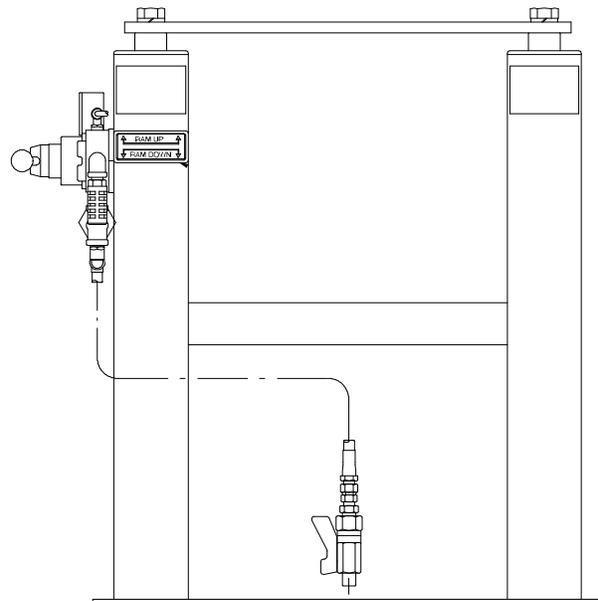


Important Safety Instructions.

Read all warnings and instructions in this manual.

Save these instructions.

See page 6 for pump chart



Model 918495

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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.

	
 <p>INSTRUCTIONS</p> 	<h3>EQUIPMENT MISUSE HAZARD</h3> <p>Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in serious injury.</p> <ul style="list-style-type: none">• 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 your Graco distributor.• 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 (8.6 bar, 0.86 MPa) 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 27.• 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.• Do not touch the metal heat sink when the surface is hot.• Use fluids that are compatible with the equipment wetted parts. See the Technical Data sections of all the equipment manuals. Read the fluid manufacturer's warnings 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 12 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. Refer to **Ground the System** on page 10.
- If there is any static sparking while using the equipment, **stop dispensing immediately**. Identify and correct 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 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 12.



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.

Pump Selection Chart

The air-powered ram modules are used with the high-pressure extrusion pumps listed in the following chart.

For Pump Model and Description	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Part Number
19:1 Senator®, Check-Mate™ 800, CS Lower	129 bar (1900 psi)	7 bar (100 psi)	237264
31:1 Bulldog®, Check-Mate 800, CS Lower	211 bar (3100 psi)	7 bar (100 psi)	237261
65:1 King™, Check-Mate 800, CS Lower	398 bar (5850 psi)	6.3 bar (90 psi)	236471
65:1 King, Check-Mate 800, SST Lower	398 bar (5850 psi)	6.3 bar (90 psi)	236462
50:1 King, Check-Mate 1000, CS Lower	306 bar (4500 psi)	6.3 bar (90 psi)	237707
50:1 King, Check-Mate 1000, SST Lower	306 bar (4500 psi)	6.3 bar (90 psi)	237708
23:1 Monark™, Check-Mate 200, CS Lower	285 bar (4140 psi)	12.5 bar (180 psi)	222782
23:1 Monark, Check-Mate 200, SST Lower	285 bar (4140 psi)	12.5 bar (180 psi)	222839
46:1 President™, Check-Mate 200, CS Lower	320 bar (4000 psi)	7 bar (100 psi)	222783
46:1 President, Check-Mate 200, SST Lower	347 bar (4950 psi)	7 bar (100 psi)	222907
10:1 Monark, Check-Mate 450, CS Lower	125 bar (1800 psi)	12.5 bar (180 psi)	222770
20:1 President, Check-Mate 450, CS Lower	350 bar (3600 psi)	12.5 bar (180 psi)	222768
34:1 Senator, Check-Mate 450, CS Lower	238 bar (3400 psi)	7 bar (100 psi)	222769
55:1 Bulldog, Check-Mate 450, CS Lower	347 bar (4950 psi)	6.3 bar (90 psi)	222778
Check-Mate 800, Heated Module, CS Lower, 480/575 VAC*	398 bar (5850 psi)	N/A	C03509
Check-Mate 800, Heated Module, CS Lower, 240 VAC*	398 bar (5850 psi)	N/A	C03512
Check-Mate 800, Heated Module, CS Lower, 380 VAC*	398 bar (5850 psi)	N/A	C03514
15:1 President, Heated	124 bar (1800 psi)	83 bar (120 psi)	686381
46:1 President, Check-Mate 200, CS Lower (Japan)	320 bar (4600 psi)	7 bar (100 psi)	237205
55:1 Bulldog, CM450, CS Lower (Japan)	347 bar (4950 psi)	63 bar (90 psi)	237208
20:1 President, CM450, CS Lower (Japan)	250 bar (3600 psi)	12.5 bar (180 psi)	237207
20:1 King, DuraFlo 2400, CS Lower	138 bar (1800 psi)	6.3 bar (90 psi)	222833
56:1 King, DuraFlo 900, CS Lower	340 bar (5000 psi)	6.3 bar (90 psi)	240946
65:1 King, CM800, CS Lower	340 bar (5000 psi)	6.3 bar (90 psi)	240945

* Must order air motor and connection kits separately.

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	1	Wiper Seal
E	Main Air Line Supply	2	Pump Assembly
F	Air Manifold	3	Ram Hand Valve
G	Follower Plate Blowoff Button	4	Ram Module (918405)
H	Ram Air Supply Hose	5	Follower Gasket
I	Air Line Lubricator	6	Follower Assembly
J	Fluid Drain Valve (required)	7	Grounding Wire (required; see page 10 for installation instructions)
K	Fluid Regulator	8	Bleed Handle

