

HIGH-FLO® Pumps

309136 rev.M

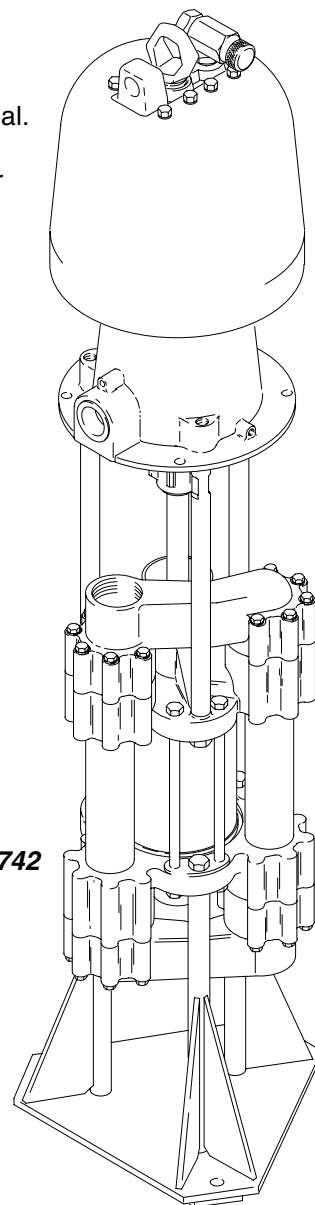
Designed for low pressure, high volume circulation of finishing materials. Do not use for flushing or purging lines with caustics, acids, abrasive line strippers, or other similar fluids.



Important Safety Instructions

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

See page 2 for table of contents and page 4 for
pump part nos., ratios, and working pressures.



01405

***Stainless Steel Model Shown,
Mounted on Accessory Stand 218742***

PROVEN QUALITY. LEADING TECHNOLOGY.

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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 instructions.

Caution Symbol



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

WARNING



INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, 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 equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure stated on the equipment or in the **Technical Data** section for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from 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).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

WARNING



FIRE AND EXPLOSION HAZARD

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

- Ground the equipment and the object being sprayed. Refer to **Grounding** on page 6.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying/dispensing immediately**. Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed/dispensed.
- Keep the spray/dispense area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray/dispense area.
- Extinguish all open flames or pilot lights in the spray/dispense area.
- Do not smoke in the spray/dispense area.
- Do not turn on or off any light switch in the spray/dispense area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray/dispense area.



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.



MOVING PARTS HAZARD

Moving parts, such as the air motor piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 13 to prevent the equipment from starting unexpectedly.

High-Flo® Pump Models

CARBON STEEL MODELS WITH NPT THREADS

Pump Part No.	Series	Ratio and Type (parts list page)	Displacement Pump, Series (parts list page)	Maximum Air (or Hydraulic*) Working Pressure	Maximum Fluid Working Pressure
				MPa, bar (psi)	MPa, bar (psi)
243737	B	3:1 Bulldog (27)	243731, Series D (27)	0.7, 7.0 (100)	2.1, 21 (300)
243738	C	6:1 King (27)	243731, Series D (27)	0.7, 7, (100)	4.1, 41 (600)
243739	C	4:1 King (27)	243732, Series D (27)	0.7, 7, (100)	2.8, 28 (400)
243740	B	Viscount II 600 (27)	243731, Series D (27)	10.3*, 103* (1500*)	4.1, 41 (600)
243741	B	Viscount II 400 (27)	243732, Series D (27)	10.3*, 103* (1500*)	2.8, 28 (400)
243742	B	Viscount II 300 (27)	243733, Series D (27)	10.3*, 103* (1500*)	2.1, 21 (300)

SEVERE-DUTY ELECTROPOLISHED STAINLESS STEEL MODELS WITH NPT THREADS

Pump Part No.	Series	Ratio and Type (parts list page)	Displacement Pump, Series (parts list page)	Maximum Air (or Hydraulic*) Working Pressure	Maximum Fluid Working Pressure
				MPa, bar (psi)	MPa, bar (psi)
243743	B	3:1 Bulldog (27)	243771, Series D (27)	0.7, 7.0 (100)	2.1, 21 (300)
243745	C	6:1 King (27)	243771, Series D (27)	0.7, 7, (100)	4.1, 41 (600)
243747	C	4:1 King (27)	243772, Series D (27)	0.7, 7, (100)	2.8, 28 (400)
243749	C	3:1 King (27)	243773, Series D (27)	0.7, 7, (100)	2.1, 21 (300)
243751	B	Viscount II 600 (27)	243771, Series D (27)	10.3*, 103* (1500*)	4.1, 41 (600)
243753	B	Viscount II 400 (27)	243772, Series D (27)	10.3*, 103* (1500*)	2.8, 28 (400)
243755	B	Viscount II 300 (27)	243773, Series D (27)	10.3*, 103* (1500*)	2.1, 21 (300)

SEVERE-DUTY ELECTROPOLISHED STAINLESS STEEL MODELS WITH BSPP THREADS

Pump Part No.	Series	Ratio and Type (parts list page)	Displacement Pump, Series (parts list page)	Maximum Air (or Hydraulic*) Working Pressure	Maximum Fluid Working Pressure
				MPa, bar (psi)	MPa, bar (psi)
243744	B	3:1 Bulldog (27)	243734, Series D (27)	0.7, 7 (100)	2.1, 21 (300)
243746	C	6:1 King (27)	243734, Series D (27)	0.7, 7 (100)	4.1, 41 (600)
243748	C	4:1 King (27)	243735, Series D (27)	0.7, 7 (100)	2.8, 28 (400)
243750	C	3:1 King (27)	243736, Series D (27)	0.7, 7 (100)	2.1, 21 (300)
243752	B	600 Viscount II (27)	243734, Series D (27)	10, 103 (1500)	4.1, 41 (600)
243754	B	400 Viscount II (27)	243735, Series D (27)	10, 103 (1500)	2.8, 28 (400)
243756	B	300 Viscount II (27)	243736, Series D (27)	10, 103 (1500)	2.1, 21 (300)

SEVERE-DUTY CHROME STAINLESS STEEL MODELS WITH NPT THREADS

Pump Part No.	Series	Ratio and Type (parts list page)	Displacement Pump, Series (parts list page)	Maximum Air (or Hydraulic*) Working Pressure	Maximum Fluid Working Pressure
				MPa, bar (psi)	MPa, bar (psi)
248343	A	400 Viscount II (27)	248333, Series B (27)	10, 103 (1500)	2.8, 28 (400)
248345	A	300 Viscount II (27)	248334, Series B (27)	10, 103 (1500)	2.1, 21 (300)

SEVERE-DUTY CHROME STAINLESS STEEL MODELS WITH BSPP THREADS

Pump Part No.	Series	Ratio and Type (parts list page)	Displacement Pump, Series (parts list page)	Maximum Air (or Hydraulic*) Working Pressure	Maximum Fluid Working Pressure
				MPa, bar (psi)	MPa, bar (psi)
248344	A	400 Viscount II (27)	248330, Series B (27)	10, 103 (1500)	2.8, 28 (400)
248346	A	300 Viscount II (27)	248331, Series B (27)	10, 103 (1500)	2.1, 21 (300)

Installation

Grounding

WARNING



FIRE AND EXPLOSION HAZARD

Before operating the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 3.



1. *King Pumps:* use a ground wire and clamp. See Fig. 1. Remove the ground screw (Z) and insert through eye of ring terminal at the end of ground wire (Y). Fasten ground screw back onto pump and tighten securely. Connect the other end of the wire to a true earth ground. Order Part No. 222011 Ground Wire and Clamp.

All Other Pumps: use a ground wire and clamp. See Fig. 2. Loosen the grounding lug locknut (W) and washer (X). Insert one end of a 1.5 mm² (12 ga) minimum ground wire (Y) into the slot in lug (Z) and tighten the locknut securely. Connect the other end of the wire to a true earth ground. Order Part No. 237569 Ground Wire and Clamp.

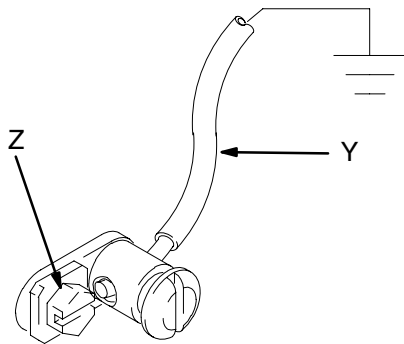
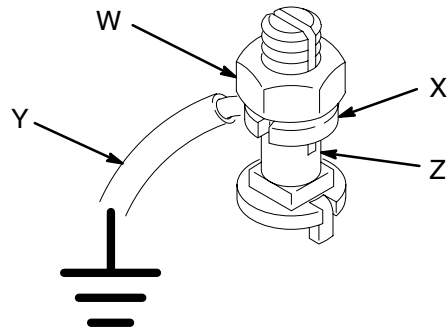


Fig. 1

TI1052



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Fig. 2

2. *Air and fluid hoses:* use only electrically conductive hoses.
3. *Air compressor or hydraulic power supply:* follow manufacturer's recommendations.
4. *Surge tank:* use a ground wire and clamp. See Fig. 2.
5. *Spray gun:* ground through connection to a properly grounded fluid hose and pump.
6. *Fluid supply container:* follow your local code.
7. *Object being sprayed:* follow your local code.
8. *Solvent pails used when flushing:* follow 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.
9. *To maintain grounding continuity when flushing or relieving pressure,* hold a metal part of the spray gun firmly to the side of a grounded *metal* pail, then trigger the gun.

Installation

Plumbing

Displacement pump models have a 2 in. npt(f) fluid inlet and a 2 in. npt(f) fluid outlet or have a 2 in. bspp(f) fluid inlet and a 2 in. bspp(f) fluid outlet.

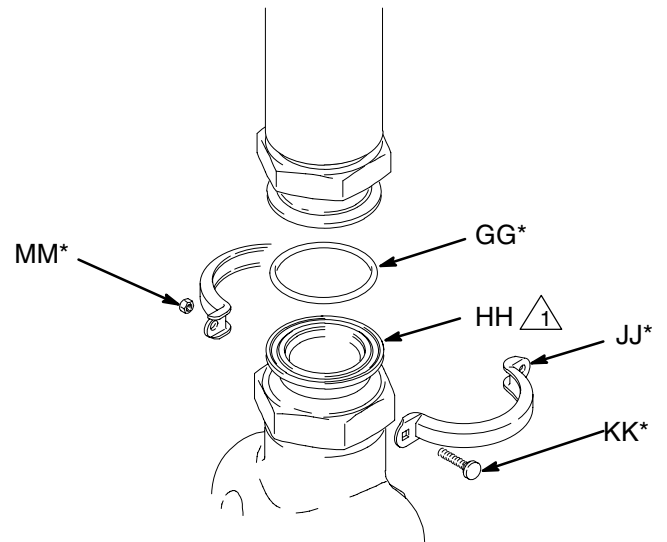
Use 50 mm (2 in.) diameter pipe and plumbing. Install a fluid shutoff valve (D) between each tank and the pump.

When using a stainless steel pump, use stainless steel plumbing to maintain a corrosion-resistant system.

Tri-Clamp Adapters

Tri-clamp adapters are available which allow sanitary pipe to be connected to a pump with bspp inlet and outlet. Refer to Fig. 3.

Install a 2 in. tri-clamp gasket (GG) in the groove of the tri-clamp adapter (HH). Mate the tri-clamp adapter with the sanitary pipe and secure with two clamps (JJ), bolts (KK), and nuts (MM). Install the bolts in opposite directions.



* Customer must supply.

8689A



Graco adapter 193202. Requires seal 193424.

Fig. 3

Installation

All Systems


NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in the figures and parts drawings.

The Typical Installations shown in Figs. 5 and 6 are only examples. Contact your Graco distributor for system design assistance.

An accessory surge tank (B), Part No. 218509 (cst) or 238983 (sst) should be used to reduce fluid surging and to prevent backflow into the pump. Install a full flow, non-restrictive fluid shutoff valve (D) before and after the surge tank to isolate it for servicing. The surge tank also uses the accessory stand (218742).


WARNING

COMPONENT RUPTURE HAZARD

 To reduce the risk of component rupture, which can cause serious injury, be sure that all accessories and system components can withstand the pressure and flow in this system.

WARNING

COMPONENT RUPTURE HAZARD


 The pressure relief valve reduces the risk of the pump overpressurizing if the piston seal is worn and leaking, and the fluid outlet is closed off. Install the valve so the arrow on its body matches the direction of fluid flow.

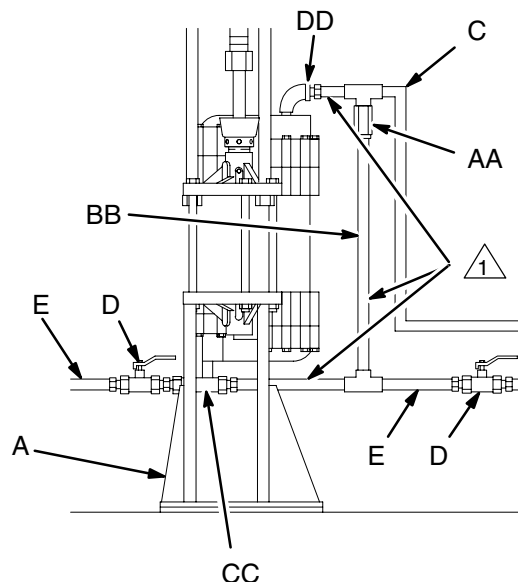
Do not install a fluid shutoff valve in the fluid line between the pump outlet (DD) and the pump inlet (CC). Doing so defeats the purpose of the pressure relief valve if the shutoff valve is closed, resulting in pump overpressurization. Overpressurization can cause the pump or components to rupture, resulting in serious injury and property damage.

