

Instructions – Parts List



WALL MOUNT OR FLOOR STAND, HIGH FLO®

4:1 Ratio, Bulldog® Circulation Packages

310569 Rev.D

For high-production circulation of fluids.

Related Manuals:

307107 Fluid Regulator

308169 Lubricators

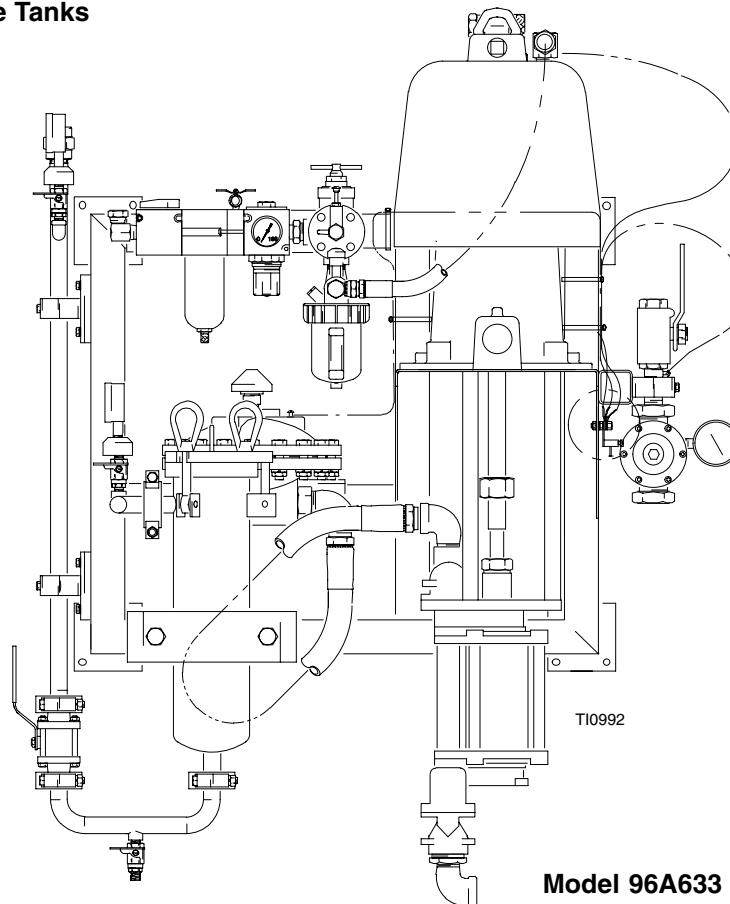
307304 Bulldog Air Motors

308201 Runaway Valves

307628 Fluid Ball Valves

308793 High Flo Pumps

307707 Surge Tanks



Model 96A633 Shown



Read warnings and instructions.

See page 2 for model numbers and maximum working pressures.

Table of Contents

List of Models	2	Parts	16
Warnings	3	Technical Data	28
Component Identification	5	Dimensions	30
Setup	6	Mounting Hole Layouts	31
Operation	10	Graco Standard Warranty	32
Maintenance	13	Graco Information	32
Troubleshooting	15		

List of Models

Model	Pump	Description – Pump Model	Ratio	Maximum Fluid Working Pressure	Maximum Pump Air Input Pressure	Parts Page
96A633	Bulldog	Right Hand Pump Mount High Flo, SS	4:1	350 psi (2.4 MPa, 24.5 bar)	90 psi (0.6 MPa, 6.2 bar)	16
96A634	Bulldog	Left Hand Pump Mount High Flo, SS	4:1	350 psi (2.4 MPa, 24.5 bar)	90 psi (0.6 MPa, 6.2 bar)	16
96A934	Bulldog	Right Hand Pump Mount High Flo, SS – Dual Filter	4:1	350 psi (2.4 MPa, 24.5 bar)	90 psi (0.6 MPa, 6.2 bar)	16
96A935	Bulldog	Left Hand Pump Mount High Flo, SS – Dual Filter	4:1	350 psi (2.4 MPa, 24.5 bar)	90 psi (0.6 MPa, 6.2 bar)	16
96A644	Bulldog	Right Hand Pump Mount High Flo, CS	4:1	350 psi (2.4 MPa, 24.5 bar)	90 psi (0.6 MPa, 6.2 bar)	16

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** 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.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- 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.



PRESSURIZED EQUIPMENT HAZARD

Spray from the gun, hose leaks, or ruptured components can splash fluid in the eyes or on the skin and cause serious injury.

- Do not point the gun at anyone or at any part of the body.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Follow the **Pressure Relief Procedure** on page 10 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.

WARNING



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 10 to prevent the equipment from starting unexpectedly.



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 9.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying 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.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.



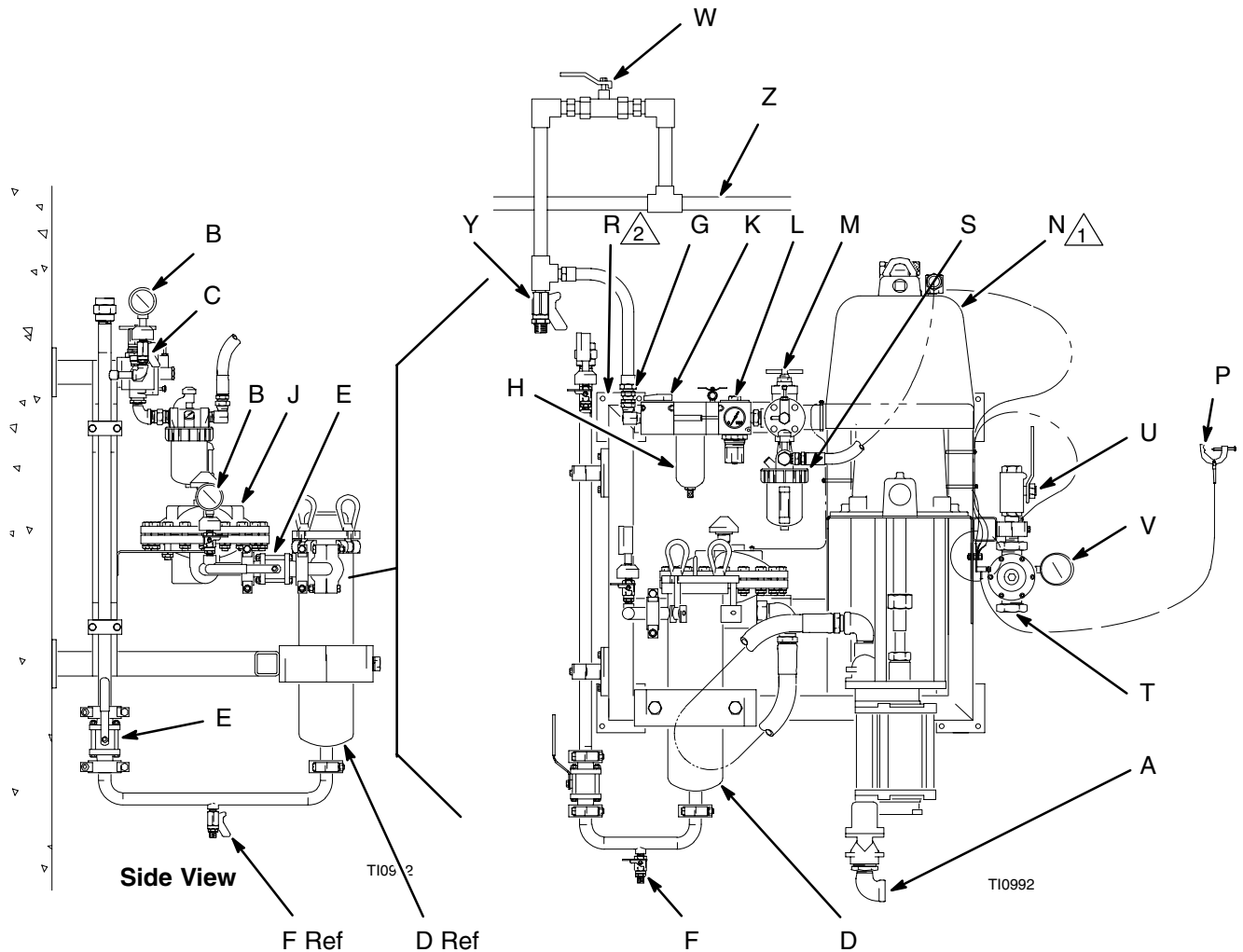
TOXIC FLUID HAZARD

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.

Component Identification

- 1 Ensure that there is 5 ft (1.5 m) overhead clearance for a wall mounted system and at least 7 ft (2.1 m) for a floor mounted system.
- 2 Mount the circulation package so the top of the bracket is 5 to 6 ft (1.5 to 1.8 m) above the floor.



Model 96A633 Shown

KEY

A Fluid Supply Outlet	J Fluid Surge Tank	T Fluid Return Inlet
B Fluid Gauge and Dampener	K Air Motor Master Air Valve	U Fluid Return Valve
C Fluid Gauge Ball Valve	L Air Regulator and Gauge	V Fluid Regulator and Gauge
D Fluid Filter	M Pump Runaway Control Valve	W Bleed-type Master Air Valve (not supplied)
E Filter Ball Valve	N Pump	Y Air Line Drain Valve (not supplied)
F Fluid Drain Valve	P Ground Wire	Z Facility Air Supply
G Air Supply Inlet	R Wall Mount Frame	
H Air Filter	S Air Line Lubricator	

Fig. 1

Setup

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

Site Preparation

Fig. 1. **Relieve system pressure.** For installing any one of the packages listed in this manual, select a site with at least 5 ft (1.5 m) overhead clearance for the wall mounted systems and at least 7 ft (2.1 m) for the floor mounted systems.

