INSTRUCTIONS–PARTS LIST 308–319

Rev A

INSTRUCTIONS

This manual contains important warnings and information.
READ AND RETAIN FOR REFERENCE

ELECTRIC, 120 VAC

ULTRA) 600 Airless Paint Sprayer

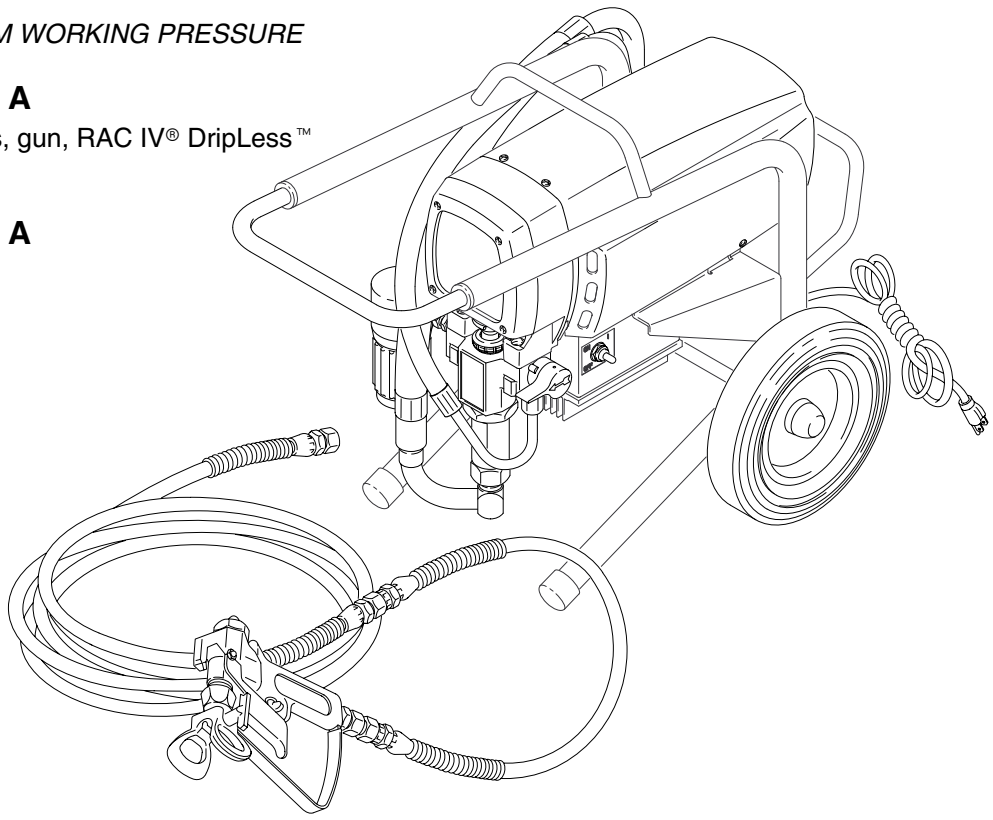
2750 psi (195 bar) MAXIMUM WORKING PRESSURE

Model 231–307, Series A

Complete sprayer with hoses, gun, RAC IV® DripLess™ Tip Guard and SwitchTip™

Model 231–325, Series A

Basic sprayer only



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NOTE: This is an example of the DANGER label on your sprayer. This label is available in other languages, free of charge. See page 39 to order.

⚠ DANGER ⚠			
	FIRE AND EXPLOSION HAZARD		**SKIN INJECTION HAZARD**
Spray painting, flushing or cleaning equipment with flammable liquids in confined areas can result in fire or explosion. **Use outdoors or in extremely well ventilated areas. Ground equipment, hoses, containers and objects being sprayed.** **Avoid all ignition sources such as static electricity from plastic drop cloths, open flames such as pilot lights, hot objects such as cigarettes, arcs from connecting or disconnecting power cords or turning light switches on and off.** **Failure to follow this warning can result in death or serious injury.**		**Liquids can be injected into the body by high pressure airless spray or leaks – especially hose leaks.** **Keep body clear of the nozzle. Never stop leaks with any part of the body. Drain all pressure before removing parts. Avoid accidental triggering of gun by always setting safety latch when not spraying.** **Never spray without a tip guard.** **In case of accidental skin injection, seek immediate "Surgical Treatment".** **Failure to follow this warning can result in amputation or serious injury.**	
READ AND UNDERSTAND ALL LABELS AND INSTRUCTION MANUALS BEFORE USE			

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

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WARNINGS

High Pressure Spray Can Cause Serious Injury. For Professional Use Only.
Observe All Warnings. Read and understand all instruction manuals before operating equipment.

FIRE OR EXPLOSION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the gun, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury, including the need for amputation. Also, fluid injected or splashed into the eyes or on the skin can cause serious damage.

NEVER point the spray gun at anyone or at any part of the body. NEVER put hand or fingers over the spray tip. NEVER try to “blow back” paint; this is NOT an air spray system.

ALWAYS have the tip guard in place on the spray gun when spraying.

ALWAYS follow the **Pressure Relief Procedure**, below, before cleaning or removing the spray tip or servicing any system equipment.

NEVER try to stop or deflect leaks with your hand or body.

Be sure equipment safety devices are operating properly before each use.

Medical Alert—Airless Spray Wounds

If any fluid appears to penetrate your skin, get **EMERGENCY MEDICAL CARE AT ONCE. DO NOT TREAT AS A SIMPLE CUT**. Tell the doctor exactly what fluid was injected.

Note to Physician**:** *Injection in the skin is a traumatic injury. It is important to treat the injury surgically as soon as possible.* ***Do not delay treatment to research toxicity.*** *Toxicity is a concern with some exotic coatings injected directly into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable*.

Spray Gun Safety Devices

Be sure all gun safety devices are operating properly before each use. Do not remove or modify any part of the gun; this can cause a malfunction and result in serious bodily injury.

Safety Latch

Whenever you stop spraying, even for a moment, always set the gun safety latch in the closed or “safe” position, making the gun inoperative. Failure to set the safety latch can result in accidental triggering of the gun.

Diffuser

The gun diffuser breaks up spray and reduces the risk of fluid injection when the tip is not installed. Check diffuser operation regularly. Follow the **Pressure Relief Procedure**, below, then remove the spray tip. Aim the gun into a metal pail, holding the gun firmly to the pail. Using the lowest possible pressure, trigger the gun. If the fluid emitted *is not* diffused into an irregular stream, replace the diffuser immediately.

Tip Guard

ALWAYS have the tip guard in place on the spray gun while spraying. The tip guard alerts you to the fluid injection hazard and helps reduce, but does not prevent, the risk of accidentally placing your fingers or any part of your body close to the spray tip.

Trigger Guard

Always have the trigger guard in place on the gun when spraying to reduce the risk of accidentally triggering the gun if it is dropped or bumped.

Spray Tip Safety

Use extreme caution when cleaning or changing spray tips. If the spray tip clogs while spraying, engage the gun safety latch immediately. ALWAYS follow the **Pressure Relief Procedure** and then remove the spray tip to clean it.

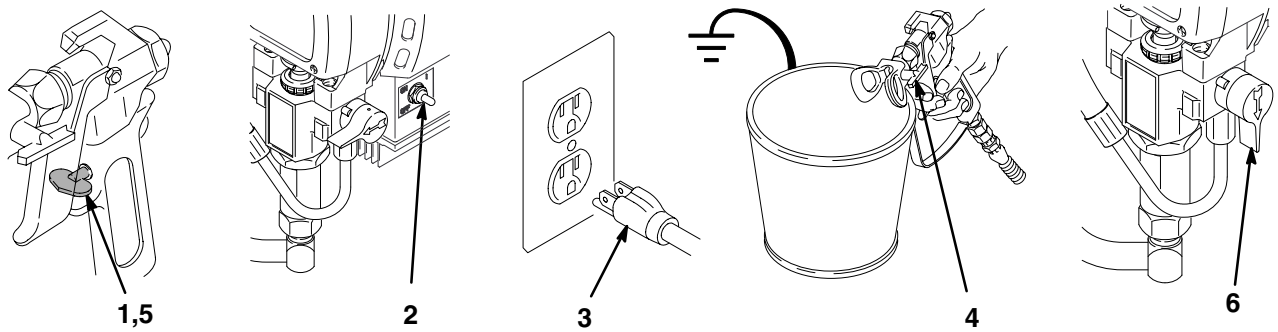
NEVER wipe off build–up around the spray tip until pressure is fully relieved and the gun safety latch is engaged.

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing fluid or solvent in the eyes or on the skin, or injury from moving parts or electric shock, always follow this procedure whenever you shut off the sprayer, when checking or servicing any part of the spray system, when installing, cleaning or changing spray tips, and whenever you stop spraying.

1. Engage the gun safety latch.
2. Turn the ON/OFF switch to OFF.
3. Unplug the power supply cord.
4. Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Open the pressure drain valve, having a container ready to catch the drainage. Leave the valve open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, VERY SLOWLY loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Now clear the tip or hose.



MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers or other body parts. KEEP CLEAR of moving parts when starting or operating the sprayer. Follow the **Pressure Relief Procedure** on page 3 before checking or servicing any part of the sprayer, to prevent it from starting accidentally.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection, splashing in the eyes or on the skin, or other serious bodily injury, or fire, explosion or property damage.

