

INSTRUCTIONS-PARTS LIST



307-760

This manual contains **IMPORTANT INSTRUCTIONS and WARNINGS.**
READ AND RETAIN FOR REFERENCE.

Rev G
Supersedes E

50 Hz, 220/240 Volts, 0.5 Amp

PT2000 Pressure Roller System

17.5 bar (250 psi) MAXIMUM WORKING PRESSURE

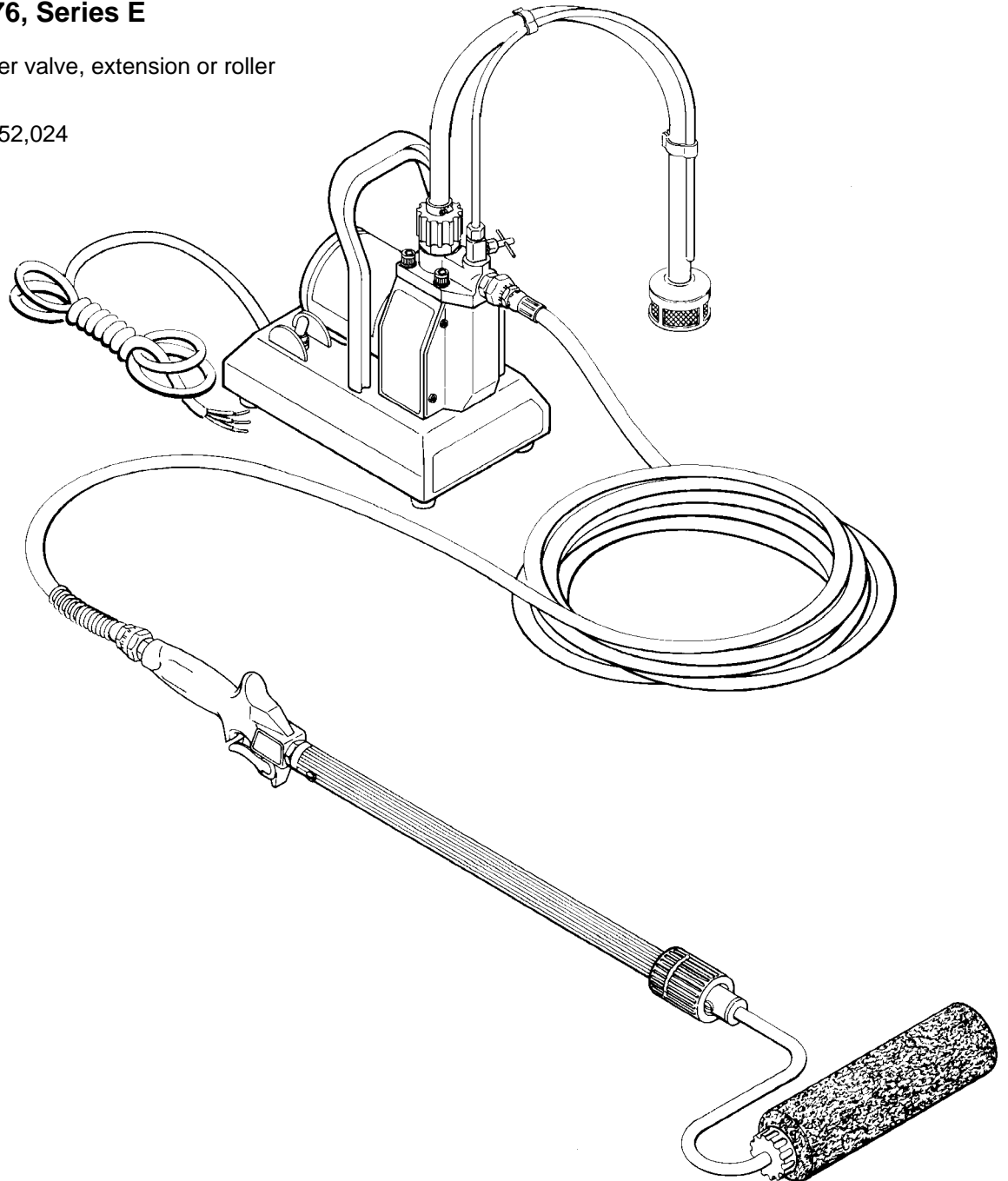
Model 220-240, Series E

Complete System
with hose, roller valve, extension and roller

Model 221-076, Series E

Basic System
without hose, roller valve, extension or roller

PATENT NO, 4,652,024



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

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TERMS

Be sure you read and understand each of these terms before reading the rest of the manual.

WARNING Alerts user to avoid or correct conditions which could cause serious bodily injury.

CAUTION Alerts user to avoid or correct conditions which could damage or destroy the equipment.

NOTE Gives additional explanation or helpful hints.

WARNING

Be sure all operators of this equipment read, understand, and follow the warnings and instructions in this manual!

GENERAL SAFETY

Use extreme care not to splash paint, contaminated flushing water or solvent into your eyes. Wear protective eyewear.

Be sure the area in which you are working is extremely well-ventilated, to avoid a buildup of harmful paint fumes.

To reduce the risk of electric shock, do not expose the system to rain. Always store the system indoors. Do not operate the pump with the pump base cover removed.

ELECTRICAL GROUNDING

Electrical grounding is essential to reduce the risk of an electric shock or other serious bodily injury from static sparking. Read and follow the grounding instructions on page 4 of this manual.

EXTENSION MISUSE HAZARD

THIS IS NOT AN AIRLESS GUN EXTENSION (for example, pole gun). Do not attempt to modify the extension or roller frame, or to use parts which are not designed for use with this system.

Improper use of the extension, roller frame, hose or roller valve can result in component rupture or explosion and cause serious bodily injury.

AVOID POWER LINES

Avoid contacting any power lines with the extension. Contact with power lines could cause extremely serious bodily injury, including burns or electrocution.

EQUIPMENT MISUSE HAZARD

This system is designed to be used at **17.5 bar (250 psi) Maximum Working Pressure**. Use only components and accessories which are designed for use with the PT2000 System.

Any misuse of this equipment, such as modifying parts, using incompatible paint or solvent, or using worn or damaged parts, can cause the equipment to rupture and result in serious bodily injury, fire or explosion, and property damage.

Never alter or modify any part of this equipment; doing so could cause it to overpressurize or malfunction.

Check all parts of the system regularly and repair or replace any worn or damaged parts immediately.

HAZARD OF USING FLUIDS CONTAINING HALOGENATED HYDROCARBONS

Never use 1, 1, 1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in this equipment. Such use could result in a serious chemical reaction, with the possibility of explosion, which could cause death, serious bodily injury and/or substantial property damage.

Consult your fluid suppliers to ensure that the fluids being used are compatible with aluminum and zinc parts.

PT2000 PRESSURE ROLLER SYSTEM DESCRIPTION

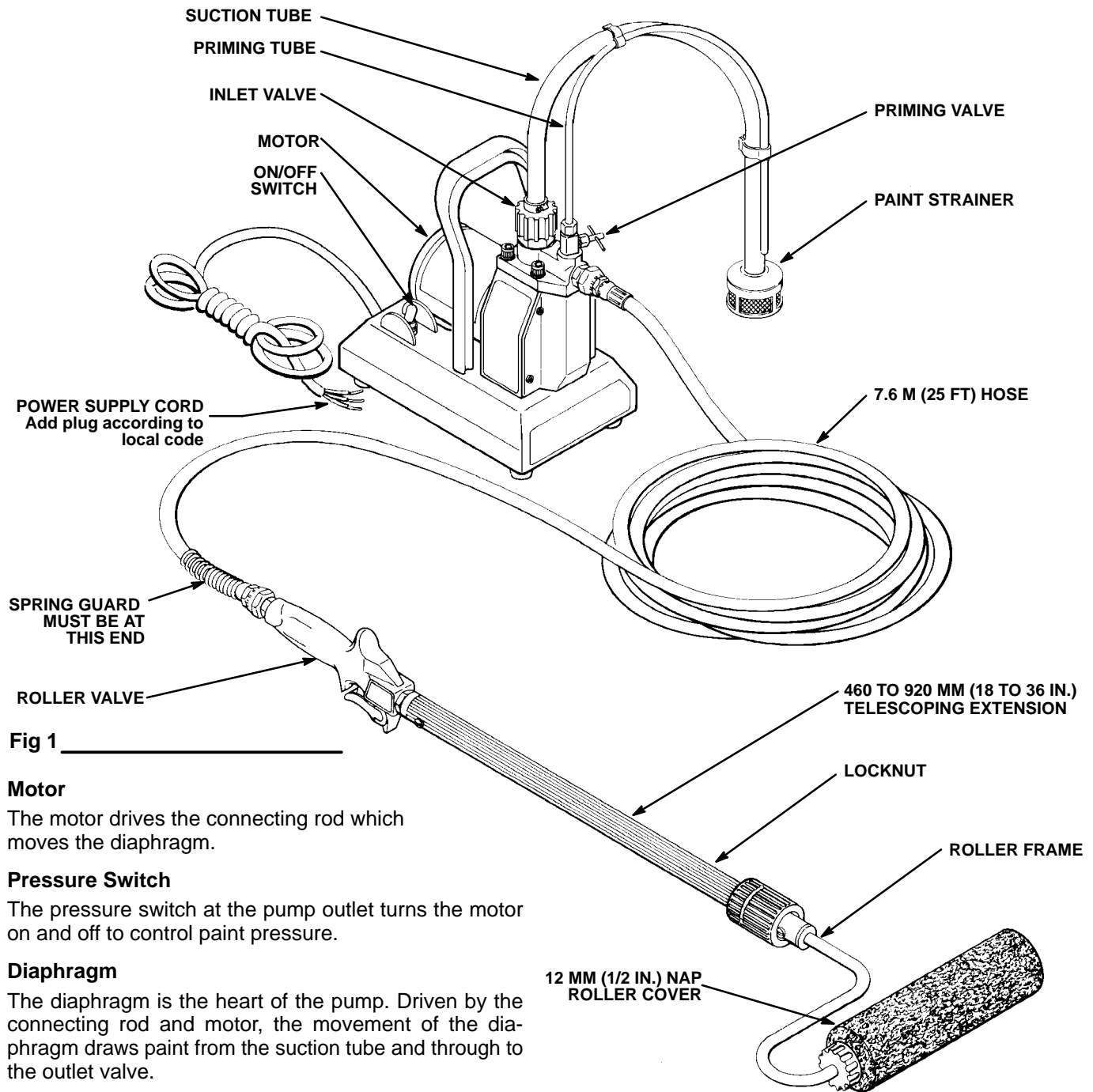


Fig 1

Motor

The motor drives the connecting rod which moves the diaphragm.