918372 shown with 918405 and Follower Kit 918408

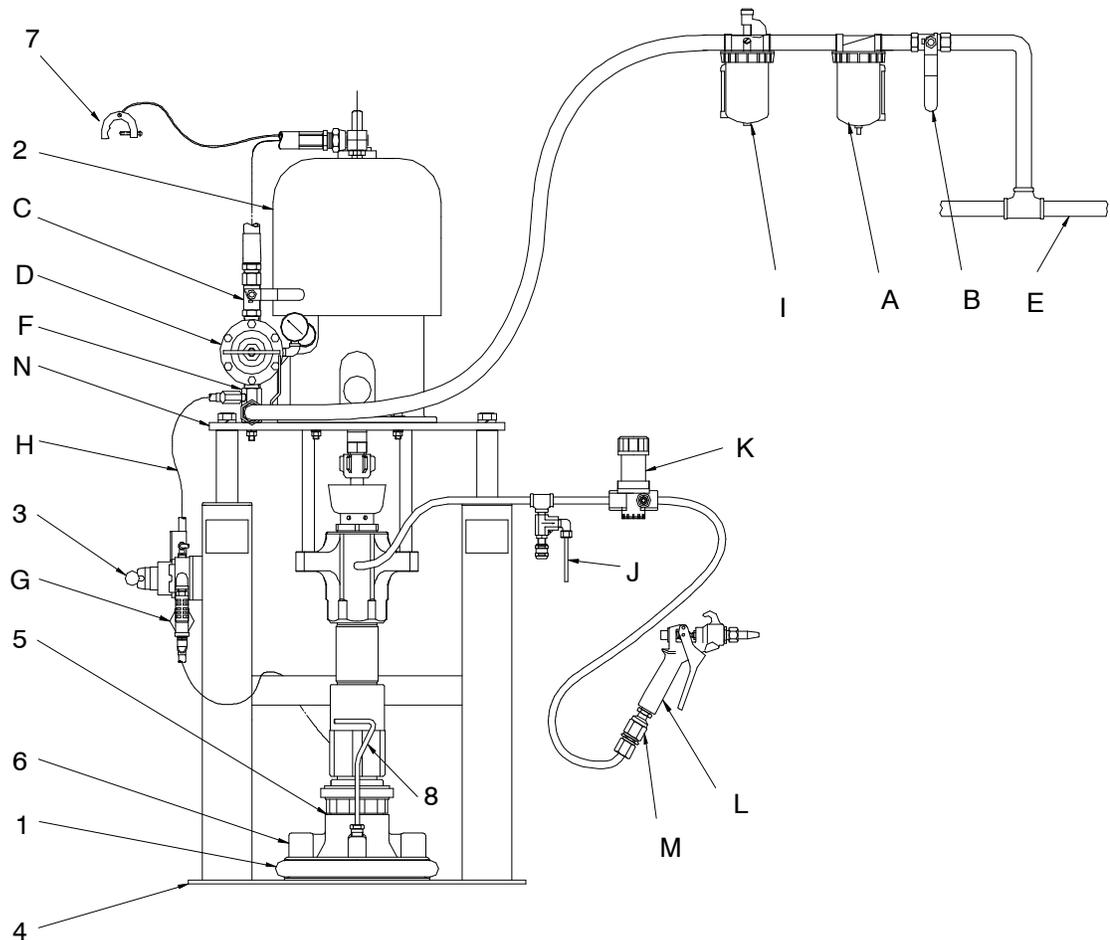


Fig. 1

Typical Installation

The typical installation discussed below is only a guide for selecting and installing system components and accessories. Contact your Graco representative or Graco Technical Assistance 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. Some system accessories are discussed below. Accessories for use with this ram are listed in the **Accessories** section on page 24.

Selecting a Location for the Ram

Refer to the Ram Mounting and Clearance Dimensions drawing (Fig. 9 on page 25) 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.
 - the air regulators for the pump and ram are fully accessible.
2. You need to decide whether you will be bolting the ram to the floor, or bolting it to a mobile platform.
3. If you bolt the ram to the floor, make sure:
 - you will be able to level the base of the ram using metal shims.
 - you have anchors long enough to prevent the unit from tipping. Refer to the Dimensional Drawing on page 25 for more information.
4. If you bolt the ram to a mobile platform, make sure:
 - you locate the platform on a surface where it won't roll around.
 - the ram and platform are stable in all operating positions, so the ram won't tip over.

System Accessories

Before you install the system you should be familiar with the parts discussed below. For more information, refer to Fig. 1, A 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.
- you use only electrically conductive air and fluid hoses.
- you ground your equipment.
- the fluid hoses have spring guards on both ends

To allow the gun freer movement, 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) 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 bodily injury, including splashing in the eyes or on the skin and injury from moving parts.

The following components are included with the module:

- 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 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.

Typical Installation

4-Regulator Air Control Modules (918416) (see Form# 310526)

The following components are included with the module:

- Pump Bleed-type Master Air Valve is required in your system to relieve air trapped between it and the air motor when the valve is closed (see the WARNING above). This bleed valve should be easily accessible and located downstream from the air regulator. It can be used for a safety lockout.
- Pump Air Regulator controls pump speed and outlet pressure by adjusting the air pressure to the pump. It is located on the air control panel upstream from the bleed-type master air valve.
- Ram Air Regulator controls the air pressure to the ram. There are separate air regulators to control the ram pressure in the up and down directions.
- Ram Air Supply Hose connects the ram air regulator to the air manifold.
- FRL (filter, regulator, lubricator) conditions the air to the ram and the pump. The pump air regulator is located in this assembly. The ram air is taken from this assembly; an air line tube connects the FRL and the ram air control module.

Air Line Accessories

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

- Pump runaway valve (not shown) 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 (I) provides automatic air motor lubrication (standard on the 4-Regulator Air Control Module).
- Air line filter (A) removes harmful dirt and moisture from the compressed air supply (standard on the 4-Regulator Air Control Module).
- Accessory bleed-type air valve (B) isolates the air line accessories for servicing. Locate upstream from all other air line accessories. This isolates the accessories for servicing.

Fluid Line Accessories

Install the following accessories in the positions shown in the Typical Installation drawing, 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, and so the handle points down 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:

- grounding the system
- locating and installing the ram

Ground the System

⚠ 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 the 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 the 1.5 mm² (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.

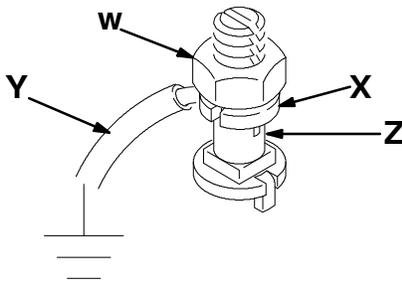


Fig. 2

2. *Fluid and air hoses*: use only electrically conductive materials and air hoses, and fluid hoses.
3. *Air compressor*: follow the manufacturer's recommendations.
4. *Spray gun or dispensing valve*: connect to a properly grounded fluid hose and pump.
5. *Fluid supply container*: according to local code.
6. *Object being sprayed*: according to local code.
7. *Dispense gun*: obtain grounding through the connection of the hose, or cable.
8. *All solvent pails used when flushing*: according to your local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.