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

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

System Pressure

This sprayer can develop *195 bar (2750 psi) maximum working pressure*. Be sure that all spray equipment and accessories used are rated to withstand this pressure. DO NOT exceed the maximum working pressure of any component or accessory used in the system.

Fluid and Solvent Compatibility

BE SURE that all fluids and solvents used are chemically compatible with the wetted parts shown in the **TECHNICAL DATA** on page 39. Always read the fluid and solvent manufacturer's literature before using them in this sprayer.

Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in this equipment, which contains aluminum and/or zinc parts. 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.

HOSE SAFETY

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.

All fluid hoses must have spring guards on both ends! Spring guards help protect the hose from kinks or bends at or close to the coupling which can result in hose rupture.

TIGHTEN all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

NEVER use a damaged hose. Before each use, check the entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. DO NOT try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

Handle and route hoses carefully. Do not pull on hoses to move equipment. Keep hoses clear of moving parts and hot surfaces of the pump and gas engine. Do not use fluids or solvents which are not compatible with the inner tube and cover of the hose. DO NOT expose Graco hose to temperatures above 180° F (82° C) or below –40° F (–40° C).

Hose Grounding Continuity

Proper hose grounding continuity is essential to maintaining a grounded spray system. Check the electrical resistance of your fluid hoses at least once a week. If your hose does not have a tag on it which specifies the maximum electrical resistance, contact the hose supplier or manufacturer for the maximum resistance limits. Use a resistance meter in the appropriate range for your hose to check the resistance. If the resistance exceeds the recommended limits, replace it immediately. An ungrounded or poorly grounded hose can make your system hazardous. Also read **FIRE OR EXPLOSION HAZARD.**

FIRE OR EXPLOSION HAZARD

Static electricity is created by the flow of fluid through the pump and hose. If every part of the spray equipment is not properly grounded, sparking may occur, and the system may become hazardous. Sparking may also occur when plugging in or unplugging a power supply cord. Sparks can ignite fumes from solvents and the fluid being sprayed, dust particles and other flammable substances, whether you are spraying indoors or outdoors, and can cause a fire or explosion and serious bodily injury and property damage. Plug the sprayer into a grounded outlet at least 20 ft. (6 m) from the sprayer.

If you experience any static sparking or even a slight shock while using this equipment, **stop spraying immediately**. Check the entire system for proper grounding. Do not use the system again until the problem has been identified and corrected.

Grounding

To reduce the risk of static sparking, ground the sprayer and all other spray equipment used or located in the spray area. CHECK your local electrical code for detailed grounding instructions for your area and type of equipment. BE SURE to ground all of this spray equipment:

1. *Sprayer:* plug into a properly grounded outlet. Do not use an adapter. Extension cords must have three wires and be rated for at least 15 amps.
2. *Fluid hoses:* use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity. See **Hose Grounding Continuity**.
3. *Spray gun:* obtain grounding through connection to a properly grounded fluid hose and sprayer.
4. *Object being sprayed:* according to local code.
5. *Fluid supply container:* according to local code.
6. *All solvent pails used when flushing,* according to local code. Use only metal pails, which are conductive. Do not place the pail on a non–conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
7. *To maintain grounding continuity when flushing or relieving pressure*, always hold a metal part of the gun firmly to the side of a grounded metal pail, then trigger the gun.

Flushing Safety

Reduce the risk of fluid injection injury, static sparking, or splashing by following the flushing procedure given on page 15 of this manual. Follow the **Pressure Relief Procedure** on page 3, and remove the spray tip before flushing. Hold a metal part of the gun firmly to the side of a grounded metal pail and use the lowest possible fluid pressure during flushing.

IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards – particularly the General Standards, Part 1910, and the Construction Standards, Part 1926 – should be consulted.

Avertissement

La pulvérisation à haute pression peut causer des blessures très graves.
Réservé exclusivement à l'usage professionnel. Observer toutes les consignes de sécurité.
Bien lire et bien comprendre tous les manuels d'instructions avant d'utiliser le matériel.

RISQUES D'INJECTION

Consignes generales de sécurité

Cet appareil produit un fluide à très haute pression. Le fluide pulvérisé par le pistolet ou le fluide sous pression provenant de fuites ou de ruptures peut pénétrer sous la peau ou à l'interieur du corps et entrainer des blessures très graves, voir même une amputation. Même sans être sous pression, le fluide éclaboussant ou entrant dans les yeux peut aussi entrainer des blessures graves.

NE JAMAIS pointer le pistolet vers quelqu'un ou vers une partie quelconque du corps. NE JAMAIS mettre la main ou les doigts sur l'ajutage du pulvérisateur. NE JAMAIS essayer de "refouler" la peinture. Cet appareil N'est P AS un compresseur pneumatique.

TOUJOURS garder la protection de l'ajutage en place sur le pistolet pendant la pulvérisation.

TOUJOURS observer la **March à Suivre pour Détendre la Pression** donnée plus loin, avant de nettoyer ou d'enlever l'ajutage du pulvérisateur, ou d'effectuer un travail quelconque sur une partie de l'appareil.

NE JAMAIS essayer d'arrêter ou de dévier les fuites avec la main ou le corps.

Avant chaque utilisation, bien s'assurer que les dispositifs de sécurité fonctionnent correctement.

Soins medicaux

En cas de pénétration de fluide sous la peau: **DEMANDER IMMEDIATEMENT DES SOINS MEDICAUX D'URGENCE.** Ne pas soigner cette blessure comme une simple coupure.

Avis au medecin: La pénétration des fluides sous la peau est un traumatisme. ***Il est important de traiter chirurgicalement cette blessure immédiatement.*** *Ne pas retarder le traitement pour effectuer des recherches sur la toxicité. Certains revêtements exotiques sont dangereusement toxiques quand ils sont injectés directement dans le sang. Il est souhaitable de consulter un chirurgien esthétique ou un chirurgien spécialisé dans la reconstruction des mains.*

Dispositifs de sécurité du pistolet

Avant chaque utilisation, bien s'assure que tous les dispositifs de sécurité du pistolet fonctionnent correctement. Ne pas enlever ni modifier une partie quelconque du pistolet; ceci risquerait d'entraîner un mauvais fonctionnement et des blessures graves.

Verrou de sécurité

A chaque fois que l'on s'arrête de pulvérisér , même s'il s'agit d'un court instant, toujours mettre le verrou de sécurité du pistolet sur la position "fermée" ou "sécurité" ("safe") pour empêcher le pistolet de fonctionner . Si le verrou de sécurité n'est pas mis, le pistolet peut se déclencher accidentellement.

Diffuser

Le diffuseur du pistolet sert à diviser le jet et à réduire les risques d'injection accidentelle quand l'ajutage n'est pas en place. Vérifier le fonctionnement du dif fuseur régulièrement. Pour cette vérification, détendre la pression en observant la **Marche à Suivre pour Détendre la Pression** donnée plus loin puis enlever l'ajutage du pulvérisateur. Pointer le pistolet dans un seau en métal, en le maintenant fermement contre le seau. Puis, en utilisant la pression la plus faible possible, appuyer sur la gachette du pistolet. Si le fluide projete *n'est pas* diffusé sous forme de jet irrégulier, remplacer immédiatement le diffuseur.

Protection de l'ajutage

TOUJOURS maintenir la protection de l'ajutage en place sur le pistolet du pulvérisateur pendant la pulvérisation. La protection de l'ajutage attire l'attention sur les risques d'injection et contribue à réduire, mais n'évite pas le risque, que les doigts ou une partie quelconque du corps ne passent accidentellement à proximité immédiate de l'ajutage du pulvérisateur.

Consignes de sécurité concernant l'ajutage du pulvérisateur

Faire extremement attention à l'occasion du nettoyage ou du remplacement des ajutages du pulvérisateur . Si l'ajutage se bouche pendant la pulvérisation, mettre immédiatement le verrou de sécurité du pistolet. T OUJOURS bien observer la **Marche à Suivre pour Détendre la Pression** puis enlever l'ajutage du pulvérisateur pour le nettoyer.

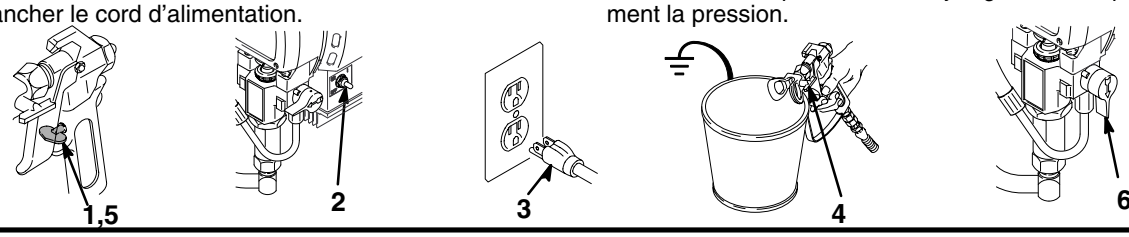
NE JAMAIS essuyer ce qui s'est accumulé autour de l'ajutage du pulvérisateur avant que la pression ne soit completement tombée et que le verrou de sécurité du pistolet ne soit engagé.

Marche à Suivre pour Détendre la Pression

Pour réduire les risques de blessures graves, y compris les blessures par projection de fluide ou celles causées par de éclaboussures dans les yeux ou sur la peau, par des pièces en mouvement, toujours bien observe cette marche à suivre chaque fois que l'on arrête le pulvérisateur, à l'occasion de la vérification, du égale ou du nettoyage du système ou lors du changement des ajutages.

