

INSTRUCTIONS-PARTS LIST

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



APPLICATION EQUIPMENT FROM GRACO

307-730

Rev G
Supersedes E
(and F, not published)

1/4 Gallon Per Minute, 120 V AC, 60 Hz

PT2000® Pressure Roller System

250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

Model 218-938, Series B

with 18 inch Extension and 1/2 and 3/4 inch nap Roller Covers

Model 223-660, Series A

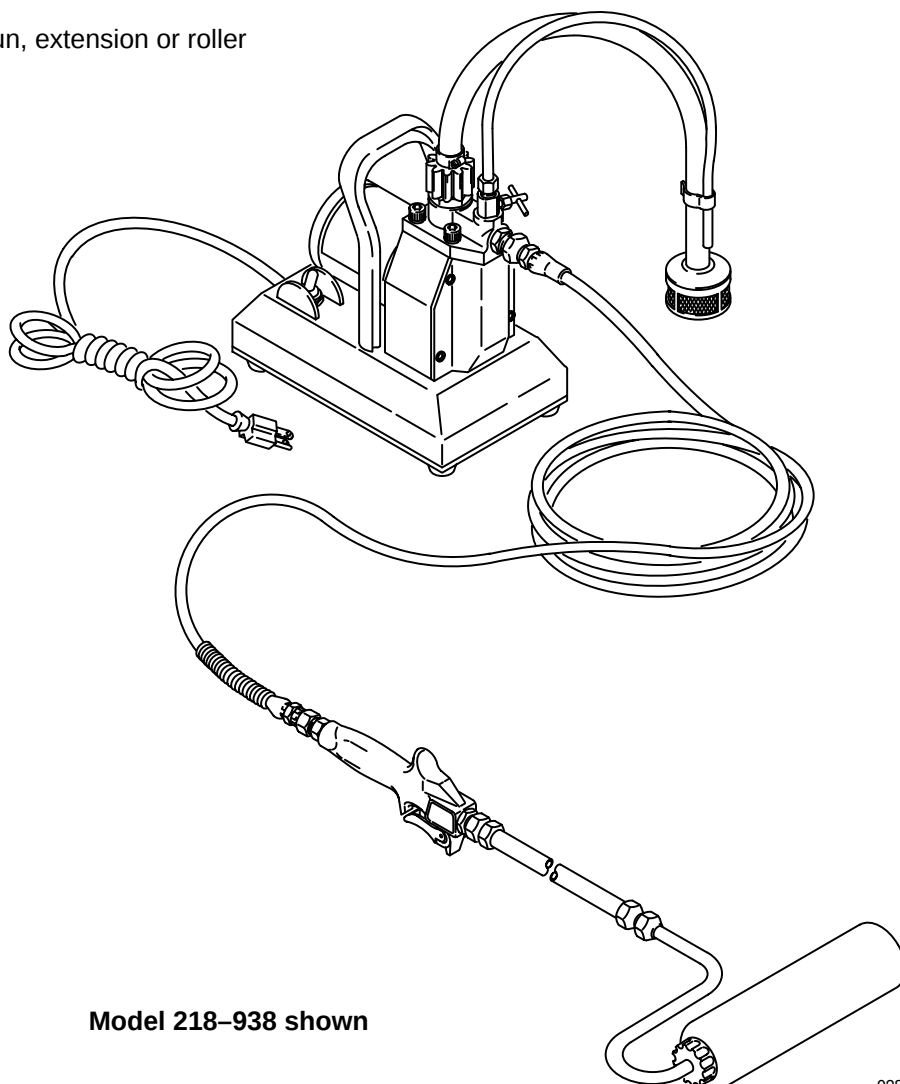
Basic Pressure Roller, without hose, gun, extension or roller

U.S. Patent No. 4,722,230; 4,652,024

Foreign Patents Pending

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Model 218-938 shown

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Always Professional Results™

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CAUTION

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

See ACCESSORIES section of the manual for ordering optional hoses.

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 bodily injury.

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

NOTE: Gives additional explanation of a procedure 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 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 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 6 of this manual.

EXTENSION MISUSE HAZARD

Do not attempt to modify the extension or roller frame, or to use parts which are not designed for use with this system. Use the extension only with the roller frame provided 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.

EQUIPMENT MISUSE HAZARD

This system is designed to be used at *250 psi (17.5 bar) MAXIMUM WORKING PRESSURE*. Use only components or 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, 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.

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.

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

AVERTISSEMENT

Assurez-vous que tous les utilisateurs de cet équipement lisent, comprennent et observent les avertissements et les instructions de ce manuel!

SECURITE GENERAL

Faites extrêmement attention de ne pas éclabousser de peinture, d'eau de rinçage sale ni de solvant dans les yeux. Portez de lunettes de protection.

Assurez-vous que l'endroit où vous travaillez est bien aéré afin d'éviter l'accumulation des vapeurs toxiques de peinture.

Pour réduire le risque de décharge électrique, *n'exposez pas le système à la pluie*. Rangez toujours le système à l'intérieur.

MISE A LA TERRE

Il est essentiel d'effectuer la mise à la terre pour réduire le risque de décharge électrique et de blessures sérieuses résultant des étincelles d'électricité statique. Lisez et observez les instructions de mise à la terre, à la page 6 de ce manuel.

DANGERS POUVANT RESULTER DU MAUVAIS USAGE DE LA RALLONGE

N'essayez pas de modifier la rallonge ni la monture du rouleau; n'essayez pas non plus d'utiliser de pièces qui ne sont pas conçues pour aller avec ce système. N'utilisez la rallonge qu'avec la monture de rouleau fournie avec le système.

L'utilisation incorrecte de la rallonge, de la monture de rouleau, du tuyau ou du robinet du rouleau peut entraîner la rupture de pièces ou une explosion et causer des blessures sérieuses.

DANGERS POUVANT RESULTER DU MAUVAIS USAGES DE L'EQUIPMENT

Ce système est conçu pour être utilisé à une *PRESSION MAXIMUM DE FONCTIONNEMENT de 17.5 bars (250 psi)*. N'utilisez que des pièces ou accessoires qui sont conçus pour être utilisés avec le système PT2000.

L'utilisation incorrecte de cet équipement, la modification des pièces, l'utilisation de peinture ou de solvant incompatibles, l'utilisation de pièces usées ou abîmées peuvent entraîner la rupture de l'équipement et causer des blessures graves, un incendie, une explosion et des dégâts matériels.

Ne changez et ne modifiez jamais aucune pièce du système et réparez ou remplacez les pièces usées ou abîmées immédiatement.

Vérifiez régulièrement toutes les pièces du système et réparez ou remplacez les pièces usées ou abîmées immédiatement.

EVITEZ LES LIGNES ELECTRIQUES

Évitez tout contact avec les lignes électriques! Ceci pourrait causer des blessures très graves, y compris des brûlures ou l'électrocution.

ADVERTENCIA

Asegurarse de que todos los operadores de este equipo lean, entiendan y repiten las precauciones e instrucciones indicadas en este manual.

SEGURIDAD EN GENERAL

Tener extremo cuidado de no salpicarse los ojos con pintura, agua de enjuague contaminada o solvente. Usar gafas protectoras.

Asegurarse de que el lugar de trabajo tenga buena ventilación, para evitar la acumulación de vapores de pintura nocivos.

Para reducir el riesgo de sufrir un choque eléctrico, *no dejar este sistema expuesto a la lluvia*. Siempre guardarlo bajo techo.

PUESTA A TIERRA

La puesta a tierra es esencial para reducir el riesgo de sufrir un choque eléctrico u otras lesiones corporales graves debido a chispas estáticas. Leer y seguir las instrucciones dadas en la página 6 de este manual.

PELIGRO POR MAL USO DE LA EXTENSION

No intentar modificar las extensión o el portarrodillo, o usar piezas que no hayan sido diseñadas para usarse en este sistema. Usar la extensión solamente con el portarrodillo provisto con este sistema.

El uso indebido de la extensión, portarrodillo, manguera o gatillo del rodillo podría romper o hacer explotar el componente y causar graves lesiones corporales.