Pressure Relief Valve (for non-circulating systems)

KEY

- A Accessory Pump Stand (P/N 218742)
- C 50 mm (2 in.) Diameter Pipe
- D Full Flow, Non-Restrictive Fluid Shutoff Valve
- E Fluid Supply Line
- AA External Pressure Relief Valve
- BB Fluid Return Line
- CC Pump Fluid Inlet
- DD Pump Fluid Outlet

 Do not install a fluid shutoff valve in the fluid line between the pump outlet (DD) and the pump inlet (CC). See the **WARNING** above.



01407

Fig. 4

Installation (Air-Powered Pumps)

WARNING

A bleed-type master air valve (L) is required in your system, to help reduce the risk of serious injury including splashing fluid in the eyes or on the skin, and injury from moving parts if you are adjusting or repairing the pump.

The bleed-type master air valve relieves air trapped between this valve and the pump after the air is shut off. Trapped air can cause the pump to cycle unexpectedly. Locate the valve close to the pump.

CAUTION

Do not hang the air accessories directly on the pump's air inlet. The fittings are not strong enough to support the accessories and may cause one or more to break. Provide a bracket on which to mount the accessories.

In an air-powered system, install the air line accessories in the order shown in Fig. 5. Working upstream from the pump air inlet, install an air line lubricator (H) for automatic air motor lubrication. Next, install a bleed-type master air valve (L) to relieve air trapped between the valve and the pump, and an air regulator and gauge (J) to control pump speed.

Install a pump runaway valve (G) to shut off the air to the pump if the pump accelerates beyond the pre-adjusted setting. A pump which runs too fast can be seriously damaged.

Install an air filter (K) to remove harmful dirt and moisture from the compressed air supply, and a second bleed-type master air valve to isolate the air line accessories for servicing. Last, install a drain valve (W) at the bottom of each air line drop, to drain off moisture.

Installation (Air-Powered Pumps)

KEY

- A Accessory Pump Stand (P/N 218742)
- B Surge Tank (P/N 218509 or 238983)
- C 50 mm (2 in.) Diameter Pipe
- D Full Flow, Non-Restrictive Fluid Shutoff Valve
- E Fluid Supply Line
- F Mix Tank
- G Pump Runaway Control Valve
- H Air Line Lubricator
- J Air Regulator and Gauge
- K Air Line Filter
- L Bleed-type Master Air Valve
- W Air Line Drain Valve
- Y Ground Wire



Do not hang the air accessories directly on the pump's air inlet. Provide a bracket on which to mount the accessories.

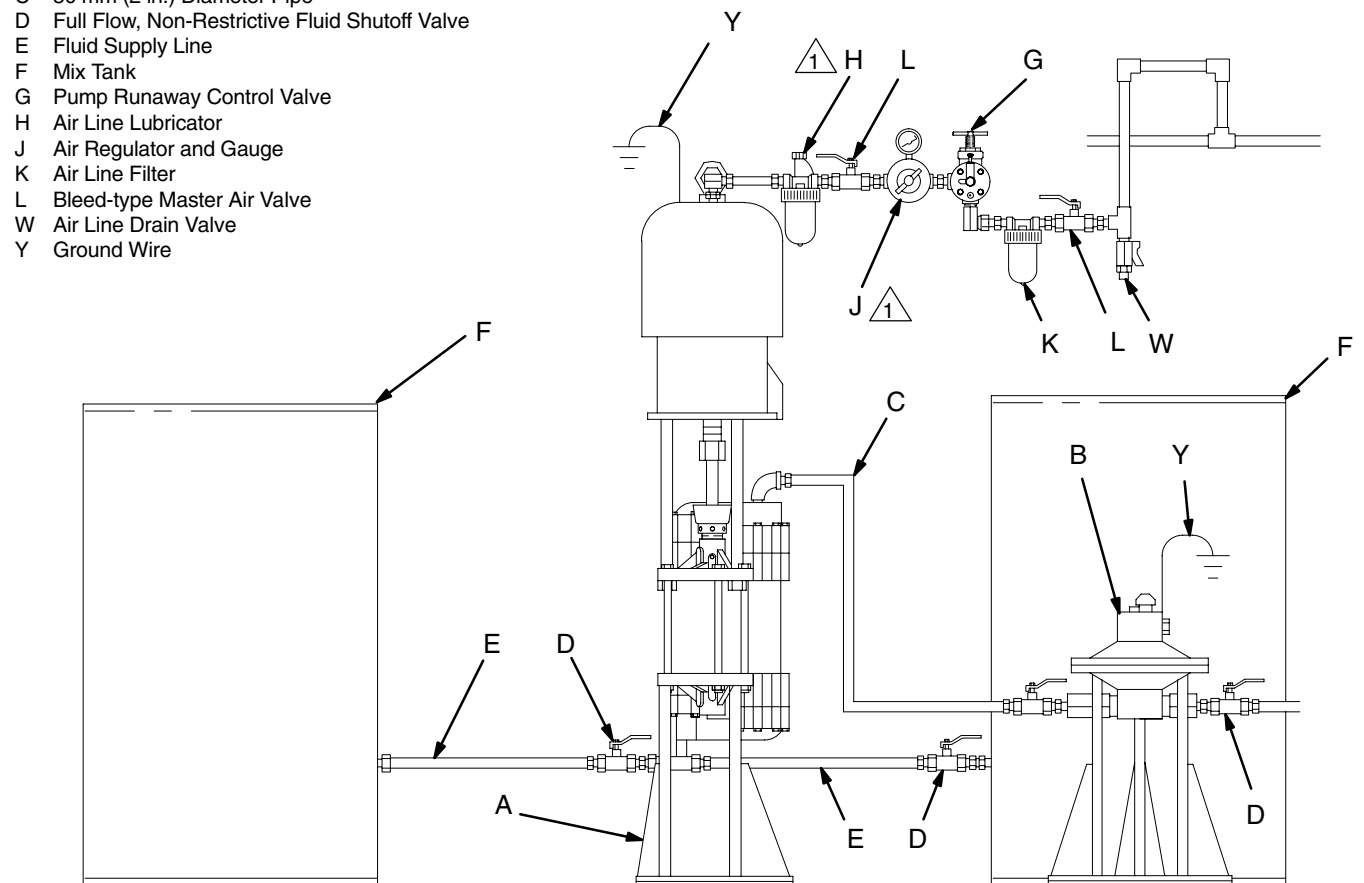


Fig. 5

01406

Installation (Hydraulic-Powered Pumps)

CAUTION

The Hydraulic Power Supply must be kept clean at all times to avoid damage to the motor and hydraulic power supply.

1. Blow out hydraulic lines with air and flush thoroughly before connection to the motor.
2. Plug hydraulic inlets, outlets, and line ends when disconnecting them for any reason.

Always plug the hydraulic inlets, outlets and lines when disconnecting them for any reason to avoid introducing dirt and other contaminants into the system.

Be sure that your hydraulic power supply is equipped with a suction filter to the hydraulic pump and a system return line filter of 10 micron size. Carefully follow the manufacturer's recommendations on reservoir and filter cleaning and periodic changes of hydraulic fluid.

The motor has a 3/4 npt hydraulic oil inlet, and a 1 in. npt hydraulic oil outlet. Use a minimum 1/2 in. ID hydraulic supply line and a minimum 5/8 in. ID return line.

On the hydraulic oil supply line (P), install a shutoff valve (G) to isolate the system for servicing; a fluid pressure gauge (H) to monitor hydraulic oil pressure to the motor and avoid overpressurizing the motor or displacement pump; a pressure- and temperature-compensated flow control valve (J) to prevent the motor from running too fast; a pressure reducing valve (K) with a drain line (L) running directly into the hydraulic return line (Q); and an accumulator (N) to reduce the hammering effect caused by the motor reversing direction.

On the hydraulic return line (Q), install a shutoff valve (M) for isolating the motor for servicing.

Installation (Hydraulic-Powered Pumps)

KEY

- | | | | |
|---|---|---|--------------------------|
| A | Accessory Pump Stand
(P/N 218742) | H | Hydraulic Pressure Gauge |
| B | Surge Tank (P/N 218509 or
238983) | J | Flow Control Valve |
| C | 50 mm (2 in.) Diameter Pipe | K | Pressure Reducing Valve |
| D | Full Flow, Non-Restrictive
Fluid Shutoff Valve | L | Drain Line |
| E | Fluid Supply Line | M | Hydraulic Return Line |
| F | Mix Tank | N | Accumulator |
| G | Hydraulic Supply Line
Shutoff Valve | P | Hydraulic Supply Line |
| | | Q | Hydraulic Return Line |
| | | Y | Ground Wire |

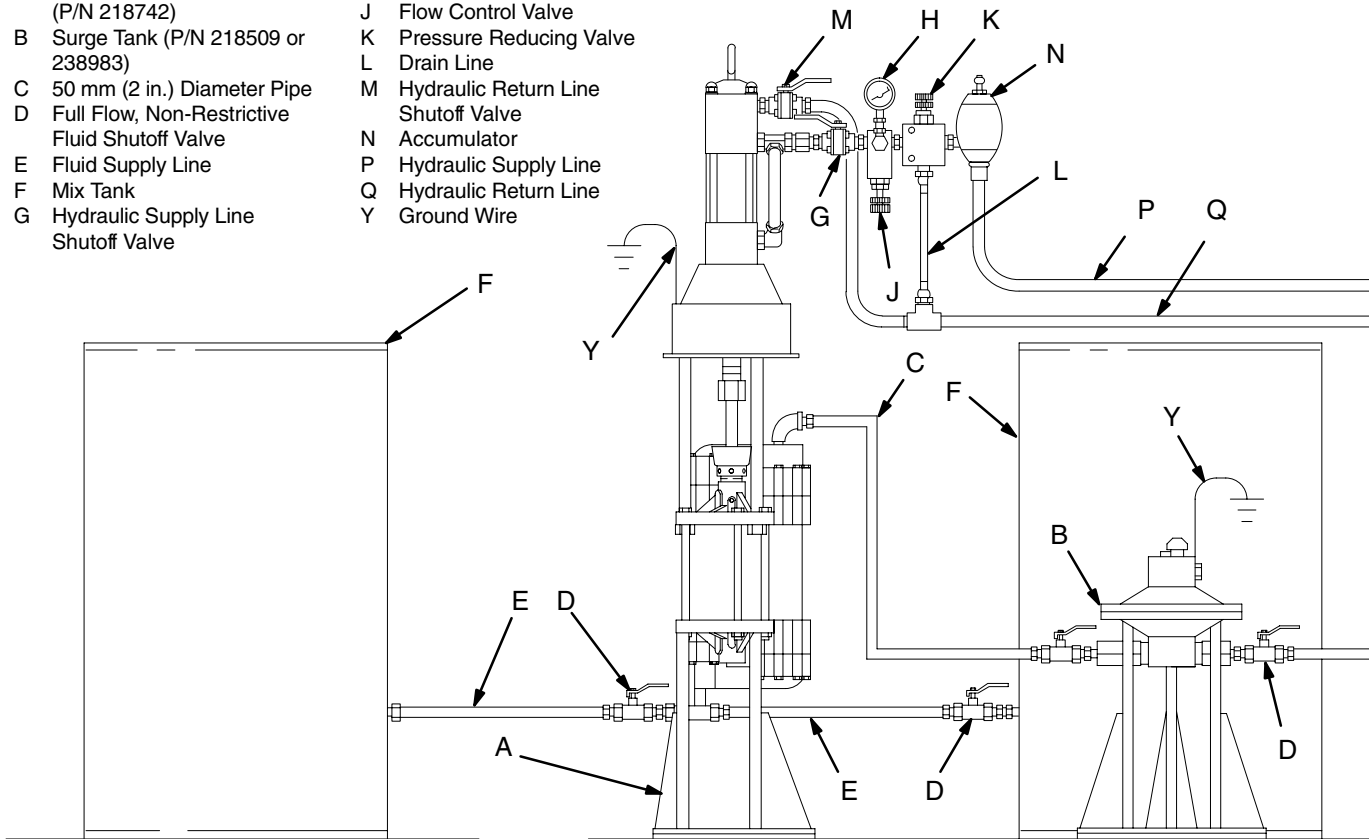


Fig. 6

01408

Operation

Pressure Relief Procedure

WARNING

PRESSURIZED EQUIPMENT HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. To reduce the risk of an injury from accidental spray from the gun, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

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

1. Shut off the power to the pump.
2. **In an air-powered system**, close the air regulator (J) and close the bleed-type master air valve (L).
3. **In a hydraulic-powered system**, close the hydraulic supply line shutoff valve (G) first, then the return line shutoff valve (M).
4. Close the fluid shutoff valves from the supply tanks.
5. Open the dispensing valve, if used, or slowly and carefully loosen a fluid fitting near the pump to relieve pressure.

Flush the Pump

Flush the pump before using it the first time to remove the lightweight oil which was left in the pump after factory testing to protect it from corrosion. Flush with a compatible solvent until your pump and lines are thoroughly cleaned. Follow the **Pressure Relief Procedure** at left and remove the spray tip before flushing. Hold a metal part of the gun firmly to the side of a grounded metal pail, and always use the lowest possible pressure when flushing.