1. Engager le verrou de sécurité du pistolet.
2. Mettre le levier d'arrêt du moteur sur ARRET (OFF).
3. Débrancher le cord d'alimentation.
4. Désengager le verrou de sécurité du pistolet. Tout en maintenant une partie métallique du pistolet fermement appuyé contre le côte d'un seau en métal, actionner le pistolet pour libérer la pression.
5. Engager le verrou de sécurité du pistolet.
6. Ouvrir la soupape de sécurité et la laisser ouverte jusqu'à ce que l'on soit prêt à se servir de nouveau du pulvérisateur.

Si l'on soupconne que le tuyau ou l'ajutage est complètement bouché ou que la pression n'a pas été complètement libérée après avoir procédé aux opérations ci–dessus, desserrer TRES LENTEMENT un raccord de bout de tuyau ou l'écrou de retenue de la protection de l'ajutage et libérer progressivement la pression.



RISQUES EN CAS DE MAUVAISE UTILISATION DU MATERIAL

Consignes générales de sécurité

Toute utilisation anormale de l'appareil de pulvérisation ou des accessoires comme, par exemple, la mise sous une pression excessive, les modifications de pièces, l'utilisation de produits chimiques et de matières incompatibles et l'utilisation de pièces usées ou abîmées peut causer des dégâts à l'appareil ou des ruptures de pièces et entraîner une injection de liquide ou d'autrès blessures sérieuses, un incendie, une explosión ou d'autrès dégâts.

Ne Jamais alterer ou modifier une piece de cet appareil; ceci risquerait d'entraîner son mauvais fonctionnement.

Vérifier régulièrement tout l'appareil de pulvérisation et ses equipements et réparer ou remplacer immédiatement les pièces usées ou abîmées.

Pression

Ce pulvérisateur peut produire une PRESSION MAXIMUM DE TRAVAIL 195 bar (2750 lb/po2). S'assurer que tous les éléments du pulvérisateur et ses accessoires sont conçus pour résister à la pression maximum de travail de ce pulvérisateur. NE PAS depasser la pression maximum de travail d'aucun des éléments ou accessoires utilisés avec cet appareil.

Compatibilité chimique des corps

Bien s'assurer que tous les corps des solvants utilisés sont chimiquement compatibles avec les parties mouillées indiquées dans les **Technical Data**, à page 39. Toujours lire soigneusement les documents et brochures du fabricant des fluides et solvants utilisés avant de s'en servir dans ce pulvérisateur.

MESURES DE SECURITE CONCERNANT LES TUYAUX FLEXIBLES

Le fluide à haute pression circulant dans les tuyaux peut être très dangereux. En cas de fuite sur le tuyau, de fissure, déchirure ou rupture à la suite de l'usure, de dégâts ou d'une mauvaise utilisation, les projections de fluide haute pression qui en proviennent peuvent entraîner des blessures graves par pénétration sous la peau ou par contact, ainsi que des dégâts matériels.

Tous les tuyaux flexibles doivent avoir des ressorts spirale de protection aux bouts! Les spirales de protection contribuent à eviter la formation de pliures, de boucles ou de nœuds sur les tuyaux qui pourraient entraîner la rupture du tuyau à l'endroit du raccord ou à son voisinagé.

Serrer fermement tous les raccords avant chaque utilisation. Le fluide sous pression peut faire sauter un raccord desserre ou produire un jet à haute pression s'échappant par le raccord.

Ne Jamais utiliser un tuyau endommagé. Ne Pas essayer de refaire le raccord d'un tuyau haute pression ni de réparer le tuyau avec du ruban adhesif ou par tout autre moyen. Un tuyau réparé ne peut pas résister au fluide sous pression.

Manipuler les tuyaux avec precaution et choisir soigneusement leur chemin. Ne pas déplacer le fluide en tirant sur le tuyau. Ne pas utiliser de fluides ou de solvants qui ne sont pas compatibles avec l'enveloppe intérieure ou extérieure du tuyau. NE PAS exposer le tuyau à des températures supérieures à 82°C (180°F) ou inférieures à –40°C (–40°F).

Continuité de la mise à la terre des tuyaux

Une bonne continuité de la mise à la terre des tuyaux est essentielle pour maintenir la mise à la terre de l'ensemble de vaporisation. Vérifiez la résistance électrique de vos tuyaux à fluides et à air, au moins une fois par semaine. Si votre tuyau ne comporte pas d'étiquette qui précise la résistance électrique maximum, prenez contact avec le fournisseur de tuyaux ou la fabricant pour avoir les límites de résistance maximum. Utilisez un mètre de résistance de la gamme appropriée pour votre tuyau et vérifiez la résistance. Si celle–ci dépasse les límites recommandées, remplacez le tuyau immédiatement. Un tuyau sans mise à la terre ou avec une mise à la terre incorrecte peut entraîner des risques pour votre systeme. Lisez aussi **LES RISQUES D'INCENDIE OU D'EXPLOSIÓN** ci–dessus.

RISQUES D'INCENDIE OU D'EXPLOSION

De l'électricité statique est produite par le passage du fluide à grande vitesse dans la pompe et dans les tuyaux. Si toutes les pièces de l'appareil de pulvérisation ne sont pas convenablement reliés à la masse ou à la terre, des étincelles peuvent se produire et l'appareil risque d'être dangereux. Des étincelles peuvent également se produire à l'occasion du branchement ou du débranchement du cordón d'alimentation. Les étincelles sont suffisantes pour allumer les vapeurs de solvants et le fluide pulvérisé, les fines particules de poussieère ainsi que d'autrès substances inflammables, et elles peuvent causer un incendie ou une explosión, ainsi que des blessures graves et des dégâts matériels. Toujours brancher le pulvérisateur dans une prise se trouvant à au moins 6 m (20 pieds) de l'appareil et de l'endroit où se fait la pulvérisation.

S'il se produit des étincelles d'électricité statique, ou si vous ressentez la moindre décharge, **arrêtez immédiatement la pulvérisation**. Vérifiez que le système entier est bien mis à laterre. Ne vous servez pas du système avant que le problème soit identifié et corrigé.

Mise à la terre ou à la masse

Pour réduire les risques de production d'étincelles d'électricité statique, le pulvérisateur et tous les équipements utilisés ou se trouvant dans la zone de pulvérisation doivent être reliés à la terre ou à la masse. Pour connaître le detail des instructions de mise à la terre dans la region et le type particulier d'équipement, CONSULTER le code ou les réglementations électriques locales. S'ASSURER que tous les équipements de pulvérisation suivants sont bien reliés à la terre:

1. *Pulvérisateur:* Brancher le cordón d'alimentation ou la rallonge qui doivent être équipés d'une prise à 3 fiches en bon état, dans une prise de courant convenablement mise à la terre. Ne pas utiliser d'adaptateur. Toutes les rallonges doivent avoir 3 fils et être prevues pour 15 ampères.
2. *Tuyaux flexibles:* Afin d'assurer la continuité de la mise à la terre, n'utiliser que des tuyaux comportant une mise à la terre et ayant une longueur maximum combinée de 150 m (1500 pieds). Se reporter également au paragraphe **Continuité du circuit de mise à la terre des tuyaux.**
3. *Pistolet*: Réaliser la mise à la terre en le raccordant à un tuyau flexible et à un pulvérisateur dèjá convenablement reliés à la terre.
4. *Récipient d'alimentation:* observer le code ou les réglementations locales.
5. *Objets, matériel ou surfaces reçevant la pulvérisation:* observer le code ou les réglementations locales.
6. *Tous les seaux de solvants* utilisés pour le rinçage: observer le code ou les réglementations locales. N'utiliser que des saux métalliques conducteurs de l'électricité. Ne pas mettre le seau sur une surface non conductrice comme sur du papier ou du carton car cela interromprait la continuité de la mise à la terre.
7. *Pour conserver la continuité de la mise à la terre quand on rince le matériel ou quand on libére la pression*, toujours maintenir une partie métallique du pistolet fermement appuyée contre le côté d'un seau en métal puis appuyer sur la détente du pistolet.

Mesures de sécurité concernant le rincage

Pour réduire les risques de blessures par pénétration de la peau et les risques dûs aux etincelles d'electricite statique ou aux éclaboussures, observer la marche à suivre pour le rincage donnée à la page 15 de ce manuel. Observer la "Marche à Suivre pour Détendre la Pression" donnée à la 5 en *enlever l'ajutage du pulvérisateur avant le rincage*. Maintenir une partie métallique du pistolet fermement appuyée contre le côté d'un seau en métal et utiliser la pression la plus faible possible pendant le rincage.

ADVERTENCIA

El rociado a alta presión puede causar graves lesiones. Solo para uso profesional. Respete los avisos de advertencia. Lea y entienda todo el manual de instrucciónes antes de manejar el equipo.

PELIGRO DE INYECCION DE FLUIDO

Seguridad general

Este equipo genera un fluido a una presión muy alta. El rociado de la pistola, los escapes de fluido o roturas de los componentes pueden inyectar fluido en la piel y el cuerpo y causar lesiones extremadamente graves, incluyendo a veces la necesidad de amputación. También, el fluido inyectado o salpicado en los ojos puede causar graves daños.