Locating the Ram

To locate the ram, follow one of the procedures below. Refer to the Ram Mounting and Clearance Dimensions drawing (Fig. 9 on page 25) for ram mounting and clearance dimensions.

Bolting the Ram to the Floor

To install the ram in a permanent location:

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 1/2 in. (13 mm) anchors.
4. Bolt the ram to the floor anchors, which must be long enough to prevent the unit from tipping. Refer to the Dimensional Drawing on page 25.

Installation

Securing the Ram to a Mobile Platform

When performing the following procedure, use the Mobile Platform Kit (918414) to secure the ram to a mobile platform.

To install the ram on a mobile platform:

1. Brace the platform so it remains stationary while you attach the ram to the platform.
2. Place the ram on the platform and line up the holes in its base with the holes in the platform.
3. Secure the ram to the platform with the provided nuts and bolts.

Operation

Pressure Relief Procedure

WARNING



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, moving parts, follow the **Pressure Relief Procedure** whenever you:

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

WARNING



MOVING PARTS HAZARD

Follow the **Pressure Relief Procedure** below 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.

Use this procedure whenever you shut off the sprayer and before checking or adjusting any part of the system, to reduce the risk of serious injury.

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 pail, 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.

Raising and Lowering the Ram

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

- Ram UP raises the ram.
- Ram DOWN lowers the ram.
- Ram OFF puts the ram in “neutral.” Moving the ram 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.

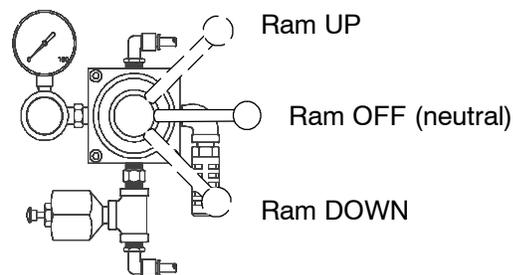


Fig. 3

Operation

Preparing to Pump Fluid

Follow the steps below to prepare the system for pumping fluid. Refer to the Typical Installation Drawing, (Fig. 1 on page 7) for more information.

1. Move the ram hand valve lever to the OFF position (Fig. 3 on page 12). Close the ram air regulator and main air control valve.
2. Move the ram hand valve lever to the UP position (Fig. 3 on page 12). Open the main air control valve and ram air regulator until the ram starts to move upward. Let the ram rise to its full height.
3. Set a full pail of fluid on the ram base and center it under the follower plate.

NOTE: Do not use pails that have side bungs or large dents with this ram. Rough bung openings or large dents will damage the wiper or stop the follower plate, resulting in a runaway pump.

4. Move the ram hand valve lever to the DOWN position (Fig. 3 on page 12) and lower the ram until the follower plate is just ready to enter the pail, then move the ram hand valve lever to OFF. If necessary, reposition the pail so the wiper will not hit the pail lip.
5. Unscrew the follower plate's bleed handle (see Fig. 1, Item 8 on page 7).
6. Move the ram hand valve lever to the DOWN position (Fig. 3 on page 12), to lower the follower plate into the pail, until all air is forced out and fluid comes out of the vent opening.
7. Move the ram hand valve lever to OFF and screw in the bleed handle see Fig. 1, Item 8 on page 7.

8. Set the air pressure to the ram at 4 bar (50 psi). Move the ram hand valve lever to the DOWN position (Fig. 3 on page 12).
9. Slowly start the pump by opening both the bleed-type master air valve and the fluid dispensing valve. Do not allow the pump to cycle too quickly. Let the pump run until the system is primed and all air is forced out.
10. Stop the pump by closing the pump's bleed-type master air valve.

NOTE: Increase air pressure to the ram if the pump does not prime properly with heavier fluids. If fluid is forced out around the top wiper, ram pressure is too high and the air pressure should be decreased.

Pumping Fluid

To pump fluid from the pail:

1. Move the ram hand valve lever to the DOWN position (Fig. 3 on page 12).
2. Open the bleed-type master air valve.
3. Start the pump by opening the pump air regulator. Then adjust the pump for normal operation.

Always use the lowest possible air pressure to both the pump and ram.

WARNING

Do not overpressurize the system, as this could result in serious injury or damage to the equipment.

NOTE: It is normal for the pump to stall if the dispense gun or other fluid valve is closed.

Operation

Changing Empty Pails

Read all warnings and instructions before starting the pail changing procedures below!

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 pail. Too little pressure can cause the ram to lift the entire pail 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.



HOT SURFACE HAZARD

If you are using a Therm-O-Flow supply unit, **the material and equipment will be hot!** To reduce risk of injury, wear eye protection, gloves and protective clothing when operating, or servicing this dispensing system.

CAUTION

If you are using a Therm-O-Flow supply unit, **do not** raise the follower plate out of the pail unless the unit is at full operating temperature. Attempting to remove a pail when the supply unit is cold could result in damage to the equipment.

Removing a Pail from the Ram

Follow this procedure to remove a pail from the ram:

1. Stop the pump by closing the pump's bleed-type master air valve.
2. Raise the follower out of the pail:
 - d. Set the ram UP air regulator to 0.68 - 1.02 bar (10 - 15 psi).
 - e. Move the ram hand valve lever to the UP position. At the same time, carefully equalize the pressure in the pail by cycling the follower blow-off valve open and closed.
3. With the follower completely out of the pail, remove the empty pail from the ram.
4. Carefully scrape any material or material build-up from the follower plate and wiper.

Placing a New Pail in the Ram

CAUTION

To help avoid damage to equipment:

- Be sure to reload the empty supply unit with a full pail of material immediately. Do not allow a supply unit to operate when empty, which would cause a pump runaway and cause damage to the system.
- Do not use a pail of material that has been dented or otherwise damaged; damage to the follower wiper may result.

Follow this procedure to load a new pail of material:

1. Carefully scrape any material or material build-up from the follower plate and wiper before placing a pail in the ram.
2. Apply a lubricant to the wiper. The lubricant should be compatible with the material to be pumped. (Check with the material supplier for a compatible lubricant.)
3. Remove the cover from a pail of appropriate material.

Continued on the next page.

Operation

Placing a New Pail in the Ram *(continued)*

4. Remove any other packing from the pail, to expose the material. Make sure that there are no foreign objects on the material surface.

NOTE: Remove the cover from a pail of new material by holding it level and lifting it straight up. Tipping the cover may allow accumulated dirt to spill into the pail, which may result in damage to the equipment.