Operation

Starting and Adjusting the Pump

1. Fill the wet-cup/packing nut (12) one half full with Graco Throat Seal Liquid (TSL). See Fig. 7.
2. Charge the surge tank, if you are using one. See the separate instruction manual, 307707.
3. Open the shutoff valves between the pump and supply tanks, and between the pump and surge tank.
4. Open the dispensing valve(s) or spray gun(s).
5. To adjust the system, perform the following applicable procedure:

In an air-powered system:

- a. Open the bleed-type master air valve.
- b. Adjust the air regulator to the minimum pressure necessary for the pump to cycle slowly.
- c. Operate the pump slowly until all air is purged from the fluid lines.
- d. Close the gun or valve.
- e. Adjust the setting on the pump runaway valve, if used.

In a hydraulic-powered system:

- f. Turn on the hydraulic power supply.
- g. Open the flow control valve all the way.

- h. Adjust the pressure-reducing valve until you get the desired fluid pressure. Run the pump until all air is purged from the fluid lines.
- i. Count the cycle rate of the pump.
- j. Close the flow control valve until the cycle rate and fluid pressure start to drop.
- k. Open the flow control valve slightly until the cycle rate and fluid pressure return to the desired level. This method of setting the hydraulic controls ensures proper pump operation and will prevent pump runaway and damage if the fluid supply runs out.
- l. Close the gun or valve.

In a circulating system, the pump operates continuously until the power supply is shut off. ***In a direct supply system***, the pump starts when the gun or valve is opened, and stops when the gun or valve is closed.

WARNING



COMPONENT RUPTURE HAZARD

To reduce the risk of serious injury, including splashing in the eyes or on the skin, and property damage, never exceed the maximum air/hydraulic and fluid working pressure of the lowest rated component in your system. See **EQUIPMENT MISUSE HAZARD, System Pressure**, on page 3.

Maintenance

Care of the Pump

WARNING

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


Check the tightness of the packing nut (12) weekly. Shut off the pump and relieve pressure before checking the packing nut. The nut should be tight enough to stop leakage, about 27–34 N•m (20–25 ft-lb). Over-tightening will compress and damage the packings and cause the pump to leak.

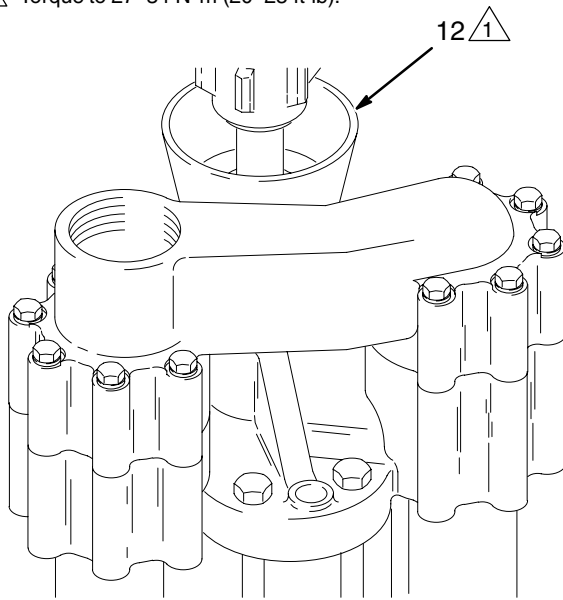
CAUTION

Always flush the pump before any fluid can dry in it. Always stop the pump at the bottom of its stroke to prevent the fluid from drying on the piston rod and damaging the throat packings.

Read all other instruction manuals supplied with your pump and with all accessories you add to the system.

Monitor the fluid supply carefully. If air is sucked into the pump due to an empty supply container, the pump will accelerate quickly and can damage the pump packings. If your pump begins running too fast, shut it off immediately. Refill the supply container and prime the pump to remove all air from the fluid line. In an air-powered system, the accessory pump runaway valve automatically senses when a pump is running too fast and shuts off the air to stop the pump.

 Torque to 27–34 N•m (20–25 ft-lb).



01411

Fig. 7

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Pump output low on both strokes	Restricted air or hydraulic lines	Clear any obstructions; be sure all valves are open; increase pressure.
	Empty fluid supply	Refill and reprime pump. In an air-powered system, use pump runaway valve.
	Clogged fluid outlet line, valves, etc.	Clear.
	Worn packings	Tighten packing nut; replace all packings.
Pump output low on only one stroke	Held open or worn check valve	Check and repair.
	Worn piston packings	Replace.
No output	Improperly installed ball check valves	Check and correct; see page 22, starting at step 24.
Pump operates erratically	Exhausted fluid supply	Refill and reprime pump. In an air-powered system, use pump runaway valve.
	Held open or worn check valves	Check and repair.
	Worn piston packings	Replace.
	Excessive hydraulic fluid supply pressure to Viscount motor	See hydraulic motor manual, 308048.
Pump does not operate	Restricted air or hydraulic power supply lines	Clear any obstructions; be sure all shut-off valves are open; increase pressure.
	Exhausted fluid supply	Refill and reprime pump.
	Clogged fluid outlet line, valves, etc.	Clear.
	Damaged air motor or hydraulic motor	See motor manual.
	Fluid dried on piston rod	Disassemble and clean pump. Stop pump at bottom of stroke.

Service

To Remove the Motor (See Fig. 8)

WARNING

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

1. Relieve the pressure.
2. Disconnect all hoses from the pump and motor.
3. Unscrew the coupling nut (106), holding your hand around the nut and shaft to catch the two couplers (105) as you lower the nut (106).
4. Remove the tie rod locknuts (104) and lift the motor off the pump.

To Reattach the Motor (See Fig. 8)

CAUTION



On stainless steel pumps, be sure to lubricate the threads of the tie rods **and** apply PTFE tape to the bottom threads of the rods before reattaching the air motor. The bottom threads are farthest from the tie rod flats.

1. Position the air motor on the pump. On stainless steel pumps, lubricate and tape the tie rod threads (see the **CAUTION** above). Screw the tie rod locknuts (104) onto the tie rods (103).
2. Place the two couplers (105) in the coupling nut (106). Screw the nut up onto the motor shaft. Torque to 195–210 N•m (145–155 ft-lb).

CAUTION

Torque the coupling nut (106) to 195–210 N•m (145–155 ft-lb). **Do not** exceed this torque specification, to prevent damage to the piston shaft (29).

3. Reconnect all hoses. Reconnect the ground wire if it was disconnected.

-  1 Torque to 195–210 N•m (145–155 ft-lb).
-  2 Apply PTFE tape or auto-seize lubricant to bottom threads.

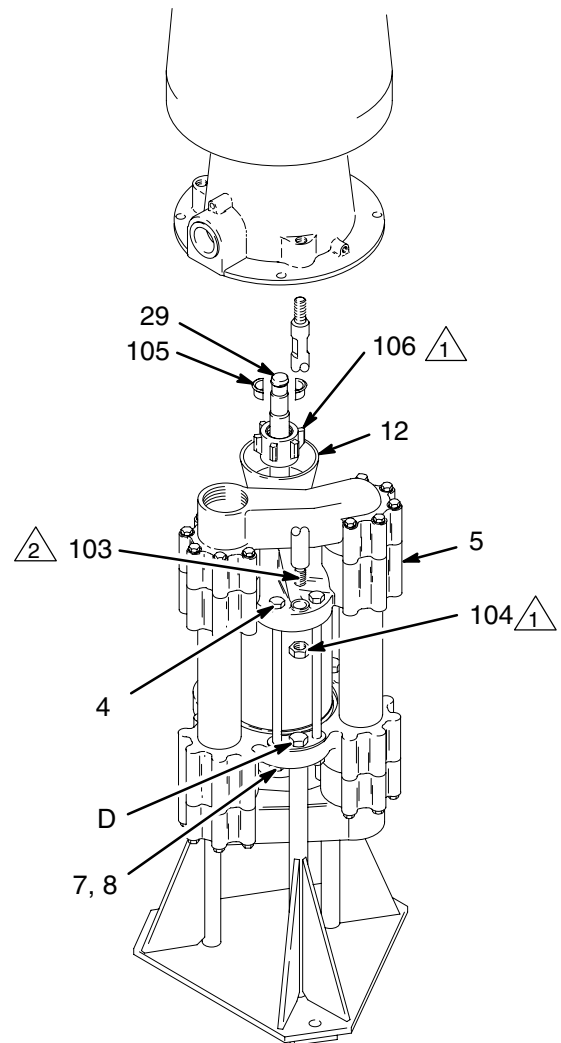


Fig. 8

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Service

NOTES:

1. This repair procedure can be used for any High-Flo pump model. The reference numbers used in the text and illustrations correspond to all of the displacement pump parts drawings.
2. Packing repair kits are available for each pump. Refer to the parts pages for your pump. Parts included in the pump seal repair kit are marked with an asterisk in the text (for example, 16*). Parts included in the throat packing kit are marked with a symbol (for example, 39†). Conversion kits are also available. See page 30. Use all the new parts in the kits for the best results.
3. This pump is easiest to repair when left in the Part No. 218742 accessory pump stand and disassembled as instructed. For repair at a remote location, have another pump stand available.
4. When reassembling, apply anti-seize lubricant 222955 on the threads of the piston shaft (29) and piston (23).

Displacement Pump Repair

1. Use a 13 mm socket wrench to loosen and remove the twelve capscrews (2) and lockwashers (3) on the outlet manifold (1). See Fig.16.
2. Lift the manifold (1) off the outlet valve housing (5) and remove the ball guides (14), balls (13), seats (17) and seals (15). Remove the o-ring (16) from the seats (17).

NOTE: Seat Puller Kit 220384 is available to make removal of the seats from the manifolds easier. See Fig. 9.

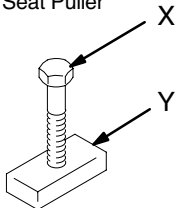
⚠ CAUTION

Be careful not to drop or damage the balls (13) or seats (17). A damaged ball or seat cannot seal properly and the pump will leak. The outlet valve seats (17) can be reversed to provide longer use of the seat.

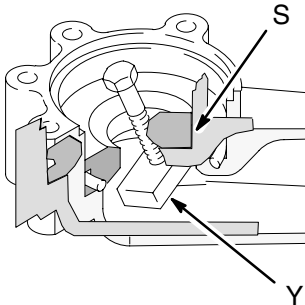
Seat Puller Kit 220384

KEY

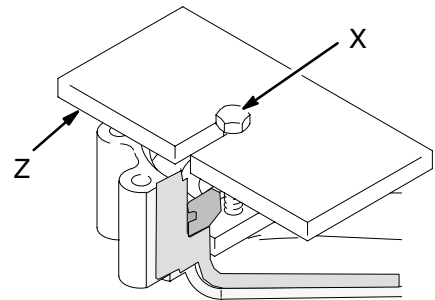
- S Seat (item 21 or 46)
- X 108481 Bolt
- Y 181630 Seat Puller
- Z 181629 Seat Puller



Screw bolt (X) into Seat Puller (Y).



Position Seat Puller (Y) under the seat (21 or 46) by slipping it through at an angle.



Place Seat Puller (Z) on top of seat. Turn bolt (X) to pull the seat out.

01414

Fig. 9

Service

3. Remove the nuts (8), lockwashers (7) and six cylinder capscrews (4). Loosen the packing nut (12). Lift off the outlet valve housing (5). See Fig. 8.
4. Lift the riser tubes (20) and cylinder (27) off the inlet valve housing (6). The piston assembly may stay in the cylinder. Remove the seals (21 and 28) from the inlet and outlet housings (5, 6). See Fig.16.

NOTE: Tap on the valve housings with a plastic mallet and use a slight rocking motion to help loosen and remove the cylinder and tubes.

5. Screw out packing nut (12). Using a small, flat-blade screwdriver, pry out male gland assembly (32) using the groove on outer surface. Remove remaining packings (31, 35) and glands (30, 42) from the nut. See Fig. 10.
6. Unscrew and remove the three pump stand bolts (D). See Fig. 8. Lift the inlet valve assembly off the stand. Place the inlet valve housing (6) face down on a protected surface.

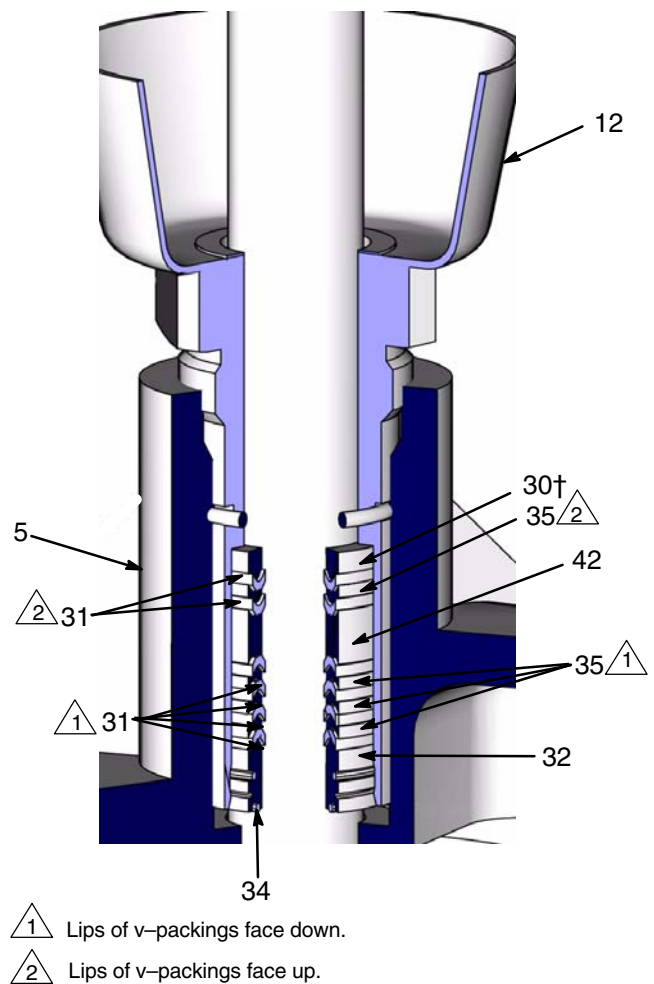


Fig. 9

Service

7. Use a 13 mm socket wrench to loosen and remove the twelve capscrews (2) and lockwashers (3) from the inlet manifold (1). See Fig 16.
8. Lift the manifold (1) off the inlet valve housing (6) and remove the seats (17 and 22). Remove the o-ring (16) from the seats.