NUNCA apuntar la pistola hacia alguien o alguna parte del cuerpo. NUNCA colocar la mano o los dedos encima de la bo–quilla. NUNCA tratar de “hacer retornar la pintura”; este NO es un sistema de rociado de aire.

SIEMPRE tener colocado el protector de la boquilla en la pistolamientras se está pulverizando.

SIEMPRE seguir el procedimiento de descarga de presión, dado másabjo, antes de limpiar o sacar la boquilla o de dar servicioa cualiquier equipo del sistema.

NUNCA tratar de parar o desviar los escapes con la mano o el cuerpo.

Asegurar que todos los aparatos de seguridad del equipo están funcionándo bien antes de cada uso.

Tratamiento médico

Si pareciera que un poco de fluido penetró la piel, conseguir **TRATAMIENTO MÉDICO DE URGENCIA DE INMEDIA TO. NO TRATAR LA HERIDA COMO UN SIMPLE CORTE.** Decir al médico exactamente cua fluido fue.

Aviso al médico: Si se llega a inyectar este fluido en la piel se causa una lesión traumática. **Es importante tratar quirúrgicamente la lesión a la brevedad posible.** No demorar el tratamiento para investigar la toxicidad. La toxicidad es algo de suma importancia en algunas pinturas exóticas cuando se inyectan directamente al torrente sanguineo. Sirá conveniente consultar a un especialista en cirugia plástica o reconstructiva de las manos.

Aparatos de seguridad de la pistola pulverizadora

Asegurar que todos los aparatos protectores de la pistola están funcionándo bien antes de cada uso. No sacar ni modificar ningúna pieza de la pistola pues podria causar el malfuncionámiento de la misma con las consiguientes lesiones personales.

Pestillo de seguridad

Cada vez que se deje de pulverizar, aunque sea por un breve momento, siempre colocar el pestillo de seguridad en la posición “cerrada” lo que deja la pistola inoperante. El no hacerlo puede llevar al disparo imprevisto de la pistola.

Difusor

El difusor de la pistola dispersa el chorro pulverizado y reduce el riesgo de inyección cuando no está instalada la boquilla. Revisar con regularidad el funcionámiento del difusor. Seguir el **procedimiento de descarga de presión**, dado más abajo, y después sacar la boquilla. Apuntar la pistola a un balde metálico, sosteniéndola bien firme contra el. Utilizando la presión más bajo posible, disparar la pistola. Si el fluido emitido no sale disperso en un chorro irregular, reemplazar de inmediato el difusor.

Protector de la boquilla

SIEMPRE tener el protector de la boquilla colocado en la pistola mientras se está pulverizando. Este protector llama la atención contra el peligro de inyección y ayuda a reducir, pero no evita, la colocación accidental de los dedos o cualquier otra parte del cuerpo cerca de la boquilla.

Seguridad de la boquilla pulverizadora

Tener mucho cuidado al limpiar o cambiar las boquillas. Si llegara a obstruirse mientras está pulverizando, enganchar el pestillo de la pistola de inmediato. SIEMPRE seguir el **procedimiento de descarga de presión** y después sacar la boquilla para limpiarla.

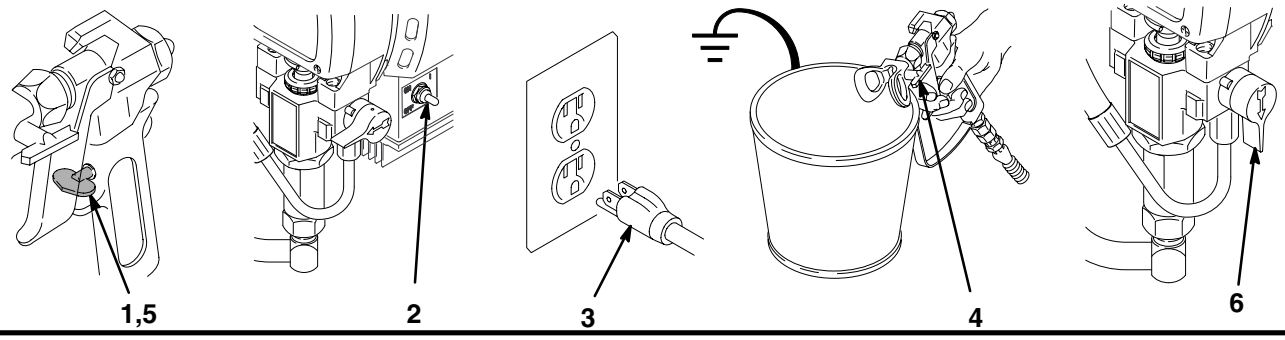
NUNCA limpiar la acumulación de pintura alrededor de la bo–quilla antes de que se haya descargado por completo la presión y el pestillo este enganchado.

Procedimiento de descarga de presión

Para reducir el riesgo de sufrir graves lesiones corporales, incluyendo inyección o lesiones causadas por piezás en movimiento o choque eléctrico, siempre seguir este procedimiento al apagar la máquina pulverizadora, al revisar o dar servicio a cualquier parte del sistema de pulverización, al instalar, limpiar o cambiar las boquillas, y cada vez que se deja de pulverizar.

1. Enganchar el pestillo de la pistola.
2. Mover el interruptor eléctrico (ON/OFF) a la posición OFF (apagado).
3. Desenchufar el cordón electrico.
4. Desenganchar el pestillo de la pistola. Sujetar una parte metálica de la pistola bien firme contra un balde de metal, y disparar la pistola para descargar la presión.
5. Enganchar el pestillo de la pistola.
6. Abrir la válvula de presión. Dejar la válvula de alivio de presión abierta hasta que se este nuevamente listo para pulverizar.

Si se sospecha que la boquilla o la manguera está completamente obstruida, o que no se ha descargado por completo la presión después de haber seguido el procedimiento anterior, aflojar muy lentamente la tuerca de retención del protector de la boquilla o acoplamiento de la punta de la manguera y descargar gradualmente la presión, después, aflojarlo por completo. Luego, despejar la boquilla o la manguera.



PELIGRO POR MAL USO DEL EQUIPO

Seguridad general
Cualquier mal uso del equipo pulverizador o los accesorios, tal como sobre presurización, modificación de piezás, uso de matériales y productos quimicos incompatibles, o utilización de piezás dañadas o desgastadas, puede hacen que se rompan y causen la inyección de fluido u otras lesiones corporales graves, incendio, explosión o dañon a la propiedad.

NUNCA alterar o modificar ningúna pieza de este equipo; el hacerlo podria causar una avería.

REVISAR con regularidad el equipo pulverizador y reparar o reemplazar de inmediato las piezás dañadas o desgastadas.

Presión del sistema
está pulverizadora puede desarrollar 195 barías (2750 psi) de presión DE TRABAJO MÁXIMA. Asegurar que todo el equipo pulverizador y sus accesorios tienen la capacidad para aguantar la presión máxima de trabajo de está pulverizadora. NO exceder la presión máxima de trabajo de ningún componente o accesorio de este sistema.

Compatibilidad de fluido
Siempre leer las instrucciónes del fabricante del fluido y solvente antes de usarlos en está pulverizadora, dadas en la página 39.

Siempre usar gafas, guantes, vestimetas protectora y un respiradero, tal como recomiendan los fabricantes del fluido y del solvente.

SEGURIDAD EN EL USO DE LAS MANGUERAS

El fluido que escapa a alta presión por las mangueras puede ser muy peligroso. Si en la manguera se desarrolla un escape, una rotura o rajadura debido a cualquier tipo de desgaste, daño o maltrato, el chorro a alta presión emitido por alli puede causar una lesion por inyección u otras lesiones corporales graves o daños a la propiedad.

!Todas las mangueras para fluidos tienen que tener guardas de resorte en ambos extremos! Estas protegen las mangueras contra dobleces o retorceduras en los acoplamientos o cerca de ellos, los que podrian traducirse en roturas de la manguera.

Antes de usarlas, APRETAR bien firmes todas las conexiones. El fluido a alta presión puede desalojar un acoplamiento suelto o dejar que por el escape un chorro a alta presión.

NUNCA usar una manguera que está dañada. Siempre, revisarla en busca de cortaduras, escapes, abrasion, cubierta abultada, o acoplamientos sueltos o dañados. Si llegara a encontrarse cualquiera de estás condiciónes, reemplazar de inmediato la manguera. NO intentar racoplar una manguera de alta presión o enmendarla con cinta adhesiva u otro matérial similar. Una manguera que ha sido remendada no aguante el fluido a alta presión.

MANEJAR Y PASAR CUIDADOSAMENTE LAS MANGUERAS. No tirar de las mangueras para mover el equipo. No usar fluidos o solventes que sean incompatibles con el tubo interno y la cubierta dela manguera. NO exponer las mangueras a temperaturas sobre 82 ° C (180 ° F) o bajo –40 ° C (–40 ° F).

Continuidad del circuito de puestá a tierra de la manguera
La continuidad del circuito de puestá a tierra apropiado es esencial para mantener conectado a tierra el sistema pulverizador. Es indispensable revisar la resistencia eléctrica máxima de las mangueras de aire y de fluido por lo menos una vez a la semana. Si la manguera no tiene una etiqueta en la cual se especifica la resistencia eléctrica, ponerse en contacto con el proveedor o fabricante de la manguera para la información sobre los límites de resistencia. Usar un metro de resistencia en la gama apropiade para comprobar la resistencia; si excede los límites recomendados, reemplazarla de inmediato. Es muy arriesgado tener una manguera sin puestá a tierra o con la puestá a tierra en malas condiciónes. Leer también la información sobre **RIESGO DE INCENDIO O EXPLOSION**, más arriba.