5. Place the pail under the raised follower plate.
6. Lower the follower into the pail:
 - f. Move the ram hand valve lever to the DOWN position.
 - g. Check the pail position as the follower lowers. If necessary, stop lowering the follower before contacting the pail, and adjust the pail's position to align the pail with the follower plate.
 - h. Continue lowering the follower. As the follower enters the pail, loosen the air bleed stick. Loosening the bleed stick allows trapped air between the follower plate and the top of the material to escape.
 - i. When air stops exhausting from the bleed stick port, replace and tighten the bleed stick.
7. Adjust the ram air pressure for normal operation.
8. Bleed, from the material pump, the air that was introduced during the pail change:
 - j. Place a waste container under the pump bleed port.
 - k. Open the bleed port and turn on pump air pressure.
 - l. Allow material to flow from the bleed port until it is air-free.
 - m. Shut off air to the pump and close the bleed port.
 - n. Turn air on to the pump and set the pump air regulator for normal operation.

WARNING



To reduce risk of injury or damage to equipment, be sure to tighten the bleed stick after bleeding the air. Otherwise hot material will leak out the opening.

9. Resume normal operation.

Shutdown

1. Move the ram hand valve lever to the OFF position (Fig. 3 on page 12). 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 12).

2. **Relieve the pressure.**

Emergency Stop

1. To stop the ram from moving, move the ram hand valve lever (Fig. 3 on page 12) to the OFF position.
2. To stop the pump, close the pump Bleed-type Master Air Valve closest to the motor's air inlet [Fig. 1, Item (C) on page 7].

Flushing Safety

1. Before flushing, be sure the entire system and flushing pails 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 12).

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 pail 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.

Operation

Inspection Frequency

Periodically (once a month), inspect the ram guide sleeves, rods and cylinders for wear or damage, and replace all worn parts. See the **Service** section (page 18) for instructions on replacing worn parts.

See the pump's instruction manual for its inspection frequency.

Troubleshooting Chart

Problem	Cause(s)	Solution(s)
Ram will not raise or lower.	Closed main air valve or clogged air line. Not enough air pressure. Worn or damaged piston. Hand valve closed or clogged.	Open air valve, clear air line. Increase ram pressure. Replace piston. See procedure on page 20. 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 on page 20.
Fluid squeezes past follower plate wiper.	Ram air pressure too high. Worn or damaged wiper.	Decrease ram air pressure. Replace wiper. See procedure on page 18.
Material pump will not prime properly, or pumps air.	Closed main air valve or clogged air line. Not enough pump air pressure. Worn or damaged piston. Hand valve closed or clogged. Hand valve dirty, worn or damaged. Bent pail has stopped follower.	Open air valve, clear air line. Increase pump pressure. Replace piston. See procedure on page 20. Open, clear hand valve or exhaust. Clean, service hand valve. Replace pail.
Air pressure will not hold pail down or push plate up.	Closed main air valve or clogged air line. Not enough ram air pressure. Valve passage clogged. Worn piston seal.	Open air valve, clear air line. Increase ram air pressure. Clean valve passage. Replace seal.

Service

This section describes how to service the different parts of your ram.

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 system pressure.**

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 12).

2. Using the ram hand valve lever on the pump air control (Fig. 3 on page 12), move the ram to the DOWN position.
3. Move the ram hand valve lever to OFF.
4. Close the master air bleed valve [Fig. 1, Item (C) on page 7].
5. Exhaust air from both sides of the ram:
 - o. Move the ram hand valve lever to the DOWN position until all air is exhausted from one side of the ram.
 - p. Move the ram hand valve lever to the UP position until all air is exhausted from the other side of the ram.

Wiper Service

If you have a stamped-metal follower plate, see Form# 308049 for wiper service information, otherwise use the procedure below. For more information, see your supply unit or system documentation.

You can change the wiper without removing the follower plate from the supply unit.

WARNING



HOT SURFACE HAZARD

If you are using a Therm-O-Flow® supply unit, **the material and equipment will be hot!** To reduce risk of injury, wear eye protection, gloves and protective clothing when servicing this dispensing system.

To replace a worn or damaged wiper (W in Fig. 4):

1. Raise the follower plate up out of the pail by observing the cautions and warnings about changing empty pails, then following the steps in the procedure for **Removing a Pail from the Ram** 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. Insert the end of the strap through the clamp and tighten.

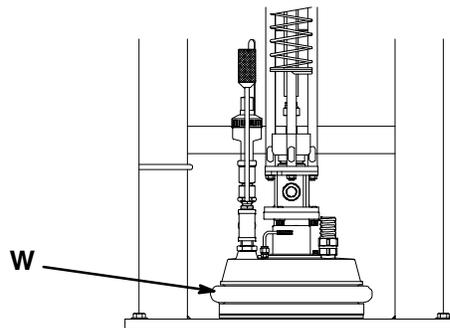


Fig. 4

5. Use a rubber mallet to pound the wiper all the way around the follower plate until the wiper's ends are butted tightly together.
6. Apply a lubricant to the wiper. The lubricant should be compatible with the material to be pumped. Check with the material supplier for a compatible lubricant.

Service

Before performing these procedures, remove the material pail from the ram. *If you are using a heated supply unit, only remove the pail while the supply unit is hot.* Observe the cautions and warnings about changing empty pails, then follow the steps in the procedure for **Removing a Pail from the Ram** on page 14.

Lift Rod Service

Always service both cylinders at the same time. We strongly recommend that when you service the lift rod (80) you change the o-rings in the guide sleeve (40) and lift-rod piston (110) at the same time.

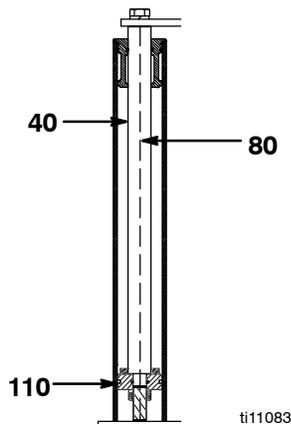


Fig. 5

The procedure below describes how to service both ends of the lift rod. Refer to Fig. 5 through Fig. 8 and Parts.

1. Relieve Both System Pressure and Ram Pressure.

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 12).

To reduce the risk of serious injury whenever you service the ram, always follow the **Ram Pressure Relief Procedure** (page 18).

2. Make sure the ram is in its lowest position.
3. Remove the two nuts and lockwashers from the lift rods.
4. Rotate the pump mounting plate off of the lift rods. Secure the pump mounting plate in place so the pump and follower will not fall.
5. Remove the guide sleeve (40):

⚠ WARNING

Do not use pressurized air to remove the guide sleeve or the piston. Using pressurized air to remove the piston or guide sleeve could result in personal injury.