Ensure that the wall is strong enough to support the weight of the circulation package and accessories, fluid, hoses, and stress caused during pump operation.

Ensure that you have an adequate compressed air supply.

Bring an air supply line from the facility air supply (Z) to the circulation package location. Be sure all air lines are properly sized and pressure-rated for the system. Use only electrically conductive hoses. The air hose should have a 1/2 npt(m) thread.

Install a bleed-type shutoff valve (W) in the air line to isolate the air line components for servicing. Install a moisture trap and drain valve (Y) to help remove moisture and contaminants from the compressed air supply.

Keep the site clear of any obstacles or debris that could interfere with the operator's movement.

Have a grounded, metal pail available for use when flushing the system.

Supplied Components

Refer to Fig. 1.

WARNING

A bleed-type master air valve (K) and a fluid drain valve (F) are supplied. These components help reduce the risk of serious injury, including splashing of 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.

The fluid drain valve assists in relieving fluid pressure in the displacement pump, fluid filter, hose, and gun. Triggering the gun to relieve pressure may not be sufficient.

- **The bleed-type master air valve (K)** is required in your system to relieve air trapped between it and the air motor when the valve is closed (see the preceding **WARNING**).
- **The fluid drain valve (F)**, is mounted on the bottom of the fluid filter bowl. The fluid drain valve is required in your system to relieve fluid pressure in the displacement pump, fluid filter, hose, and gun. (see the preceding **WARNING**).
- **The pump air filter (H)** includes an air filter with a 40 micron polypropylene element, to remove harmful dirt and moisture from the compressed air supply.
- **The pump air regulator and gauge (L)** controls pump speed and outlet pressure by adjusting the air pressure to the pump. The gauge provides a readout of air pressure to the pump. See manual 308168 for further details.
- **The pump runaway control valve (M)** protects the pump against damage by a runaway air motor. See manual 308201 for further details.
- **The air line lubricator (S)** provides automatic lubrication of the air motor.
- **The pump (N)**, run by air motor, circulates fluid throughout the system. See pump manual for further details.
- Fluid is supplied to the pump through the **fluid outlet (A)**. Fluid pressure is monitored by the two **fluid gauges (B)**.
- **The fluid filter (D)** includes a 60 mesh (250 micron) stainless steel element to filter particles from the fluid as it leaves the pump.
- **The fluid surge tank (J)** protects against surges in the fluid lines during gun use and system operation.
- **The fluid regulator and gauge (V)** controls fluid inlet pressure. The gauge provides a readout of fluid pressure at the inlet. See manual 307107 for further details.
- Fluid is returned from the circulation package to the system through the **fluid return valve (U)**. See valve manual 307628 for further details.

Setup

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

Wall Mount installation of the Circulation Package

Fig. 1. The circulation package consists of the pump mounted on the wall mount frame. Also on the wall mount frame are air filter, master air valve, air controls, lubricator, surge tank, fluid filter, and plumbing.

NOTE: Ensure that there is 5 ft (1.5 m) overhead clearance for a wall mounted system.

NOTE: Refer to Fig. 1, and to the Dimension drawing on page 30 and the Mounting Hole Layout on page 31.

1. **Relieve system pressure** prior to installation of circulation package. Follow **Pressure Relief Procedure** on page 10.
2. Ensure that wall is strong enough to support weight of circulation package, accessories, fluid plumbing, and stress caused during pump operation.
3. Using capable hoist, position wall mount frame (R) so that the top edge is 5 to 6 ft (1.5 to 1.8 m) above floor. Check that wall mount frame is level. Mark four holes on wall for each of four wall mount feet.
4. Drill holes where marked on wall.

WARNING

The wall mount frame (R) must be bolted to the wall. Do not simply hang the wall mount frame. Failure to do so may cause circulation package to fall causing equipment damage or personal injury.

5. Using capable hoist, lift circulation package back into position. Bolt wall mount frame (R) to wall. Use 1/2 in. anchor bolts and washers to mount circulation package to wall. Use bolts that are long enough to keep wall mount frame from vibrating during operation.

Single or Dual Floor Mount installation of the Circulation Package

Fig. 1. The circulation package consists of the pump mounted on the wall mount frame. Also on the wall mount frame are air filter, master air valve, air controls, lubricator, surge tank, fluid filter, and plumbing.

NOTE: Ensure that there is 7 ft (2.1 m) overhead clearance for a floor mounted system.

NOTE: Refer to Fig. 1, and to the Single Mount Floor Stand drawing on page 26 or the Dual Mount Floor Stand drawing on page 27. Also refer to the Mounting Hole Layouts on page 31.

1. **Relieve system pressure** prior to installation of circulation package. Follow **Pressure Relief Procedure** on page 10.
2. Anchor either single or dual floor stand to floor using 1/2 in. bolts.

WARNING

Do not attempt to mount two circulation packages on a single mount floor stand. Use dual mount stand for dual or back-to-back installations. Failure to do so can result in mount failure causing equipment damage or personal injury

3. Using capable hoist, position wall mount frame (R) so that the top edge is level with the top edge of the floor stand. For dual, use second hoist and align with dual floor stand and first circulation package.
4. Bolt single unit or dual units to floor stand using 1/2 in. hardware.

Setup

Connect the Fluid Lines

Fig. 1. Connect system fluid supply line to the circulation package at fluid supply inlet (A). Close filter ball valves (E) to isolate the circulation package from the main fluid supply line.

Connect circulation package to the system fluid return line at fluid return outlet (T). Close fluid return valve (U) to isolate the circulation package from the main fluid return line.

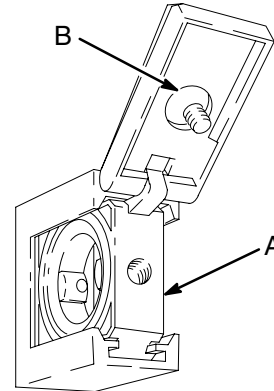
Connect the Air Line

Fig. 1. Bring an air supply line from the facility air supply (Z) to the circulation package location. Be sure all air lines are properly sized and pressure-rated for the system. Use only electrically conductive hoses. Air hose should have a 1/2 npt(m) thread.

Install a bleed-type shutoff valve (W) in the air line to isolate the air line components for servicing. Install a moisture trap and drain valve (Y) to help remove moisture and contaminants from the compressed air supply.

Using the Quick Connectors

Fig. 2. To open a quick connector (A), loosen the captive screw (B) and open the connector. Slide the desired component into or out of the connector, close, and tighten the screw.





06278

Fig. 2

Setup

Grounding

**WARNING**

**FIRE AND EXPLOSION HAZARD**
Before operating the circulation package, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 4.

1. *Pump:* use the ground wire and clamp (A, supplied). See Fig. 3. Connect the ground clamp to a true earth ground.

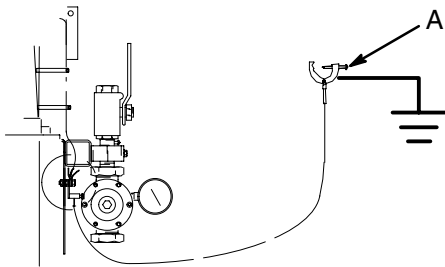


Fig. 3

2. *Air and fluid hoses:* use only electrically conductive hoses.
3. *Air compressor:* follow manufacturer's recommendations.
4. *Spray gun:* ground through connection to a properly grounded fluid hose and pump.
5. *Fluid supply container:* follow your local code.
6. *Object being sprayed:* follow your local code.
7. *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.
8. *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.

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. Fig. 4. Relieve the pressure of the entire system following applicable system pressure relief procedures. Ensure that system pressure is relieved before proceeding with step 2.
2. Close the bleed-type master air valve (W, required in your system).
3. Trigger the gun at the last gun station to relieve fluid pressure. Maintain firm metal-to-metal contact between the gun and a grounded waste pail. Repeat for all gun stations.
4. Open the fluid drain valve (14) to relieve fluid pressure which may be trapped in the pump, plumbing, or hose.

If you suspect that pressure is not fully relieved after following the steps above, wrap a fitting near the pump outlet with a rag, and slowly and carefully loosen the fitting to relieve pressure. Be careful to protect your eyes from splashing.

Packing Nut

Fig. 4. Before starting, fill the packing nut (AA) 1/3 full with Graco Throat Seal Liquid (TSL) or compatible solvent.