PELIGRO DE INCENDIO O EXPLOSION

El flujo a alta velocidad del fluido al pasar por la bomba y manguera crea electricidad estática. Si todas las partes del equipo pulverizador no tienen buena tierra, pueden ocurrir chispas, convirtiendo al sistema en algo peligroso. T ambién, pueden producirse chispas a enchufar o desenchufar el cordón electrico. Estás chispas pueden inflamar los vapores de los solventes y el chorro de fluido pulverizado, particulas de polvo y otras sustancias in flamables, sea al aire libre o bajo techo, lo que podria causar una explosión o incendio y graves lesiones corporales y daños al a propiedad. Enchufar siempre la pulverizadora a un tomacorriente que se encuentre a por lo menos 6 m (20 pies) de la maquina y del area que se va a rociar.

Si ocurre una chispa de electricidad estática o incluso un ligero choque electrico mientras se usa el equipo, **dejar de pulverizar de inmediato**. Revisar todo el sistema en busca de una tierra apropiada. No usar de nuevo el sistema hasta haber identificado y soluciónado el problema.

Peusta a tierra
Para reducir el reisgo de chispas estáticas, conectar a tierra la pulverisadora y todo el otro equipo de pulverisar que se use o se encuentre en el lugar que se va a rociar . CONSULTAR el codigo electrico de la localidad para las instrucciónes sobre las conexiones a tierra exigidas para la zona y tipo de equipo. ASEGURAR de conectar a tierra todo este equipo pulverisador:

1. *Pulverizadora:* enchufar el cordón electrico, o cable extensor, cada uno un enchuf de très patas en buen estádo, a un tomacorreinte con puesat a tierra aporpiado. No usar un adaptador. Totos los cables extensores tienen que tener très hilos y una capacidad de 15 amperios.
2. *Mangueras para fluidos:* usar solamente mangueras con puestá a tierra de una longitud combinada de 150 m (500 pies), para asequrar buena continuidad a tierra. Referirse también al párrafo sobre **continuidad a tierra de la manugeura.**
3. *Pistola:* hace la puestá a tierra conectándola a una manguera de fluido y pulverizadora bien conectadas a tierra.
4. *Suministrar un recipiente:* de acuerdo al código de la localidad.
5. *Objeto que se está rociando:* de conformidad con el codigo local.
6. *Todos los baldes de solvente* usados durante el lavado, de conformidad con el código local. Usar *solamente baldes de metal,* que sean conductivos. no colocar el balde en una superficie no conductiva, como papel o cartón, que interumpe la continuidad a tierra.
7. *Para mantenar la continuidad a tierra durante el lavado o descarga de presión,* siempre apoyar una parte metálica de la pistola bien firme contra el costado del *balde de metal,* después apretar el gatillo.

Seguridad durante el lavado
Para reducir el riesgo de que se inyecte o salpique fluido en la piel, o que ocurra una descarga de electricidad estática, siempre seguir las INSTRUCCIÓNES PARA EL LAVADO, dadas en la página. 15 Seguir el **procedimiento de descarga de presión** en la págna 7, y quita la *boquilla rociadora antes de lavar.* Apoyar una parte metalica de la pistola bien firme contra el costado de un *balde de metal* y usar le presión más baja posible de fluido durante el lavado.

Setup

WARNING

If you supply your own hoses and spray gun, be sure the hoses are electrically conductive, that the gun has a tip guard, and that each part is rated for at least *2750 psi (195 bar) Working Pressure*. This is to reduce the risk of serious bodily injury caused by static sparking, fluid injection or over–pressurization and rupture of the hose or gun.

CAUTION

To avoid damaging the pressure control, which may result in poor equipment performance and component damage, follow these precautions:

1. Always use a nylon spray hose at least 50 ft. (15 m) long.
2. Never use a wire braid hose as it is too rigid to act as a pulsation dampener.
3. Never install any shutoff device between the pump and the hose. See Fig. 1.

1. **Connect the hose (B) and gun (C)** and screw it onto the outlet nipple (A). *Don't use thread sealant, and don't install the spray tip yet!*

2. **Fill the wet–cup (D).** Pry off the wet–cup seal. Fill the cup 1/3 full with Graco Throat Seal Liquid (TSL) (68) supplied. Install the seal.

3. **Check the electrical service.** Be sure it is 120 V, 60 HzAC, 15 Amp (minimum). Use a properly grounded outlet. Do not remove the third (grounding) prong of the power supply cord, and do not use an adapter.

   Use a 3-wire, (12 ga recommended), 15 amp extension cord.

   NOTE: Long extension cord lengths affect sprayer performance.

4. **Plug in the sprayer.** Be sure the ON/OFF switch (E) is OFF. Plug the cord into a grounded outlet at least 20 ft. (6 m) away from the spray area.

WARNING

Proper electrical grounding is essential to reduce the risk of fire or explosion which can result in serious bodily injury and property damage. Also read **FIRE OR EXPLOSION HAZARD** on page 4.

continued on the next page

△1 Do not install any shutoff device here.

△2 Fill 1/3 full with TSL

△3 Shown in closed, or spray position.

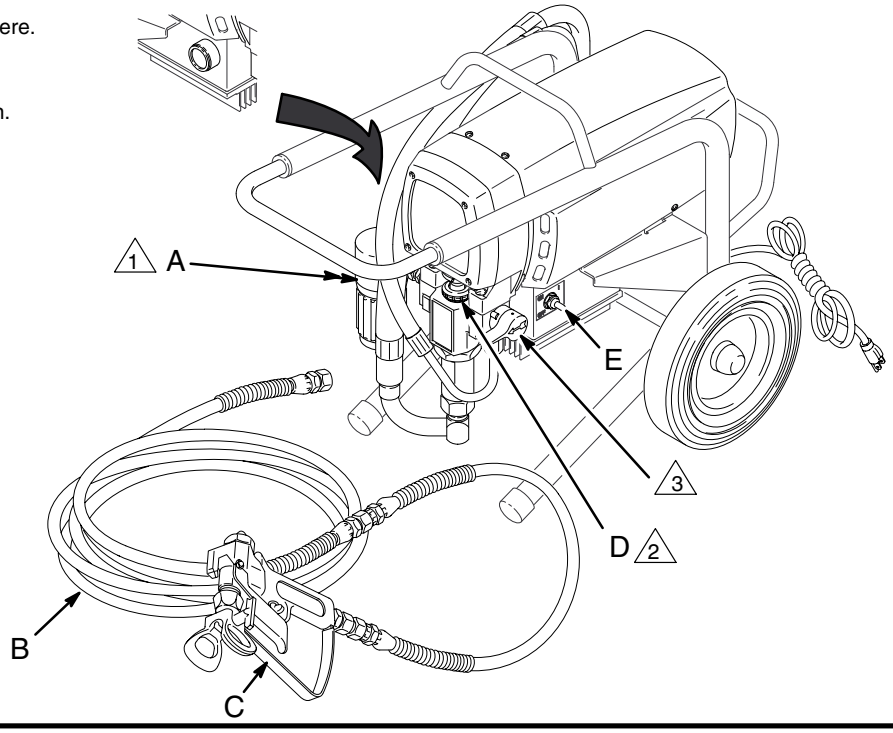


Fig.1 02984

5. **Flush the pump** to remove the oil which was left in to protect pump parts after factory testing. See page 15.

6. **Prepare the paint** according to the manufacturer's recommendations. Remove any paint skin. Stir the paint to mix pigments. Strain the paint through a fine nylon mesh bag (available at most paint dealers) to remove particles that could clog the gun filter or spray tip. This is an important step toward trouble–free paint spraying.

How to use the gun safety latch

When engaged, the gun safety latch prevents the gun from accidental triggering. See Fig. 2.

WARNING

If the gun still sprays when the gun safety latch is engaged, adjust the gun. See manual 307–614, supplied.

How to use the pressure drain valve

Use the pressure drain valve to relieve fluid pressure from the pump and to help prime the pump. If the valve senses an over pressure condition, it opens automatically to relieve fluid pressure. If this happens, stop spraying immediately, shut off and unplug the sprayer. Determine the cause of the problem and correct it before operating the sprayer again. Refer also to the Troubleshooting Guide, page 17. See Fig. 3.

How to use the pressure control

The pressure control controls the motor operation so the sprayer maintains constant fluid pressure at the pump outlet. Turn the pressure control knob fully counterclockwise to obtain the minimum setting. Turn the knob clockwise to increase pressure. See Fig. 4.