⚠ CAUTION

If the pressure relief valve in the inlet seat (22) is clogged or filled with material, soak the inlet seat in a compatible solvent. Make sure all material residue is cleaned from the ball and seat area.

If the relief valve cannot be thoroughly cleaned so that the ball and spring are free to move, replace the seat (22).

9. Inspect the pressure relief valve in the fluid inlet seat (22) to make sure it is not clogged. Press down on the valve's ball to see if the ball and spring are free to move. See the detail in Fig. 16.

⚠ CAUTION

Be careful not to drop or damage the balls (13) or seats (17 or 22). A damaged ball or seat cannot seal properly and the pump will leak. One inlet valve seat (17) can be reversed to provide longer use of the seat. However, the fluid inlet seat (22) contains a pressure relief valve and is not reversible. See the detail in Fig. 16 for proper orientation.

10. Remove the balls (13), ball guides (14) and seals (15) from the inlet valve housing (6).
11. Push the piston assembly through the cylinder just enough to expose the piston (23) flats. Secure the piston flats in a vise. Use a plastic mallet to tap the cylinder (27) up and off the piston assembly.

NOTE: Refer to Fig. 11 for Steps 12–16.

12. Loosen the piston nut (26). Use Tool Kit 220385 to remove the piston shaft (29) and piston nut (26). See Fig. 12. Remove the piston nut o-ring (18) and o-ring retainer (43) from the shaft. Remove the plate (25) and the seal (24) from the piston (23).
13. Inspect the piston shaft (29). If it is damaged or the surface is scored, replace it.

14. Clean all piston parts and the cylinder thoroughly in a compatible solvent. Inspect the inner surface of the cylinder for scoring, and replace it if necessary. A scored cylinder will quickly damage the packings.
15. Lubricate the new piston seal (24*) and install it on the piston.
16. Install the piston plate (25) with the beveled edge facing away from the piston seal.

- 1 Torque to 270–284 N•m (200–210 ft-lb).
- 2 Apply medium strength sealant to threads.
- 3 Lubricate.
- 4 Apply anti-seize lubricant 222955 to the face of piston nut (26)

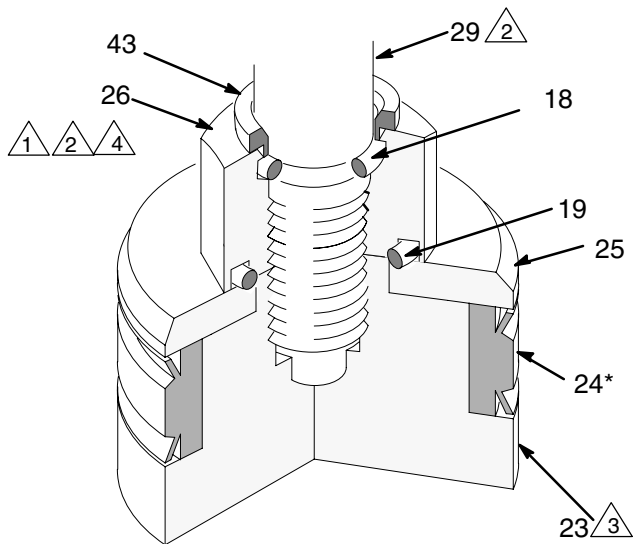


Fig. 11

T10219

Tool Kit 220385

Tighten the tool on the widest part of the shaft (29). Grip the tool with a wrench and unscrew the shaft.

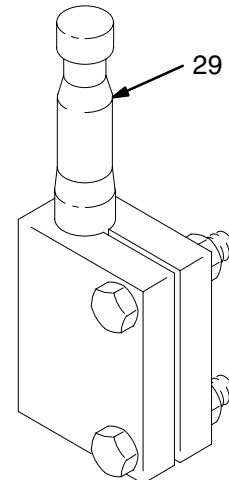


Fig. 12

01413

Service

17. Install o-ring retainer (43). Lubricate o-ring (18) and slide it on over the threads of piston shaft. Apply medium strength liquid thread adhesive to the piston nut (26) threads and the piston rod. Screw the nut snugly against the o-ring retainer (43). Apply anti-seize lubricant 222955 to the bottom face of the piston nut (26). Assemble o-ring (19) and install in the groove on the piston nut. Screw rod (29) into piston (23) until snug. Tighten piston nut (26) to 270–284 N•m. (200–210 ft-lb).
18. Remove the piston assembly from the vise, but **do not lay it down on its side**.


CAUTION

Do not lay the piston assembly, with the new seal installed, on its side. Doing so may damage the seal.

NOTE: Refer to Fig. 13 for Step 19.

19. Carefully and evenly guide the seal and the piston into the cylinder. The piston seal and piston may need to be tipped at an angle and the exposed, leading lip of the seal tapped into the cylinder with a plastic mallet. After the seal lip has entered the cylinder use an arbor press or tap the bottom of the piston assembly lightly with a plastic mallet to slide the piston assembly into the cylinder. Before pressing, ensure the piston seal lips are started into the cylinder.

20. Clean the remaining pump parts in a compatible solvent.

 Do not damage edges of seal (24).

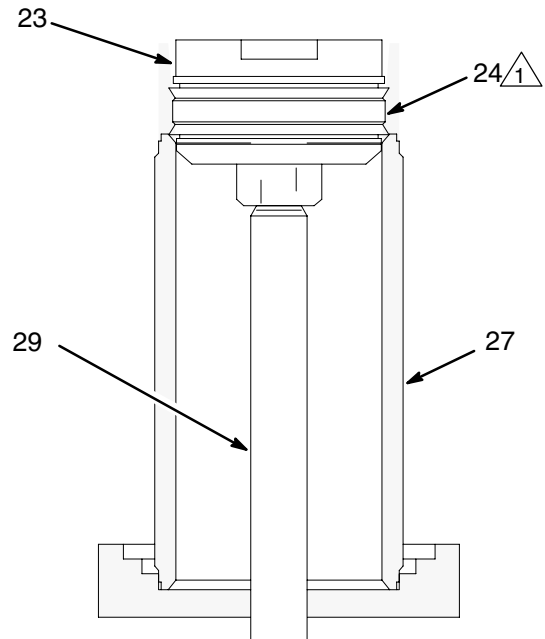


Fig. 13

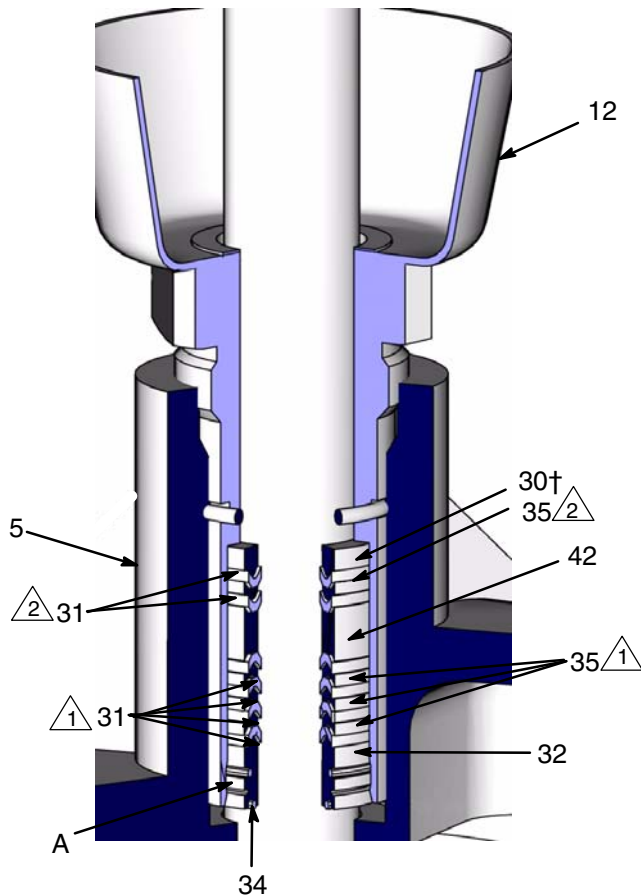
TI0221

Service

NOTE: Refer to Fig. 14 for Steps 21 and 22.

21. Lubricate three new throat packings (two – 31†) and (one – 35†) and the male gland (30†) with light grease. Holding the packing nut (12), drop the gland (30†) into the packing nut so that the lips face up. Alternately set the three v-packings with the lips facing up into the packing nut one at a time, starting with 31†, followed by 35†, and ending with 31†.

22. Lubricate the female gland (42†) well and place it in the packing nut. Lubricate seven new throat packings (four – 31†) and (three – 35†) with light grease. Alternately set the seven v-packings with the lips facing down into the packing nut one at a time, starting with (31†), followed by (35†), and ending with (31†). Lightly grease gland assembly (32) and press fit into wet cup (12) until you feel the o-ring (A) snap into its groove. Place lubricated o-ring (34) into the groove on the face of the gland assembly.



1 Lips of v-packings face down.

2 Lips of v-packings face up.

Fig. 14 9136

NOTE: Refer to Fig. 16 for Steps 23–35 unless otherwise indicated.

23. Loosely screw the packing nut (12) into the outlet valve housing (5).

24. Lubricate and install the new o-rings (16*) around each of the four ball seats (17 and 22).

CAUTION

The orientation of the ball valves in the inlet and outlet valve housings is critical. Install the parts of the ball valve exactly as instructed and refer to Fig. 16. If installed incorrectly, the pump will not operate.

25. Place the inlet valve housing (6) on a flat surface with the ball valve openings facing up. Lubricate the seals (15*) and set them into each side of the inlet valve housing.

26. Place the ball guides (14) and balls (13) in the inlet valve housing.

WARNING

COMPONENT RUPTURE HAZARD





The relief valve seat (22) **must** be installed at the fluid inlet, to reduce the risk of pump overpressurization. It cannot relieve pressure if installed in another location.

27. Press the seat (22) with the pressure relief valve into the **fluid inlet side** of the inlet manifold (1). This seat is not reversible. Orient as shown in the detail in Fig. 16. Press the other seat (17), with the unworn side facing out, into the other side of the inlet manifold.

NOTE: The pressure relief seat kit (22) includes two seals (15) and two o-rings (16). When installing a new pressure relief seat, also install the seals and o-rings on **both sides** of the fluid inlet manifold (1).

Service

28. Position the inlet manifold (1) on the inlet valve housing (6). Install the twelve capscrews (2) and lockwashers (3) loosely.
 29. Tighten the four inside capscrews oppositely and evenly to 3 N•m (27 in-lb) to balance the load on the valves. Then tighten all twelve capscrews oppositely and evenly to 11.5–24.5 N•m (8.5–18 ft-lb). See Fig. 15.
 30. Place the inlet valve housing and manifold assembly on the pump stand. Install and tightly screw in the three pump stand bolts (D). See Fig. 8, page 17.
 31. Lubricate and install the new seals (21*, 28*) in the inlet and outlet housings (6, 5). Set the cylinder (27) and riser tubes (20) into place in the inlet valve housing (6). Set the outlet housing (5) onto the cylinder and riser tubes.
 32. Install the six cylinder capscrews (4), lockwashers (18) and nuts (19). Tighten the capscrews oppositely and evenly to 81–88 N•m (60–65 ft-lb). See Fig. 15.
 33. Lubricate the seals (15*) and press one into each side of the outlet valve housing (5). Press the seats (17), with the unworn sides facing the balls, into the outlet valve housing. Then install the balls (13) and ball guides (14).
 34. Place the outlet manifold (1) on the outlet valve housing (5) and install the twelve capscrews (2) and lockwashers (3) loosely. Tighten the inside four capscrews oppositely and evenly to 3 N•m (27 in-lb) to balance the load on the valves. Then tighten all twelve capscrews oppositely and evenly to 24–27 N•m (18–20 ft-lb). See Fig. 15.
 35. Torque the packing nut (12) to 67 N•m (50 ft-lb). Back off and re-torque to 27–34 N•m (20–25 ft-lb).
 36. Reconnect the motor as explained on page 17. Be sure the grounding wire is connected.
-  Torque oppositely and evenly to 81–88 N•m (60–65 ft-lb).
-  Torque these 4 screws oppositely and evenly to 3 N•m (27 in-lb), then tighten all 12 screws oppositely and evenly to 24–27 N•m (18–20 ft-lb).