WARNING

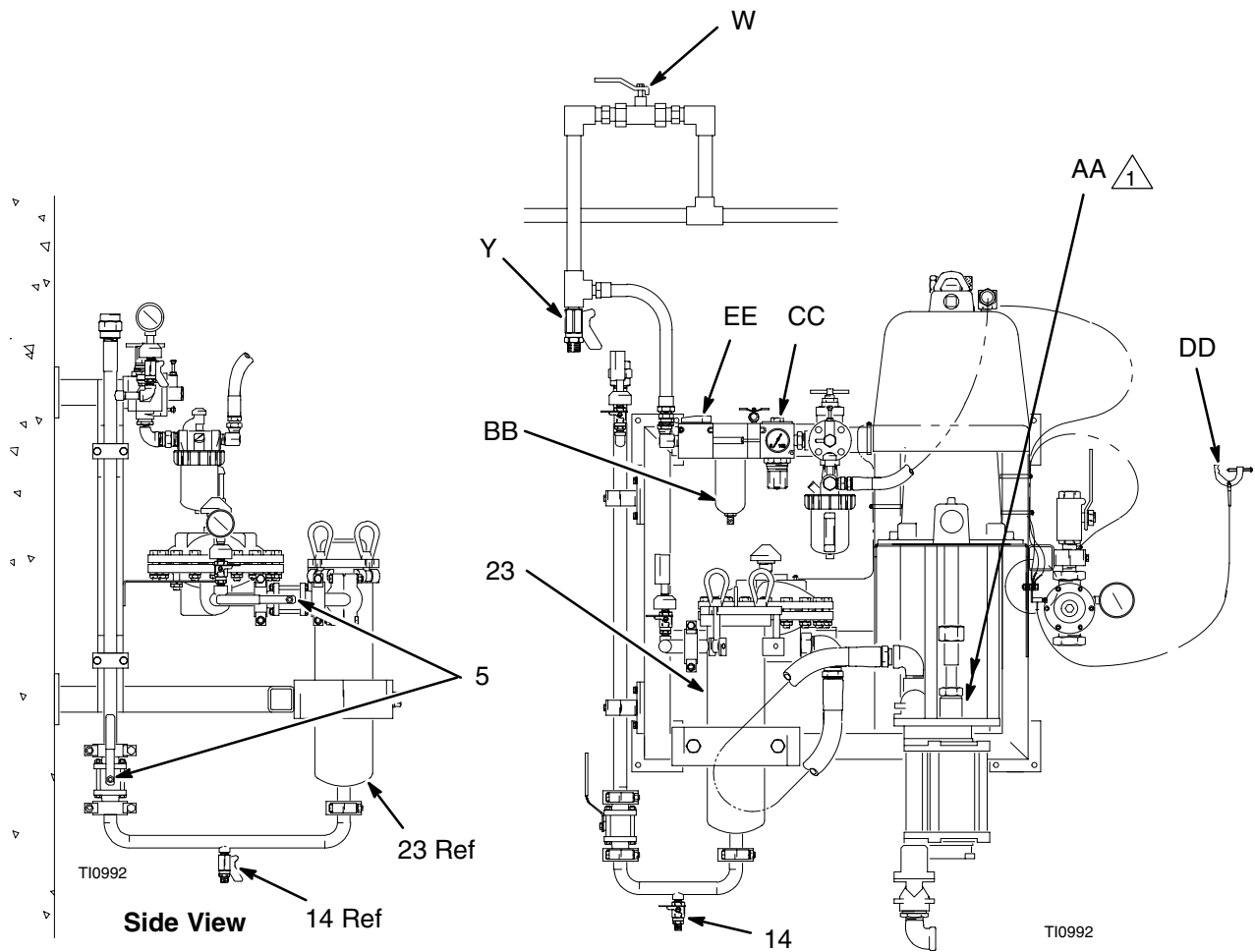
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** at left.

The packing nut is torqued at the factory and is ready for operation. If it becomes loose and there is leaking from the throat packings, relieve pressure, then torque the nut to 34–40 N•m (25–30 ft-lb). Do this whenever necessary. Do not overtighten the packing nut.

Flush the Circulation Package Before First Use

The circulation package is tested with lightweight oil, which is left in to protect the circulation package parts. If the fluid you are using may be contaminated by the oil, flush it out with a compatible solvent. See **Flushing** on page 13.

Operation



Model 96A633 Shown

△ 1 Torque packing nut (H) to 34–40 N•m (25–30 ft-lb).
Packing nut is partially hidden.

Fig. 4

Operation

Starting and Adjusting the Pump

1. Fig. 4. Open all fluid shutoff valves (5–two) (DD).
2. Open the spray gun at the last gun station and keep it open while starting the pump.
3. Open the bleed-type master air valves (W, EE).
4. Slowly open air regulator (CC) until the pump starts. The air regulator controls the pump speed and fluid outlet pressure.
5. Adjust the fluid back pressure to the lowest setting necessary to get the desired results. Higher pump pressures may not improve the spray pattern and will cause premature component wear. Use the air regulator (CC) to adjust the pump speed and back pressure regulator to adjust line pressure until the spray is completely atomized.
6. To adjust the spray pattern, follow the complete instructions in your gun manual.
7. When you have achieved the desired spray pattern, release the gun trigger. The pump will continue to cycle as long as air is supplied.
8. One at a time, open any other guns in the system to purge air from the lines.

NOTE: In a circulating system, the pump will continue to cycle as long as air is supplied. In a direct supply system, the pump starts when the gun is opened, and stops when the gun is closed.

WARNING



COMPONENT RUPTURE HAZARD

To reduce the risk of overpressurizing your system, which could cause component rupture and serious injury, *never exceed the specified maximum air input pressure to the pump* (see **Technical Data** on page 28).

CAUTION

Do not allow the pump to run dry. It will quickly accelerate to a high speed, causing damage. If your pump is running too fast, stop it immediately and check the fluid supply. If the container is empty and air has been pumped into the lines, refill the container and prime the pump and the lines, or flush and leave it filled with a compatible solvent. Eliminate all air from the fluid system.

Shutdown

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.


1. To prevent damage to the throat packings, stop the pump at the bottom of its stroke so fluid will not dry on the exposed displacement rod
2. Relieve the pressure.
3. Always flush the pump before fluid dries on the displacement rod. See **Flushing** on page 13.

Maintenance

Preventive Maintenance Schedule

The operating conditions of your particular system determine how often maintenance is required. Establish a preventive maintenance schedule by recording when and what kind of maintenance is needed, and then determine a regular schedule for checking your system.

Flushing

 **WARNING**



**FIRE AND EXPLOSION HAZARD**
Before flushing, read the section **FIRE AND EXPLOSION HAZARD** on page 4. Be sure the entire system and flushing pails are properly grounded. Refer to **Grounding** on page 9.

Fig. 4. Flush the pump:

- Before the first use
- When changing colors or fluids
- Before fluid can dry or settle out in a dormant pump (check the pot life of catalyzed fluids)
- Before storing the pump.

Flush with a fluid that is compatible with the fluid you are pumping and with the wetted parts in your system. Check with your fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.

 **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Fig. 4. Relieve the pressure.
2. Remove the air cap and spray tip from the gun. See the gun manual.

3. Fig. 4. Remove the filter element from the fluid filter (23). Clean or replace filter. Reinstall filter bowl.
4. Hold a metal part of the gun firmly to the side of a grounded *metal* pail.
5. Start the pump. Always use the lowest possible fluid pressure when flushing.
6. Trigger the gun. Flush the system until clear solvent flows from the gun.
7. Release the gun trigger and lock the trigger safety. The pump will continue to cycle as long as air is supplied.
8. Direct drain hose into a waste container. Continue flushing until clear fluid comes from the hose.
9. Relieve the pressure.
10. Clean the air cap, spray tip, and fluid filter element separately, then reinstall them.

Fluid Filter Service

 **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Fig. 4. Relieve the pressure.
2. Replace the fluid filter as required to maximize filtering efficiency and to avoid excessive pressure drop.
3. Close two filter ball valves (5). Open filter drain valve (14) and partially loosen filter top to allow fluid in filter to drain into waste container.
4. Install new filter, close filter drain valve (14) and open filter ball valves (5).

Maintenance

Air Filter Service

1. Fig. 4. Every day, drain contaminants from the bowl before reaching the baffle level by opening the drain at the bottom of the bowl (BB).



WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

2. Clean the air filter regularly to maximize filtering efficiency and to avoid excessive pressure drop. Fully relieve pressure to remove the bowl (BB).
3. Clean the filter element and bowl using household soap and water or denatured alcohol. Use compressed air to blow out the filter body. Blow the filter element out from the inside.
4. Clean the sight glass thoroughly. Do not leave solvent residue in the sight glass as it may attack or weaken the glass. If the sight glass appears damaged, replace it immediately.

Troubleshooting

⚠ WARNING



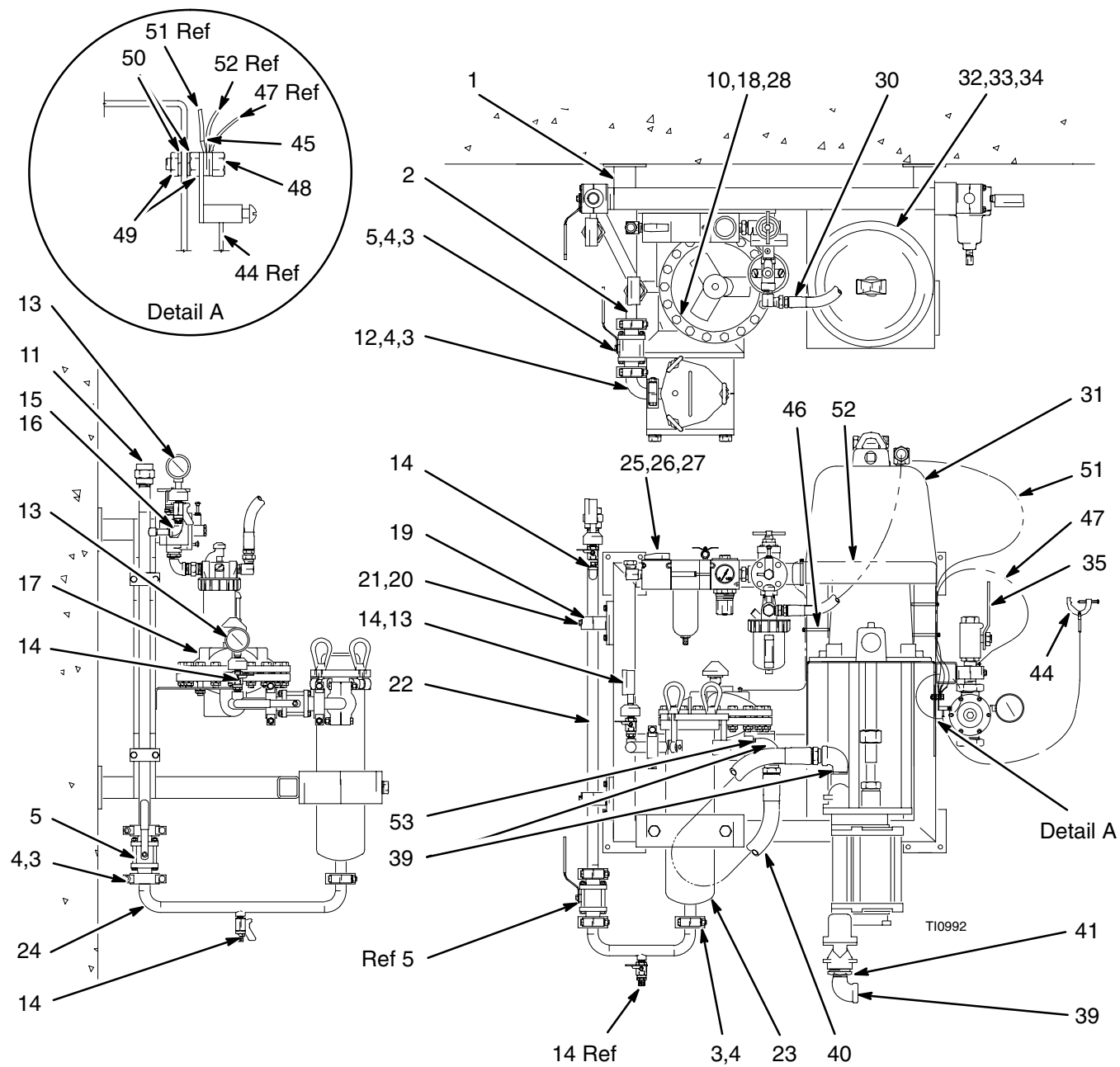
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 10).