PELIGRO POR MAL USO DEL EQUIPO

Este sistema está diseñado para una *PRESION DE TRABAJO MAXIMA de 17.5 barías (250 lbs/pulg2)*. Usar componentes o accesorios diseñados para usarse con el sistema PT2000.

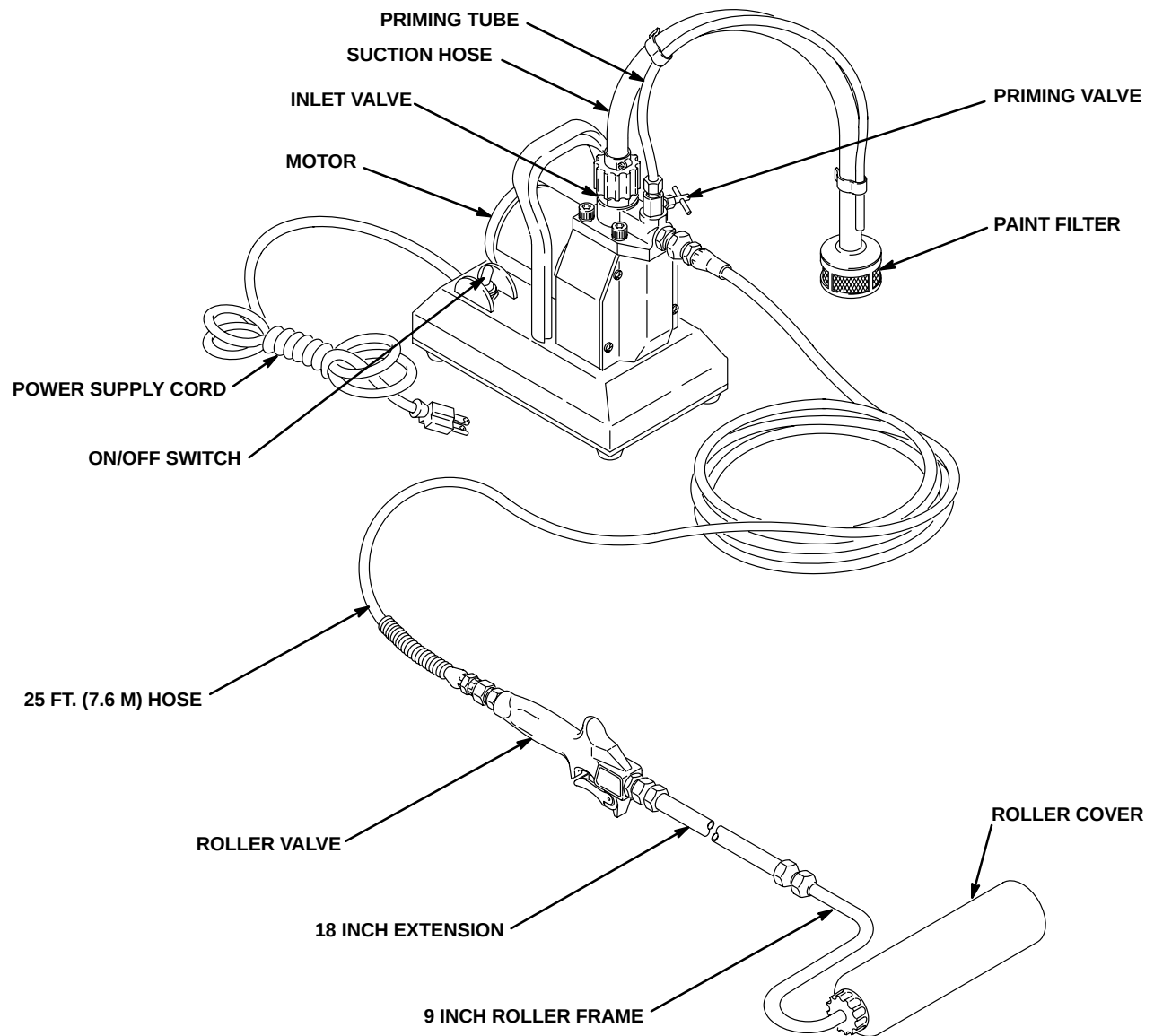
El uso indebido de este equipo, tal como modificación de las piezas, uso de pintura o solvente incompatible, o de piezas dañadas o desgastadas, podría causar la rotura del equipo y terminar en graves lesiones personales, incendio, explosión y daños a la propiedad.

Nunca alterar o modificar ninguna pieza del equipo; el hacerlo podría causar sobrepresión o malfuncionamiento.

Revisar con regularidad todas las piezas del sistema y reparar o sustituir de inmediato las que estén dañadas o desgastadas.

PROCURAR NO TOCAR LOS CABLES ELECTRICOS

¡Procurar no tocar ningún cable eléctrico! De llegar a suceder esto se podrían sufrir lesiones corporales sumamente graves, incluso quemaduras o electrocución.

**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 through the suction hose and 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 19.

Roller Valve

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

Pressure Roller

The pressure roller has an 18 inch extension. Two roller covers, one 1/2 inch nap for smooth surfaces, and one 3/4" nap for semi-rough surfaces, are provided. Different lengths and adjustable extensions and different types of roller covers are available. See ACCESSORIES on page 19.

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SETUP



- | Cord Length | | Extension |
|-------------|-----------|------------|
| feet | (meters) | Wire Gauge |
| 1–100 | (1–30) | 18 |
| 100–200 | (30–61) | 16 |
| 200–300 | (61–92) | 14 |
| over 300 | (over 92) | 12 |

WARNING

Never remove the third (grounding) pin of the power supply cord. 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 shows signs of wear or damage.

- Fig 2** **GROUNDING PIN** / 0286

STARTUP

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.

1. Place the suction hose 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 hose (if the hose 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. Trigger the roller valve to prime the outlet hose and extension. Once 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. Do not operate the pump with the base cover removed.

CAUTION

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

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. Whenever you stop painting, turn the ON/OFF switch to OFF, and trigger the roller valve. Then elevate the roller end of the extension to prevent paint from draining out the roller end.
4. Thoroughly flush the system immediately after each use to keep it in good working order. See page 8.

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

NOTE: A Garden Hose Flush Adapter, P/N 220–231, is included. This adapter is placed at the pump inlet and uses a standard city water supply to aid in flushing. Instructions on how to use it are included with the adapter.

Flushing Procedure (Latex Paint Only)

1. Turn the ON/OFF switch to OFF.
2. Trigger the roller valve and roll out the excess paint from the roller onto a wall or newspaper. Remove the roller cover and diffuser, and soak these parts in a pail of warm, soapy water.
3. Put the suction tube in a 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. See Fig 3. Release the trigger and shut off the pump as soon as all the paint is drained. This avoids contaminating the paint with the flushing water.

4. 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 using a cold solution). Open the priming valve for a few seconds to clean the priming tube. Close the priming valve.
5. Raise the suction hose above the water and run the pump for a few seconds to drain the flushing solution. Shut off the pump.
6. Wash off all external parts of the hoses, extension, roller frame, roller valve and pump.
7. Flush again with clean, clear water. Change the water as necessary, until the system is thoroughly cleaned.
8. 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.

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 with mineral spirits.

9. Thoroughly rinse the roller cover inside and out. Clean the diffuser as explained on page 9.
10. Oil the needle in the roller valve and trigger the valve a few times to distribute the oil. See Detail A, Fig 3.