Pressure Switch

The pressure switch at the pump outlet turns the motor on and off to control paint pressure.

Diaphragm

The diaphragm is the heart of the pump. Driven by the connecting rod and motor, the movement of the diaphragm draws paint from the suction tube and through to the outlet valve.

Priming Valve

The priming valve assists in priming the pump during startup. Turning the priming valve **counterclockwise** causes the paint to drain directly back into the pail through the priming tube. Turning the knob clockwise causes the paint to flow through the fluid outlet valve and to the hose, roller valve and extension.

Outlet Valve

The outlet valve has a ball check which prevents paint from flowing backwards into the pump. This helps keep an even supply of paint to the roller each time you trigger the roller valve.

Inlet Valve

As the diaphragm draws paint from the suction tube the paint passes through the inlet valve which opens to allow paint into the pump.

Outlet Hose

The hose has swivel-type couplings for easy assembly. A larger diameter outlet hose and chemical-resistant outlet and suction hoses are available. See ACCESSORIES on page 17.

Roller Valve

The roller valve controls paint flow to the roller by triggering it on and off.

Pressure Roller

The pressure roller has a telescoping extension and a roller cover for use on smooth surfaces. Longer extensions and different types of roller covers are available. See the ACCESSORIES on page 17.

SETUP

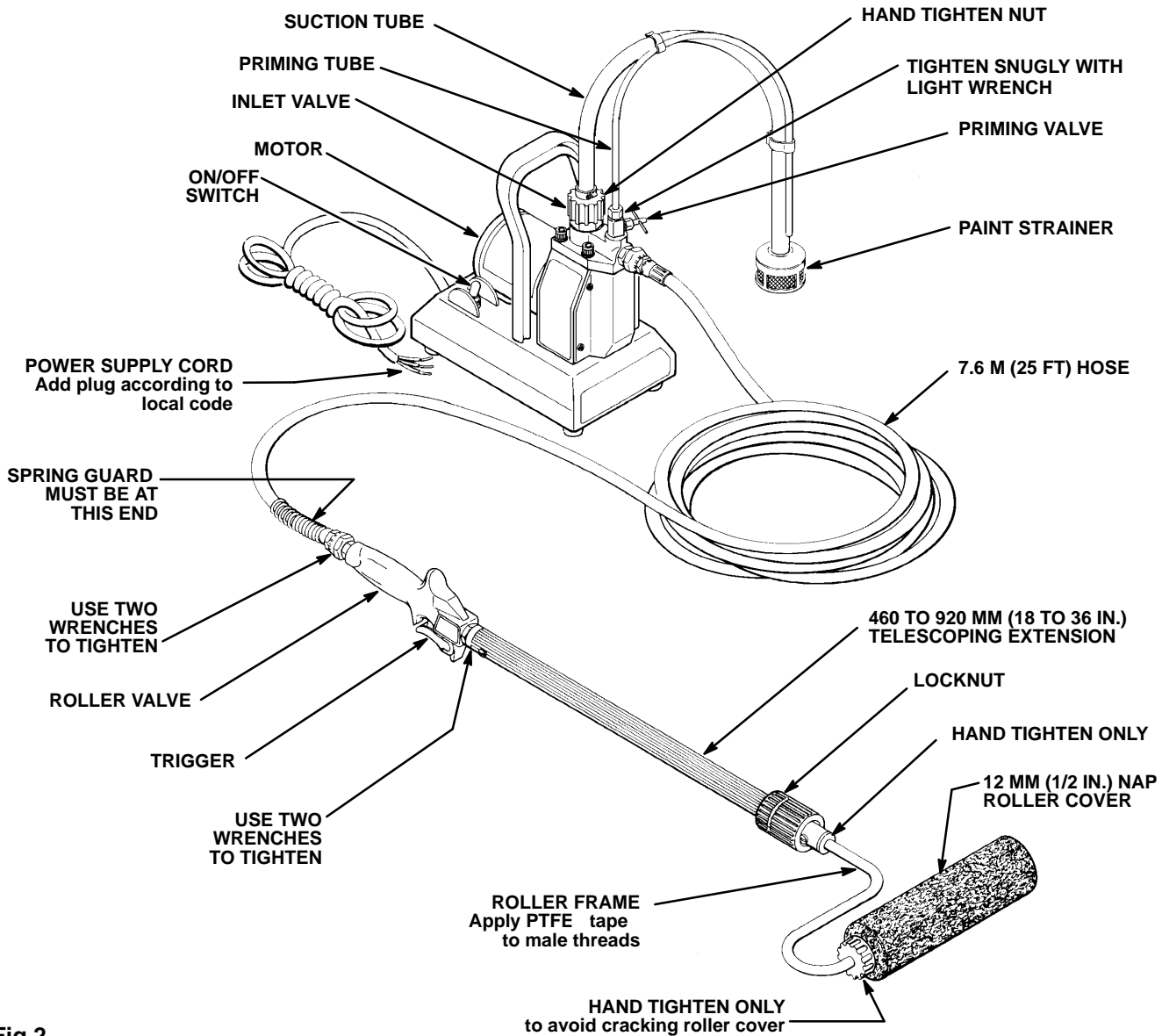


Fig 2

CAUTION

To avoid premature wear of the pressure switch, never use more than 7.6 m (25 ft) of 1/4 in. ID outlet hose. When longer outlet hose is needed, use 3/8 in. ID hose at a maximum of 30 m (100 ft) long. Never use 1/4 in. ID and 3/8 in. ID hose together.

See ACCESSORIES, page 17, for ordering optional hoses.

WARNING

Never remove the grounding pin of the power supply cord plug. Be sure the outlet is properly grounded. In the event of an electrical short circuit, grounding reduces the risk of an electric shock by providing an escape wire for the electric current.

Inspect the power supply cord and extension cord before each use. Be sure they are in good condition and have undamaged three-pin plugs. Replace immediately if either cord is worn or damaged.

1. Assemble the system as shown in Fig 2, following the notes on the drawing.
2. Prepare the paint according to the manufacturer's recommendations. Remove any skin from the top of the paint. Strain the paint. Thin the paint as needed.
3. Be sure the electrical service is properly rated for your sprayer and that the outlet you use is properly grounded. Install an appropriate plug on the power supply cord, according to your local electrical code. Do not use an adapter. All extension cords must have three wires. Use the chart below for selecting the appropriate wire gauge for the extension cord.

Extension Cord Chart		
Cord Length		Extension Cord Cross Sectional Area
meters	feet	
1 - 30	1 - 100	0.75 mm ²
30 - 61	100 - 200	1.0 mm ²
61 - 92	200 - 300	1.5 mm ²

4. Loosen the locknut on the telescoping extension and adjust the extension to the desired length. Firmly tighten the locknut.

STARTUP

1. Place the suction tube in the pail of paint.
2. Plug in the sprayer.
3. Open the priming valve 2 turns counterclockwise.
4. Turn the ON/OFF switch ON.
5. You can see the paint being drawn into the suction tube (if the tube is clean). As soon as you see paint flow through the priming tube, close the priming valve. This usually takes less than 30 seconds.

CAUTION

Failure to completely close the priming valve after the system is primed will cause the valve to erode, greatly shortening the valve life.

NOTE: If your system is hard to prime, first try to force feed the suction tube. Hold the suction tube in a vertical position and pour paint into it. Turn on the system. If the system does not prime within one minute, shut it off. Heavy viscosity paint may need to be thinned. Be sure to follow the paint manufacturer's recommendations on thinning.

6. When the outlet hose and extension tube are fully primed, the motor will run when there is paint demand, but appears to shut itself off when there is no paint demand.

NOTE: An occasional start and stop of the motor when the roller valve is not triggered is normal.

OPERATION

WARNING

To reduce the risk of electric shock, do not expose the system to rain. Always store the system indoors.

CAUTION

Always allow cold equipment to warm to room temperature before using to prevent damaging the system. Always store the system indoors.

CAUTION

Do not use lacquer or lacquer thinner in the suction and outlet hoses supplied with this system. These fluids quickly destroy the hose material. Use the optional chemical-resistant hoses.

See ACCESSORIES, page 17, for ordering optional hoses.

1. With the system fully primed, trigger the roller valve briefly until paint comes to the roller.
2. Experiment with triggering and rolling the paint until you determine just how often you need to trigger the roller valve to keep an even flow of paint to the roller.
3. To adjust the extension tube length, loosen the locknut and extend or retract the tube. If retracting, some paint in the tube will be pushed out to the roller. Roll this excess paint onto the wall, or completely retract the tube, drain the excess paint into a pail, and then adjust the tube length. Tighten the locknut securely.
4. Whenever you stop painting, turn the ON/OFF switch to OFF and trigger the roller valve. Elevate the roller end of the tube to prevent paint from draining out the roller end.
5. Flush the system thoroughly and immediately after each use to keep it in good working order. See page 6.

CAUTION

Thorough flushing and proper maintenance are essential to keep your system working properly

Improper flushing or maintenance may prevent the system from working the next time you need it, and may result in costly damage to the system.

ALWAYS flush your system thoroughly and immediately after each use.

ALWAYS fully extend the telescoping extension when flushing to clean it thoroughly.

ALWAYS drain all water out of the roller valve and extension and leave the system filled with mineral spirits to prevent corrosion.

6. Raise the suction tube above the water and run the pump for a few seconds to drain the flushing solution. Shut off the pump.
7. Wash off all external parts of the hoses, extension, roller frame, roller valve and pump.
8. Using clean, clear water, flush again, changing water as often as necessary, until the system is thoroughly cleaned.
9. Finally, flush the system with clean mineral spirits for just a few seconds. Open the priming valve and turn off the pump. Some mineral spirits must be left in the system to prevent corrosion. Retract the extension before storing it.

CAUTION

Never leave water or water-based paint (latex) in the system. To prevent corrosion in the pump, extension, roller valve and roller frame, your final flush must be mineral spirits.

Flushing (Latex Paint Only)

1. Turn the ON/OFF switch to OFF.
2. Fully extend the telescoping extension.
3. Trigger the roller valve and roll out the excess paint onto a wall or newspaper. Remove the roller cover and diffuser, and soak in a pail of warm soapy water.
4. Place the suction tube in the pail of warm, soapy water. Hold the roller frame over the paint pail, turn on the system and trigger the roller valve to drain and save the paint in the hoses. Release the trigger and shut off the pump as soon as all paint is drained, to avoid contaminating the paint with the flushing water.
5. Now hold the roller frame over the flushing pail. Turn on the pump and trigger the roller valve. Circulate the solution for three to five minutes (five to ten minutes if it is cold). Pump the extension in and out a few times to clean it, and then leave it extended. Open the priming valve for a few seconds to clean the priming tube. Close the valve.