For pump service see pump manual. For air motor service see air motor manual.

Problem	Cause(s)	Solution(s)
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. See pump manual.
Pump output low on only one stroke	Held open or worn check valve	Check and repair. See pump manual.
	Worn piston packings	Replace. See pump manual.
No output	Improperly installed ball check valves	Check and correct. See pump manual.
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. See pump manual.
	Worn piston packings	Replace. See pump manual.
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	See air motor manual.
	Fluid dried on piston rod	Disassemble and clean pump. Stop pump at bottom of stroke. See pump manual.

Parts

Right Hand Mount Model: 96A633
4:1 Ratio, Bulldog Pump



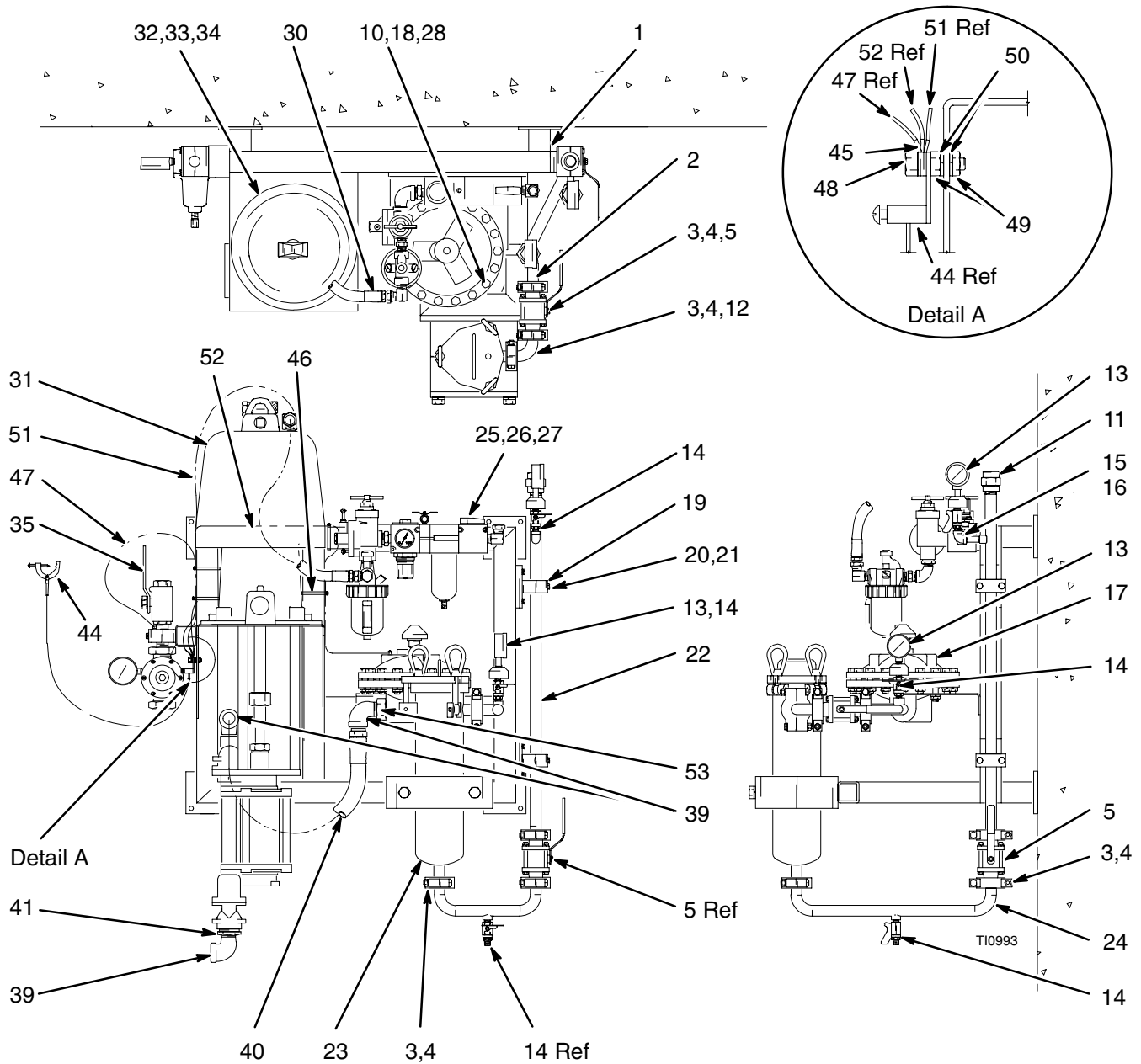
Parts

Right Hand Mount Model: 96A633 4:1 Ratio, Bulldog Pump

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	618216	FRAME, wall/floor stand mount	1	26	C19817	SCREW, cap, soc hd	2
2	618217	MANIFOLD, surge tank discharge	1	27	105510	WASHER, lock, spring (hi-collar)	2
3	51A297	CLAMP, sanitary, sst, 1-1/2"	6	28	101044	WASHER, plain	4
4	516320	GASKET, 1" tube	6	30	238114	HOSE, coupled, 24 in.	1
5	515563	BALL VALVE, paint service	2	31	220578	PUMP, Bulldog, quiet, sst	1
10	194255	SPACER, accumulator	2			See 308793 for parts	
11	515763	COUPLING, full, sst, 3/4" npt	1	32	100004	SCREW, cap, hex hd	4
12	51A795	FITTING	1	33	100133	WASHER, lock	4
13	515571	GAUGE and DAMPENER, sst	2	34	100307	NUT, hex, 3/8"	4
14	237528	BALL VALVE, sst, 1/4" npt	3	35	241207	KIT, repair, valve	1
		See 307628 for parts		39	504045	FITTING, elbow, street	3
15	516010	FITTING, elbow, 90°	1	40	51A192	HOSE, paint	1
16	516771	FITTING, nipple, pipe	1	41	516306	FITTING, bushing, reducer	1
17	220157	TANK, surge, sst	1	44	220011	GROUND WIRE ASSY, 25 ft	1
		See 307707 for parts		45	101896	TERMINAL, ring	4
18	551292	SCREW, cap, hex hd	2	46	112278	WRAP, tie, electrical	4
19	618236	BRACKET, tube support, 1"	2	47	236297	CLAMP ASSY, grounding	1
20	100057	SCREW, cap, hex hd	4	48	115248	SCREW, cap, hex hd	1
21	100016	WASHER, lock	4	49	100166	NUT, full, hex	2
22	618806	HEADER, filter discharge	1	50	100718	WASHER	2
23	916366	FILTER	1	51	220089	CONDUCTOR, ground	1
24	618218	MANIFOLD, filter, discharge	1	52	065136	WIRE, copper, electrical	1
25	917089	KIT, accessory	1	53	515992	FITTING, bushing, reducer	1
		See 308168 and 308201 for parts					