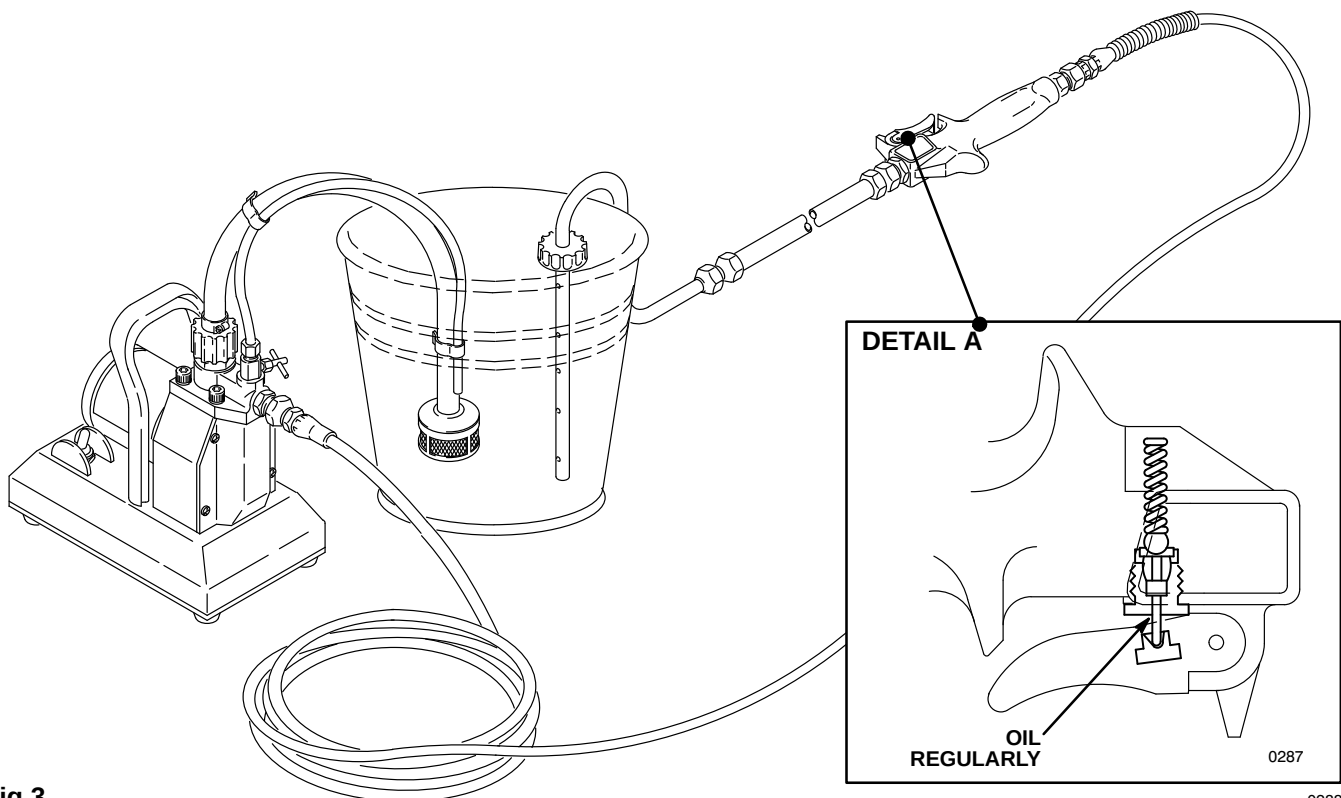


Fig 3

Flushing Procedure (Oil-based Paint Only)

NOTE: Follow the instructions on page 8, except use mineral spirits. **DO NOT** heat the mineral spirits.

Installing and Removing a Roller Cover (See Fig 4.)

1. To install a cover, hold the diffuser and unscrew the retainer nut. Pull the diffuser off the frame. Slide the cover over the diffuser. Install the diffuser on the frame and reinstall the nut. *Be careful not to over tighten the nut.*
2. To remove a cover, hold the cover and unscrew the retainer nut. Slide the cover and diffuser off the roller frame, and press on the end of the diffuser to separate it from the cover.
3. To clear an obstruction in the frame, or for more thorough cleaning, remove the setscrew. Be sure to reinstall the setscrew after cleaning.

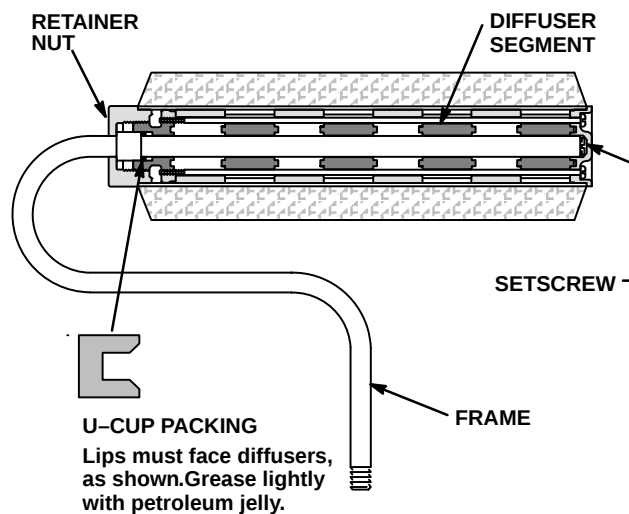


Fig 4

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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 wet paint. For oil-base paint, use unheated mineral spirits. Use a soft brass bristle brush to remove dried paint.
2. Disassemble the diffuser 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 packing with petroleum jelly. Slide the diffuser segments onto the roller frame. Twist and press the last diffuser segment to snap the pieces together.
 - c. Install the outside end cap and the two screws. Holding the inside end cap, press on the two screws and rotate the diffuser segments to seat the screws. Tighten the screws evenly into the inside end cap. Be sure there is no binding and that the diffuser segments move freely.

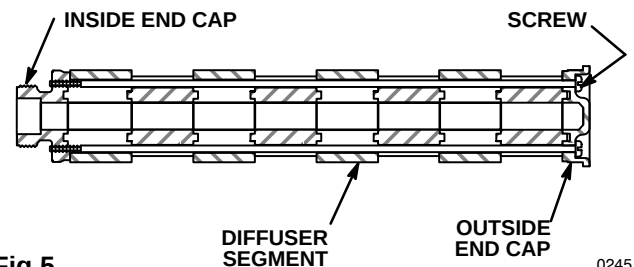


Fig 5

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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.

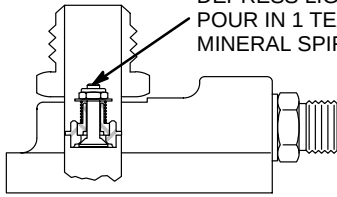
1. Turn the ON/OFF switch to OFF.
2. Unplug the power supply cord.
3. Trigger the roller valve to relieve pressure.

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 takes long time to prime	Clogged suction tube filter	Clean.
	Paint too thick	Thin; try pouring paint into suction tube.
	Outlet valve spring worn or damaged	Pour paint into suction tube and try to prime system. If it doesn't prime in one minute, replace the outlet spring. See Outlet Valve, page 13.
	Inlet valve stuck or damaged	Depress valve gently and pour in about 1 teaspoon mineral spirits. Try to prime pump. Replace valve if necessary. See Inlet Valve, page 13. 
	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 15.
	Fuse burned out.	Replace. See page 12. If it burns out again soon, return the system to an authorized repair agency for repair.
Low or no paint flow	Clogged roller cover, diffuser, roller frame, roller valve, or hose	Clean thoroughly after each use. See Flushing on page 8.
	Using more than 25 ft. (7.6 m) of 1/4" ID hose	Use up to 100 ft. (30 m) of 3/8" ID hose. See CAUTION on page 2.
	Loose inlet hose nut	Tighten.
	Worn or damaged priming valve	Replace. See page 14.
	Priming valve is open	Close.
	Paint too thick	Thin: Follow manufacturer's recommendations.
	Damaged pressure switch	Replace. See page 13.
	Worn inlet and/or outlet valve	Replace. See page 13.
Pump runs after roller valve trigger is released	Worn or damaged pressure switch	Replace. See page 13.
	Worn or damaged inlet valve	Replace. See page 13.
	Worn or damaged outlet valve	Replace. See page 13.
	Worn or damaged priming valve	Replace. See page 14.
	Worn roller valve packings or needle	Repair. See page 11.

Roller Valve

WARNING

Always follow the **Pressure Relief Procedure Warning** on page 10 before attempting any repair.

NOTE: Order Repair Kit P/N 218-960 to repair this roller valve.