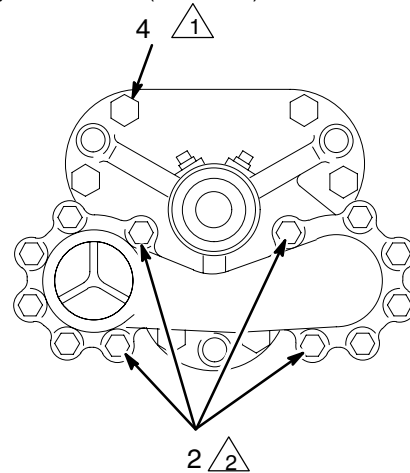


Fig. 15

01410

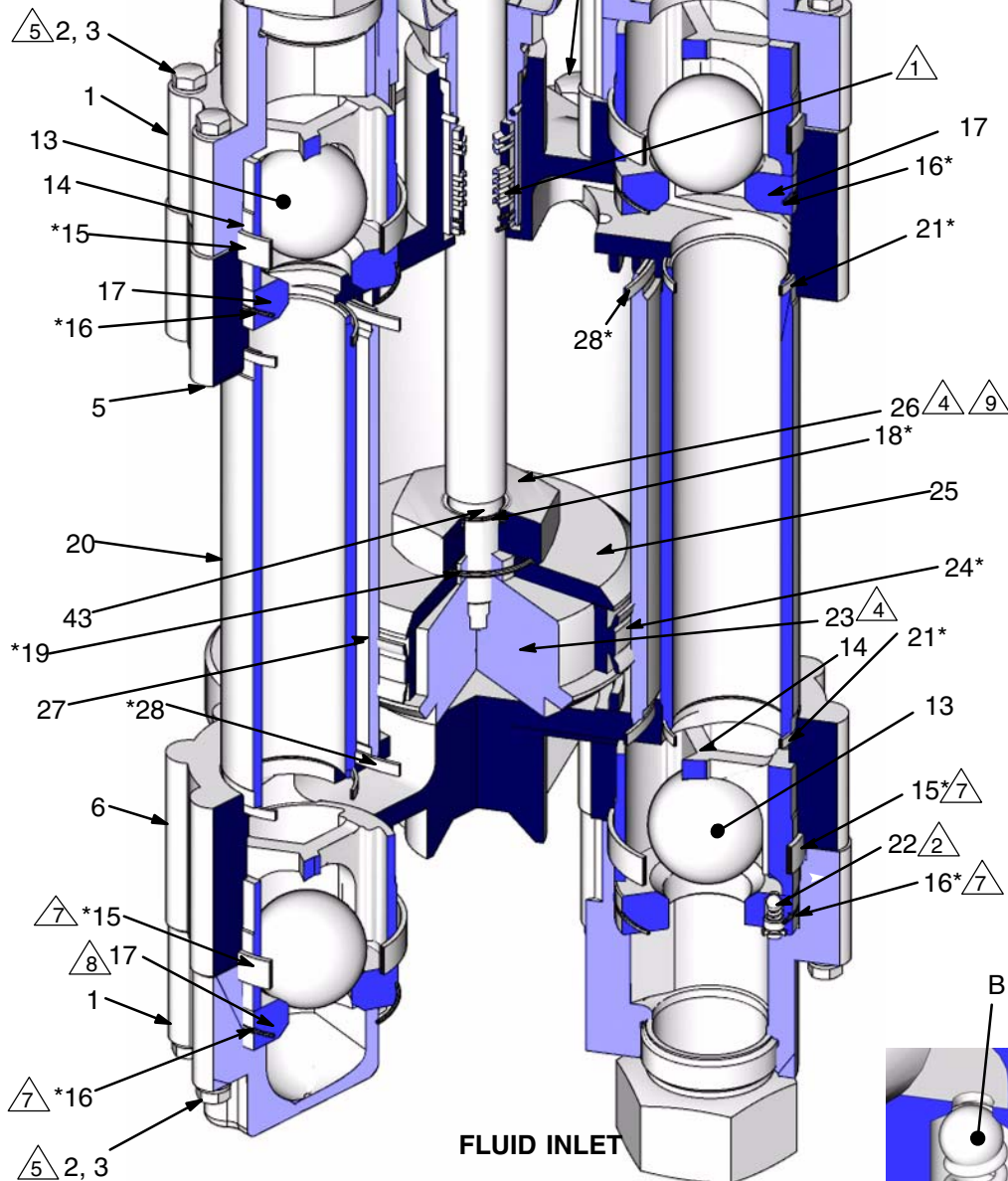
Service

Stainless Steel Model Shown

- △1 See Fig. 14 for proper assembly of v-packings.
- △2 The relief valve seat (22) **must** be installed at the pump fluid inlet. Orient the seat as shown in the Detail. The small ball (B) in the relief valve should point up toward the check ball (13).
- △3 Torque to 67 N•m (50 ft-lb). Back off and re-torque to 27–34 N•m (20–25 ft-lb).
- △4 Apply medium strength throat sealant and torque to 270–284 N•m (200–210 ft-lb).
- △5 Apply medium strength sealant and torque to 24–27 N•m. (18–20 ft-lb).

- △6 Torque oppositely and evenly to 81–88 N•m (60–65 ft-lb).
- △7 Install seals (15) and o-rings (16) on the opposite side of the inlet manifold (1) and at the pump fluid inlet, when installing the relief valve seat (22).
- △8 **Do not** install relief valve seat (22) on this side of the inlet manifold (1).
- △9 Apply anti-seize lubricant 222955 to face of piston nut (26).

FLUID OUTLET



FLUID INLET
Detail of Inlet Valve Seat (22)

* These parts are included in Piston Seal Repair Kit 243727, 243728, and 243729 which may be purchased separately. See page 30.

** These parts are included in Coupling Jaw Kit 243948 or 15D950. See page 30.

† These parts are included in the Throat Packing Kits 243671 and 243672 which may be purchased separately. Material varies according to kit. See page 30.

Fig. 16

High-Flo® Pump Parts

		MOTOR	DISPLACE- MENT PUMP	TIE ROD	LOCKNUT	COUPLER	COUPLING NUT	ADAPTER	SEAL
	(Qty.)	(1)	(1)	(3)	(3)	(2)	(1)	(2)	(2)
	ITEM	101	102	103	104	105	106	107	108

MODEL BULLDOG PUMPS

NUMBER RATIO Air Motor Manual – See 307304

Carbon Steel Pumps	NPT	243737	3:1	215255	243731	180487	102216	184129	186925	N/A	N/A
Severe-Duty Electro-polished Stainless Steel Pumps	NPT	243743	3:1	215255	243734	180487	102216	184129	186925	196321	193424
	BSPP	243744	3:1	233077	243734	180487	102216	184129	186925	N/A	N/A
Severe-Duty Chrome Stainless Steel Pumps	NPT	248335	3:1	215255	248329	180487	102216	184129	186925	196321	193424
	BSPP	248336	3:1	233077	248329	180487	102216	184129	186925	N/A	N/A

MODEL KING PUMPS

NUMBER RATIO Air Motor Manual – See 309348

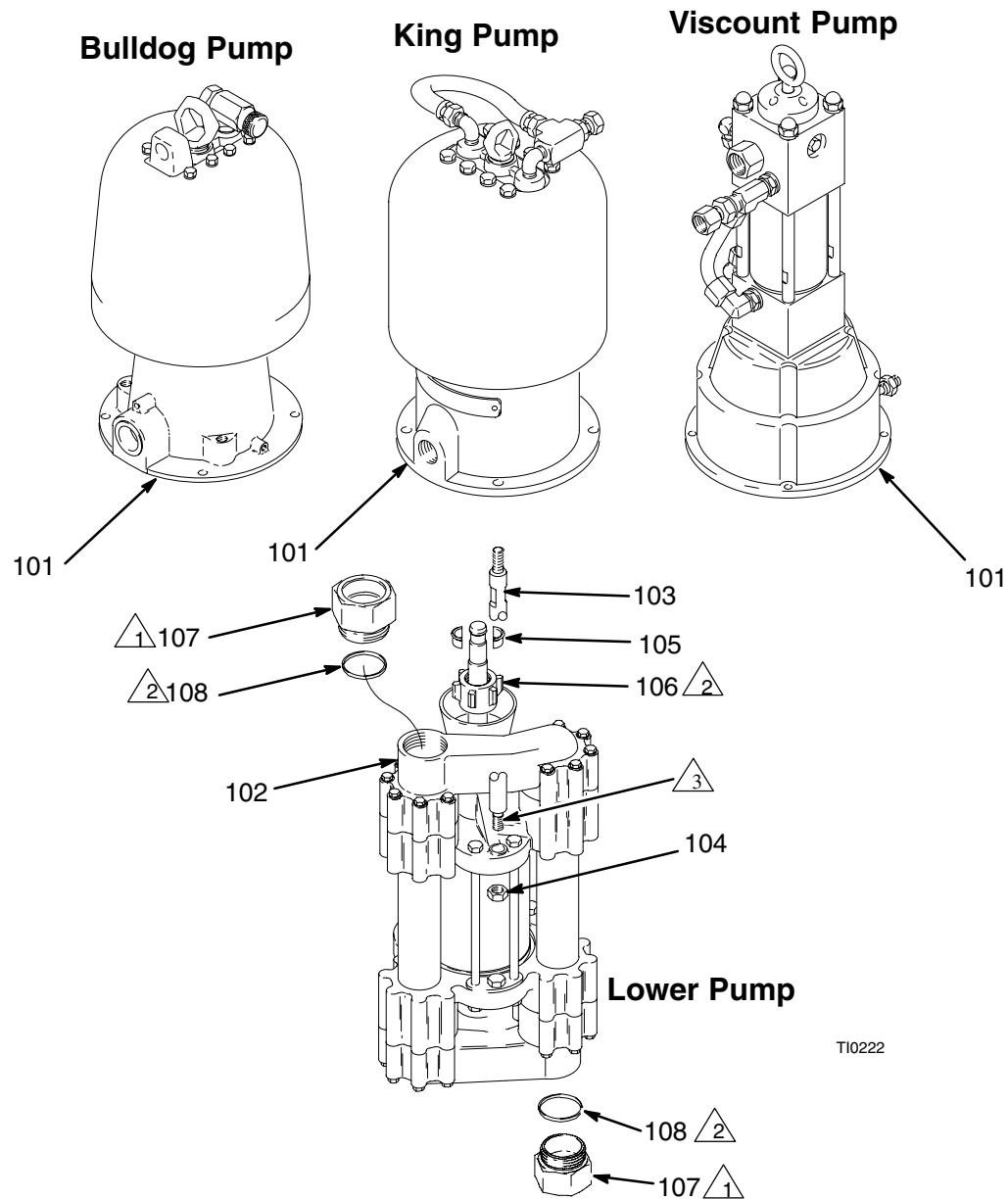
Carbon Steel Pumps	NPT	243738	6:1	220106	243731	180487	102216	184129	186925	N/A	N/A
	NPT	243739	4:1	220106	243732	180487	102216	184129	186925	N/A	N/A
Severe-Duty Electro-polished Stainless Steel Pumps	NPT	243745	6:1	220106	243734	180487	102216	184129	186925	196321	193424
	BSPP	243746	6:1	235525	243734	180487	102216	184129	186925	N/A	N/A
	NPT	243747	4:1	220106	243735	180487	102216	184129	186925	196321	193424
	BSPP	243748	4:1	235525	243735	180487	102216	184129	186925	N/A	N/A
	NPT	243749	3:1	220106	243736	180487	102216	184129	186925	196321	193424
	BSPP	243750	3:1	235525	243736	180487	102216	184129	186925	N/A	N/A

MODEL VISCOUNT II PUMPS

NUMBER RATIO Hydraulic Motor Manual – See 308048

Carbon Steel Pumps	NPT	243740	600	223646	243731	180487	102216	184129	186925	N/A	N/A
	NPT	243741	400	223646	243732	180487	102216	184129	186925	N/A	N/A
	NPT	243742	300	223646	243733	180487	102216	184129	186925	N/A	N/A
Severe-Duty Electro-polished Stainless Steel Pumps	NPT	243751	600	223646	243734	180487	102216	184129	186925	196321	193424
	BSPP	243752	600	223646	243734	180487	102216	184129	186925	N/A	N/A
	NPT	243753	400	223646	243735	180487	102216	184129	186925	196321	193424
	BSPP	243754	400	223646	243735	180487	102216	184129	186925	N/A	N/A
	NPT	243755	300	223646	243736	180487	102216	184129	186925	196321	193424
	BSPP	243756	300	223646	243736	180487	102216	184129	186925	N/A	N/A
	NPT	248343	400	223646	248330	180487	102216	184129	186925	196321	193424
	BSPP	248344	400	223646	248330	180487	102216	184129	186925	N/A	N/A
	NPT	248345	300	223646	248331	180487	102216	184129	186925	196321	193424
	BSPP	248346	300	223646	248331	180487	102216	184129	186925	N/A	N/A

High-Flo® Pump Models



- △1 Adapter for NPT models only.
- △2 Torque to 195–210 N•m. (145–155 ft-lb).
- △3 Apply PTFE tape or anti-seize lubricant to the bottom threads.