- q. Grip the spiral retaining ring tab with a pair of pliers and rotate the spiral retaining ring out of the groove.
 - r. Slide the guide sleeve (40) off of the rod.
6. Remove the lift rod from the ram's cylinder.
 - s. Screw a 3/4"-10 x 1.5" long bolt into the top of the lift rod.
 - t. Grasp the bolt and carefully pull the lift rod (80) straight up, out of the cylinder.
 - u. Lay the rod on a bench or other work surface.

Continued on the next page.

Service

Lift Rod Service (continued)

7. Service the lift-rod piston (Fig. 6):

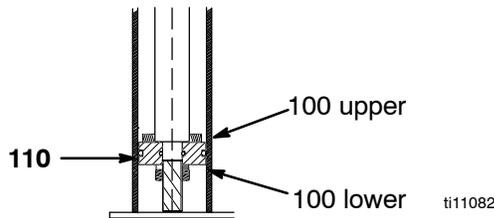


Fig. 6

NOTE: Whenever you service the lift-rod piston or the guide sleeve, always install new o-rings.

- v. Remove the lower piston retaining ring (100). Inspect it for damage or wear, and replace it with a new one if necessary.
- w. Remove the piston (110) from the retaining rod (80) and inspect it for damage or wear. Replace it with a new one if necessary.
- x. Remove the two old o-rings (70) and (120) in Parts from inside and outside the piston. Replace the o-rings with new ones.
- y. Lubricate the o-rings with o-ring lubricant.
- z. Put the piston (110) back onto the lift rod (80). Position it against the upper retaining ring.
- aa. Snap the lower piston retaining ring (100) back into its groove, between the bottom of the piston and the end of the lift rod.
- ab. Carefully re-insert the lift rod (80) into its cylinder. Push the rod straight down as far as it will go.

8. Service the guide sleeve (Fig. 7):

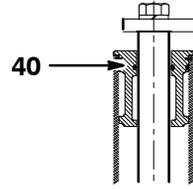


Fig. 7

- ac. Inspect the guide sleeve. If it is damaged or worn, replace it with a new one.
- ad. Remove the two old o-rings (60) and (230) in Parts from inside and outside the guide sleeve. Replace the o-rings with new ones.
- ae. Lubricate the o-rings with o-ring lubricant.
- af. Slide the guide sleeve back onto the lift rod. Make sure the spiral retaining ring relieved area (41) faces toward the middle of the ram, then push the guide sleeve all the way into the cylinder.

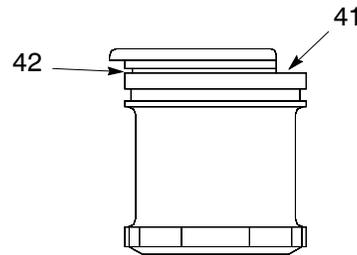


Fig. 8

- ag. Install a new spiral retaining ring by feeding it into the spiral retaining ring groove (42). You may have to wiggle it around a bit to get it feeding properly.

The ring is installed completely when the ring tab is facing toward the middle of the ram, and it is the only part of the spiral retaining ring that remains above the guide sleeve.

- 9. Repeat steps 5 through 8 to service the parts of the other lift rod.
- 10. Secure the pump mounting plate to the ram, using the same nuts and lockwashers. Torque to 54 N.m (40 ft-lb).

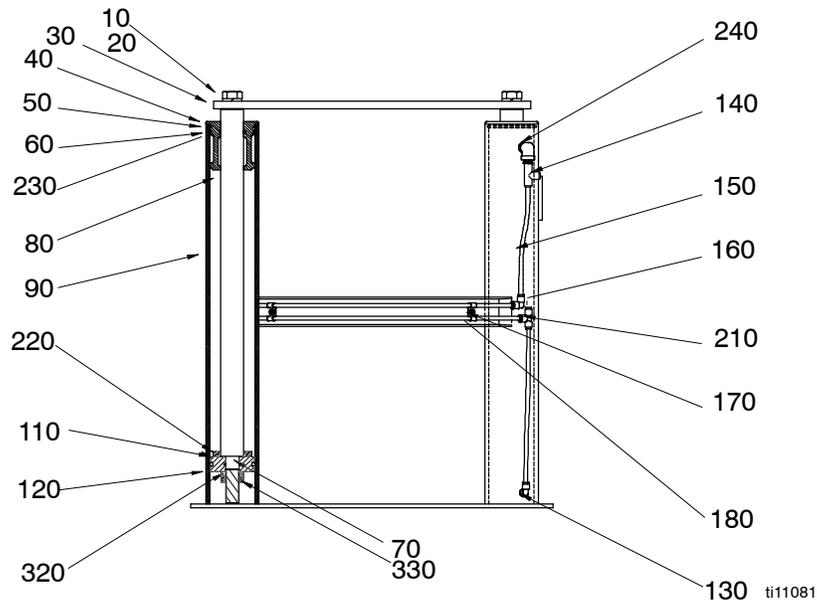
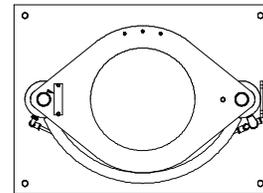
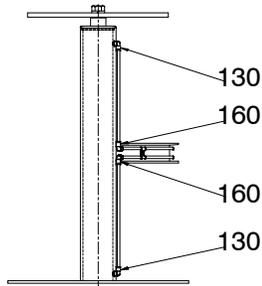
Parts

Model 241086, Ram Module

Model 918405, Ram Module

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
10	516587	Screw, hex head 45 mm (3/4") -10 x 1.5	2	120*	160258	O-ring 2.62 ID x 0.19 CS	2
20	101015	Washer, lock 45 mm (3/4")	2	130	128863	Elbow, male push in .25 OD x 1/8 npt	3
30	617374	Plate, top	1	140	C20365	Tee, male run .25 OD tube	1
40	617375	Sleeve, guide	2	150	C12509	Tubing, nylon black .25 OD	86
50*	617373	Ring, retaining	2	160	C20354	Union, elbow push in .25 OD x .25 OD	3
60*	162440	O-ring 2.75 ID x 0.12 WA	2	170	C19979	Screw, soc. hd. cap #10-24 x 0.38	2
70*	156401	O-ring 1.25 ID x 0.12 THK	2	180	517254	Clip, tubing for 0.25 OD	2
80	617372	Rod, lift used on Model 918405 and Model 918495	2	210	C20344	Tee, push in	1
	194154	Rod, lift used on Model 241086	2	220*	C36268	Bumper	2
90	918404	Weldment, ram 76 mm (3") used on Model 918405 and Model 918495	1	230*	156593	O-ring 1.5 ID x 0.12 THK	2
	241087	Weldment, ram 76 mm (3") used on Model 241086	1	240	158962	Elbow, street 1/8 npt	1
100*	C20417	Ring, retaining ext. hd for Ø 1.5 shaft	4	320	101533	Washer	2
110*	183943	Piston	2	330	102301	Nut	2