Parts

Left Hand Mount Model: 96A634
4:1 Ratio, Bulldog Pump



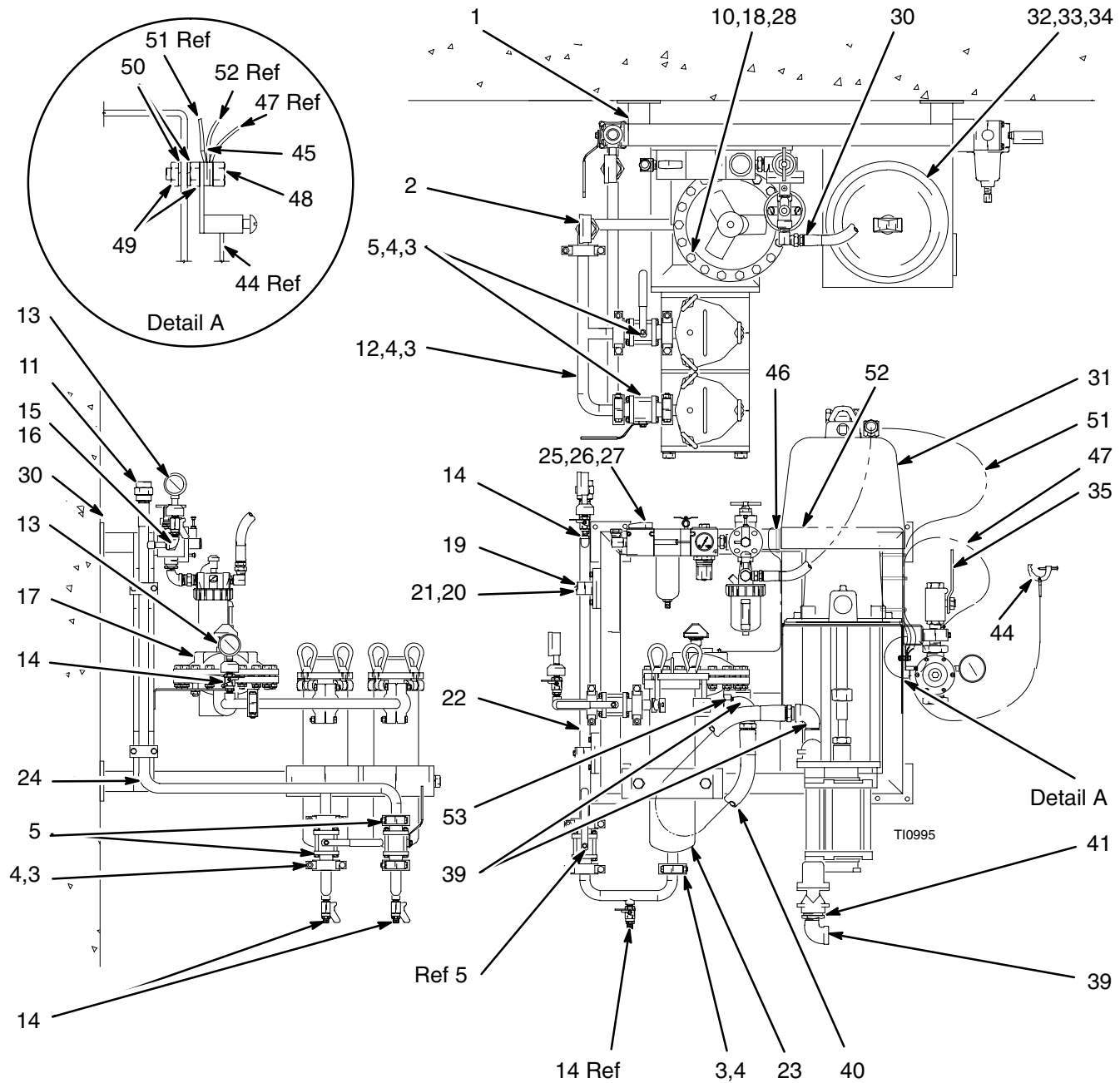
Parts

Left Hand Mount Model: 96A634 4:1 Ratio, Bulldog Pump

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	618226	FRAME, wall/floor stand mount	1	26	C19817	SCREW, cap, soc hd	2
2	618217	MANIFOLD, surge tank discharge	1	27	105510	WASHER, lock, spring (hi-collar)	2
3	51A297	CLAMP, sanitary, sst, 1-1/2"	6	28	101044	WASHER, plain	4
4	516320	GASKET, 1" tube	6	30	214952	HOSE, coupled, 61215	1
5	515563	BALL VALVE, paint service	2	31	220578	PUMP, Bulldog, quiet, sst	1
10	194255	SPACER, accumulator	2			See 308793 for parts	
11	515763	COUPLING, full, sst, 3/4" npt	1	32	100004	SCREW, cap, hex hd	4
12	51A795	FITTING	1	33	100133	WASHER, lock	4
13	515571	GAUGE and DAMPENER, sst	2	34	100307	NUT, hex, 3/8"	4
14	237528	BALL VALVE, sst, 1/4" npt	3	35	241207	KIT, repair, valve	1
		See 307628 for parts		39	504045	FITTING, elbow, street	3
15	516010	FITTING, elbow, 90°	1	40	51A192	HOSE, paint	1
16	516771	FITTING, nipple, pipe	1	41	516306	FITTING, bushing, reducer	1
17	220157	TANK, surge, sst	1	43	156684	UNION, adapter	4
		See 307707 for parts		44	220011	GROUND WIRE ASSY, 25 ft	1
18	551292	SCREW, cap, hex hd	2	45	101896	TERMINAL, ring	4
19	618236	BRACKET, tube support, 1"	2	46	112278	WRAP, tie, electrical	4
20	100022	SCREW, cap, hex hd	4	47	236297	CLAMP ASSY, grounding	1
21	100016	WASHER, lock	4	48	115248	SCREW, cap, hex hd	1
22	618806	HEADER, filter discharge	1	49	100166	NUT, full, hex	2
23	916366	FILTER	1	50	100718	WASHER	2
24	618218	MANIFOLD, filter, discharge	1	51	220089	CONDUCTOR, ground	1
25	917089	KIT, accessory	1	52	065136	WIRE, copper, electrical	1
		See 308168 and 308201 for parts		53	515992	FITTING, bushing, reducer	1