1. Tap out the pin (A) from the trigger (B) and slide the trigger off of the valve (N). See Fig 6.
2. Remove the cap (C). Use a 1/2 in. socket wrench to screw the fluid housing (D) out of the valve. Remove the o-ring (J). See Fig 6.
3. Pull the needle (K) out with needle nose pliers. See Fig 6.
4. Tap the seat (G) out of the valve (N). See Fig 6.
5. Remove the ball (F) and spring (E) from the valve handle. See Fig 6.
6. Turn the nylon screw (L) into the packing (H). Insert the needle (K) through the bottom of the housing (D) and push the packing out the top of the fluid housing. 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 back (flat) side of the packing. 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. Guide the tool (M) into the fluid housing (D) until the needle protrudes through the bottom of the housing. Lightly tap the end of the tool 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 (N), then install the ball (F) so it is centered on the spring. See Fig 9.
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 23-27 in-lb (2.6-3 N.m). See Fig 9.
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 9.
16. Slide the trigger (B) into place. Install the pin (A) in the trigger. See Fig 6.

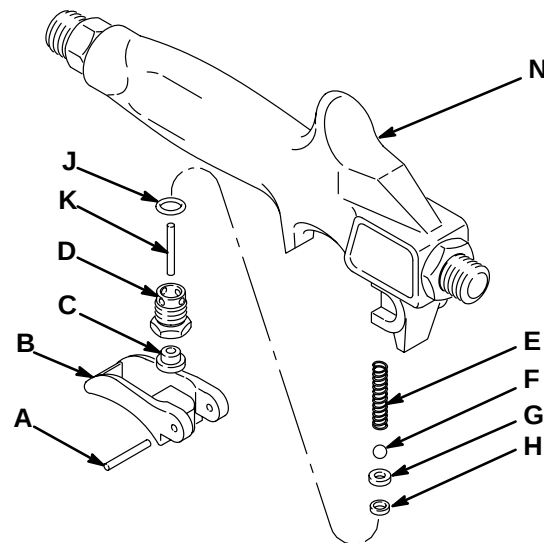


Fig 6

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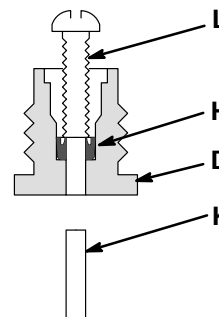


Fig 7

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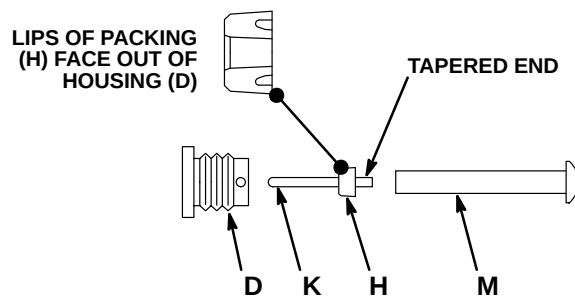


Fig 8

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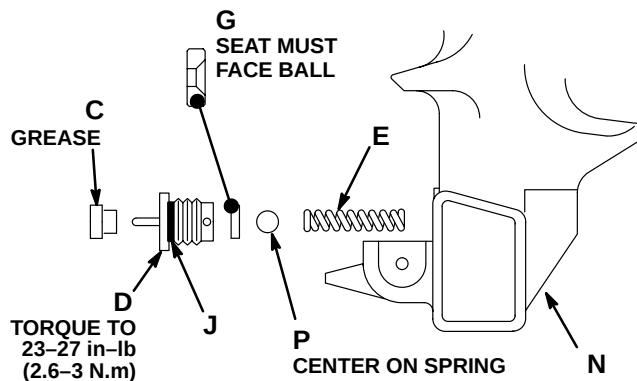


Fig 9

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Pressure Relief Procedure

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

WARNING

NOTE: For all electrical repair, follow the **Pressure Relief Procedure Warning** above. Then remove the base cover (42). Before checking or operating the system, reinstall the base cover, making sure all wires are tucked in neatly.

1. Pull the old fuse out of the fuse holder (65). Install a new fuse (67). *Be sure you install ONLY a 3AG fuse, rated at 1-1/4 amps.*

1. Disconnect the four leads from the rectifier.
2. Remove the screw (33) and rectifier (39).
3. Install a new rectifier so the positive terminal (+) is closest to the fuse holder (65). Install the screw (33).
4. Connect the power supply cord's white lead to an unmarked terminal. Connect 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.



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1. Disconnect the two leads from the ON/OFF switch (34) terminals. See Fig 11.
2. Remove the boot (36) and pull the switch (34) out of the base. Remove the ground wire (84). See Fig 10.
3. Remove the top nut (A) from the new switch. Place the ground wire connector (84) on the switch and re-install the nut. 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. See Fig 11.

1. Disconnect the white lead from the rectifier (39), and the black lead from the fuse holder (65), and the green lead from the grounding screw (82).
2. From the inside of the base, use a screwdriver to push the strain relief bushing (38) out of the base. Remove the bushing and power supply cord.
3. Slide the strain relief bushing over the new power supply cord. Press the bushing together and then press the bushing into the base.
4. Connect the green ground wire to the grounding screw (82) and secure it with a washer (81) and nut (80). Connect the black lead to the fuse holder (65) and the white lead to an unmarked terminal on the rectifier (39).

To maintain grounding continuity in your system, and to reduce the risk of electric shock, check to be sure the ground wires are properly connected. The power supply cord's green ground wire connects to the screw (82), and the ground wire (84) connects between the ON/OFF switch and the screw (82). Also be sure the screws (25 and 33) are tightly screwed into the base. See Fig 10 and 11.



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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 55–65 in-lb (6.2–7.4 N.m). See Fig 13.
6. Guide the pressure switch leads through the base. Connect a lead to the power-OUT side of the ON/OFF switch (34) and connect the other end to an unmarked terminal on the rectifier (39). See Fig 11.
7. Reinstall the front cover.

CAUTION

To avoid damaging the pressure switch, do not drop it or 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) and spring (2c).
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 and dry all parts.
6. Tip the pump back. Install a new seal (2f), making sure it lays flat.
7. Install the seat (2e) and torque it to 80–100 in-lb (13.5–16 N.m).
8. Drop in the ball (2d), *making sure it stays there!*

CAUTION

Do not let the ball drop into the pressure switch cavity (12). If that happens, and the outlet fitting (2a) is screwed into the pump, the switch will be permanently damaged.

9. Check the ball stop pin in the outlet fitting (2a) for wear or damage. 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, torquing to 280–300 in-lb (32–34 N.m).

Inlet Valve (See Fig 13.)

1. Unscrew the nut (45) on the suction hose (44). Screw the inlet valve housing (1) out of the pump housing (9). Remove the inlet valve (3).

2. Grease the inlet valve (3) to hold it in place. Install it in the valve housing (9). Screw the inlet valve housing (1) into the pump housing. Have someone firmly hold the pump housing (9) and then torque the inlet valve to 470–490 in-lb (53–55 N.m).