Fig. 17

Displacement Pump Parts

			DISPLACEMENT PUMP MODELS								
MODELS			243731	243732	243733	243734	243735	243736	243771	243772	243773
MOTOR Viscount Series Pumps King Ratios Bulldog Ratios Inlet/Outlet Thread			CRS			ELECTROPOLISHED SST PUMPS					
			600	400	300	600	400	300	600	400	300
			6:1	4:1	3:1	6:1	4:1	3:1	6:1	4:1	3:1
			3:1			3:1			3:1		
			BSPP						NPT		
Ref No.	Description	Qty.									
1	MANIFOLD	2	180520			193203			193203		
2	CAPSCREW, M8, 75 mm	24	107554								
3	WASHER, flat Sz. 8	24	111003								
4	CAPSCREW, M12, 280 mm	6	107553								
5	HOUSING, valve, outlet	1	180522			180524			180524		
6	HOUSING, valve, intake	1	180521			180523			180523		
7	LOCKWASHER, spring	6	108792								
8	NUT, hex; M 12	6	107538								
9	SCREW drive	4	103972								
11	LABEL, warning	1	183460								
12	WET-CUP/PACKING NUT	1	254966								
13	BALL	4	110294								
14	GUIDE, ball	4	180509								
15	SEAL; UHMWPE*	4	180761								
16	O-RING; PTFE	4	107545								
17	SEAT, valve	3	180529								
18	O-RING; PTFE, encapsulated fluoroelastomer	1	115929								
19	O-RING; PTFE	1	115930								
20	TUBE, riser	2	180530								
21	SEAL; UHMWPE*	4	180760								
22	SEAT, valve, relief***	1	237744								
23	PISTON, pump	1	196261	196263	196265	196261	196263	196265	196261	196263	196265
24	SEAL; piston; UHMWPE*	1	196232	196233	196234	196232	196233	196234	196232	196233	196234
25	PLATE, retaining	1	196262	196264	196266	196262	196264	196266	196262	196264	196266
26	NUT, jam	1	196243								
27	CYLINDER, pump	1	180499	180498	180497	180499	180498	180497	180499	180498	180497
28	SEAL; UHMWPE*	1	180759	180758	180757	180759	180758	180757	180759	180758	180757
29	SHAFT, piston** (Tuff coat™)	1	196228								
30	GLAND, packing, male†	1	198360								
31	V-PACKING, UHMWPE†	6	180641								
32	GLAND, cartridge†	1	243839								
34	O-RING; PTFE†	1	109213								
35	V-PACKING, Leather†	4	15J057								
40	ADAPTER, 2 in. NPT	2							196321		
41	SEAL 2 in. ID PTFE	2							193424		
42	GLAND, packing, female†	1	196216								
43	RETAINER,O-Ring	1	196356								

* These parts are included in Piston Seal Repair Kit 243727, 243728, and 243729 which may be purchased separately. See page 30.

** These parts are included in Coupling Jaw Kit 243948 or 15D950. See page 30.

† These parts are included in the Throat Packing Kits 243671 and 243672 which may be purchased separately. Material varies according to kit. See page 30.

*** Also includes two of item 15 and two of item 16.

Displacement Pump Parts

DISPLACEMENT PUMP MODELS								
MODELS			248229	248330	248331	248332	248333	248334
MOTOR Viscount Series Pumps King Ratios Bulldog Ratios Inlet/Outlet Thread			CHROME SST PUMPS					
				400	300		400	300
			6:1	4:1	3:1	6:1	4:1	3:1
			3:1			3:1		
			BSPP			NPT		
Ref No.	Description	Qty.						
1	MANIFOLD	2	193203			193203		
2	CAPSCREW, M8, 75 mm	24	107554					
3	WASHER, flat Sz. 8	24	111003					
4	CAPSCREW, M12, 280 mm	6	107553					
5	HOUSING, valve, outlet	1	180524			180524		
6	HOUSING, valve, intake	1	180523			180523		
7	LOCKWASHER, spring	6	108792					
8	NUT, hex; M 12	6	107538					
9	SCREW drive	4	103972					
11	LABEL, warning	1	183460					
12	WET-CUP/PACKING NUT	1	254966					
13	BALL	4	110294					
14	GUIDE, ball	4	180509					
15	SEAL; UHMWPE*	4	180761					
16	O-RING; PTFE	4	107545					
17	SEAT, valve	3	180529					
18	O-RING; PTFE, encapsulated fluoroelastomer	1	115929					
19	O-RING; PTFE	1	115930					
20	TUBE, riser	2	180530					
21	SEAL; UHMWPE*	4	180760					
22	SEAT, valve, relief***	1	237744					
23	PISTON, pump	1	196261	196263	196265	196261	196263	196265
24	SEAL; piston; UHMWPE*	1	196232	196233	196234	196232	196233	196234
25	PLATE, retaining	1	196262	196264	196266	196262	196264	196266
26	NUT, jam	1	196243					
27	CYLINDER, pump	1	180499	180498	180497	180499	180498	180497
28	SEAL; UHMWPE*	1	180759	180758	180757	180759	180758	180757
29	SHAFT, piston**	1	185197					
30	GLAND, packing, male†	1	198360					
31	V-PACKING, UHMWPE†	6	180641					
32	GLAND, cartridge†	1	243839					
34	O-RING; PTFE†	1	109213					
35	V-PACKING, Leather†	4	15J057					
40	ADAPTER, 2 in. NPT	2				196321		
41	SEAL 2 in. ID PTFE	2				193424		
42	GLAND, packing, female†	1	196216					
43	RETAINER,O-Ring	1	196356					

* These parts are included in Piston Seal Repair Kit 243727, 243728, and 243729 which may be purchased separately. See page 30.

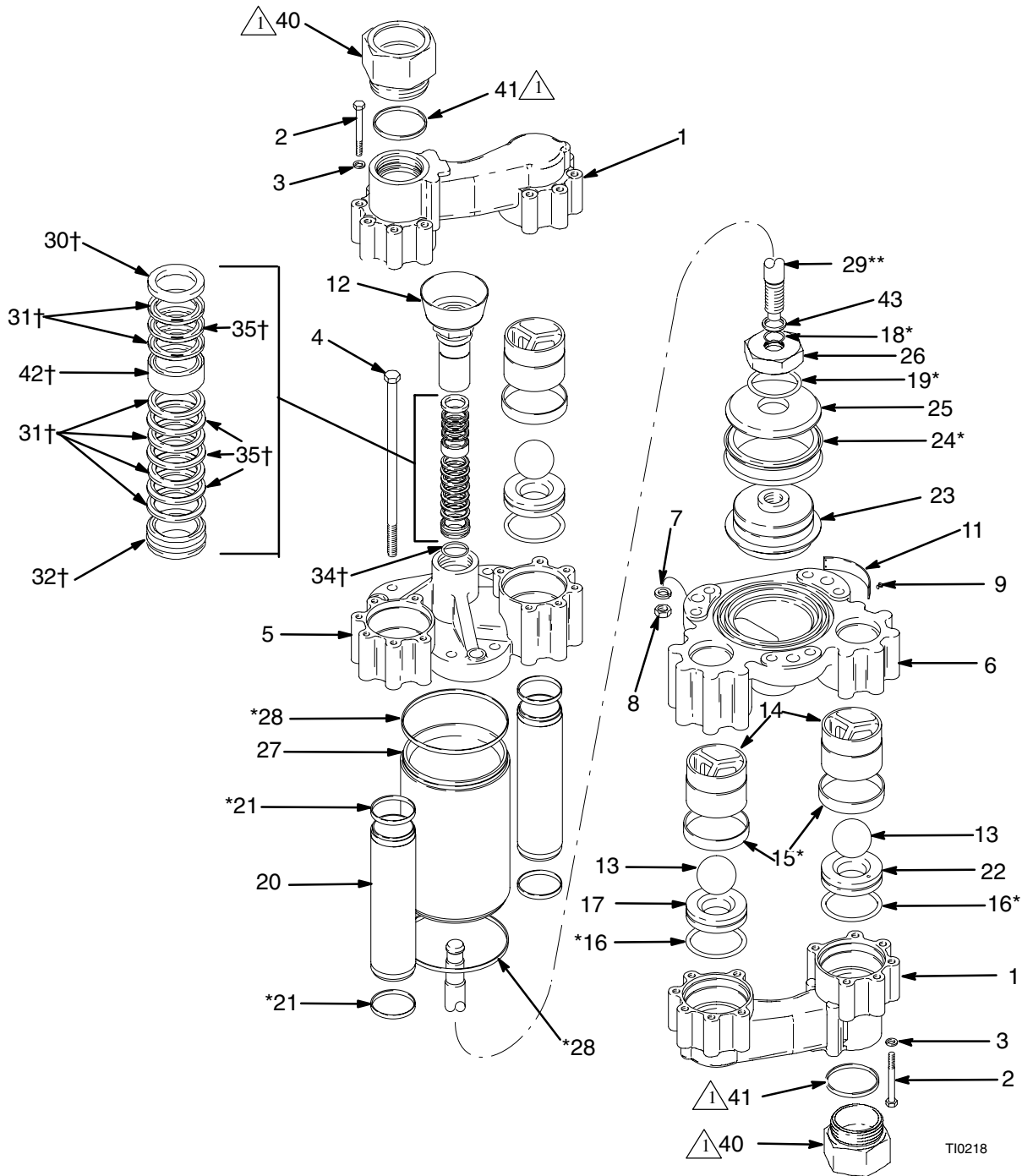
** These parts are included in Coupling Jaw Kit 243948 or 15D950. See page 30.

† These parts are included in the Throat Packing Kits 243671 and 243672 which may be purchased separately. Material varies according to kit. See page 30.

*** Also includes two of item 15 and two of item 16.

Displacement Pump Parts

Models: 243731, 243732, 243733, 243734, 243735,
243736, 243771, 243772, and 243773



TI0218

* These parts are included in Pump Seal Repair Kit 243727, 243728, and 243729 which may be purchased separately. See page 30.

** These parts are included in Coupling Jaw Kit 243948 or 15D950. See page 30.

† These parts are included in the Throat Packing Kits 243671 and 243672 which may be purchased separately. Material varies according to kit. See page 30.


 BSPP to NPT adapter, used on NPT pumps only.

Fig. 18

Repair and Conversion Kits

Use Only Genuine Graco Parts and Accessories

Piston Seal Repair Kit 243727

For Displacement Pumps 243731 & 243734.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	196232	SEAL, piston; UHMWPE	1
	28	180759	SEAL; UHMWPE	2

Piston Seal Repair Kit 243728

For Displacement Pump 243732 & 243735.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	196233	SEAL, piston; UHMWPE	1
	28	180758	SEAL; UHMWPE	2

Piston Seal Repair Kit 243729

For Displacement Pumps 243733 & 243736.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	196234	SEAL, piston; UHMWPE	1
	28	180757	SEAL; UHMWPE	2

UHMWPE/Leather Throat Packing Repair Kit

243671. For all pumps.

Ref.	No.	Part No.	Description	Qty.
	30	198360	GLAND, packing, male	1
	31	180641	V-PACKING, UHMWPE	6
	32	243839	GLAND, packing male	1
	34	109213	O-RING, PTFE	1
	35	15J057	V-PACKING, leather	4
	42	196216	GLAND, packing female	1

Coupling Jaw Kit 15D950. For all chrome SST pumps.

Ref.	No.	Part No.	Description	Qty.
		184129	COLLAR, coupling	2
		186925	NUT, coupling	1
	29	196228	SHAFT, piston, chrome	1

PTFE/Leather Throat Packing Repair Kit 243672.

For all pumps.

Ref.	No.	Part No.	Description	Qty.
	30	198360	GLAND, packing, male	1
	31	190298	V-PACKING, PTFE	6
	32	243839	GLAND, packing, male	1
	34	109213	O-RING, PTFE	1
	35	15J057	V-PACKING, leather	4
	42	196216	GLAND, packing, female	1

Triple Lip™ Throat Conversion Kit 243673.

For all pumps.

Part No.	Description	Qty.
115906	O-RING	1
196240	BEARING	1
243674	SEAL, Throat	1

Piston Seal Conversion Kit 235855

For Displacement Pump 243732 & 243735.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	112037	SEAL; unfilled PTFE	1
	28	180758	SEAL; UHMWPE	2

Piston Seal Conversion Kit 235856

For Displacement Pumps 243731 & 243734.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	112038	SEAL; unfilled PTFE	1
	28	180759	SEAL; UHMWPE	2

Piston Seal Conversion Kit 235854

For Displacement Pumps 243733 & 243736.

Ref.	No.	Part No.	Description	Qty.
	15	180761	SEAL; UHMWPE	4
	16	107545	O-RING; PTFE	4
	18	115929	PACKING, O-RING	1
	19	115930	PACKING, O-RING	1
	21	180760	SEAL; UHMWPE	4
	24	112036	SEAL; unfilled PTFE	1
	28	180757	SEAL; UHMWPE	2

Coupling Jaw Kit 243948

For CST and Electropolished SST pumps.