10. Clean the roller cover thoroughly by rinsing it inside and out. Clean the diffuser as explained on page 3.
11. Oil the needle in the roller valve and trigger the valve a few times to distribute the oil. See Detail A, Fig 3.

Flushing (Oil-based Paint Only)

NOTE: Follow the instructions above, except use mineral spirits. Do not heat the mineral spirits.

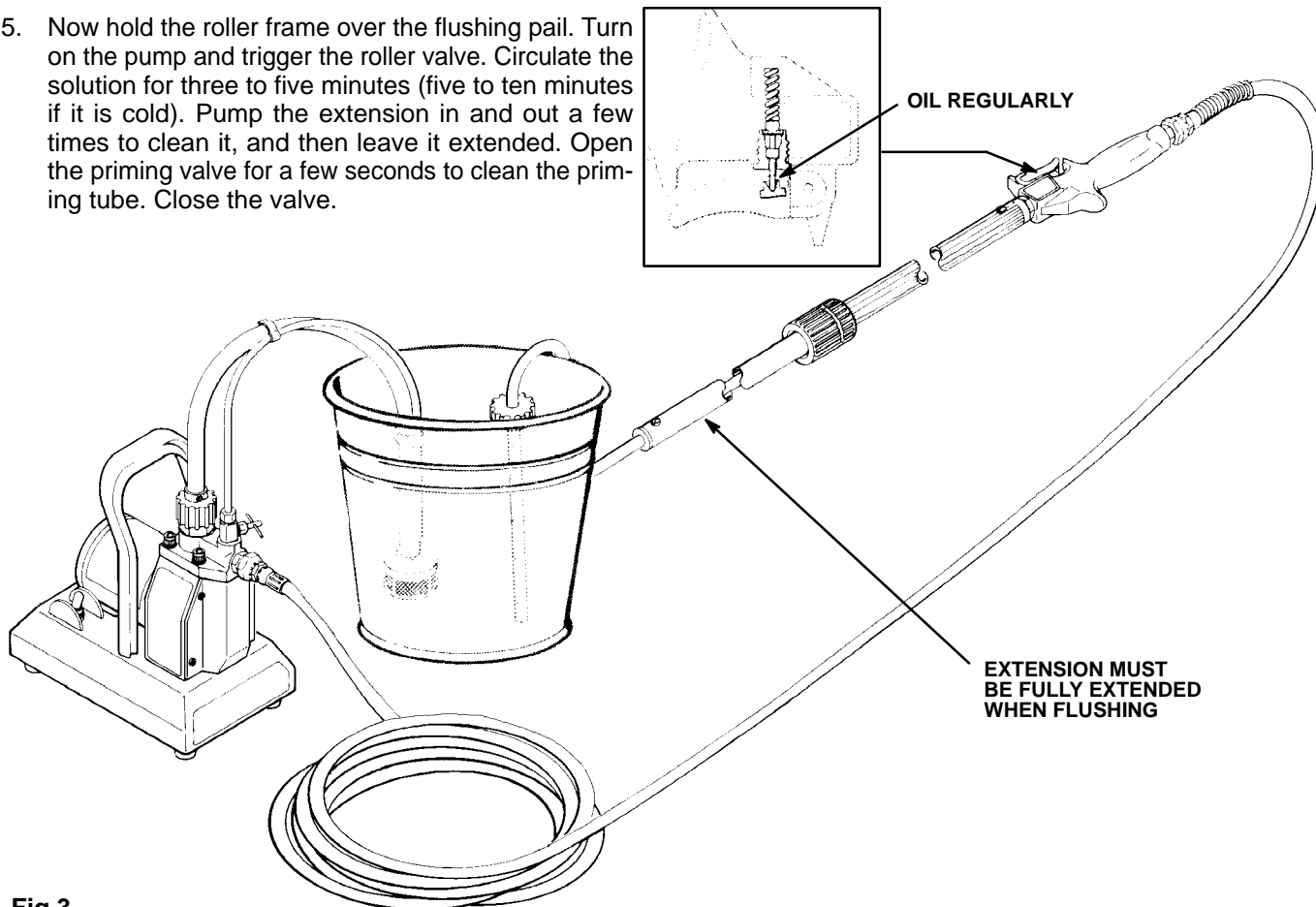


Fig 3

Installing and Removing a Roller Cover (See Fig 4)

1. To install a cover, hold the diffuser and unscrew the retainer nut. Slide the cover over the diffuser assembly and reinstall the nut. Do not overtighten the nut.
2. To remove a cover, hold the cover and unscrew the retainer nut. Slide the cover and diffuser assembly off the roller frame. Press on the end of the diffuser assembly to separate it from the cover.

Cleaning the Roller Diffuser (See Fig 5)

1. For water base paint (latex), vigorously shake the diffuser in a pail of hot soapy water to remove undried paint. For oil-base paint, use mineral spirits. Use a soft brass bristle brush to remove dried paint.
2. To clear an obstruction in the frame, or for more thorough cleaning, remove the setscrew. Be sure to reinstall it after cleaning.

3. Disassemble if further cleaning is needed.
 - a. Remove the two screws. Pull off the outside end cap. Disassemble all parts and clean thoroughly in water or mineral spirits.
 - b. Install the inside end cap on the frame. Lightly grease the u-cup seal with petroleum jelly. Slide the diffusers onto the roller frame. Twist and press the last diffuser to snap the pieces together.
 - c. Install the outside end cap and the two screws. Holding the inside end cap, press on the screws and rotate the diffusers to seat the screws. Tighten the screws evenly into the inside end cap. Be sure there is no binding and that the diffusers move freely.

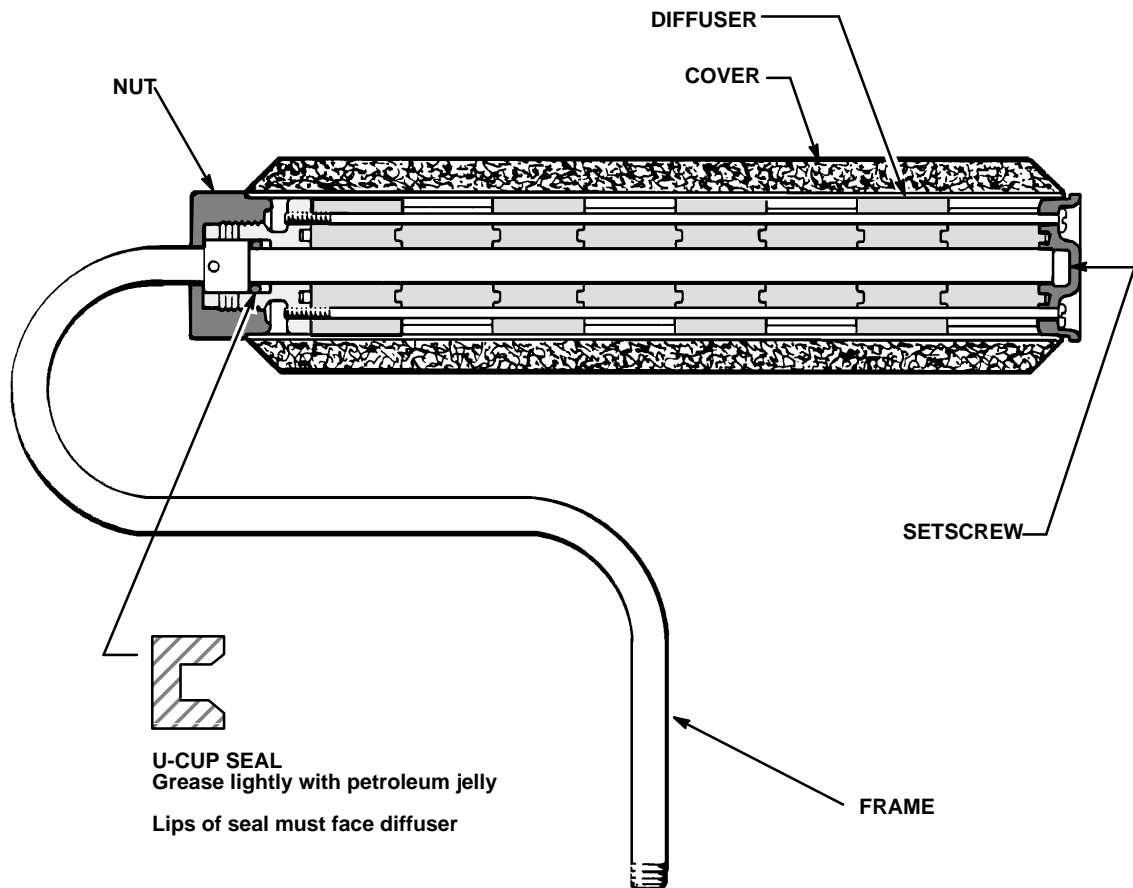


Fig 4

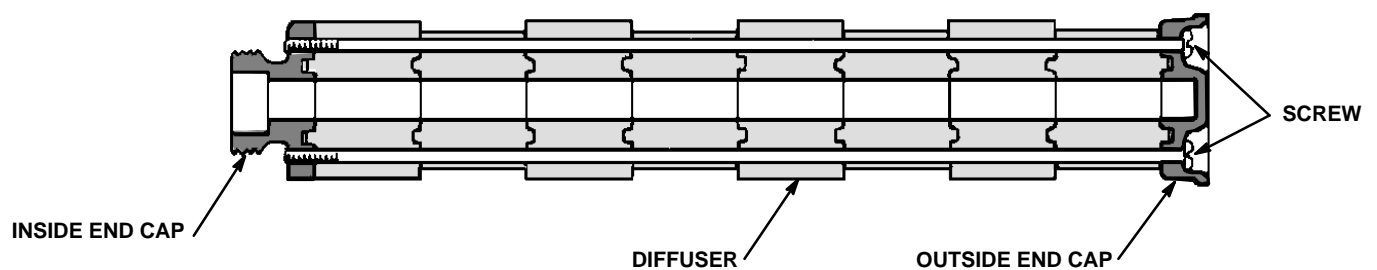


Fig 5

TROUBLESHOOTING GUIDE

WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including injury from moving parts or electric shock, always follow this procedure whenever you shut off the system, when checking or servicing any part of the system, and whenever you stop painting.