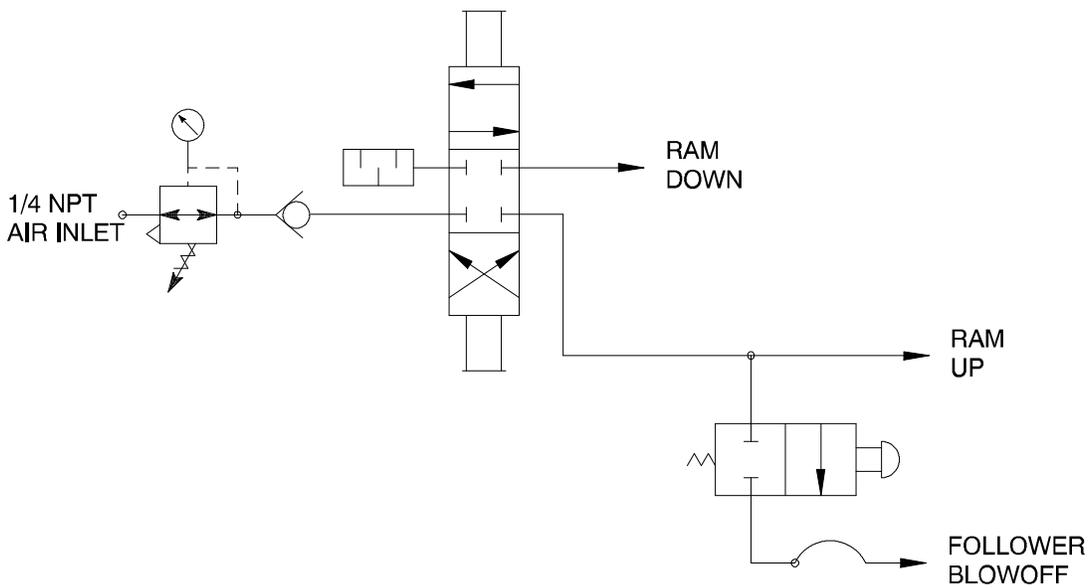
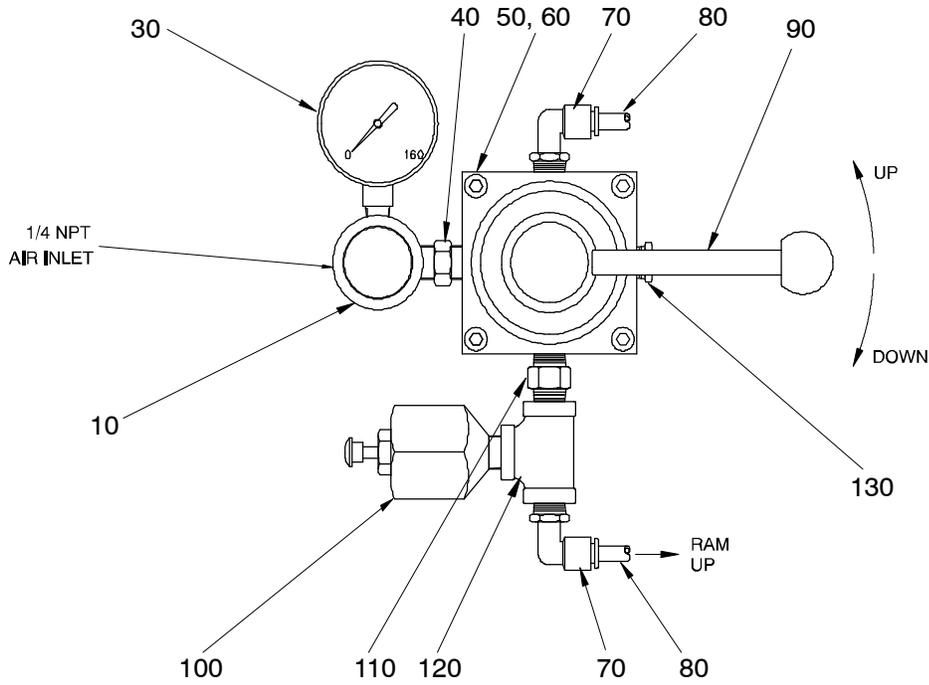
* These parts are included in Ram Repair Kit 918439, which may be purchased separately.



Parts

Model 918406, 5 Gallon Ram Air Control Assembly

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
10	C11023	Regulator, air	1	80	C12509	Tubing, nylon black	300"
30	111598	Gauge pressure, air	1	90	C06015	Valve 4-way, manual, 1/4 npt	1
40	617817	Valve check, SST, 250 psi	1	100	918108	Valve, blow off	1
50	C19812	Screw, cap, socket head	4	110	156971	Fitting, nipple hex	1
60	101016	Washer, lock	4	120	104984	Tee, pipe	1
70	C19391	Elbow, fitting	1	130	C32390	FILTER, vent	1