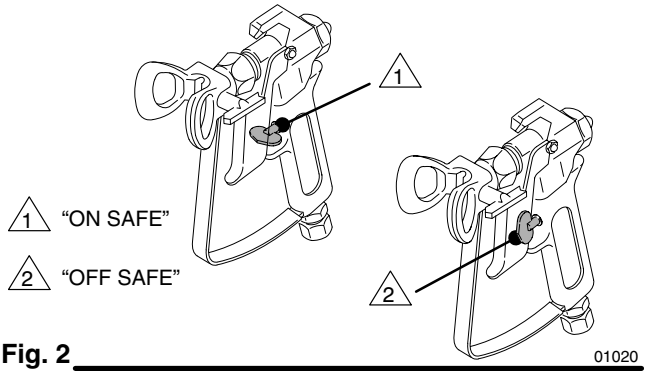


Fig. 2 01020

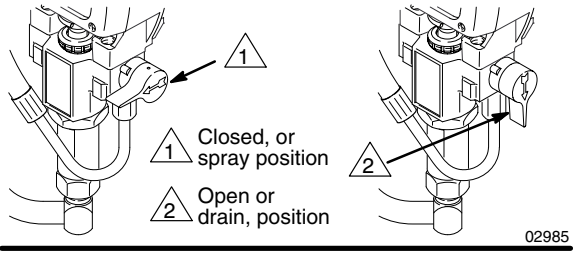


Fig. 3 02985

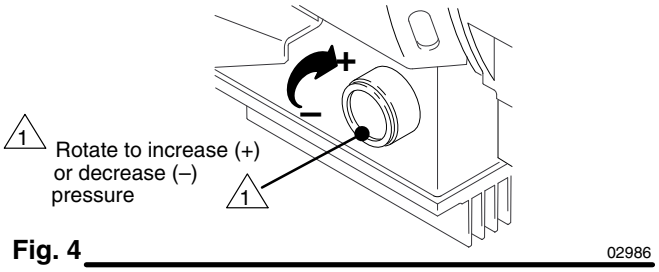


Fig. 4 02986

Setup

WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing fluid or solvent in the eyes or on the skin, or injury from moving parts or electric shock, always follow this procedure when you shut off the sprayer, check or service any part of the spray system, install, clean or change spray tips, and whenever you stop spraying.

1. Engage the gun safety latch.
2. Turn the ON/OFF switch to OFF.
3. Unplug the sprayer.
4. Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail. Trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Open the pressure drain valve. Leave it open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, VERY SLOWLY loosen the tip guard retaining nut or hose coupling to relieve pressure gradually, then loosen completely.

How to use the RAC IV tip guard

WARNING

To reduce the risk of serious bodily injury from fluid injection:

NEVER operate the spray gun with the tip guard removed.

DO NOT hold your hand, body, or a rag in front of the spray tip when cleaning or checking a clogged tip. Always point the gun toward the ground or into a pail when checking to see if the tip is clear.

DO NOT try to “blow back” paint; this is NOT an air spray sprayer.

The tip guard alerts you to the risk and helps prevent placing any part of the body close to the spray tip. The tip guard also adjusts the vertical or horizontal spray pattern. See page 13. The tip guard holds a reversing spray tip. The tip is in the spraying position when the tip handle points forward. See Fig. 5.

Clean the front of the tip frequently during the day’s operation. First, follow the **Pressure Relief Procedure Warning,** left.

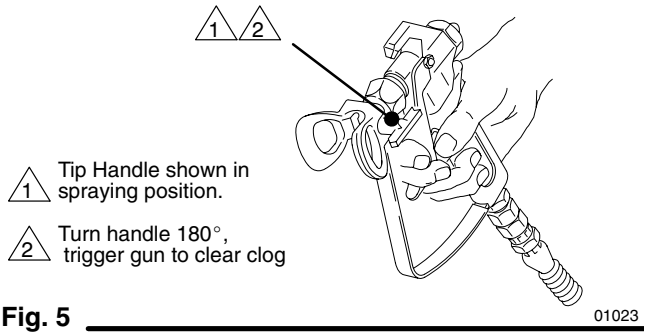


Fig. 5

How to remove a tip clog

1. Release the gun trigger. Engage the safety latch. Rotate the RAC IV tip handle 180°. See Fig. 5.
2. Disengage the safety latch. Trigger the gun into a pail or onto the ground to remove the clog.
3. Engage the safety latch. Rotate the tip handle to the spraying position.
4. If the tip is still clogged, engage the safety latch, shut off and unplug the sprayer, and open the pressure drain valve to relieve pressure. Clean the spray tip as shown in manual 307–848, supplied.

Startup

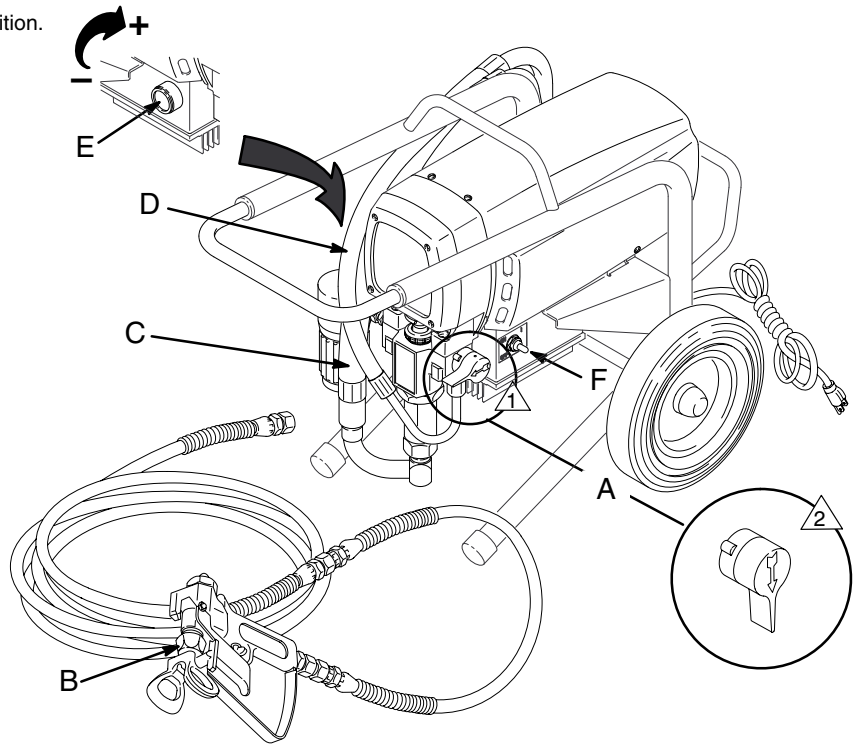


Fig. 6

Use this procedure each time you start the sprayer to help ensure the sprayer is ready to operate and that you start it safely.

NOTE: If this is a first–time startup, flush the sprayer. See page 15.

1. **Open the pressure drain valve (A).** See Fig. 6.
2. **Don't install the spray tip until the pump is primed!**
3. **Put the suction hose (C) into the paint**. If you are pumping from a 1 gallon (5 liter) pail, push the drain hose (D) down below the top of the pail to avoid splashing paint when the drain valve is opened.
4. **Turn the pressure knob (E) to the minimum setting.**
5. **Disengage the gun safety latch.** See Fig. 2, page 10.

CAUTION

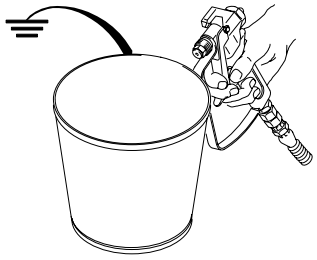
To reduce the risk of damage to the displacement pump packings, never run the pump without fluid in it for more than 30 seconds.

6. **To prime the pump,** turn the sprayer switch (F) on. Slowly increase the pressure until the sprayer starts. When fluid comes from the pressure drain valve, close the valve.

Startup

WARNING

To reduce static sparking and splashing when priming, be sure the spray tip is not installed on the gun, and hold a metal part of the gun firmly to the side of a grounded metal pail.



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7. **To prime the hose**, lower the pressure to reduce splashing. Holding the gun against the pail, trigger the gun and slowly increase the pressure until the pump starts. Keep the gun triggered until all air is forced out of the system and the fluid flows freely from the gun. Release the trigger and engage the gun safety latch.

8. **Check all fluid connections for leaks**. Relieve pressure before tightening any connections.

9. **Install the spray tip.** Engage the gun safety latch first! See manual 307–848 for how to install the tip.

10. **Adjust the spray pattern**

    a. Increase the pressure just until spray from the gun is completely atomized. To avoid excessive overspray and fogging, and to extend tip and sprayer life, always use the lowest pressure needed to get the desired results.

    b. If more coverage is needed, use a larger tip rather than increasing the pressure.

    c. Test the spray pattern. To adjust the direction of the spray pattern, engage the gun safety latch and loosen the retaining nut (B). Position the tip guard horizontally for a horizontal pattern or vertically for a vertical pattern. Hold the tip guard in place while tightening the retaining nut. See Fig. 7.

NOTE: Spray patterns will change as tips wear. Change the spray tip if adjusting the pressure will not improve the spray pattern.