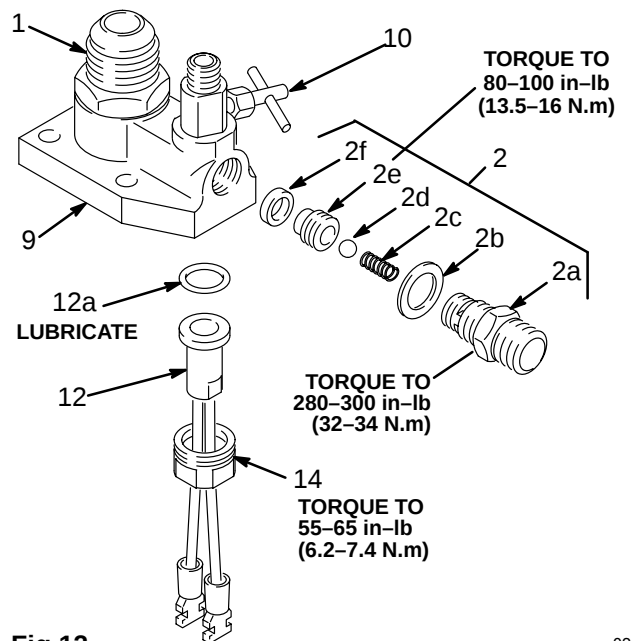


Fig 12

0296

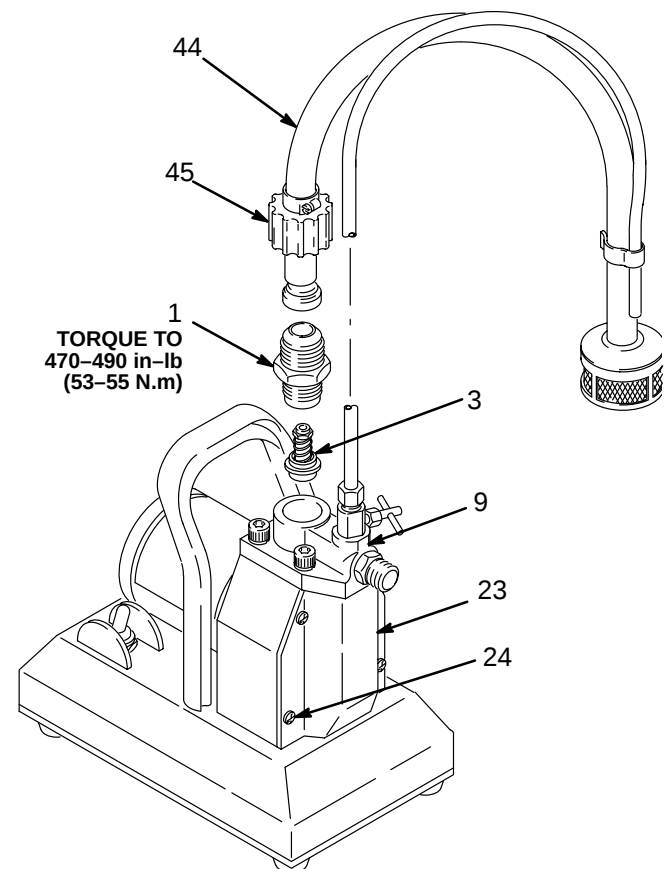


Fig 13

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Diaphragm (See Fig 14.)

CAUTION

Replace the diaphragm whenever you remove the pump housing (9), or after each 100 hours of use, whichever comes first. During use, small grooves are formed in the diaphragm which cannot be re-aligned properly. Reusing a diaphragm may cause leaking, resulting in costly pump damage.

1. Remove the screws (15). Tip the pump housing (9) back, being careful not to damage the wires. Remove the front cover (23).
2. Check the diaphragm guide (11) in the bottom of the pump housing (9) and replace it if it is worn or damaged. Clean the pump housing thoroughly. Press the new guide, flat side first, into the housing, *using only your fingers*. Be sure it is installed evenly.
3. Screw the diaphragm (17) out of the connecting rod assembly (18).
4. Use a soft brass or nylon bristle brush to clean the top of the connecting rod and housing. Taking care not to damage the diaphragm grooves, gently clean the bottom of the pump housing (9).
5. Check the rod, motor bearing and eccentric. If there is *any* paint or damage, clean or replace the connecting rod assembly as explained on page 15.
6. Screw the new diaphragm (17) into the connecting rod *just until it bottoms out*. Then turn it 1/8 – 1/4 turn [about 4–6 in-lb (0.4–0.7 N.m)].

CAUTION

Never turn the diaphragm more than 1/4 turn when torquing it, as that will prevent the diaphragm from working properly.

7. Apply thread lubricant to the screws (15) and install them with the lockwashers (16) in the pump housing. Torque the screws a few inch-pounds (N.m) at a time, oppositely and evenly, to 85 in-lb (9.6 N.m).
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 on the handle (E) of the priming valve (10a). Unscrew the stem of the handle.
2. Screw the priming valve (10a) out of the pump housing (9).
3. Wrap the threads of the priming valve with Teflon® tape. Screw the valve snugly into the pump housing (9). 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). 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, and then back it out two turns. Hand tighten the nut onto the priming valve, and then tighten the stem into the valve.

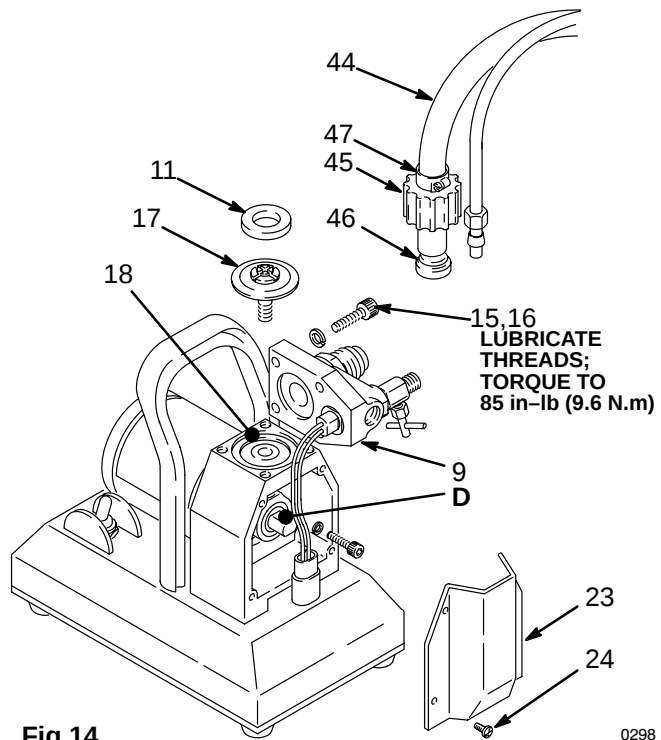


Fig 14

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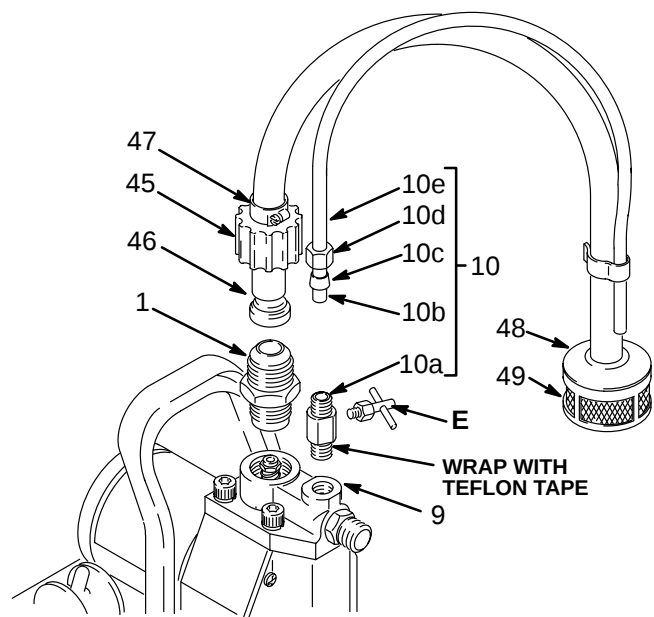


Fig 15

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Suction Tube (See Fig 15.)

1. Unscrew the nut (45) from the fluid inlet valve housing (1). Remove the hose clamp (47). Slit the suction tube 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 (1). Press the hose further onto the nipple, leaving about a 1/8 in. (3 mm) gap between the nut and hose end.
3. Install the hose clamp (47) and tighten snugly.
4. Remove the filter housing (48) and filter (49) from the old suction hose. Install these parts on the new hose. Dampen the hose with warm water to ease the filter and filter housing onto the hose.

Connecting Rod and Bearing (See Fig 16.)

1. Remove the front cover (23). Remove the screws (15). Carefully tip back the pump housing. Unscrew the diaphragm (17) and discard it.

CAUTION

Replace the diaphragm whenever you remove the pump housing (9), or after each 100 hours of use, whichever comes first. During use, small grooves are formed in the diaphragm which cannot be re-aligned properly. Reusing a diaphragm may cause leaking, resulting in costly pump damage.

2. Remove the motor screws (20). Lift the motor (30) slightly. Holding the connecting rod (18a), pull the motor away from the housing (22).
3. Inspect the bearing (18b) in the connecting rod (18a). If it is worn or any rollers are broken, replace the connecting rod assembly (18). Inspect the motor eccentric, 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

Thoroughly grease the bearing 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. Taking care not to damage the diaphragm grooves, gently clean the bottom of the pump housing (9).
6. Install the connecting rod assembly (18) in its housing (22). Screw a new diaphragm (17) into the rod just until it bottoms. Turn the diaphragm another 1/8 to 1/4 turn [about 4–6 in-lb (0.4–0.7 N.m)].