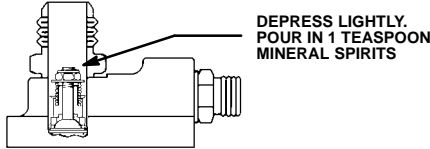
1. Turn the ON/OFF switch to OFF.
2. Unplug the power supply cord.
3. Trigger the roller valve to relieve pressure.

If you suspect that pressure is not fully relieved after following the steps above, open the priming valve 2 turns counterclockwise.

CAUTION

Thoroughly flush the system after each use to reduce down time and costly repair bills.

NOTE: If you are not able to determine the cause of the problem, or the problem and solution is not discussed in this chart, return the system to an authorized service agency for repair.

PROBLEM	CAUSE	SOLUTION
Pump will not prime or primes slowly	Clogged suction tube strainer	Clean.
	Paint too thick	Thin; try pouring paint into suction tube; use 3/8 in. ID hose if necessary.
	Outlet valve spring worn	Pour paint into suction tube and try to prime system. If it doesn't prime in one minute, replace the outlet valve spring. See page 11.
	Inlet valve stuck or damaged.	Depress inlet valve gently and pour in about 1 teaspoon mineral spirits. Try to prime pump. Replace inlet valve if necessary. See page 10.
		
	Loose inlet hose nut	Tighten.
Pump will not start	Power cord unplugged	Plug in.
	ON/OFF switch turned off	Turn on.
	Damaged motor	Replace. See page 13.
	Fuse burned out.	Replace. See page 10. If it burns out again quickly, return the system for repair.
Low paint flow or no paint flow.	Clogged roller valve, diffuser, roller frame, roller valve or hose	Clean thoroughly after each use. See page 6.
	Using more than 7.6 m (25 ft) of 1/4 in. ID hose	Use up to 30 m (100 ft) of 3/8 in. ID hose. See CAUTION on page 17.
	Loose inlet hose nut	Tighten.
	Worn priming valve	Replace. See page 12.
	Priming valve is open	Close.
	Paint too thick	Thin.
	Damaged pressure switch	Replace. See page 11.
Worn inlet and/or outlet valve	Replace. See page 11.	
Pump runs after roller valve trigger is released.	Worn pressure switch	Replace. See page 11.
	Worn inlet valve	Replace. See page 11.
	Worn priming valve	Replace. See page 12.
	Worn roller valve packings or needle	Repair. See page 9.

Roller Valve

WARNING

Always follow the **Pressure Relief Procedure Warning** on page 8 before attempting any repair.

NOTE: Order repair kit no. 218-960 to repair this roller valve.

1. Tap out the pin (A) and slide the trigger (B) off of the valve. See Fig 6.
2. Remove the cap (C). Unscrew the fluid housing (D). See Fig 6.
3. Pull the needle (K) out.
4. Tap the seat (G) out of the roller valve (N). See Fig 6.
5. Remove the ball (F) and spring (E). See Fig 6.
6. Turn the nylon screw (L) into the packing. Insert the needle (K) through the housing (D) and push out the packing (H). See Fig 7.
7. Clean all parts thoroughly. Use a cotton-tipped swab or pipe cleaner to clean small orifices.
8. Grease the needle (K) and packing (H). Insert the tapered end of the needle into the assembly tool (M) and press the lips of the packing over the end of the tool. See Fig 8.
9. Guide the tapered end of the needle into the assembly tool (M) and press the lips of the packing over the end of the tool. See Fig 8.
10. Grease the free end of the needle. Guide the tool (M) into the fluid housing until the needle protrudes through the top of the housing. Lightly tap the tool end until you hear the packing bottom in the housing. Remove the tool with pliers. See Fig 8.
11. Grease the seat (G) and place it on the fluid housing so the seat which is formed on the inside diameter faces out. See Fig 9.
12. Install the spring (E) in the spring cavity of the valve handle, then install the ball (F) so it is centered on the spring. See Fig 6.
13. Place the o-ring (J) around the fluid housing. Pushing lightly with your fingers, start the threads of the housing into the valve handle. Torque the housing to 1.7-2.2 N.m (15-20 in-lb). See Fig 6.
14. Push on the needle until you feel some resistance.
15. Grease the cap (C) and place it on the end of the needle. See Fig 6.
16. Slide the trigger (D) into place. Install the pin (A). See Fig 6.

CAUTION

Never attempt to remove the adapter fittings from either end of the valve body (N). Doing so could crack the body.

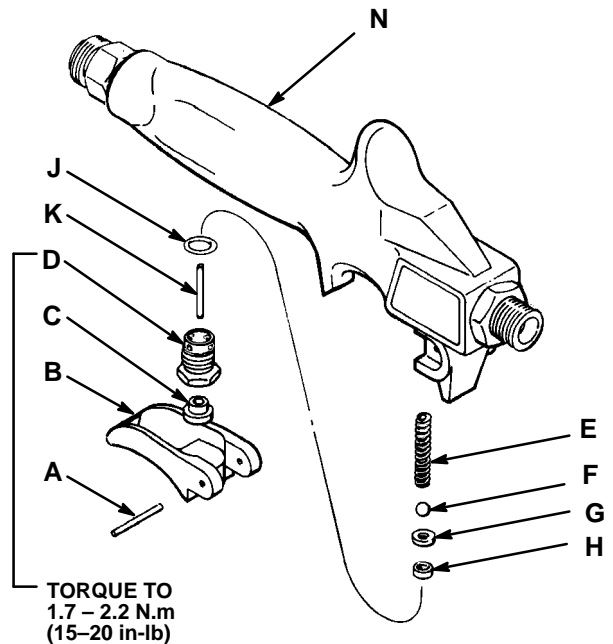


Fig 6

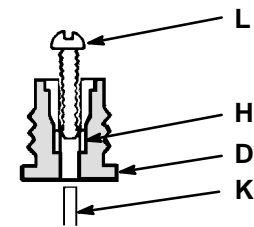


Fig 7

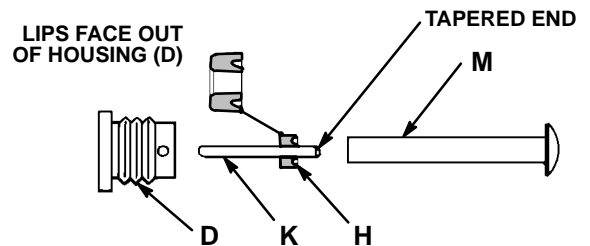


Fig 8

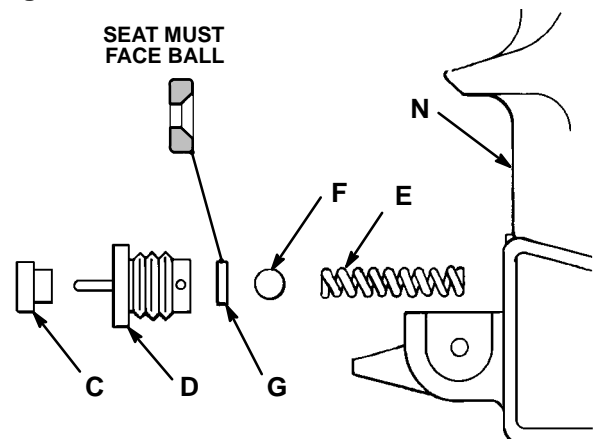


Fig 9

WARNING

These repair procedures should be performed only by qualified repair personnel with an electrical background, using the proper tools. Failure to do the procedures correctly can result in electric shock, or other serious injury and damage to the pump.

WARNING

Always follow the **Pressure Relief Procedure Warning** on page 8 before attempting any repair.

NOTE: For all electrical repair, follow the Pressure Relief Procedure Warning on page 8, and then remove the base plate (42), screws (33) and bumpers (43). Reinstall these parts, making sure all wires are tucked in neatly, before checking or operating the system.

Fuse (See Fig 10)

1. Remove the old fuse (67) and install a new one. Use **only** a 3AG, 1 amp fuse.

Rectifier (See Fig 11)

1. Disconnect the four leads from the rectifier.
2. Remove the rectifier (39).
3. Install a new rectifier so the positive terminal (+) is closest to the fuse holder (65).
4. Connect the blue lead to an unmarked terminal, and the pressure switch lead to the other unmarked terminal. Connect the black motor lead to the negative (-) terminal, and the red motor lead to the positive (+) terminal.

ON/OFF Switch (See Fig 10 & 11)

1. Disconnect the two leads from the ON/OFF switch terminals. See Fig 11.
2. Remove the boot (36). Pull the switch (34) out of the base. See Fig 10.
3. Install the new switch, aligning the tab in the base with the slot in the switch. See Fig 10. Install the boot.
4. Connect a pressure switch lead to the power-out terminal, and a jumper wire lead to the power-in terminal of the new ON/OFF switch.

WARNING

To maintain grounding continuity in your system, and reduce the risk of electric shock, be sure the green ground wire from the power supply cord is properly connected to the grounding screw (83) as instructed in Step 4, above. Also be sure the screw (25) is tightly screwed into the base. See Fig 10 and 11.

Power Supply Cord (See Fig 11)

1. Disconnect the power supply cord leads from the terminal strip (71) by loosening the three screws on the cord side of the strip. See Fig 11.
2. Loosen the screw in the side of the strain relief bushing (38) and pull out the cord.
3. Strip approximately 6 mm (1/4 in.) of insulation off each end of the new cord. Install the new cord and connect the leads to the terminal strip as shown in Fig 11, being sure that each color lead is across from a like-colored lead.
4. Install an appropriate, three-pin plug on the other end of the power supply cord.