Parts

Right Hand Mount Dual Filter Model: 96A934
4:1 Ratio, Bulldog Pump



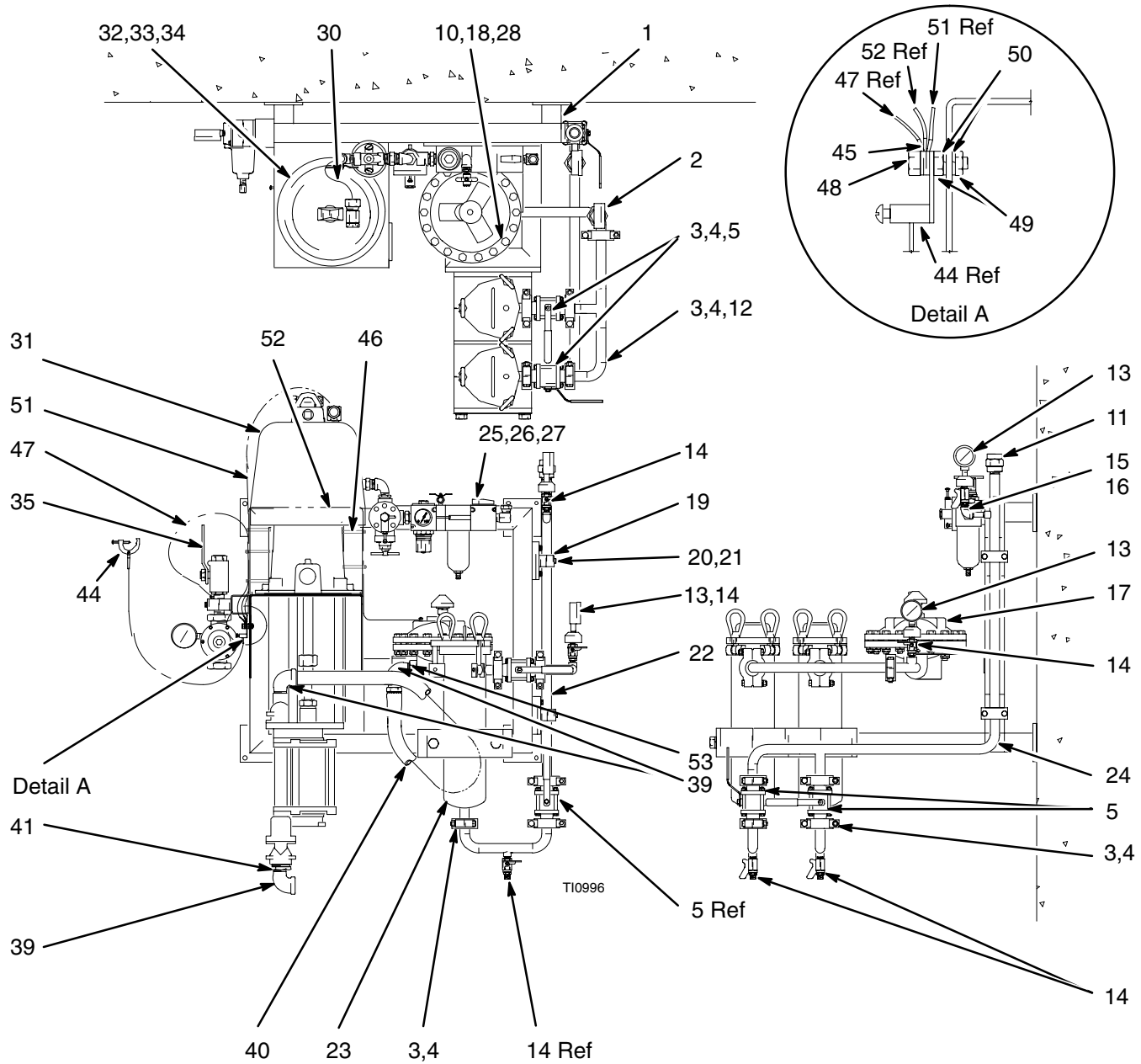
Parts

Right Hand Mount Dual Filter Model: 96A934 4:1 Ratio, Bulldog Pump

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	618380	FRAME, wall/floor stand mount	1	26	C19817	SCREW, cap, soc hd	2
2	618217	MANIFOLD, surge tank discharge	1	27	105510	WASHER, lock, spring (hi-collar)	2
3	51A297	CLAMP, sanitary, sst, 1-1/2"	6	28	101044	WASHER, plain	4
4	516320	GASKET, 1" tube	6	30	214952	HOSE, coupled, 61215	1
5	515563	BALL VALVE, paint service	2	31	220578	PUMP, Bulldog, quiet, sst	1
10	194255	SPACER, accumulator	2			See 308793 for parts	
11	515763	COUPLING, full, sst, 3/4" npt	1	32	100004	SCREW, cap, hex hd	4
12	51A795	FITTING	1	33	100133	WASHER, lock	4
13	515571	GAUGE and DAMPENER, sst	2	34	100307	NUT, hex, 3/8"	4
14	237528	BALL VALVE, sst, 1/4" npt	3	35	241207	KIT, repair, valve	1
		See 307628 for parts		39	504045	FITTING, elbow, street	3
15	516010	FITTING, elbow, 90°	1	40	51A192	HOSE, paint	1
16	516771	FITTING, nipple, pipe	1	41	516306	FITTING, bushing, reducer	1
17	220157	TANK, surge, sst	1	44	220011	GROUND WIRE ASSY, 25 ft	1
		See 307707 for parts		45	101896	TERMINAL, ring	4
18	551292	SCREW, cap, hex hd	2	46	112278	WRAP, tie, electrical	4
19	618236	BRACKET, tube support, 1"	2	47	236297	CLAMP ASSY, grounding	1
20	100022	SCREW, cap, hex hd	4	48	115248	SCREW, cap, hex hd	1
21	100016	WASHER, lock	4	49	100166	NUT, full, hex	2
22	618806	HEADER, filter discharge	1	50	100718	WASHER	2
23	917091	FILTER, dual assembly	1	51	220089	CONDUCTOR, ground	1
24	618218	MANIFOLD, filter, discharge	1	52	065136	WIRE, copper, electrical	1
25	917089	KIT, accessory	1	53	515992	FITTING, bushing, reducer	1
		See 308168 and 308201 for parts					

Parts

Left Hand Mount Dual Filter Model: 96A935
4:1 Ratio, Bulldog Pump



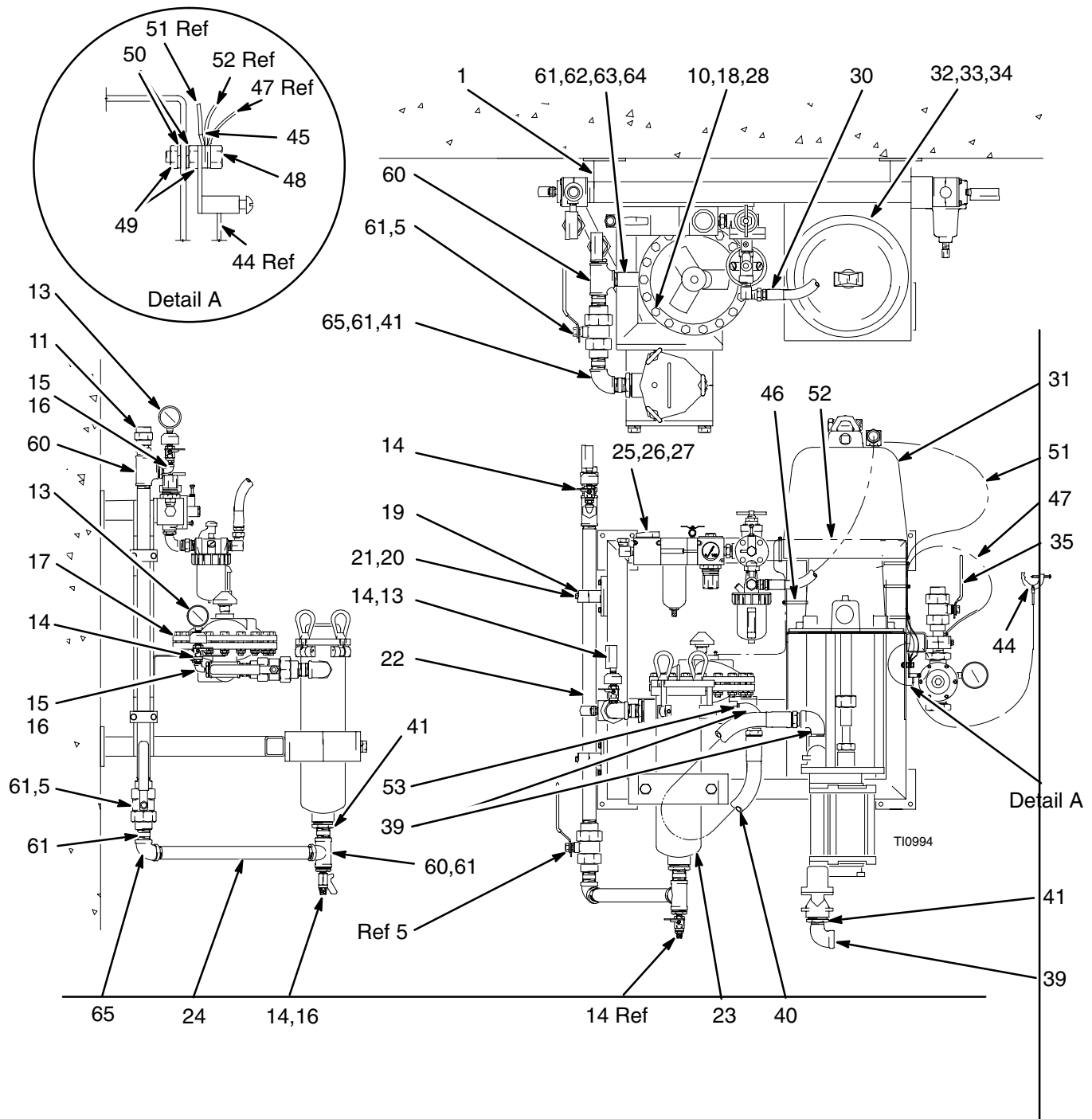
Parts

Left Hand Mount Dual Filter Model: 96A935 4:1 Ratio, Bulldog Pump

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	618381	FRAME, wall/floor stand mount	1	26	C19817	SCREW, cap, soc hd	2
2	618217	MANIFOLD, surge tank discharge	1	27	105510	WASHER, lock, spring (hi-collar)	2
3	51A297	CLAMP, sanitary, sst, 1-1/2"	6	28	101044	WASHER, plain	4
4	516320	GASKET, 1" tube	6	30	214952	HOSE, coupled, 61215	1
5	515563	BALL VALVE, paint service	2	31	220578	PUMP, Bulldog, quiet, sst	1
10	194255	SPACER, accumulator	2			See 308793 for parts	
11	515763	COUPLING, full, sst, 3/4" npt	1	32	100004	SCREW, cap, hex hd	4
12	51A795	FITTING	1	33	100133	WASHER, lock	4
13	515571	GAUGE and DAMPENER, sst	2	34	100307	NUT, hex, 3/8"	4
14	237528	BALL VALVE, sst, 1/4" npt	3	35	241207	KIT, repair, valve	1
		See 307628 for parts		39	504045	FITTING, elbow, street	3
15	516010	FITTING, elbow, 90°	1	40	51A192	HOSE, paint	1
16	516771	FITTING, nipple, pipe	1	41	516306	FITTING, bushing, reducer	1
17	220157	TANK, surge, sst	1	43	156684	UNION, adapter	4
		See 307707 for parts		44	220011	GROUND WIRE ASSY, 25 ft	1
18	551292	SCREW, cap, hex hd	2	45	101896	TERMINAL, ring	4
19	618236	BRACKET, tube support, 1"	2	46	112278	WRAP, tie, electrical	4
20	100022	SCREW, cap, hex hd	4	47	236297	CLAMP ASSY, grounding	1
21	100016	WASHER, lock	4	48	115248	SCREW, cap, hex hd	1
22	618806	HEADER, filter discharge	1	49	100166	NUT, full, hex	2
23	917092	FILTER, dual assembly	1	50	100718	WASHER	2
24	618218	MANIFOLD, filter, discharge	1	51	220089	CONDUCTOR, ground	1
25	917090	KIT, accessory	1	52	065136	WIRE, copper, electrical	1
		See 308168 and 308201 for parts		53	515992	FITTING, bushing, reducer	1