Ref.	No.	Part No.	Description	Qty.
		184129	COLLAR, coupling	2
		186925	NUT, coupling	1
	29	196228	SHAFT, piston (Tuff Coat™)	1

Technical Data

3:1 Ratio Bulldog Pumps, Models 243737, 243743, and 243744

Category	Data
Maximum Fluid Working Pressure	2.1 MPa, 21 bar (300 psi)
Air Operating Range	0.28–0.7 MPa, 2.8 – 7 bar (40 – 100 psi)
Fluid Flow at 60 Cycles per Minute	118 liter/min (31 gpm)
Cycles Per Liter (gallon)	0.5 (1.93)
Maximum Recommended Pump Speed	60 cycles per minute
Wetted parts	<p><i>Model 243737:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Model 243743 and 243744:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Sound Pressure Levels (dBA) (measured at 1 meter from unit)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	100 psi (0.7 MPa, 7 bar)
Quiet Bulldog	81.5 dB(A)	83.6 dB(A)	85.8 dB(A)

Sound Power Levels (dBA) (tested in accordance with ISO 9614–2)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	100 psi (0.7 MPa, 7 bar)
Quiet Bulldog	90.2 dB(A)	93.5 dB(A)	95.3 dB(A)

Performance Charts

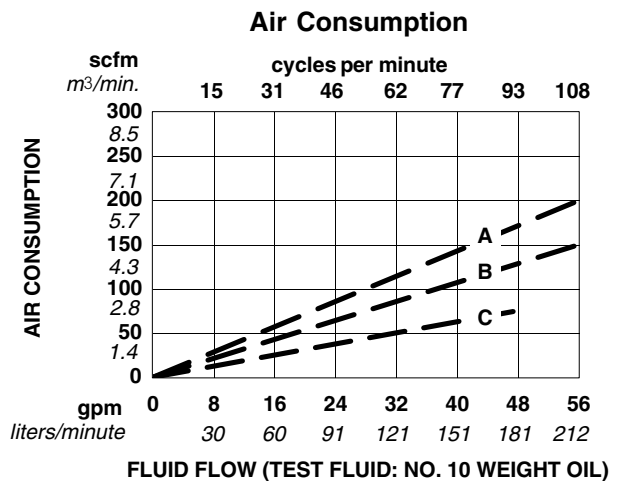
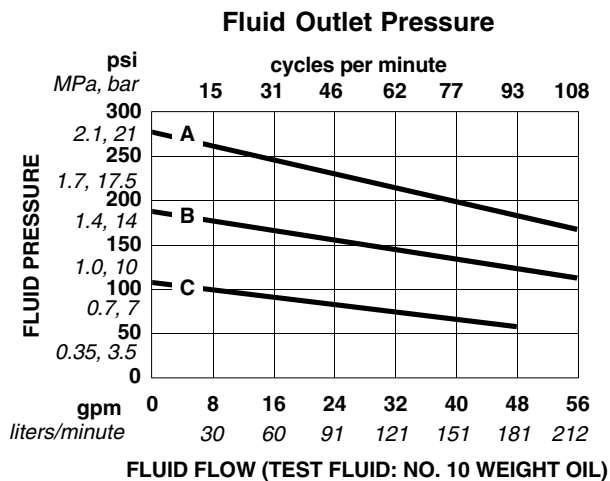
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Pump Air Consumption (m³/min. or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (dashes). Follow left to scale to read air consumption.

- A** 0.7 MPa, 7 bar (100 psi) air pressure
B 0.49 MPa, 4.9 bar (70 psi) air pressure
C 0.28 MPa, 2.8 bar (40 psi) air pressure



Technical Data

6:1 Ratio King Pumps, Models 243738, 243745, and 243746

Category	Data
Maximum Fluid Working Pressure	4.2 MPa (42 bar) (600 psi)
Air Operating Range	0.28–0.7 MPa, 2.8 – 7 bar (40 – 100 psi)
Fluid Flow at 60 Cycles per Minute	118 liter/min (31 gpm)
Cycles Per Liter (gallon)	0.5 (1.93)
Maximum Recommended Pump Speed	60 cycles per minute
Wetted parts	<p><i>Model 243738:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Model 243745 and 243746:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Sound Pressure Levels (dBa)

(measured at 1 meter from unit)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	77.9 dB(A)	79.2 dB(A)	87.5 dB(A)

Sound Power Levels (dBa)

(tested in accordance with ISO 9614–2)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	85.2 dB(A)	86.6 dB(A)	95.2 dB(A)

Performance Charts

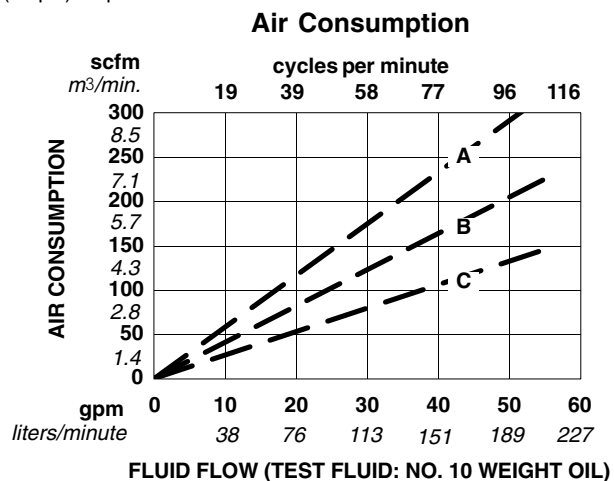
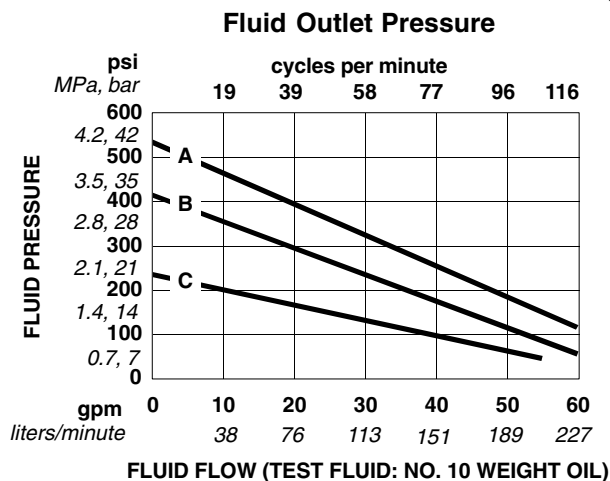
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Pump Air Consumption (m³/min. or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (dashes). Follow left to scale to read air consumption.

- A** 0.6 MPa, 6.2 bar (90 psi) air pressure
B 0.49 MPa, 4.9 bar (70 psi) air pressure
C 0.28 MPa, 2.8 bar (40 psi) air pressure



Technical Data

4:1 Ratio King Pumps, Models 243739, 243747, and 243748

Category	Data
Maximum Fluid Working Pressure	2.8 MPa (28 bar) (400 psi)
Air Operating Range	0.28–0.7 MPa, 2.8 – 7 bar (40 – 100 psi)
Fluid Flow at 60 Cycles per Minute	178 liter/min (47 gpm)
Cycles Per Liter (gallon)	0.34 (1.3)
Maximum Recommended Pump Speed	60 cycles per minute
Wetted parts	<p><i>Model 243739:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Models 243747 and 243748:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Sound Pressure Levels (dBa) (measured at 1 meter from unit)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	77.9 dB(A)	79.2 dB(A)	87.5 dB(A)

Sound Power Levels (dBa) (tested in accordance with ISO 9614–2)

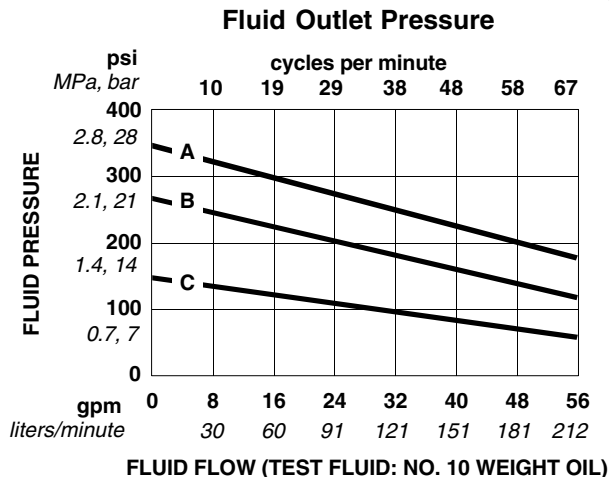
Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	85.2 dB(A)	86.6 dB(A)	95.2 dB(A)

Performance Charts

To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

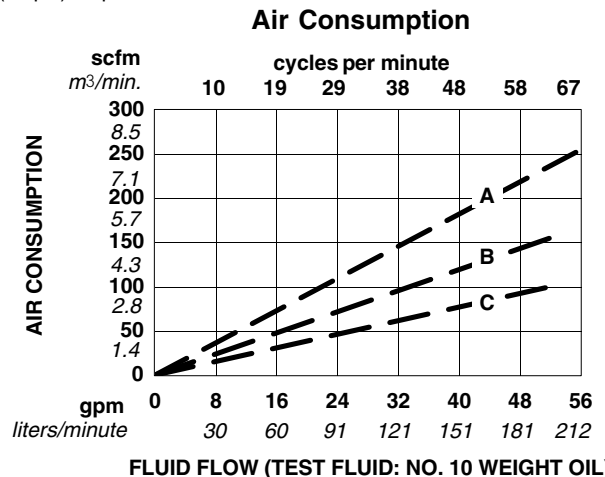
1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

- A** 0.6 MPa, 6.2 bar (90 psi) air pressure
B 0.49 MPa, 4.9 bar (70 psi) air pressure
C 0.28 MPa, 2.8 bar (40 psi) air pressure



To find Pump Air Consumption (m³/min. or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (dashes). Follow left to scale to read air consumption.



Technical Data

3:1 Ratio King Pumps, Models 243749, and 243750

Category	Data
Maximum Fluid Working Pressure	2.1 MPa (21 bar) (300 psi)
Air Operating Range	0.28–0.7 MPa, 2.8 – 7 bar (40 – 100 psi)
Fluid Flow at 60 Cycles per Minute	237 liter/min (63 gpm)
Cycles Per Liter (gallon)	0.24 (0.93)
Maximum Recommended Pump Speed	60 cycles per minute
Wetted parts	<i>Models 243749 and 243750:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene

Sound Pressure Levels (dBa)

(measured at 1 meter from unit)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	77.9 dB(A)	79.2 dB(A)	87.5 dB(A)

Sound Power Levels (dBa)

(tested in accordance with ISO 9614–2)

Air Motor	Input Air Pressures at 15 cycles per minute		
	40 psi (0.28 MPa, 2.8 bar)	70 psi (0.48 MPa, 4.8 bar)	90 psi (0.6 MPa, 6.2 bar)
Quiet King	85.2 dB(A)	86.6 dB(A)	95.2 dB(A)

Performance Charts

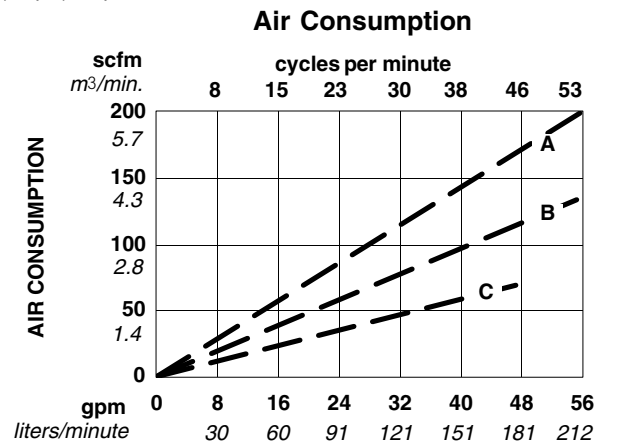
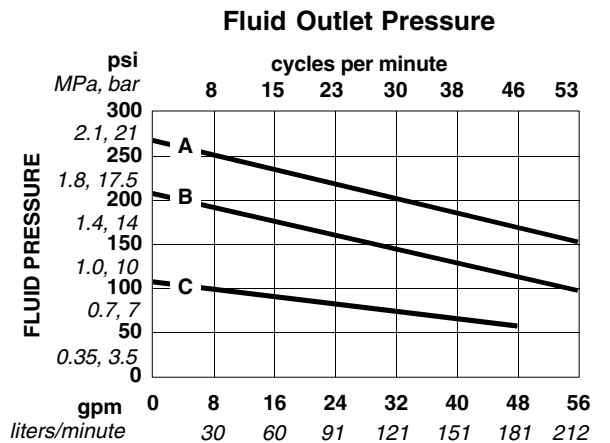
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Pump Air Consumption (m³/min. or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (dashes). Follow left to scale to read air consumption.

A 0.6 MPa, 6.2 bar (90 psi) air pressure
B 0.49 MPa, 4.9 bar (70 psi) air pressure
C 0.28 MPa, 2.8 bar (40 psi) air pressure



Technical Data

Viscount II 600 Pumps, Models 243740, 243751, & 243752

Category	Data
Maximum Fluid Working Pressure	4.1 MPa, 41 bar (600 psi)
Maximum Hydraulic Fluid Pressure	10.3 MPa, 103 bar (1500 psi)
Fluid Flow at 60 Cycles per Minute	118 liter/min (31 gpm)
Cycles Per Liter (gallon)	0.5 (1.93)
Maximum Recommended Pump Speed	60 cycles per minute
Maximum Hydraulic Motor Fluid Temperature	54°C (134°F)
Wetted parts	<p><i>Model 243740:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Model 243751 and 243752:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Performance Charts

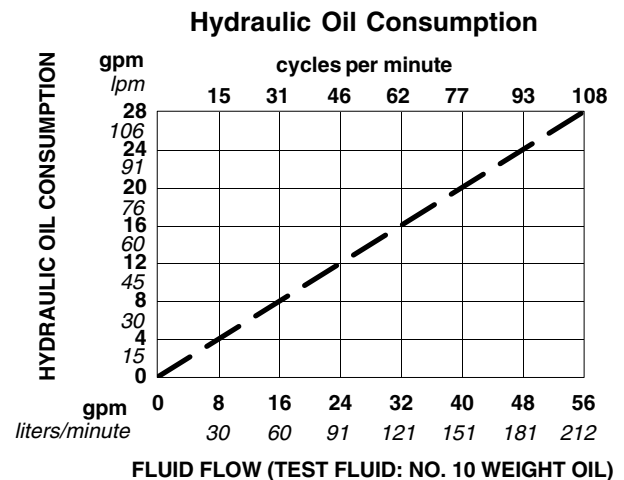
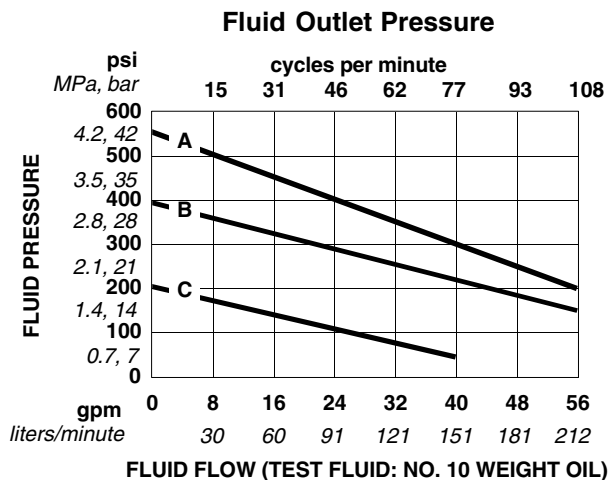
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating hydraulic pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Motor Hydraulic Oil Consumption (lpm or gpm) at a specific fluid flow (lpm or gpm):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with hydraulic oil consumption curve (dashes). Follow left to scale to read hydraulic oil consumption.