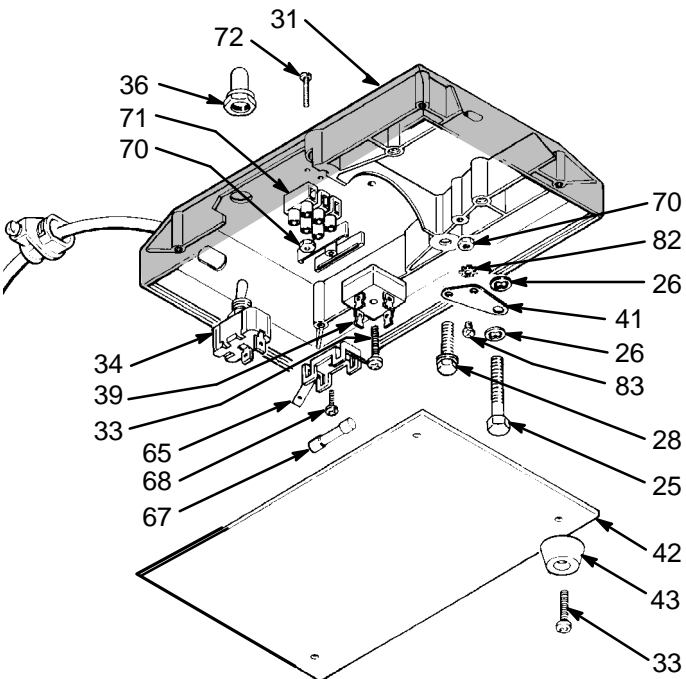


Fig 10

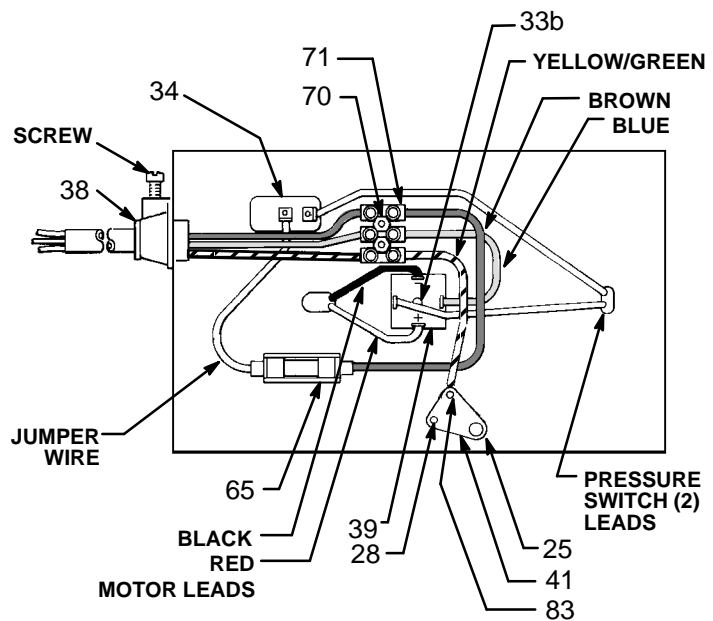


Fig 11

REPAIR

Pressure Switch (See Fig 11, 12 & 13)

1. Disconnect the pressure switch leads from the ON/OFF switch and from the rectifier. See Fig 11.
2. Remove the front cover (23). See Fig 13.
3. Unscrew the retainer (14) and remove the pressure switch (12) and o-ring (12a). See Fig 12.
4. Grease and install a new o-ring (12a) in the pump housing (9). See Fig 12.
5. Slide the retainer (14) over the pressure switch and screw the retainer into the pump housing. Torque the retainer to 6.2–7.4 N.m (55–65 in-lb). See Fig 12.
6. Guide the pressure switch leads through the base. Connect a lead to the power-out side of the ON/OFF switch (34) and a lead to an unmarked terminal on the rectifier (39). See Fig 11.
7. Reinstall the front cover (23).

CAUTION

To avoid damaging the pressure switch, do not drop it, and do not press on the center of the switch.

Outlet Valve (See Fig 12)

1. Remove the outlet hose (64). Unscrew the outlet fitting (2a) and remove the gasket (2b).
2. Tip the pump forward to remove the ball (2d).
3. Use a 1/4 in. square socket wrench extension to screw out the seat (2e).
4. Use a pointed tool, such as a dentist's pick, to remove the seal (2f).
5. Thoroughly clean all parts and dry.
6. Tip the pump back. Install a new seal (2f), making sure it lays flat.
7. Install the seat (2e) and torque it to 13.5–16 N.m (120–140 in-lb).
8. Drop in the ball, making very sure it stays there!

CAUTION

Do not drop the ball into the pressure switch cavity (12). If it does, and the outlet fitting (2a) is then installed, the switch will be permanently damaged.

9. Check the ball stop pin in the outlet fitting (2a) for wear, and replace the fitting if necessary. Place a new gasket (2b) around the fitting. The last coil on one end of the spring (2c) is turned in. Place this end on the ball stop pin. Screw the fitting into the pump housing, and torque to 32–34 N.m (280–300 in-lb).

Inlet Valve (See Fig 13)

1. Unscrew the suction hose (44). Unscrew the inlet valve (3). Remove the gasket (4) and replace it if it is worn.
2. Screw the new valve into the pump housing, torquing to 27–29 N.m (240–260 in-lb).

NOTE: To torque the inlet valve, have someone firmly hold the pump housing (9).

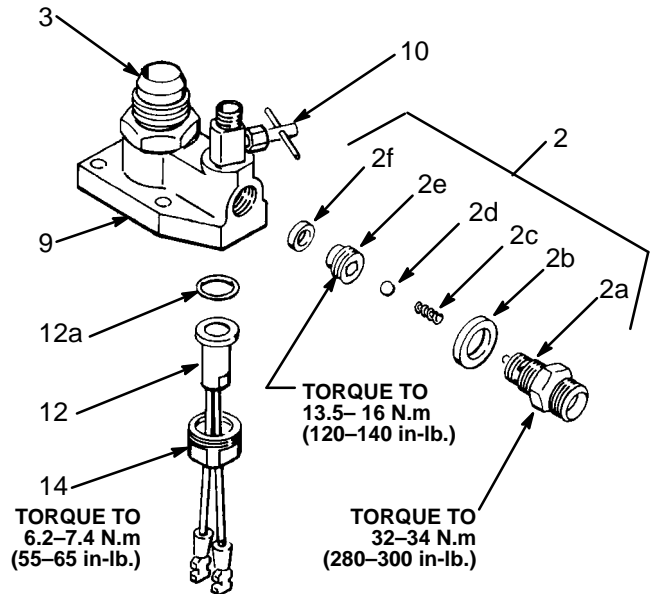


Fig 12

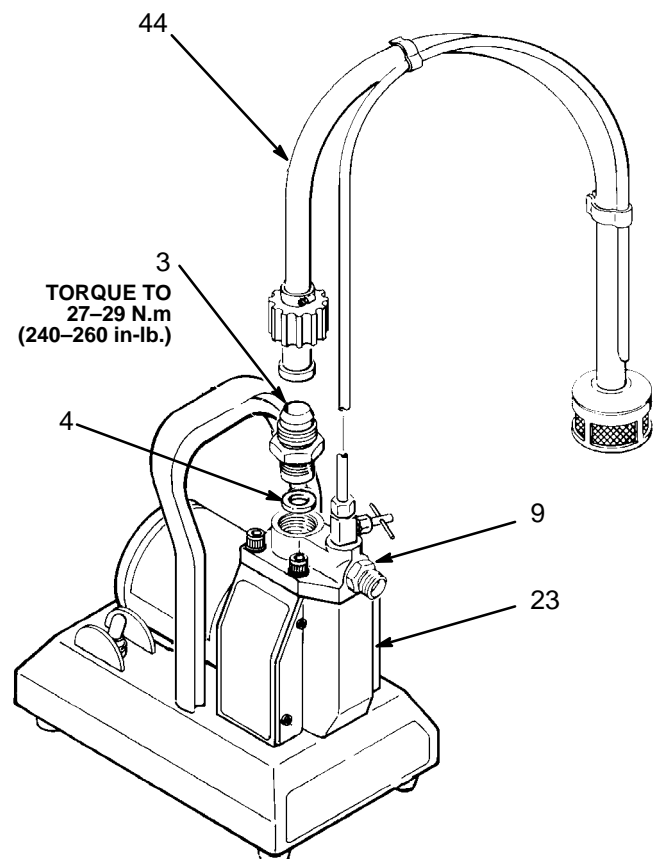


Fig 13

REPAIR

Diaphragm (See Fig 14)

CAUTION

To avoid leaks and costly pump damage, replace the diaphragm whenever the pump housing (9) is removed or after each 100 hours of use, whichever comes first. During use, small grooves are formed in the diaphragm which cannot be realigned properly.

1. Remove the screws (15). Tip the pump housing (9) back, being careful not to damage the wires. Remove the front cover plate (23).
2. Check the diaphragm guide (11), and replace it if necessary. Clean the pump housing thoroughly, and then lay the flat side of the guide into the housing and use your fingers to press it evenly into place.
3. Unscrew the diaphragm (17).
4. Use a soft bristle brush to clean the top of the connecting rod and housing. Gently clean the bottom of the pump housing (9), avoiding damage to the diaphragm grooves.
5. Check the rod, motor bearing and eccentric for paint. If there is any paint or damage, clean or replace the connecting rod assembly as explained on page 13.

CAUTION

To ensure the diaphragm will work properly, do not turn the diaphragm more than 1/2 turn when torquing it.

6. Screw the new diaphragm (17) into the connecting rod just until it bottoms out. Then turn it 1/4 to 1/2 turn (2.7–3.6 N.m [6–8 in-lb]).
7. Apply thread lubricant to the screws (15) and install them with the lockwashers in the pump housing. Torque the screws a little at a time, oppositely and evenly, to 9.8 N.m (85 in-lb).
8. Spin the motor shaft (D) to be sure it turns freely.
9. Reinstall the front cover (23).

Priming Valve & Tube (See Fig 15)

NOTE: Each new priming valve kit includes a priming tube and fittings.

1. Unscrew the nut (E) of the priming valve (10a), and then unscrew the stem of the handle.
2. Unscrew the priming valve (10a).
3. Wrap the threads of the priming valve with PTFE tape, and then screw it snugly into the pump housing. The valve handle should be parallel with the angled edge of the housing to avoid interference with the inlet or outlet valves.
4. Slide the nut (10d) and ferrule (10c) onto the tube (10e), and then install the tube support (10b) in the end of the tube. Screw the nut onto the priming valve, which will seat the ferrule.
5. Screw the stem of the handle (E) onto the priming valve until it bottoms, then back it out two turns. Screw the nut hand tight onto the priming valve, then tighten the stem into the valve.