Parts

Right Hand Mount Model: 96A644
4:1 Ratio, Bulldog Pump, Carbon Steel



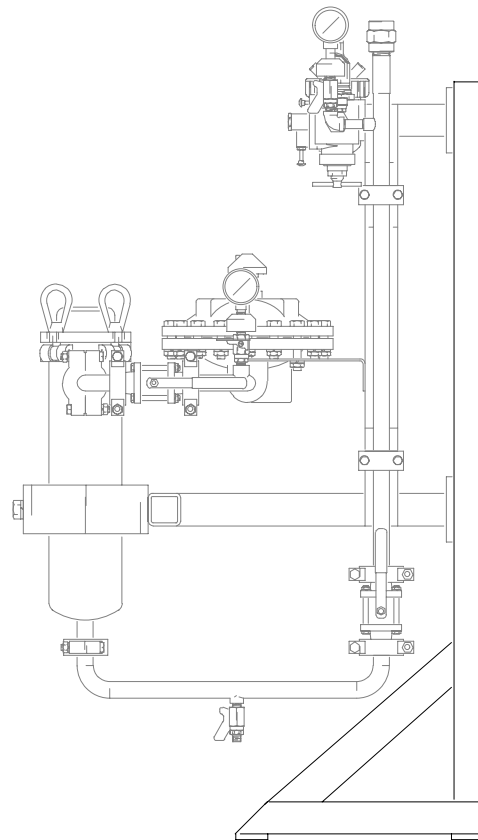
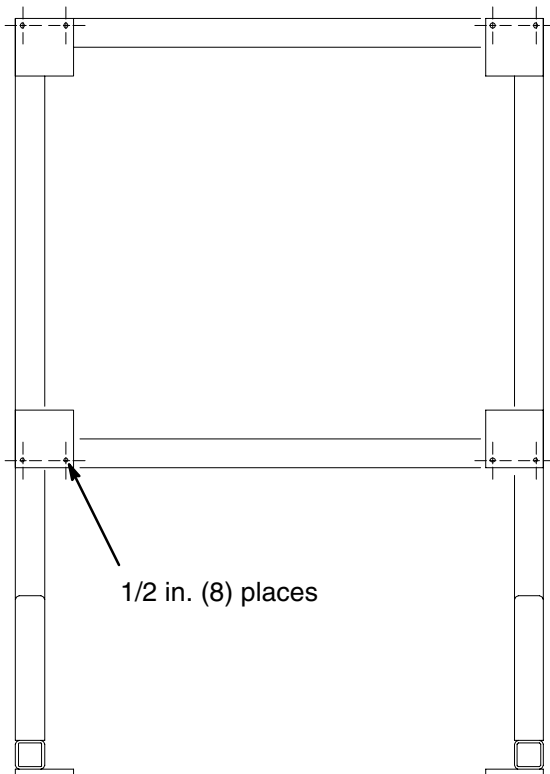
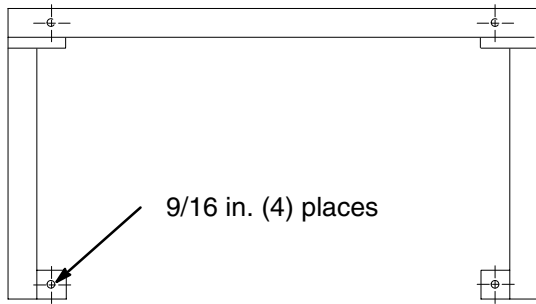
Parts

Right Hand Mount Model: 96A644 4:1 Ratio, Bulldog Pump, Carbon Steel

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	618216	FRAME, wall/floor stand mount	1	32	100004	SCREW, cap, hex hd	4
5	515557	BALL VALVE, paint service	2	33	100133	WASHER, lock	4
10	194255	SPACER, accumulator	2	34	100307	NUT, hex, 3/8"	4
11	515763	COUPLING, full, sst, 3/4" npt	1	35	917075	KIT, repair, valve	1
13	515571	GAUGE and DAMPENER, sst	2	39	110300	FITTING, elbow, street, pipe	3
14	208390	BALL VALVE	3	40	51A192	HOSE, paint	1
		See 307628 for parts		41	C19668	FITTING, bushing, reducing	3
15	100840	ELBOW, street	2	44	220011	GROUND WIRE ASSY, 25 ft	1
16	C19652	FITTING, nipple, pipe	3	45	101896	TERMINAL, ring	4
17	220157	TANK, surge, sst	1	46	112278	WRAP, tie, electrical	4
		See 307707 for parts		47	236297	CLAMP ASSY, grounding	1
18	551292	SCREW, cap, hex hd	2	48	115248	SCREW, cap, hex hd	1
19	618235	BRACKET, pipe support, 1"	2	49	100166	NUT, full, hex	2
20	100022	SCREW, cap, hex hd	4	50	100718	WASHER	2
21	100016	WASHER, lock	4	51	220089	CONDUCTOR, ground	1
22	C19629	FITTING, nipple, header	1	52	065136	WIRE, copper, electrical	1
23	915517	FILTER, bag	1	53	515992	FITTING, bushing, reducer	1
24	51B577	FITTING, nipple, manifold	1	60	106464	TEE, pipe	3
25	917089	KIT, accessory	1	61	100485	NIPPLE, pipe	6
		See 308168 and 308201 for parts		62	C20506	FITTING, union	1
26	C19817	SCREW, cap, soc hd	2	63	51B579	FITTING, nipple	1
27	105510	WASHER, lock, spring (hi-collar)	2	64	500054	BUSHING, hex hd	1
28	101044	WASHER, plain	4	65	C19438	ELBOW, plain	2
30	214952	HOSE, coupled, 61215	1				
31	220577	PUMP, Bulldog, quiet, sst	1				
		See 308793 for parts					

Parts

Single Mount Floor Stand, Model 618613

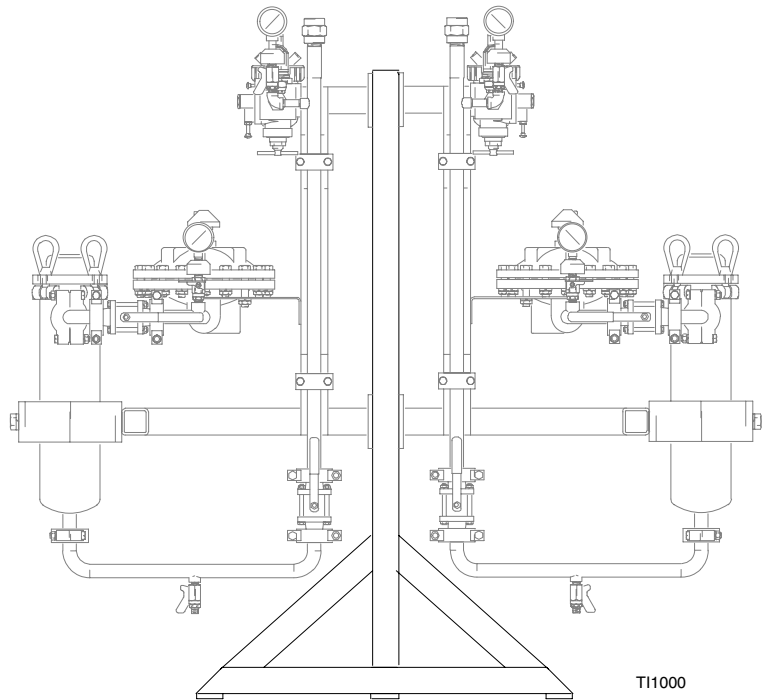
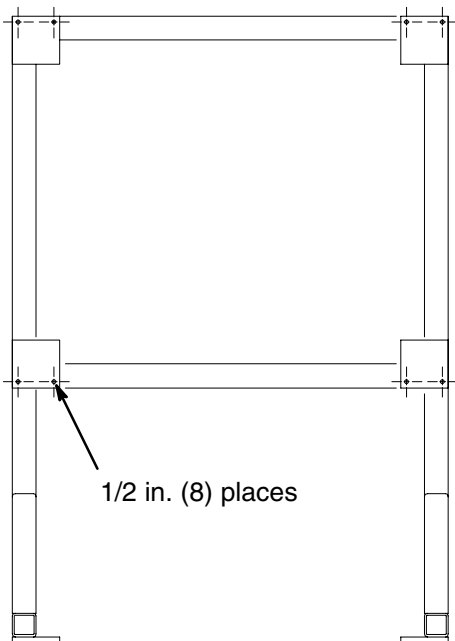
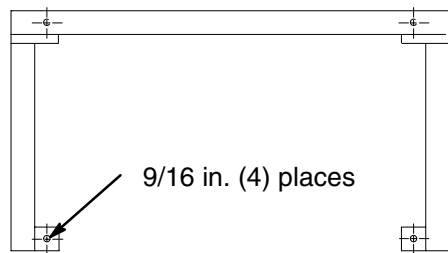


T10999

Model 618613

Parts

Dual Mount Floor Stand, Model 618314



Model 618314

Technical Data

4:1 Ratio Bulldog Pumps, Models 220577 and 220578

Category	Data
Maximum Working Pressure	2.8 MPa, 28 bar (400 psi)
Air Operating Range	0.28–0.7 MPa, 2.8–7 bar (40–100 psi)
Air Consumption	See Performance Chart
Fluid Flow at 60 cycles per minute	90.8 liter/min (24 gpm)
Pump Cycles Per Liter (gallon)	0.66 (2.5)
Maximum Fluid Temperature Rating	66°C (150°F)
Air Inlet	3/4 npsm(f)
Fluid Inlet	1–1/2" npt(f)
Fluid Outlet	1" npt(f)
Wetted Parts	<i>Model 220577:</i> Carbon Steel, Stainless Steel, Leather, PTFE, Ultra-High Molecular Weight Polyethylene <i>Model 220578:</i> Chrome-Plated Stainless Steel, Leather, PTFE, Ultra-High Molecular Weight Polyethylene

Loctite® is a registered trademark of the Loctite Corp.