- A** 10.3 MPa, 103 bar (1500 psi) hydraulic pressure
B 7.2 MPa, 72.4 bar (1050 psi) hydraulic pressure
C 4.1 MPa, 41 bar (600 psi) hydraulic pressure



Technical Data

Viscount II 400 Pumps, Models 243741, 243753, 243754, 248344, & 248345

Category	Data
Maximum Fluid Working Pressure	2.8 MPa, 28 bar (400 psi)
Maximum Hydraulic Fluid Pressure	10.3 MPa, 103 bar (1500 psi)
Fluid Flow at 60 Cycles per Minute	178 liter/min (47 gpm)
Cycles Per Liter (gallon)	0.34 (1.3)
Maximum Recommended Pump Speed	60 cycles per minute
Maximum Hydraulic Motor Fluid Temperature	54°C (134°F)
Wetted parts	<p><i>Model 243741:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Model 243753, 243754, 248344, & 248345:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Performance Charts

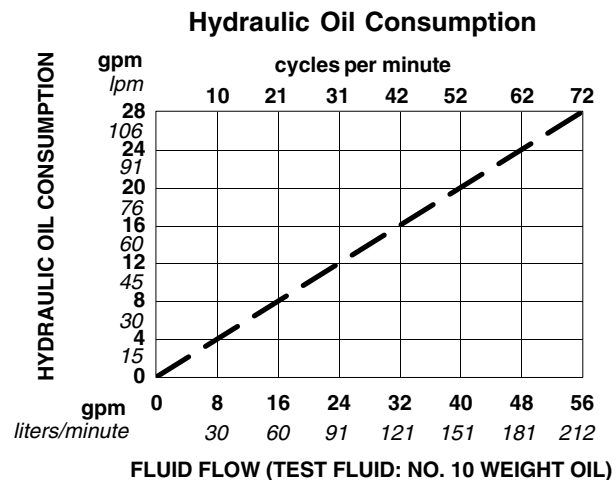
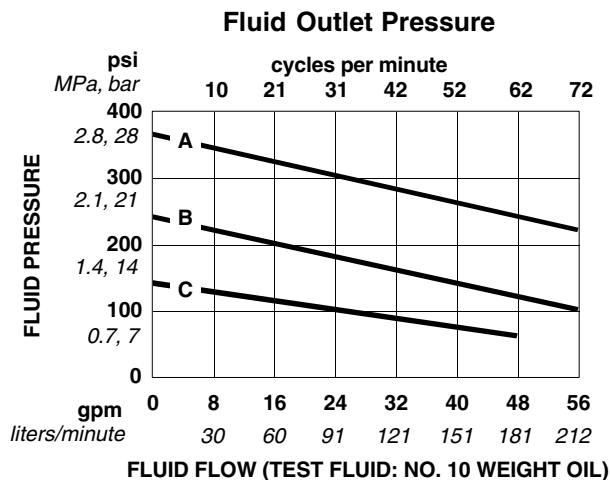
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating hydraulic pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Motor Hydraulic Oil Consumption (lpm or gpm) at a specific fluid flow (lpm or gpm):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with hydraulic oil consumption curve (dashes). Follow left to scale to read hydraulic oil consumption.

- A** 10.3 MPa, 103 bar (1500 psi) hydraulic pressure
B 7.2 MPa, 72.4 bar (1050 psi) hydraulic pressure
C 4.1 MPa, 41 bar (600 psi) hydraulic pressure



Technical Data

Viscount II 300 Pumps, Models 243742, 243755, 243756, 248345, 248346

Category	Data
Maximum Fluid Working Pressure	2.1 MPa, 21 bar (300 psi)
Maximum Hydraulic Fluid Pressure	10.3 MPa, 103 bar (1500 psi)
Fluid Flow at 60 Cycles per Minute	237 liter/min (63 gpm)
Cycles Per Liter (gallon)	0.24 (0.93)
Maximum Recommended Pump Speed	60 cycles per minute
Maximum Hydraulic Motor Fluid Temperature	54°C (134°F)
Wetted parts	<p><i>Model 243742:</i> Carbon Steel, Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p> <p><i>Model 243755, 243756, 248345, & 248346:</i> Stainless Steel, PTFE, Ultra High Molecular Weight Polyethylene</p>

Performance Charts

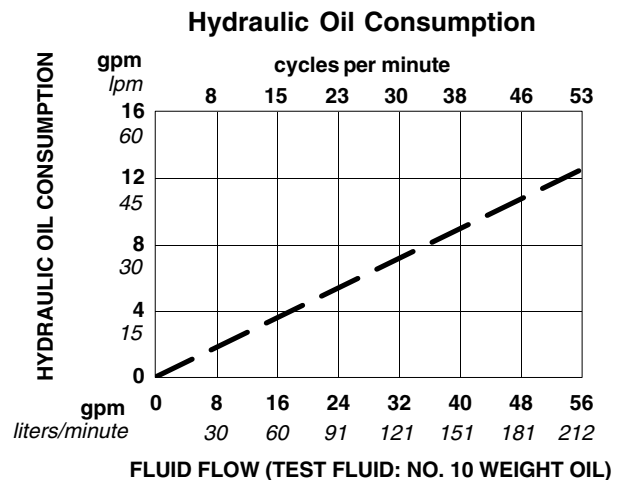
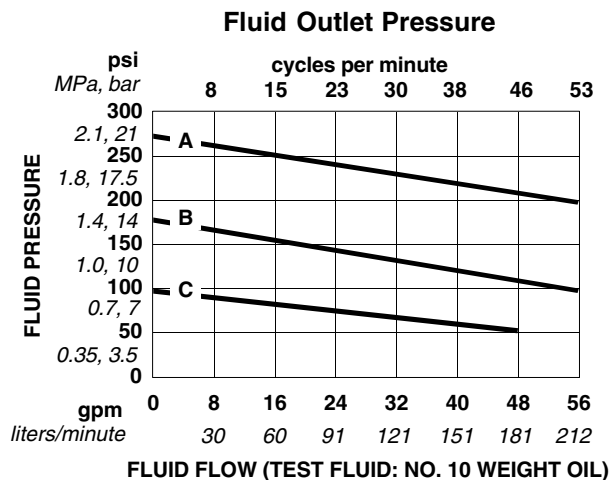
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating hydraulic pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve (black). Follow left to scale to read fluid outlet pressure.

To find Motor Hydraulic Oil Consumption (lpm or gpm) at a specific fluid flow (lpm or gpm):

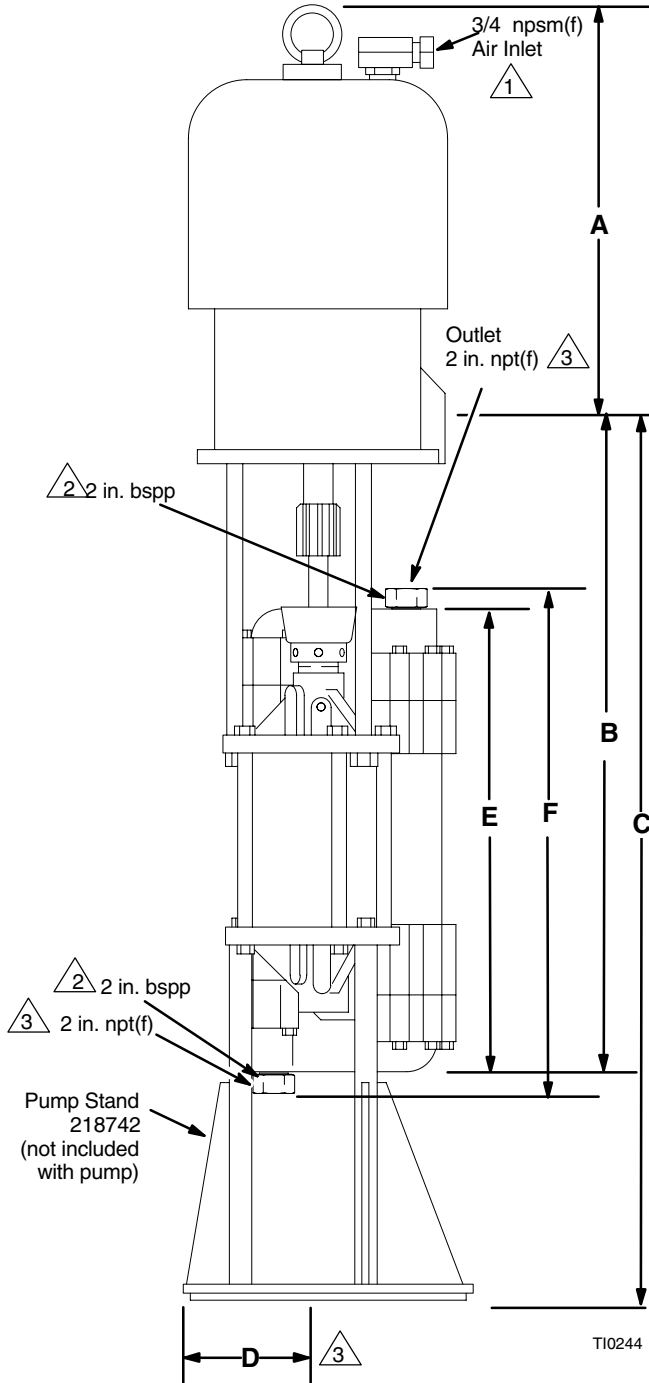
1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with hydraulic oil consumption curve (dashes). Follow left to scale to read hydraulic oil consumption.

- A** 10.3 MPa, 103 bar (1500 psi) hydraulic pressure
B 7.2 MPa, 72.4 bar (1050 psi) hydraulic pressure
C 4.1 MPa, 41 bar (600 psi) hydraulic pressure

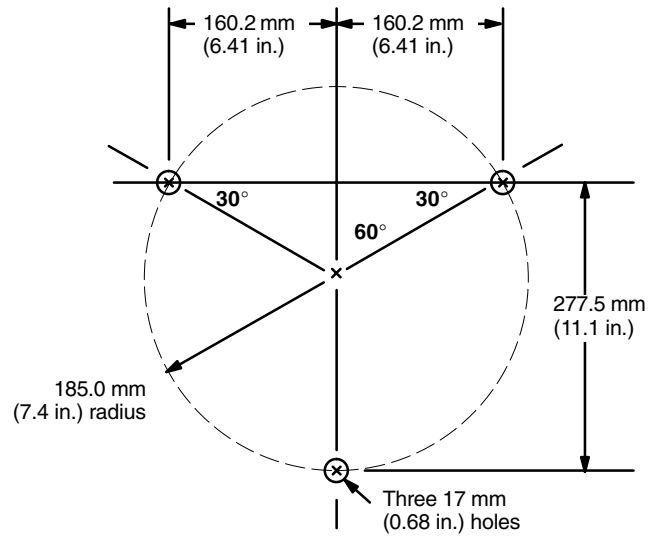


Dimensions

- 1 Viscount Motors have a 3/4 npt hydraulic inlet and a 1 in. npt hydraulic outlet.
- 2 Models 243744, 243745, 243748, 243750, 243752, 243754, 243756, 248344, 248346: 2 in. bspp(f)
- 3 Models 243737, 243738, 243739, 243740, 243741, 243742, 243743, 243745, 243747, 243749, 243751, 243753, 243755, 248343, 248345 include NPT adapter.



Mounting Stand Hole Layout



Pump Model	A	B	C	D	E	F	Weight
Bulldog	540 mm (21.25 in.)	732 mm (29.28 in.)	1003 mm (40 in.)	205 mm (8.2 in.)	551 mm (21.7 in.)	641.7 mm (25.2 in.)	75 kg (167 lb)
King	540 mm (21.25 in.)	732 mm (29.28 in.)	1003 mm (40 in.)	205 mm (8.2 in.)	551 mm (21.7 in.)	641.7 mm (25.2 in.)	84 kg (187 lb)
Viscount	633 mm (24.94 in.)	732 mm (29.28 in.)	1003 mm (40 in.)	205 mm (8.2 in.)	551 mm (21.7 in.)	641.7 mm (25.2 in.)	98 kg (217 lb)

Notes

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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.

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In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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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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