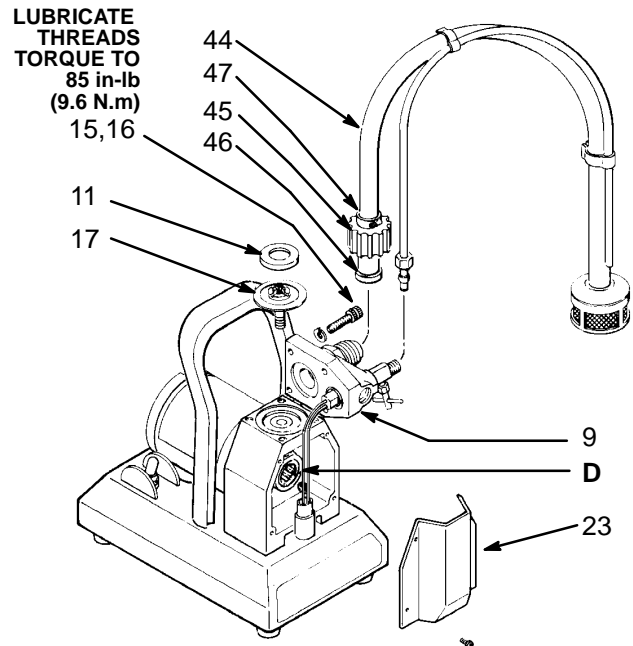


Fig 14

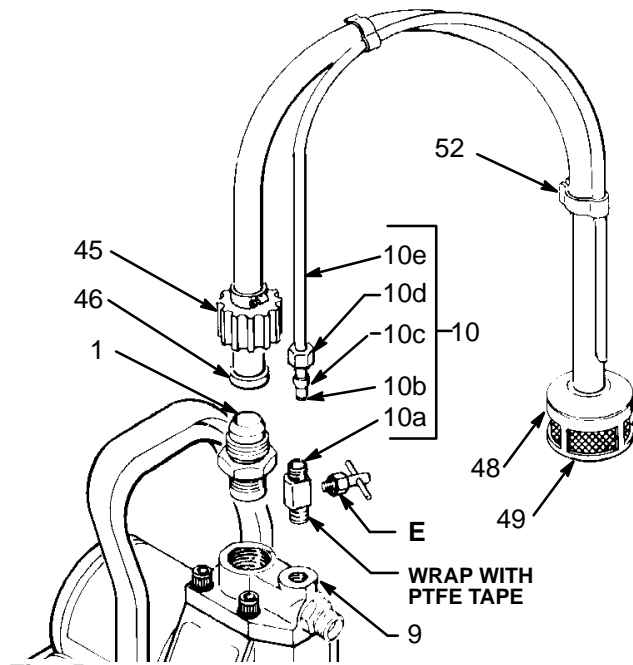


Fig 15

Suction Tube (See Fig 15)

1. Unscrew the hose nut (45). Remove the hose camp (47). Slit the suction hose to free the nipple (46).
2. With the nipple (46) inserted through the nut (45), dampen the new hose (44) with warm water and press the hose over the nipple. Screw the nut onto the inlet valve housing, and then press the hose further onto the nipple. Leave about a 1/8 in. (3 mm) gap between the nut and hose end.
3. Install the hose camp (47) and tighten snugly.
4. Remove the filter housing (48) and strainer (49) and install them on the new hose. Dampen the hose with warm water to ease assembly.

Connecting Rod and Bearing (See Fig 16)

1. Remove the front cover plate (23). Remove the screws (15) and tip the pump housing (9) out of the way. Unscrew the diaphragm (17) and discard.

CAUTION

Replace the diaphragm (17) whenever you remove the pump housing (9). During use, small grooves are formed in the diaphragm which cannot be realigned properly. Reusing a diaphragm may cause leaking which will result in costly damage to the pump.

2. Remove the motor screws (20). Lift the motor (30) slightly. Holding the connecting rod, pull the motor away from the housing (22).
3. Inspect the bearing (18b) in the connecting rod (18). If it is worn or any rollers are broken, replace the bearing and rod assembly (18). Inspect the motor eccentric (F), and replace the motor if the eccentric is worn.
4. Use your fingers to pack high-quality bearing grease thoroughly in between the bearing rollers.

CAUTION

Thorough greasing of the bearing is essential to extend the life of the bearing and the motor eccentric.

5. Use a soft brass or nylon bristle brush to clean the top of the connecting rod and housing. Gently clean the bottom of the pump housing (9), avoiding damage to the diaphragm grooves.
6. Install the connecting rod (18) in the connecting rod housing (22). Screw a new diaphragm (17) into the rod just until it bottoms. Turn the diaphragm **only** 1/4 to 1/2 turn more (2.7–3.6 N.m [6–8 in-lb]).
7. Align the motor with the pins in the connecting rod housing (22), guiding the motor eccentric through the connecting rod bearing (18b). Spin the motor shaft to be sure it moves freely.
8. Loosely install the lockwashers (21) and screws (20). Spin the motor shaft again. Now alternately tighten the screws. Spin the motor shaft again.

CAUTION

Spinning the motor shaft while assembling the pump ensures that parts are properly aligned. If they are not, and you start the pump, serious damage could result to the motor, bearing, and connecting rod. If you feel binding or resistance, disassemble the parts, checking the spin often, until you determine the cause of the binding.

9. Position the pump housing (9) on the sprayer. Lubricate the screws (15) and install them and the lockwashers (16) loosely. Torque the screws a few inch-pounds (N.m) at a time, oppositely and evenly, to 85 in-lb (9.8 N.m).
10. Reinstall the front cover plate (23).

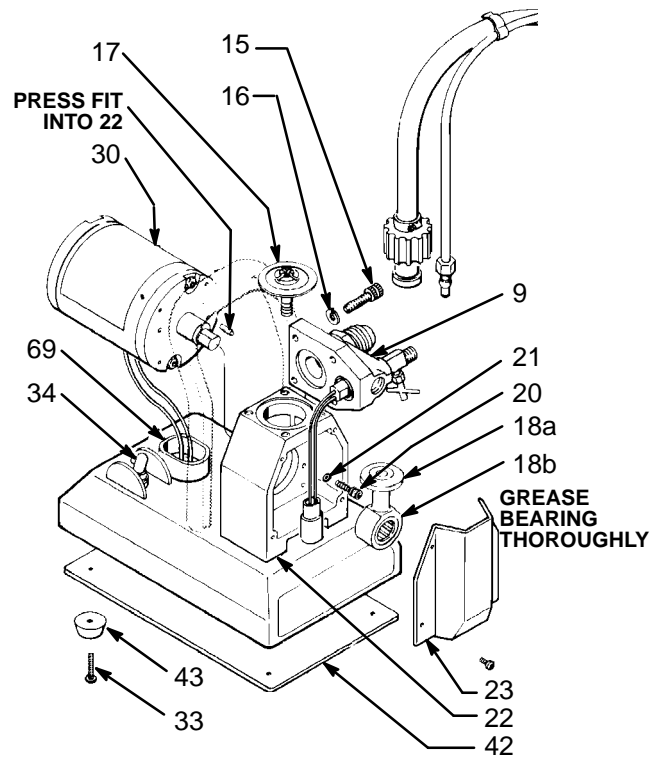


Fig 16

Motor (See Fig 16)

1. Remove the front cover plate (23).
2. Remove the bumpers (43) and the bottom cover plate (42). Disconnect the motor leads from the positive and negative rectifier terminals. See Fig 11, page 12.
3. Remove the motor screws. Lift the motor (31) slightly. Holding the connecting rod, pull the motor away from the housing (22).
4. Inspect the bearing (18b) in the connecting rod (18). If it is worn or any rollers are broken, replace the bearing and rod assembly (18) as instructed to the left.
5. Use your fingers to pack high-quality bearing grease thoroughly in between the bearing rollers.
6. Feed the motor leads through the rubber grommet (69). Align the motor with the pins in the connecting rod housing (22), guiding the motor eccentric through the connecting rod bearing (18b). Spin the motor shaft to be sure it moves freely.
7. Loosely install the lockwashers (21) and screws (20). Spin the motor shaft again. Alternately tighten the screws. Spin the motor shaft again. See the CAUTION in Step 8 to the left.
8. Connect the red motor lead to the positive (+) terminal and the black motor lead to the negative (-) terminal of the rectifier (39). Refer to Fig 11.
9. Reinstall the front cover plate.

PARTS DRAWING

Model 221-076, Series E

Basic System

Includes items 2 – 54 and 65 – 87

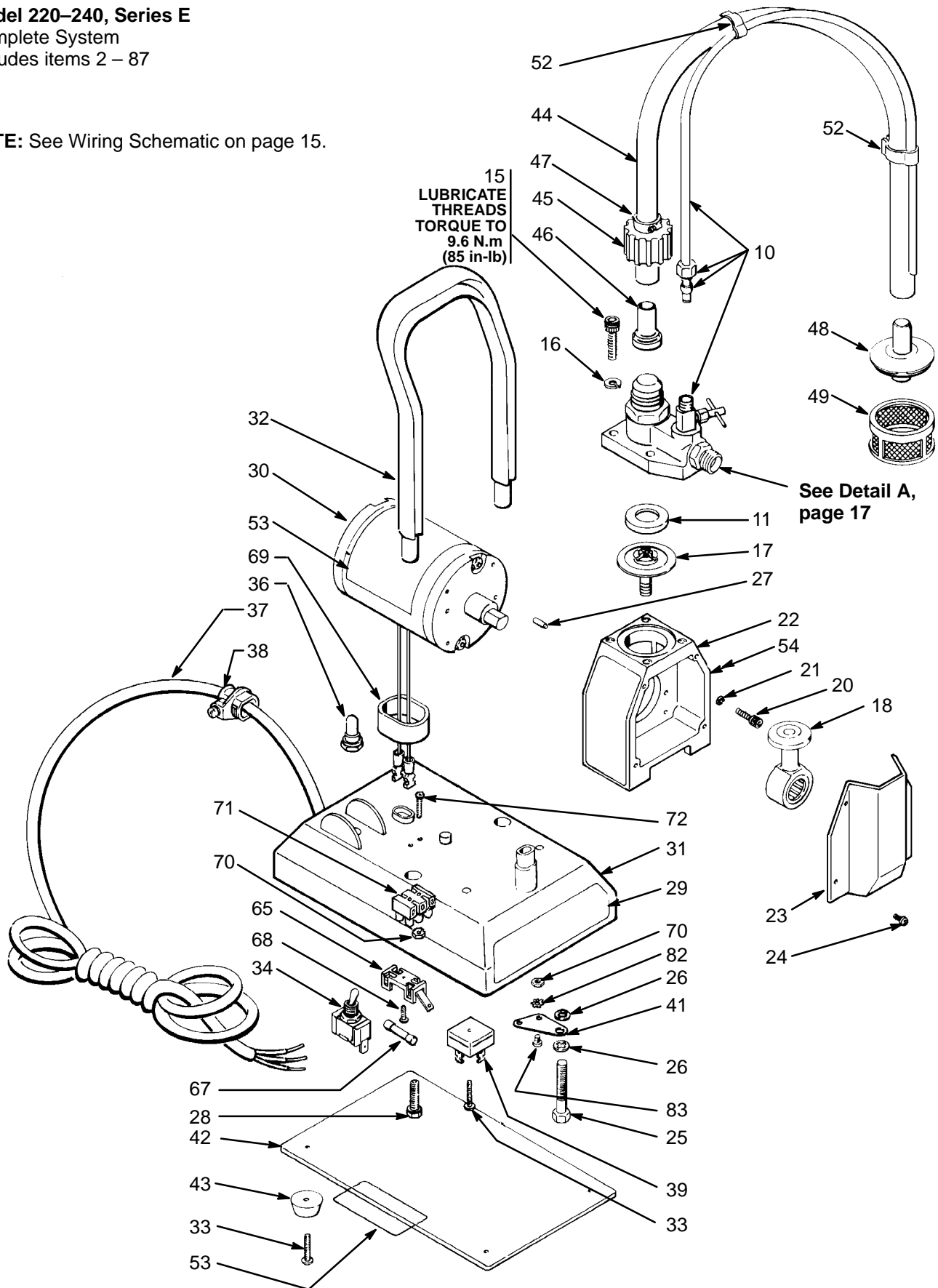
Model 220-240, Series E

Complete System

Includes items 2 – 87

NOTE: See Wiring Schematic on page 15.