Sound Pressure Levels (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 Bulldog	81.5 dB(A)	83.6 dB(A)	85.6 dB(A)

Sound Power Levels (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 Bulldog	90.2 dB(A)	93.5 dB(A)	94.9 dB(A)

Performance Charts

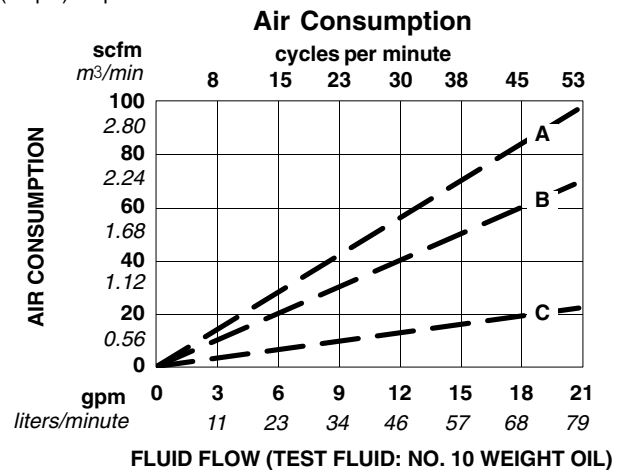
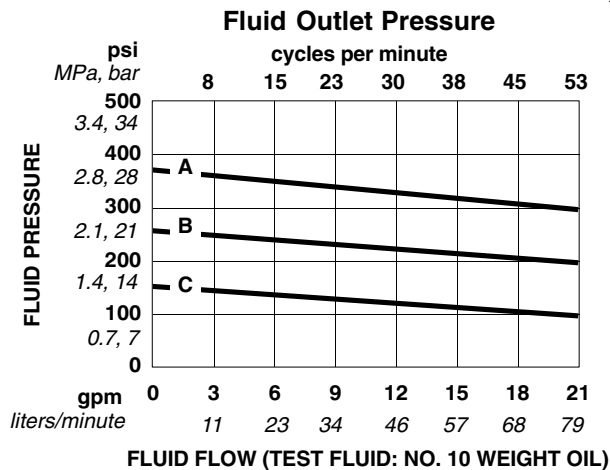
To find Fluid Outlet Pressure (psi/MPa/bar) at a specific fluid flow (lpm/gpm) and operating air pressure (psi/MPa/bar):

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

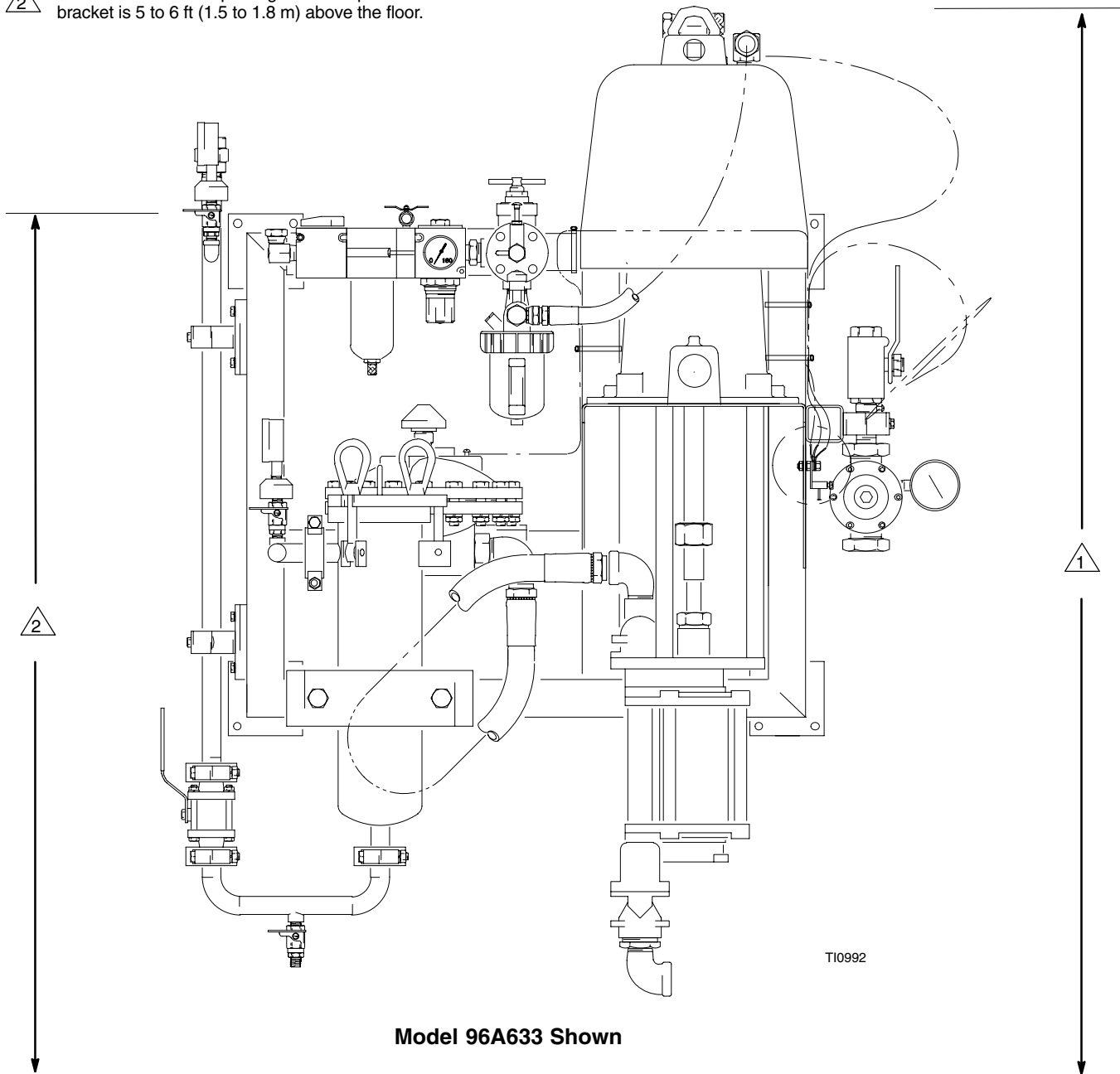


[illegible]

Dimensions

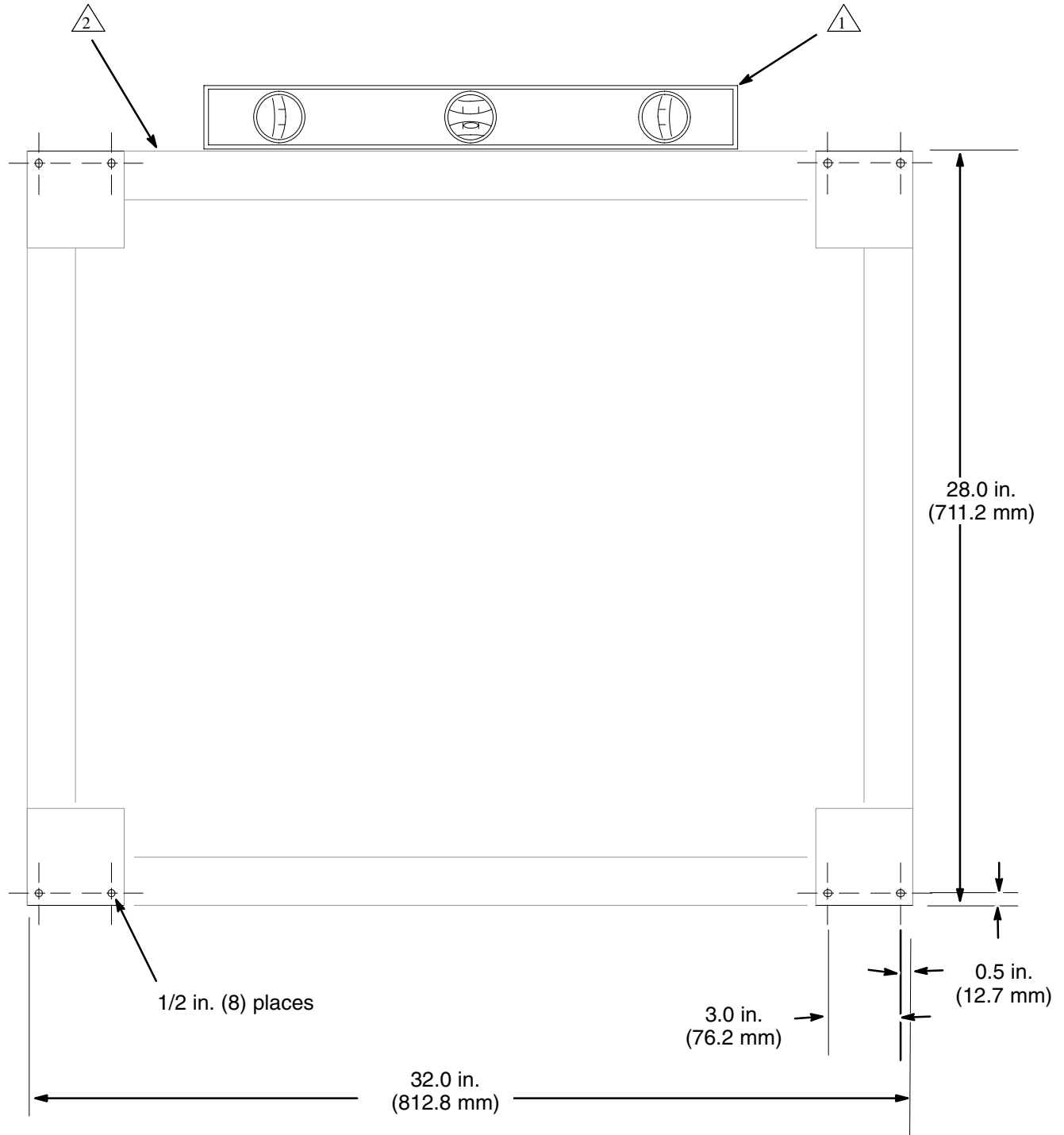
1 Ensure that there is 5 ft (1.5 m) overhead clearance for wall mounted systems and at least 7 ft (2.1 m) for floor mounted systems.

2 Mount the circulation package so the top of the bracket is 5 to 6 ft (1.5 to 1.8 m) above the floor.



Mounting Hole Layout

- △1 Check that the wall frame is level before bolting it to the wall.
- △2 Mount the wall frame so the top edge is 5 to 6 ft (1.5 to 1.8 m) above the floor.



Wall Frame 618216

Graco Standard Warranty

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

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

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

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

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

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

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.

FOR GRACO CANADA CUSTOMERS

The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

Graco Information

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

1-800-328-0211 Toll Free

612-623-6921

612-378-3505 Fax

*All written and visual data contained in this document reflects the latest product information available at the time of publication.
Graco reserves the right to make changes at any time without notice.*

Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441

www.graco.com

PRINTED IN USA 310569 10/2001 Revised 01/2005