CAUTION

Never turn the diaphragm more than 1/4 turn when torquing it, as that will prevent the diaphragm from working properly.

7. Align the motor with the pins in the connecting rod housing (22). Guide the motor shaft (A) 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) to hold the motor. Spin the motor shaft again. 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 and correct the cause of the binding.

9. Position the pump housing (9) on the connecting rod housing. Lubricate the screws (15) and loosely install them and the lockwashers (16). Torque the screws a few inch-pounds (N.m) at a time, oppositely and evenly, to 85 in-lb (9.6 N.m).
10. Reinstall the front cover (23).

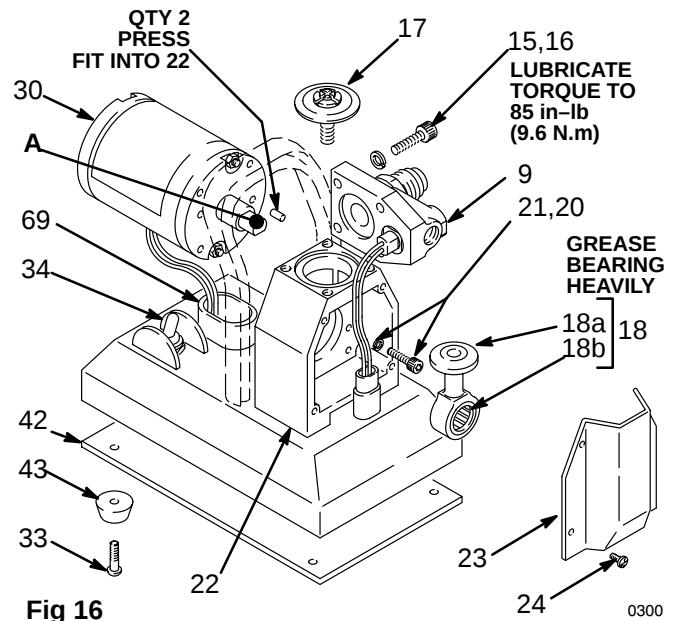


Fig 16

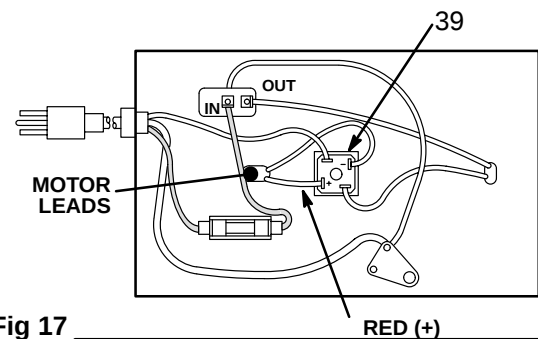
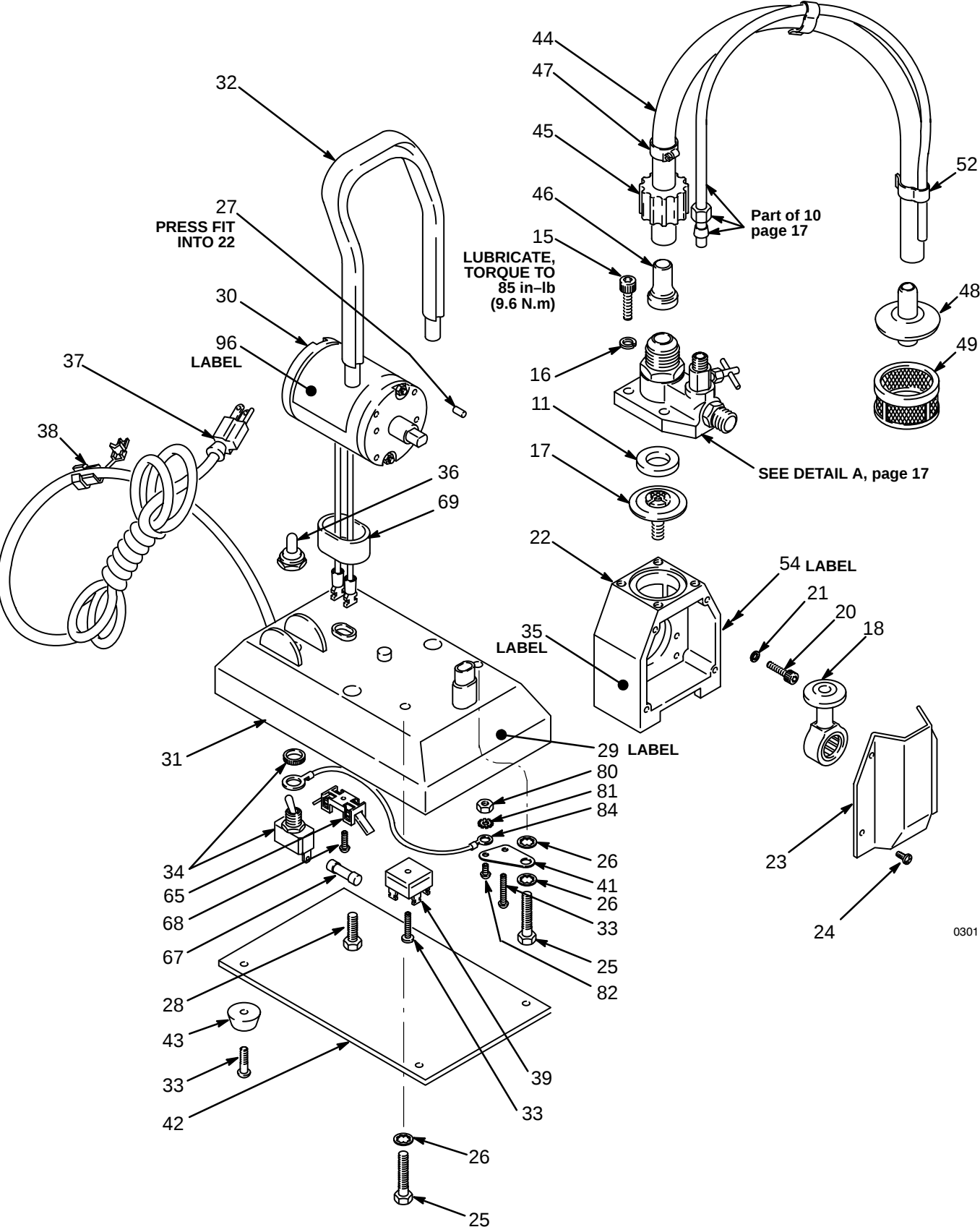


Fig 17

Motor (See Fig 16 and 17.)

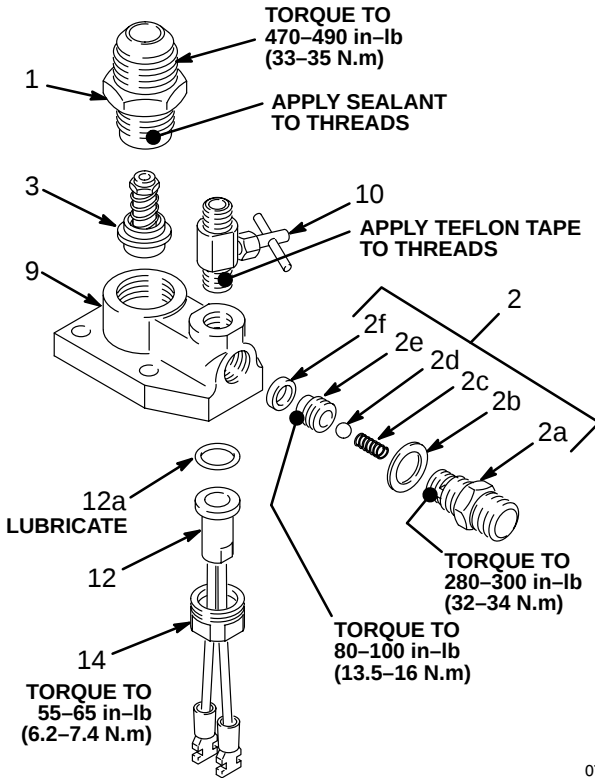
1. Remove the front cover (23).
2. Remove the base cover (42). Disconnect the motor leads from the positive and negative rectifier terminals. See Fig 17.
3. Remove the motor screws (20). Lift the motor (30) slightly. Holding the connecting rod (18a), pull the motor away from the housing (22).
4. Inspect the bearing (18b) in the connecting rod (18a). If it is worn or any rollers are broken, replace the bearing and connecting rod assembly (18) as instructed to the left.
5. Use your fingers to pack high quality bearing grease thoroughly in between the bearing rollers. See the CAUTION following Step 4, to the left.
6. Feed the motor leads through the rubber boot (69). Align the motor with the pins in the connecting rod housing (22). Guide the motor shaft (A) 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, following 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). See Fig 17.
9. Install the base cover (42) and bumpers (43), and the front cover (23).