15
LUBRICATE
THREADS
TORQUE TO
9.6 N.m
(85 in-lb)



PARTS LIST

PRESSURE ROLLER SYSTEM

Model 220-240, Series E

Complete System

Includes items 2-87

Model 221-076, Series E

Basic System

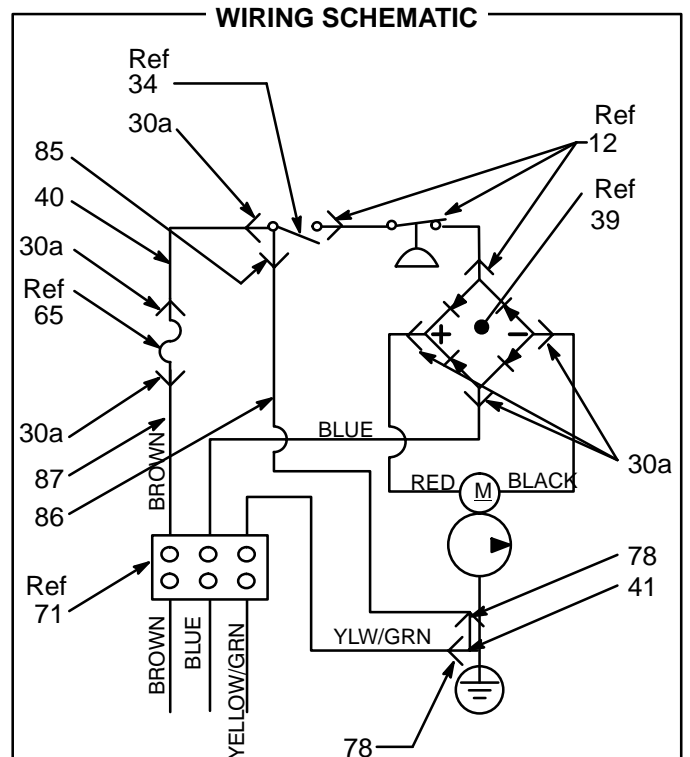
Includes items 2 - 54 and 65 - 87

NOTE: Part numbers and drawings for items 2, 3, 4, 9, 12, 14, and 55 - 64 are given on pages 16 and 17.

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
10	218-973*	PRIMING VALVE KIT	1	45	181-159	NUT, coupling	1
11	181-152	GUIDE, diaphragm	1	46	181-160	NIPPLE, hose	1
15	108-225	CAPSCREW, socket head; 5/16-18x 1-1/8" long	4	47	108-231	CLAMP, hose	2
16	104-008	LOCKWASHER, spring, 5/16"	4	48	181-163	HOUSING, filter	1
17	275-619*	DIAPHRAGM	1	49	181-164	FILTER	1
18	218-981	CONNECTING ROD & BEARING	1	52	178-342	CLAMP, hose	2
20	108-237	CAPSCREW, socket head; No.8-32 x 5/8"	4	53	181-613**	LABEL, Warning	1
21	100-079	LOCKWASHER, spring, 0.168"	4	54	181-214	LABEL, designation, left hand	1
22	181-147	HOUSING, conn rod; <i>Always order two of Ref No. 27 when replacing housing</i>	1	65	108-199	HOLDER, fuse	1
23	181-839	COVER, front	1	67	104-188*	FUSE, electrical, 3AG, 1 amp	1
24	108-236	SCREW, mach, filh, No. 8-32 x 1.75"	4	68	108-223	SCREW, thd forming, pnh; No. 6 x 1/2"	1
25	102-313	CAPSCREW, hex head; 1/4-20 x 1.75"	2	69	181-218	GROMMET, rubber	1
26	100-028	LOCKWASHER, internal; shakeproof; 1/4"	3	70	100-072	NUT, hex, mscr; No. 6-32 UNC-2B	3
27	108-213	PIN, dowel	2	71	108-421	STRIP, terminal	1
28	108-230	SCREW, mach, hex washer head; self tapping; 1/4-14 x 1"	2	72	104-038	SCREW, mach, pnh; No. 6-32-2a x 0.75"	2
29	181-215	LABEL, designation, front	1	78	102-799	TERMINAL (for ground wire)	2
30	181-575	MOTOR, electric	1	82	103-181	LOCKWASHER, No. 6	1
30a	596-421	.TERMINAL <i>Includes two item 30a and one of item 53</i>	1	83	103-854	SCREW, mach, bdgh; No. 6-32 UNC-2a x 1/4"	1
31	181-573	BASE, pump	1	85	108-716	TERMINAL	1
32	181-182	HANDLE	1	86	065-239	WIRE <i>specify length when ordering</i>	8 in.
33	108-224	SCREW, thd forming, pnh; No. 8 x 7/8"	6	87	065-236	WIRE <i>specify length when ordering</i>	8 in.
34	105-679	SWITCH, toggle	1				
35	181-213	LABEL, designation, right hand	1				
36	105-659	TOGGLE, boot	1				
37	181-626	CORD, power supply	1				
38	106-013	BUSHING, strain relief	1				
39	108-420	RECTIFIER, bridge	1				
40	065-120	WIRE, jumper <i>specify length when ordering</i>	5 in.				
41	183-301	TERMINAL, ground	1				
42	181-799	COVER, base	1				
43	108-220	BUMPER	4				
44	181-231	TUBE, suction	1				

*Recommended "tool box" spare parts.

**Extra warning labels available at no charge.

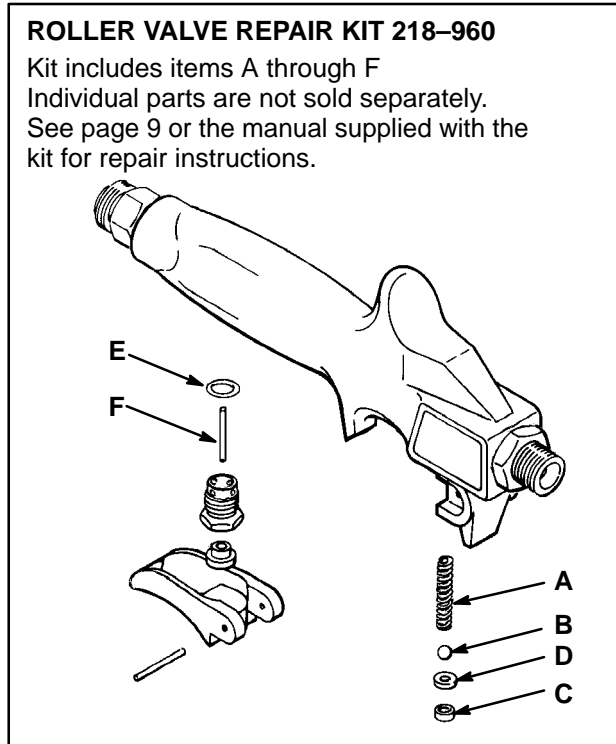
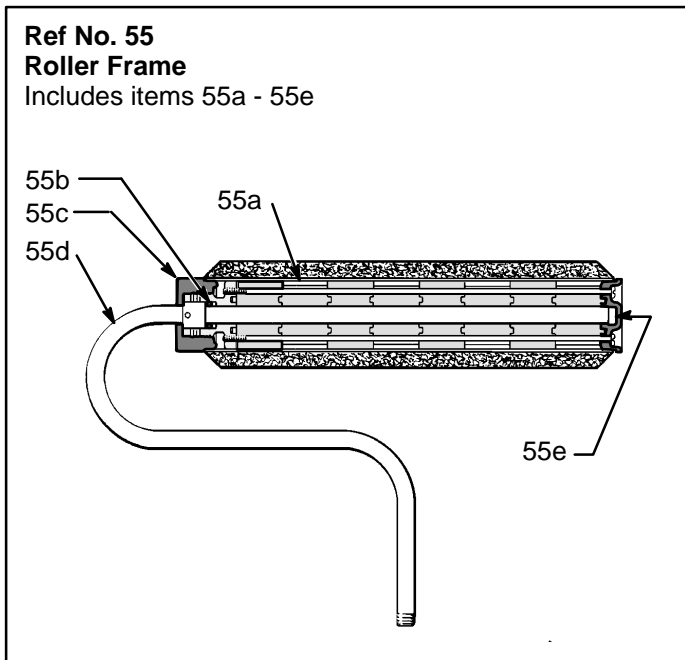