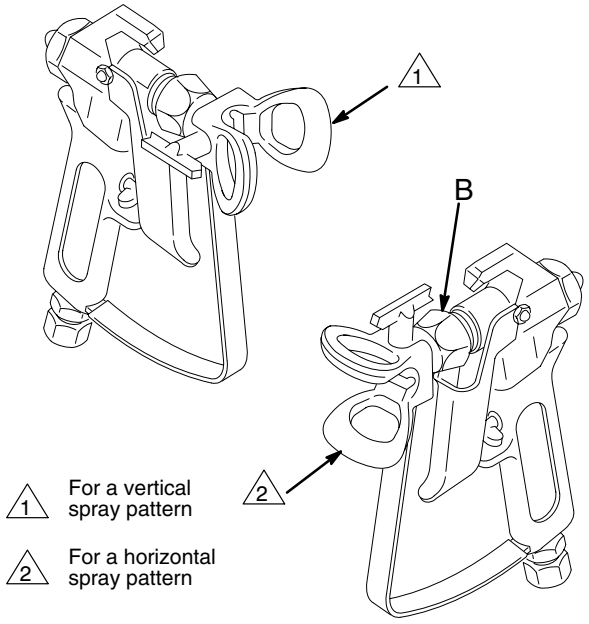


Fig. 7 01025

Shutdown and Care

WARNING

To reduce the risk of serious bodily injury, always follow the **Pressure Relief Procedure Warning** on page 3 when instructed in this procedure to relieve pressure.

1. **Check the packing nut/wet-cup daily.** Relieve pressure first. Keep the wet-cup 1/3 full of TSL at all times to help prevent fluid buildup on the piston rod and premature wear of packings.

2. **Tighten the packing nut/wet-cup just enough to stop leakage.** Over-tightening causes binding and excessive packing wear. Use a round punch or brass rod and a light hammer to adjust the nut. See Fig. 8.

3. **Clean the gun's fluid filter often** and whenever the gun is stored. Relieve pressure first. Refer to manual 307–614.

4. **Lubricate the bearing housing** after every 100 hours of operation. Remove the front cover. Apply several drops of SAE 10 non-detergent oil in the bearing housing cavity (B). See Fig. 9.

5. **Flush the sprayer at the end of each work day** and fill it with mineral spirits to help prevent pump corrosion and freezing. See page 15.

CAUTION

To prevent pump corrosion, and to reduce the chance of fluid freezing in the pump in cold weather, never leave water or any type of paint in the sprayer when it is not in use. Freezing can seriously damage the sprayer or result in a loss of pressure or stalling.

6. **For very short shutoff periods,** leave the suction hose in the paint, relieve pressure, and clean the spray tip.

7. **Coil the hose** when storing it, even for overnight, to help protect the hose from kinking, abrasion, coupling damage, etc.

WARNING

See the warning section **HOSE SAFETY** on page 4 for information on the hazard of using damaged hoses.

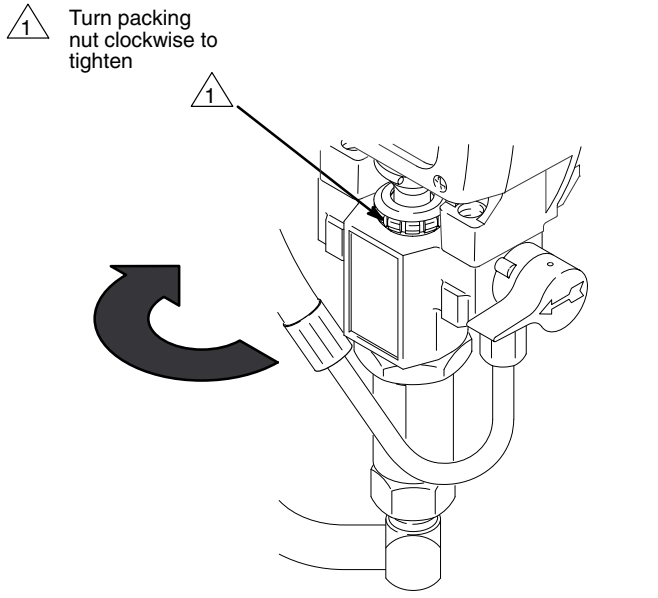


Fig. 8 02988

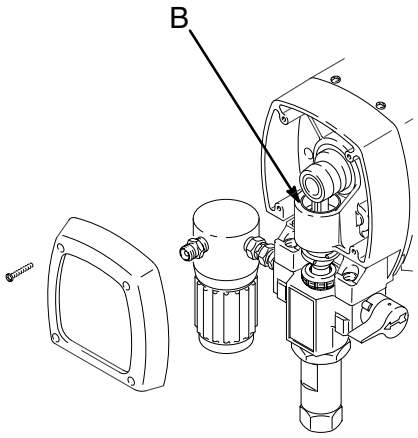


Fig. 9 02989

Flushing

When to flush

Determine the material you are going to pump from the Column 1, then flush with the material indicated in the Column 2, then, depending on what you plan to do next, follow the recommendations in one of the next three columns.

CAUTION

NEVER leave water or water-based fluids in the sprayer if there is a chance it could freeze. Push the water out with mineral spirits. Frozen fluid in the sprayer prevents it from being started and may cause serious damage.

Column 1	Column 2	Column 3	Column 4	Column 5
If you are going to: ▼	**Flush with: ▼**	**Prime with: ▼**	**Clean with: ▼**	**Store unit with: ▼**
Spray latex paint	Warm, soapy water, then clean water	Latex-base paint	Warm soapy water, then clean water	Mineral spirits
Spray oil paint	Mineral spirits	Oil–base paint	Mineral spirits	Mineral spirits
Change latex to oil paint	Warm, soapy water, then clean water	Mineral spirits	Mineral spirits	Mineral spirits
Change oil to latex paint	Mineral spirits, soapy water, and clean water.	Latex	Warm, soapy water, then clean water	Mineral spirits
Change colors, same base	Compatible solvent such as water or mineral spirits			

How to flush

1. Follow **Pressure Relief Procedure**. See page 11.
2. Remove the spray tip and clean it separately. If you are changing from water–based to oil–based paints or solvents, be sure that the tip is cleaned thoroughly.
3. Remove the filter screen and then reinstall the bowl, hand tight, without the screen. Clean the screen separately. See Fig. 10.

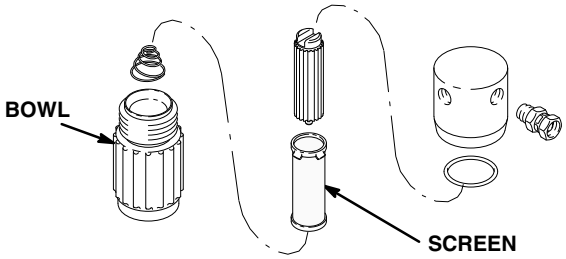


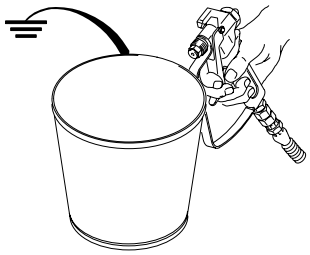
Fig. 10 02990

4. Pour one-half gallon (2 liters) of compatible solvent into a grounded metal flushing pail. Put the suction hose in the pail.
5. Open the pressure drain valve. See Fig.11.
6. **To save the paint still in the pump and hose,** follow Step 7, except put the drain hose in the paint pail. When solvent appears, close the drain valve. Put the drain hose in the flushing pail. Trigger the gun into the paint pail. When solvent appears, release the trigger. Continue with Step 7.

Flushing

WARNING

To reduce static sparking and splashing, always remove the spray tip from the gun, and hold a metal part of the gun firmly to the side of a grounded metal pail when flushing.



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7. Lower the pressure setting. Turn on the sprayer. Maintaining metal-to-metal contact, trigger the gun into the flushing pail. Slowly increase the sprayer pressure just until the pump starts. Keep the gun triggered until the solvent flows freely from the gun. Circulate the solvent to thoroughly clean the sprayer. Release the gun trigger. Engage the gun safety latch.

8. Open the drain valve and circulate the solvent through the drain hose to thoroughly clean it. Close the drain valve.

9. Remove the suction hose from the pail. Disengage the gun safety latch. Trigger the gun and run the pump a few seconds to push air into the hose. Do not run the pump dry for more than 30 seconds to avoid damaging the pump packings! Relieve pressure.

10. Reinstall the clean filter screen.

11. Remove and clean the inlet strainer. Wipe paint off the suction hose and drain hose.

12. Leave the drain valve open until you use the sprayer again.

△1 Open or drain position

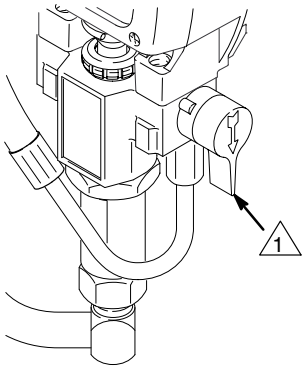


Fig. 11

02987

Troubleshooting

WARNING

To reduce the risk of serious injury, always follow the **Pressure Relief Procedure** on page 3 before checking or repairing any part of the sprayer.

Check everything in the guide before disassembling the sprayer.

NOTE: Thaw sprayer if water or water–based paint has frozen in it, due to exposure to low temperatures, by placing it in a warm area. Do not try to start sprayer until it has thawed completely or damage to motor and/or control board may occur. If paint hardened (dried) in sprayer, the pump packings and/or pressure transducer must be replaced. See page 24 (pump) or 32 (pressure transducer).