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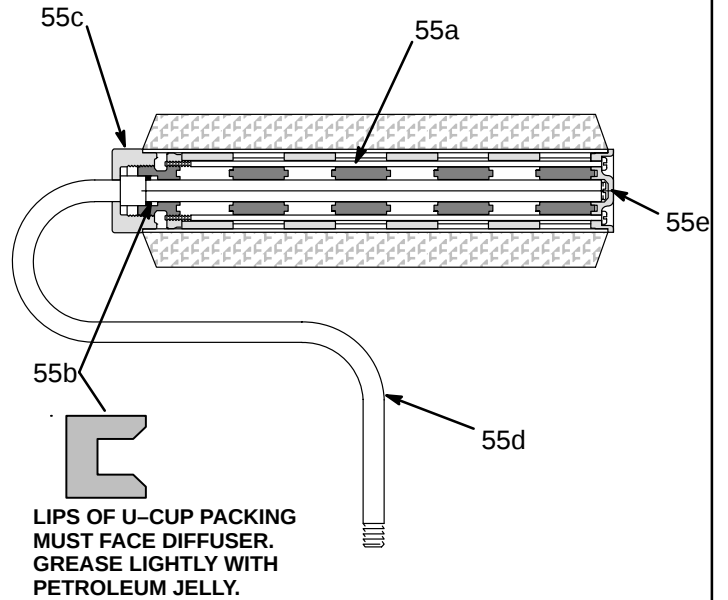
PARTS DRAWING

DETAIL A

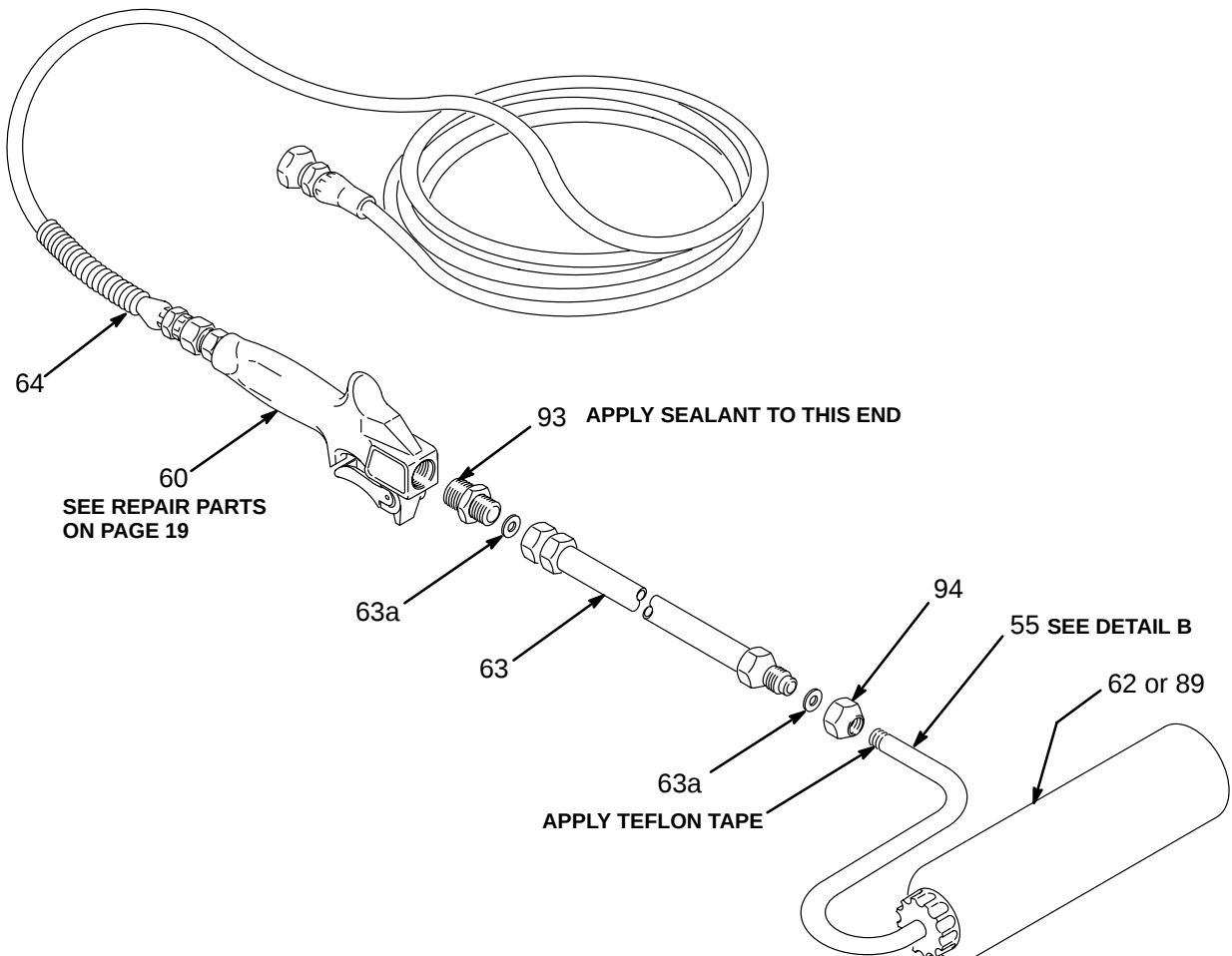


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DETAIL B



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0303

PARTS LIST

Model 218-938, Series B

Includes items 1-96

Model 223-660, Series A (Basic Unit)