PARTS LIST

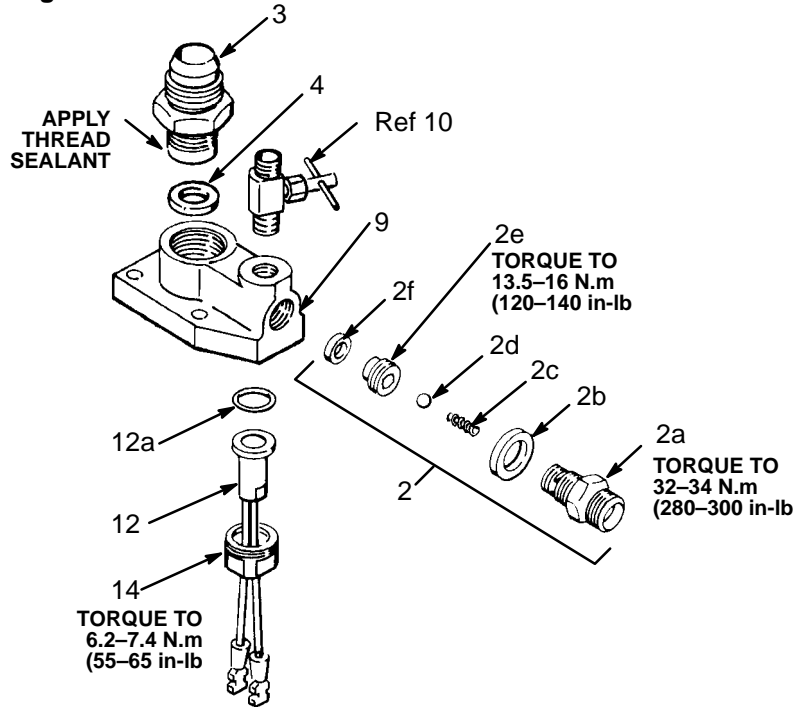
REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
2	220-970	OUTLET VALVE KIT <i>Includes items 2a-2f</i>	1	55	218-935	FRAME, roller <i>Includes items 55a-55e</i>	1
2a	222-349	.FITTING, outlet	1	55a	218-934	DIFFUSER, roller	1
2b	180-454	.GASKET	1	55b	108-808	SEAL, u-cup, retainer	1
2c	107-521	.SPRING	1	55c	183-420	NUT, retainer	1
2d	101-956	.BALL	1	55d	218-582	FRAME, roller	1
2e	218-968	.HOUSING, seat, valve	1	55e	101-983	SETSCREW	1
2f	180-455	.SEAL, washer	1	60	218-954	ROLLER VALVE <i>Replaceable parts are shown in the drawing below for Kit 218-960</i>	1
3	220-931*	INLET VALVE KIT <i>Includes replaceable item 4</i>	1	62	107-590	COVER, roller, 1/2" nap	1
4	183-419	.GASKET	1	63	218-775	EXTENSION, adjustable, 0.45-0.9 m (18-36") long	1
9	181-146	HOUSING, pump	1	64	108-356	HOSE, fluid, nitrile rubber; 6 m (1/4" ID; cpld 3/8 npsm(f); 7.6 m (25') long	1
12	218-974	PRESSURE SWITCH KIT <i>Includes item 12a</i>	1				
12a	108-195	.O-RING	1				
14	181-209	RETAINER	1				

*Recommended "tool box" spare parts.

PARTS DRAWING

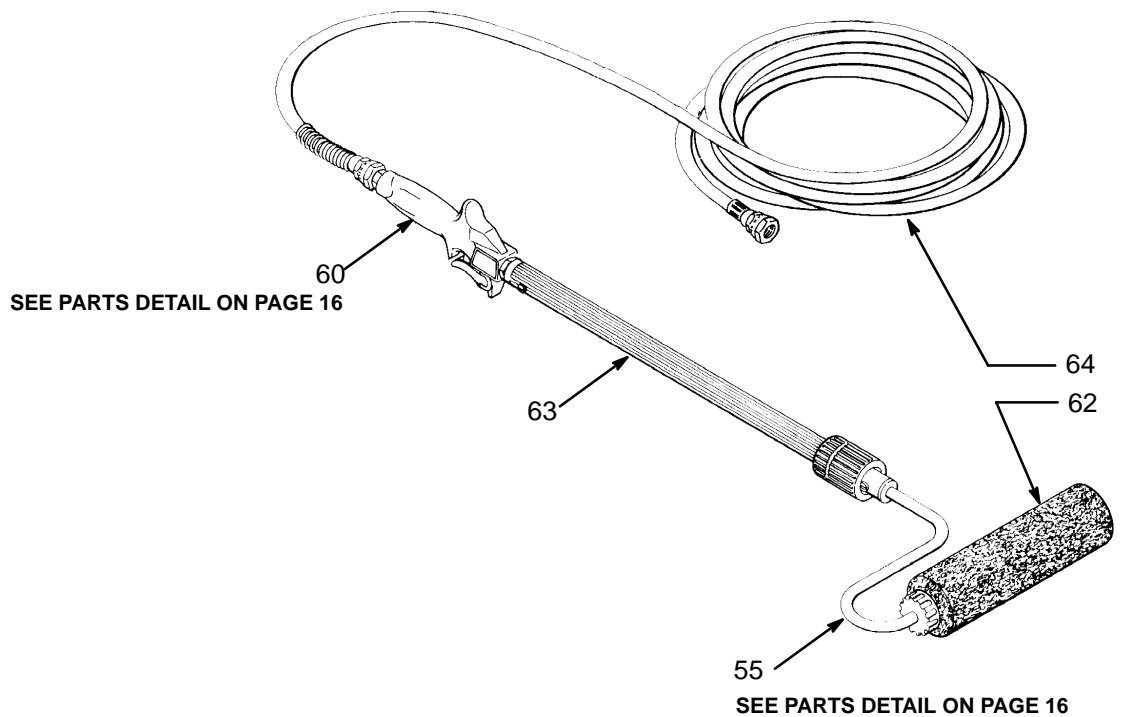


**DETAIL A
Pump Housing Parts**



DISPENSING ACCESSORIES

Not included with Basic System 221–076



ACCESSORIES

Must be purchased separately.

CAUTION

To avoid premature wear of the pressure switch, never use more than 7.6 m (25 ft) of 6 mm (1/4 in.) ID outlet hose. When longer outlet hose is needed use 9 mm (3/8 in.) ID hose at a maximum of 30 m (100 ft) long. Never use 6 mm (1/4 in.) ID and 9 mm (3/8 in.) ID hose together.

Do not use lacquer or lacquer thinner in the suction and outlet hoses supplied with this system. These fluids quickly destroy the hose material. Use the optional chemical-resistant hoses.

CHEMICAL-RESISTANT SUCTION & OUTLET HOSES

For use with lacquer and lacquer thinners.

205-142 Outlet Hose; Nylon; 9 mm (3/8") ID; cpld 3/8 npsm(fbe); 7.6 m (25');
21 bar (300psi) MAXIMUM WORKING PRESSURE

219-095 Suction Hose; Nylon

LARGER DIAMETER OUTLET HOSE

Use this hose when using more than 7.6 m (25 ft) of outlet hose. Not intended for use with lacquer or lacquer thinners.

220-009 Outlet Hose; 9 mm (3/8") ID; cpld 3/8 npsm(fbe); 15 m (50'); **17.5 bar (250 psi) MAXIMUM WORKING PRESSURE**

NIPPLE 108-228

Needed to couple two lengths of hose 220-009.
3/8 npsm(mbe)

ADAPTER FITTING 220-265

5000 psi (350 bar) MAXIMUM WORKING PRESSURE

Couples roller frame directly to roller valve.

3 INCH ROLLER FRAME & DIFFUSER 220-234

Same as 9 in. version but shorter. (See page 16)
Must order cover separately.

3 INCH ROLLER COVER

108-402 1/2 in. (12 mm) nap, for semi-rough to smooth surfaces.

9 INCH ROLLER COVERS

107-590 12 mm (1/2 in.) nap, for semi-rough to smooth surfaces

107-591 19 mm (3/4 in.) nap, for semi-rough surfaces

107-592 32 mm (1-1/4 in.) nap, for rough surfaces

ADJUSTABLE EXTENSION TUBES

218-775 0.45-0.9 m (18-36 in.)

218-776 0.9-1.8 m (3-6 ft)

218-777 1.8-3.7 m (6-12 ft)

218-778 2.4-4.8 m (8-16 ft)

SPRAY WAND 220-236

4050 psi (260 bar) MAXIMUM WORKING PRESSURE

Creates soft spray when used with the PT2000.

TWO ACCESSORY ADAPTER 220-232

1000 psi (70 bar) MAXIMUM WORKING PRESSURE

Adapts pump outlet of PT2000 to use two accessory applicators simultaneously.

FLUSH ADAPTER 220-231

Allows you to use the city water supply to quickly flush the PT2000.

SERVICE INFORMATION

Listed below by the assembly changed are OLD, NEW, ADDED and DELETED parts. OLD and NEW parts are interchangeable. ADDED and DELETED parts may not be interchangeable individually.

Assembly Changed	Part Status	Ref No.	Part No.	Name
220-970 Outlet Valve	Old	2a	220-952	Fitting
	New		222-349	Fitting
220-240 Sprayer To Series E	Old	3	220-930	Inlet Valve
	New		220-931	Inlet Valve
	Old	23	181-166	Cover
	New		181-839	Cover
	Added (1)	26	100-028	Lockwasher
	Added (4)	30a	596-421	Terminal
	Added (1)	33	108-224	Screw
	Old	40	181-167	Terminal
	New		183-301	Terminal
	Old	41	181-574	Cover
	New		181-799	Cover
	Old	67	108-419	Fuse
	New		104-188	Fuse
	Added (1)	78	102-799	Terminal
	Old	83	103-584	Screw
New	103-854		Screw	
Deleted	84	158-223	Washer	
Added	85	108-716	Terminal	
Added	86	065-239	Wire	
Added	87	065-236	Wire	
218-935 Roller Frame	Old	55b	108-186	O-ring
	New		108-808	Seal
	Old	55c	275-644	Nut
	New		183-420	Nut

NOTE: A Basic System, Model 221-076, has been added to this manual. It is identical to Model 220-240 except it does not include a hose, roller valve, extension or roller.

TECHNICAL DATA

Maximum Operating Pressure	17.5 bar (25l) psi)
Power Requirements	50Hz, 220/240 Vac, 1 Phase, 0.5 amp
Pump Output	3.8 liter (1 gallon) in 5 minutes
Power Supply Cord	No. 16 AWG, 3 wire, 6 ft (1.7 m) long
Weight	6.1 Kg. (13.5 lb)

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven defective, with the exception of defects in parts on the drive train/gear box, which will be repaired or replaced for forty-eight months from the date of sale, and the electric motor (excluding brush replacement, which is routine maintenance) or pressure control assembly which will be repaired or replaced for twenty-four months from the date of sale. 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, 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 with Graco equipment of 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 claim. 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.

DISCLAIMERS AND LIMITATIONS

The terms of this warranty constitute purchaser's sole and exclusive remedy and are in lieu of any other warranties (express or implied), including warranty of merchantability or warranty of fitness for a particular purpose, and of any non-contractual liabilities, including product liabilities, based on negligence or strict liability. Every form of liability for direct, special or consequential damages or loss is expressly excluded and denied. In no case shall Graco's liability exceed the amount of the purchase price. Any action for breach of warranty must be brought within two (2) years of the date of sale.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose, with respect to accessories, equipment, materials, or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motor, 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.

Factory Branches: Atlanta, Chicago, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)

Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan

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

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