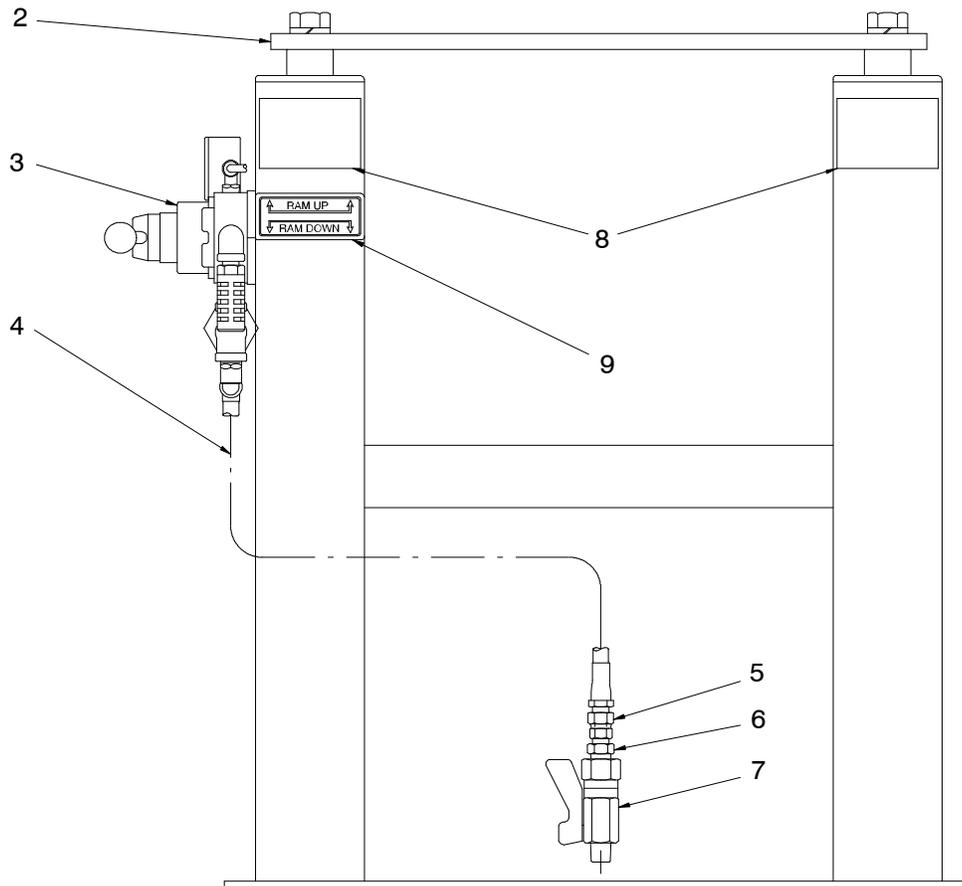


8735A

Parts

Model 918495, Air-Powered Ram Module

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
2	918405	Module, Ram 3" 5 gallon (See page 21)	1	6	100176	Bushing, hex	1
3	918406	Control assy, ram air 5 gallon (See page 22)	1	7	208391	Valve, ball	1
4	C12007	Air hose, 1/4" npt	1	8	C14043	Label, warning pinch point	1
5	156823	Union, swivel	1				



8734A

Accessories

Use Only Genuine Graco Parts and Accessories

Description	Part No.
HEATED 5-GALLON FOLLOWER PLATE ASSEMBLY Used for 240, 380, 480, 575 VAC. 305 mm (12") O.D. Silicone Wiper hose	
Check-Mate 800 Heated Module	617335
15:1 President	617325
UNHEATED 5-GALLON FOLLOWER ASSEMBLY 305 mm (12") O.D.	
Follower, hose type for high viscosity (no wiper hose)	918408
Follower, wiper type for low viscosity (Buna-N)	918409
Follower, wiper type for low viscosity (Buna-N) for use with Check-Mate 800 & Check-Mate 1000 pumps	237702
UNHEATED 5-GALLON WIPER RING KIT 305 mm (12") O.D. Kit contains hose and clamp to be used with 918408	
PVC, Unheated applications	C03064
AIR CONTROL MODULES FOR RAM AND AIR CONTROL 2 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	
2-Regulator air control module for King/Bulldog/Senator air motors	918407
4-Regulator air control module for King/Bulldog/Senator air motors	918416
LOW LEVEL PAIL KIT Lights a red beacon signal when the pail is empty.	918430
MOUNTING KIT Required for mounting Check-Mate pumps to follower plate.	222776
AIR MOTOR/PUMP MOUNTING KIT Used in heated applications to connect the Heated Check-Mate 800 pump to various air motors (King, Bulldog, Senator).	C32434
MOBILE PLATFORM KIT Used for installing a ram on a mobile platform.	918414
HOSE SUPPORT KIT Supports hose to ram to prevent hose kinks. Used only in 20 liter (5 gal.) applications.	C31197
RAM REPAIR KIT for 918405 Series B and older, and 241086 Series A Kit contains o-rings, retaining rings, piston, and bumper.	918439
RAM REPAIR KIT for 918405 Series C and newer, and 241086 Series B and newer Kit contains o-rings, retaining rings, piston, and bumper.	255683