Includes items 1-54, 65-84, 96

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	220-930	HOUSING, valve, inlet	1	39	108-219	RECTIFIER, bridge	1
2	218-977*	OUTLET VALVE KIT	1	41	183-301	TERMINAL, ground	1
		Includes items 2a-2f	1	42	181-156	COVER, base	1
2a	222-349	. FITTING, outlet	1	43	108-220	BUMPER	4
2b	180-454	. GASKET	1	44	181-231	HOSE, suction	1
2c	107-521	. SPRING	1	45	181-159	NUT, coupling	1
2d	101-956	. BALL	1	46	181-160	NIPPLE, hose	1
2e	218-968	. HOUSING, seat, valve	1	47	108-231	CLAMP, hose	1
2f	180-455	. SEAL, washer	1	48	181-163	HOUSING, filter	1
3	218-976*	INLET VALVE KIT	1	49	181-164	FILTER	1
9	181-146	HOUSING, pump	1	52	178-342	SPRING CLIP	2
10	218-973*	PRIMING VALVE KIT	1	54	181-214	LABEL, identification	1
11	181-152	GUIDE, diaphragm	1	55	218-935	FRAME, roller	1
12	218-974	SWITCH, pressure <i>Includes item 12a</i>	1			Includes items 55a-55e	1
12a	108-195	.O-RING	1	55a	218-934	.DIFFUSER, roller	1
14	181-209	RETAINER	1	55b	108-808	.PACKING, u-cup	1
15	101-864	CAPSCREW, socket head, 5/16-18 x 1" long	4	55c	183-420	.NUT, retainer	1
16	104-008	LOCKWASHER, spring, 5/16"	4	55d	218-582	.FRAME, roller	1
17	275-619*	DIAPHRAGM	1	55e	101-983	.SETSCREW	1
18	218-981	CONNECTING ROD & BEARING	1	60	218-954	VALVE, roller	1
20	108-237	CAPSCREW, socket head, No. 8-32 x 0.625"	4	62	107-590	COVER, roller, 9" long, 1/2" nap	1
21	100-079	LOCKWASHER, spring, No. 8	4	63	224-414	EXTENSION, 18" long	1
22	181-147	HOUSING, conn rod, Always order two of Ref No. 27 when replacing housing	1			<i>Includes item 63a</i>	1
		COVER, front	1	63a	166-969	.GASKET	2
23	181-166	SCREW, mach, filh, No. 8-32 x 0.312"	4	64	108-356	HOSE, fluid, nitrile rubber, cpld 3/8 npsm(m), 25' (7.6 m) long	1
24	108-236	CAPSCREW, hex head, 1/4-20 x 1.75"	2	65	108-199	HOLDER, fuse	1
25	102-313	LOCKWASHER, internal, 1/4"	3	67	108-461*	FUSE, electrical, 3AWG, 1-1/4 amp	1
26	100-028	PIN, dowel	2	68	108-223	SCREW, thd forming, pnh, No. 6 x 0.5"	1
27	108-213	SCREW, mach, hex washer head, Self-tapping, 1/4-14 x 1"	2	69	181-218	BOOT, rubber	1
28	108-230	LABEL, identification	1	80	100-072	NUT, hex, No. 6-32	1
29	181-215	MOTOR, electric	1	81	103-181	LOCKWASHER, No. 6	1
30	185-489	BASE, pump	1	82	103-854	SCREW, mach, bdgh, No. 6-32 x 0.25"	1
31	181-180	HANDLE	1	84	220-890	WIRE, ground	1
32	181-182	SCREW, thd forming, pnh, No.8 x 0.875"	6	88	220-231	GARDEN HOSE FLUSH ADAPTER	1
33	108-224	SWITCH, toggle	1	89	107-591	COVER, roller, 9" long, 3/4" nap	1
34	105-679	LABEL, identification	1	93	187-113	NIPPLE,	1
35	181-213	TOGGLE, boot	1	94	187-082	FITTING, adapter	1
36	105-659	CORD, power supply	1	96	181-787	LABEL, identification	1
37	108-192	BUSHING, strain relief	1				
38	102-519						

**Recommended spare parts to keep on hand.*

See IMPORTANT PHONE NUMBERS on page 20.

ACCESSORIES

Must be purchased separately.

CAUTION

To avoid premature wear of the pressure switch, never use more than 25 ft. (7.6 m) of 1/4" ID outlet hose. When longer outlet hose is needed, use 3/8" ID hose at a maximum of 100 ft (30 m) long. Never use 1/4" ID and 3/8" 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; 3/8" ID; cpld 3/8 npsm(fbe); 25' (7.6 m); 300 psi (21 bar) **MAXIMUM WORKING PRESSURE**

219-095 Suction Hose; Nylon

LARGER DIAMETER OUTLET HOSE

250 psi (17.5 bar) **MAXIMUM WORKING PRESSURE**

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

220-009 Outlet Hose; 3/8" ID; cpld 3/8 npsm(fbe); 50' (15 m)

NIPPLE 108-228

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

SPRAY WAND 220-236

4050 psi (279 psi) **MAXIMUM WORKING PRESSURE**
Creates soft spray when used with PT2000.

FIXED EXTENSION TUBES

**Included with sprayer.*

224-413 12 in. (0.31 m) long
224-414*18 in. (0.45 m) long
224-415 36 in. (0.91 m) long
224-416 72 in. (1.83 m) long

ROLLER FRAMES/DIFFUSERS AND ROLLER COVERS

**Included with sprayer.*

ADJUSTABLE EXTENSION TUBES

Must also order 167-703 nipple to replace the 187-113 (Ref no. 59) at the outlet of the roller valve.

218-77518—36 in. (0.45–0.91 m) long

218-7763 — 6 ft. (0.91–1.8 m) long

218-7776—12 ft. (1.8–3.7 m) long

218-7788—16 ft. (2.4–4.9 m) long

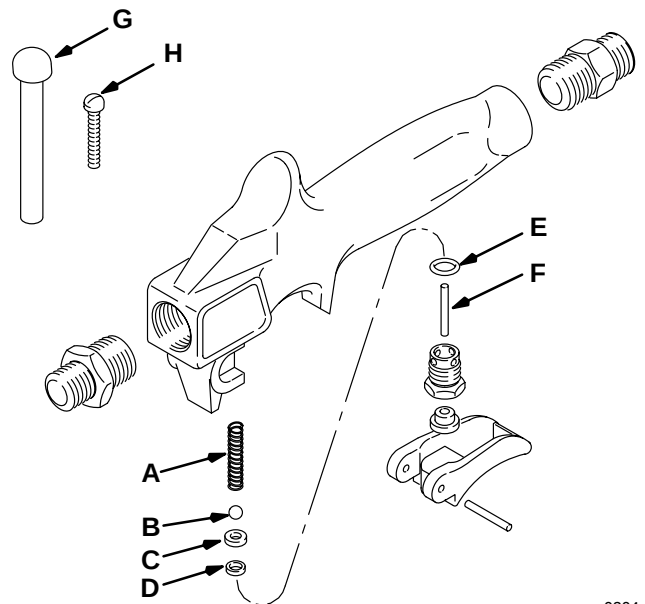
TWO ACCESSORY ADAPTER 220-232

1000 psi (70 bar) **MAXIMUM WORKING PRESSURE**

Adapts pump outlet to use two accessory applicators simultaneously.

ROLLER VALVE REPAIR KIT 218-960

Includes items A through H
Individual parts not sold separately.
See page 11 for instructions.



0304

Frame Size	Roller Frames & Diffusers	Roller Covers		
		1/2" (12 mm) Nap For semi-rough to smooth surfaces	3/4" (19 mm) Nap For semi-rough surfaces	1-1/4" (32 mm) Nap For rough surfaces
3" Size	220-234	108-402	—	—
9" Size	218-935*	107-590*	107-591*	107-592
12" Size	224-268	186-944	186-945	186-946

TECHNICAL DATA

Maximum Operating Pressure 250 psi (17.5 bar)
 Power Requirements 120 V AC, 60 Hz,
 1 Phase, 1.0 Amp
 Pump Output 1 gallon (3.8 liter) in 5 minutes
 Power Supply Cord No. 16 AWG, 3 wire,
 6' (1.7 m) long
 Wetted Parts Aluminum, Brass, Viton®,
 Delrin®, Polyurethane, Neoprene,
 Tungsten Carbide, Stainless Steel, Nylon, Plated
 Steel,
 Buna-N, Polyester, Polyvinyl Chloride
 Weight 13.5 lb (6.1 Kg)

Viton® and Teflon® are registered trademarks of the
 DuPont Company.

GRACO PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you: **1-800-328-0211 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or assistance regarding the application of Graco equipment:

1-800-543-0339 Toll Free

The CSA Listed Model, 220-345, has been obsoleted. A Basic System, Model 223-660, has been added.

MANUAL CHANGE SUMMARY

Listed below by the assembly changed are OLD, NEW, ADDED and DELETED parts.

Assembly Changed	Part Status	Ref No.	Part No.	Name
218-938 System	Old	2a	218-978	Outlet Fitting
	New	2a	222-349	Outlet Fitting
	Old	15	108-225	Capscrew
	New	15	101-864	Capscrew
	Old	30	218-975	Motor
	New	30	181-800	Motor
	Old	63	218-775	Extension
	New	63	224-414	Extension
	New	63a	166-969	Gasket
	Old	67	102-513	Fuse
	New	67	108-461	Fuse
	Old	70	181-184	Label
	New	96	181-787	Label
	Old	82	103-584	Screw
	New	82	103-854	Screw
	Add	88	220-231	Flush Kit
	Add	89	107-591	Roller Cover
	Old	59	167-703	Nipple
	New	93	187-113	Nipple
	Old	61	108-227	Nipple
	New	94	187-082	Nipple

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. 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; Korea; Switzerland; France; Germany; Hong Kong; Japan

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