Dimensions

Ram Mounting and Clearance Dimensions for Model 918405 and Model 918495

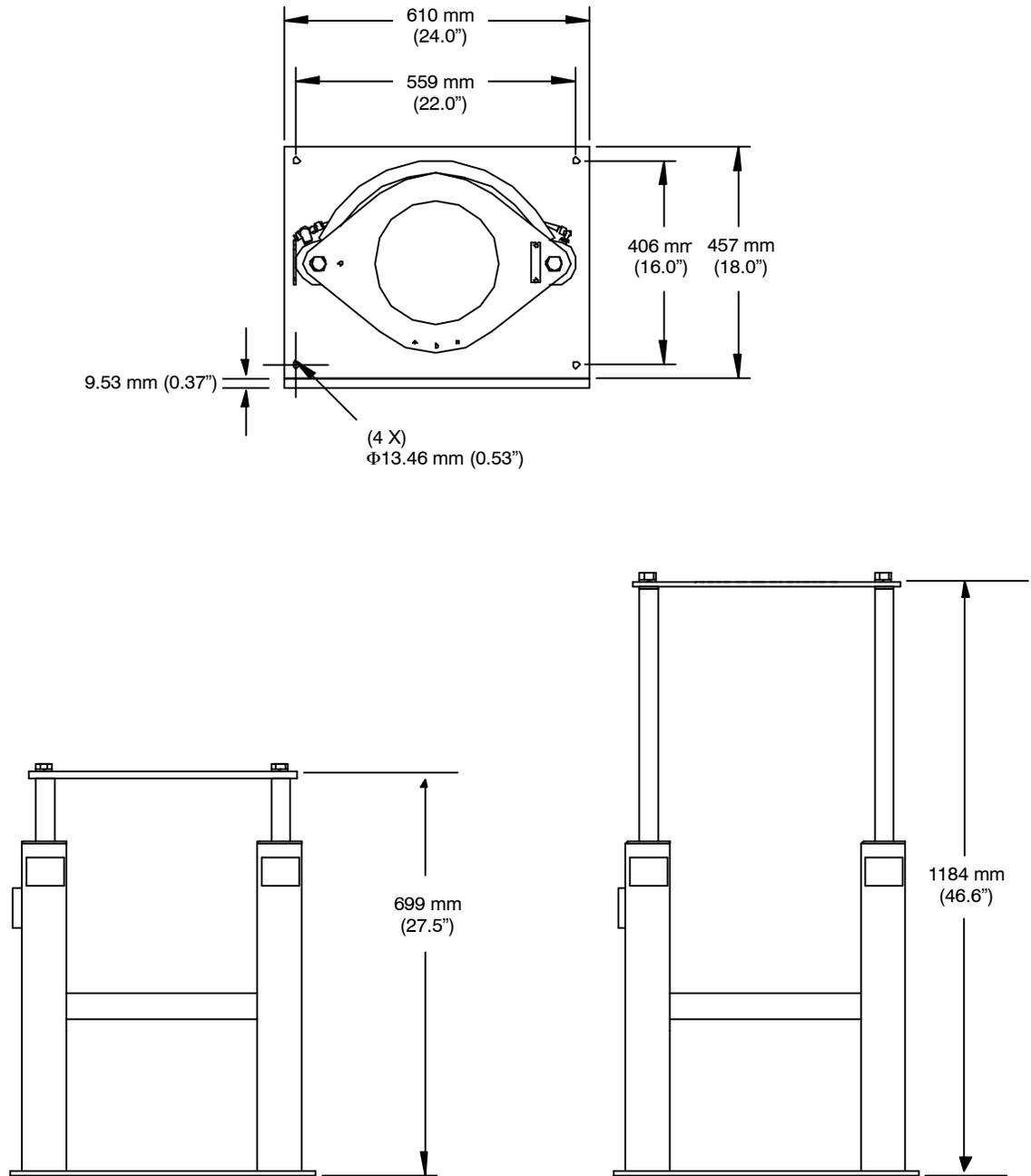


Fig. 9

Dimensions

Ram Mounting and Clearance Dimensions for Model 241086

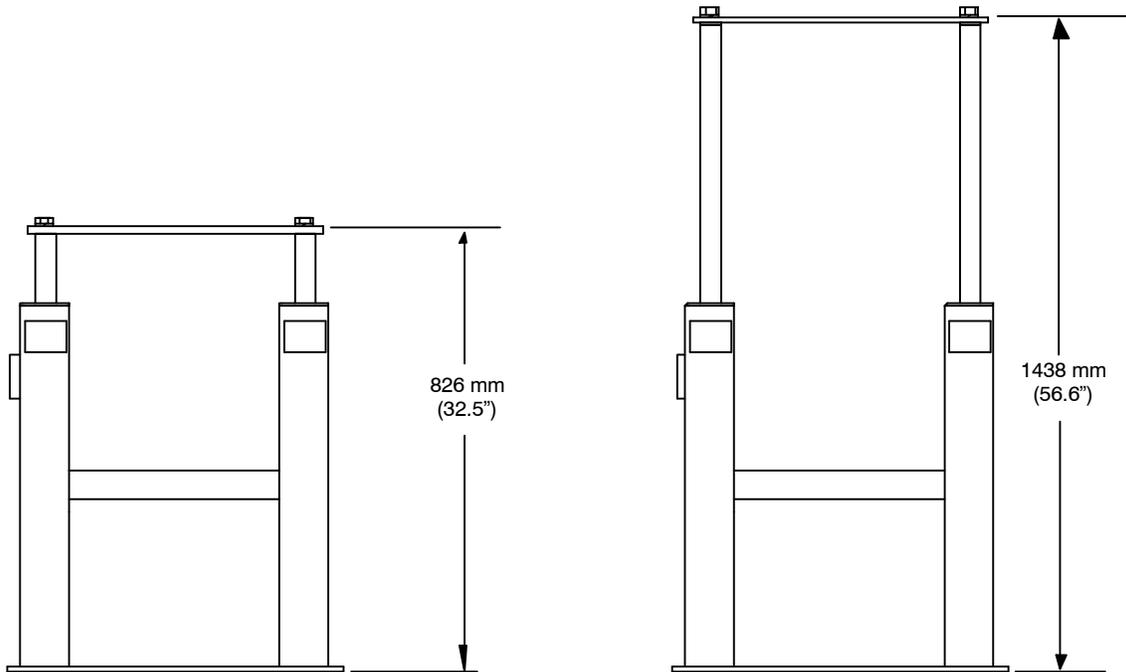
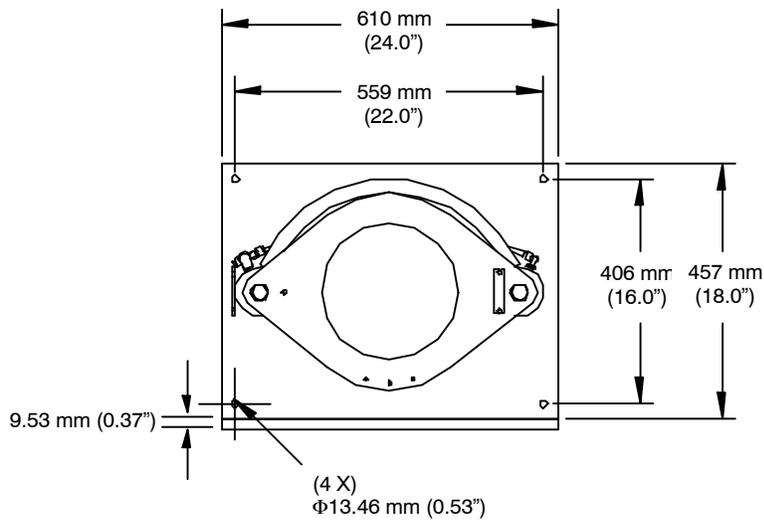


Fig. 10

Technical Data

Maximum ram inbound air pressure	8.8 bar (125 psi)
Weight	approx. 68 kg (150 lbs)
Ram wetted parts (materials of construction)	Carbon steel, nitrile, nylon
Floor space dimensions	610 mm x 457 mm (24" x 18")
Model 918405 and Model 918495 Overall height (lowered)	699 mm (27.5")
Model 241086 Overall height (lowered)	826 mm (32.5")
Model 918405 and Model 918495 Overall height (extended)	1184 mm (46.6")
Model 241086 Overall height (extended)	1438 mm (56.6")
Sound (ram only)	
*Sound pressure level @4.5 bar (100 psi)	80db(A)

*Readings taken with ram in full down and up positions, at the assumed operator position.

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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.

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For patent information, see www.graco.com/patents.

Original instructions. This manual contains English. MM 310525

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