Basic Problem Solving

TYPE OF PROBLEM	WHAT TO CHECK *If check is OK, go to next check*	WHAT TO DO *When check is not OK, refer to this column*
Fluid Pressure	1. Check pressure transducer knob setting. The pump won't develop much pressure if it is at minimum setting (fully counterclockwise).	1. Slowly increase pressure setting to see if motor starts.
	2. Check for a clogged spray tip or fluid filter, if used. See page 11.	2. If tip is still clogged, relieve pressure; refer to separate gun or tip instruction manual for tip cleaning. Clean or replace filter element. See manual 308–249.
Mechanical	1. Check for frozen or hardened paint in pump (20). Using a screwdriver, carefully try to rotate fan at back of motor by hand. See page 28.	1. Thaw. Plug in sprayer and turn on. Slowly increase pressure setting to see if motor starts. If it doesn't, see NOTE above.
	2. Check pump connecting rod pin (17). It must be completely pushed into connecting rod (15), and retaining spring (18) must be firmly in connecting rod groove. See Fig. 18, page 24.	2. Push pin into place and secure with spring retainer.
	3. Check for motor damage. Remove drive housing assembly (11). See page 30. Try to rotate motor fan by hand.	3. Replace motor (4) if fan won't turn. See page 28.
Electrical	1. Check electrical supply with volt meter. Meter should read 105–125 VAC.	1. Reset building circuit breaker; replace building fuse. Try another outlet.
	2. Check extension cord for visible damage. Use a voltmeter or test lamp at extension cord outlet to check.	2. Replace extension cord.
	3. Check sprayer power supply cord (50) for visible damage such as broken insulation or wires.	3. Replace power supply cord. See page 29.
	4. Check motor brushes for the following: a. Loose terminal screws. b. Broken or misaligned brush springs. c. Brushes binding in holders. d. Broken leads. e. Worn brushes. f. Brush leads snagged on spring clip. **NOTE:** The brushes do not wear at same rate on both sides of motor. Check both brushes.	4. Refer to page 23. a. Tighten. b. Replace broken spring and/or align spring with brush c. Clean brush holders. Remove carbon with small cleaning brush. Align brush leads with slot in brush holder to assure free vertical brush movement. d. Replace brushes e. Replace brushes if less than 0.4" (10 mm) long. f. Correctly route the wires. See page 23.
	5. Check motor armature commutator for burn spots, gouges and extreme roughness. Remove motor cover and brush inspection plates to check. See page 23.	5. Remove motor and have motor shop resurface commutator if possible. See page 28.
	6. Check motor armature for shorts using armature tester (growler) or perform motor test. See page 22.	6. Replace motor. See page 28.

Basic Problem Solving

TYPE OF PROBLEM	WHAT TO CHECK *If check is OK, go to next check*	WHAT TO DO *When check is not OK, refer to this column*
Electrical *(continued)*	7. Check leads from pressure transducer and motor to motor control board (47) to be sure they are securely fastened and properly mated.	7. Replace loose terminals; crimp to leads. Be sure male terminal blades are straight and firmly connected to mating part.
	8. Check motor control board (47) by substituting with a good board. **CAUTION:** Do not perform this check until motor armature is determined to be good. A bad motor armature can burn out a good board.	8. Replace board. See page 29.
	9. Check power supply cord (50). Disconnect black and white power cord terminals; connect volt meter to these leads. Plug in sprayer. Meter should read 105–125 VAC. Unplug sprayer.	9. Replace power supply cord. See page 29.
	10. Check ON/OFF switch (52). Disconnect the "L" wire between motor control board (47) and switch and connect volt meter between exposed terminal switch and power cord's white wire. Plug in sprayer and turn **ON**. Meter should read 105–125 VAC. Turn off and unplug sprayer.	10. Replace ON/OFF switch. See page 29.
	11. Check motor thermal cutout switch. Connect ohmmeter between motor's red leads. Meter should read 1 ohm maximum.	11. Allow motor to cool. Correct cause of overheating. If switch remains open after motor cools, replace motor.
	12. Check the transducer (29) by replacing it with a new one.	12. Replace pressure transducer. See page 32.
	13. Check pressure adjustment potentiometer (64) by replacing it with a new one.	

Intermediate Problem Solving

TYPE OF PROBLEM	WHAT TO CHECK *If check is OK, go to next check*	WHAT TO DO *When check is not OK refer to this column*
Low Output	1. Check for worn spray tip.	1. Follow **Pressure Relief Procedure Warning** then replace tip. See your separate gun or tip manual.
	2. Be sure pump does not continue to stroke when gun trigger is released. Plug in and turn on sprayer. Prime with paint. Trigger gun momentarily, then release and engage safety latch. Relieve pressure, turn off and unplug sprayer.	2. Service pump. See page 24.
	3. Release gun trigger. Observe resting position of pump rod (107).	3. If pump consistently comes to rest with rod (107) fully extended, the piston packings and/or piston valve may be worn. Service the pump. See page 24.
	4. Check electrical supply with volt meter. Meter should read 105–125 VAC.	4. Reset building circuit breaker; replace building fuse. Repair electrical outlet or try another outlet.
	5. Check extension cord size and length.	5. Replace with a correct, grounded extension cord. Note that long lengths and/or smaller gauges reduce performance.
	6. Check motor brushes. See Electrical – What To Check, item 4, on page 17.	6. See page 23.

Intermediate Problem Solving

TYPE OF PROBLEM	WHAT TO CHECK *If check is OK, go to next check*	WHAT TO DO *When check is not OK, refer to this column*
Low Output *(continued)*	7. Check motor control board (47) by substituting with a good board. **CAUTION:** Do not perform this check until motor armature is determined to be good. A bad motor armature can burn out a good board.	7. Replace board. See page 29.
	8. Check motor armature for shorts by using an armature tester (growler) or perform motor test. See page 22.	8. Replace motor. See page 28.
Drain Valve Leaks	1. Check drain valve for correct torque and/or worn parts. Check for debris trapped on seat.	1. Tighten to 185 in–lb (21 N.m). Clean valve and replace with new gasket (42a) and sealant (42e). See page 35.
No Output: Motor Runs And Pump Strokes	1. Check paint supply.	1. Refill and reprime pump.
	2. Check for clogged intake strainer.	2. Remove and clean, then reinstall.
	3. Check for loose suction tube or fittings. See page 34.	3. Tighten; use thread sealant on npt threads of inlet tube (38). Check for damaged o–ring (27).
	4. Check to see if intake valve ball and piston ball are seating properly. See page 24.	4. Remove intake valve and clean. Check ball and seat for nicks; replace as needed. See page 24. Strain paint before using to remove particles that could clog pump.
	5. Check for leaking around throat packing nut which may indicate worn or damaged packings. See page 24.	5. Replace packings. See page 24. Also check piston valve seat for hardened paint or nicks and replace if necessary. Tighten packing nut/wet-cup.
	6. Release gun trigger. Observe resting position of pump rod (107).	6. If pump consistently comes to rest with rod (107) fully extended, the piston packings and/or piston valve may be worn. Service the pump. See page 24.
No Output: Motor Runs But Pump Does Not Stroke	1. Check displacement pump connecting rod pin (17). See Fig. 18, page 24.	1. Replace pin if missing. Be sure retainer spring (18) is fully in groove all around connecting rod.
	2. Check connecting rod assembly (15) for damage. See page 30.	2. Replace connecting rod assembly. See page 30.
	3. Be sure crank in drive housing rotates; plug in sprayer and turn on briefly to check. Turn off and unplug sprayer. See page 30.	3. Check drive housing assembly for damage and replace if necessary. See page 30.
Spray Pattern Variations	1. Spray tip worn beyond sprayer pressure capability.	1. Replace spray tip. **NOTE:** A smaller size tip will provide longer life.
	2. Check motor control board by replacing it with a new one.	2. Replace board. See page 29.
	3. Check pressure transducer (64) by replacing it with a new one.	3. Replace pressure transducer. See page 32.

Intermediate Problem Solving

TYPE OF PROBLEM	WHAT TO CHECK *If check is OK, go to next check*	WHAT TO DO *When check is not OK, refer to this column*
Spray Pattern Variations *(continued)*	4. Check pressure adjustment potentiometer (64) by replacing it with a new one.	
	5. Check Low Output section, page 18.	
Motor Is Hot and Runs Intermittently	1. Determine if sprayer was operated at high pressure with small tips, which causes excessive heat build up.	1. Decrease pressure setting or increase tip size.
	2. Be sure ambient temperature where sprayer is located is no more than 90°F (32°C) and sprayer is not located in direct sun.	2. Move sprayer to shaded, cooler area if possible.
	3. Check motor.	3. Replace motor. See page 28.
Building Circuit Breaker Opens As Soon As Sprayer Switch Is Turned On.	1. Check all electrical wiring for damaged insulation, and all terminals for loose fit or damage. Also check wires between pressure transducer and motor. See page 28.	1. Repair or replace any damaged wiring or terminals. Securely reconnect all wires.
	2. Check for missing motor brush inspection plate gasket (see page 23), bent terminal forks or other metal to metal contact points which could cause a short.	2. Correct faulty conditions.
	3. Check motor armature for shorts. Use an armature tester (growler) or perform motor test. See page 18. Inspect windings for burns.	3. Replace motor. See page 28.
	4. Check motor control board (47) by substituting with a good board. **CAUTION:** Do not perform this check until motor armature is determined to be good. A bad motor armature can burn out a good board.	4. Replace board. See page 29.
Circuit breaker opens after sprayer operates for 5 to 10 minutes.	1. Check 'Basic Problems – Electrical' on page 17.	
Building circuit breaker opens as soon as sprayer is plugged into outlet and sprayer is NOT turned on.	1. Check ON/OFF switch (52). Be sure sprayer is unplugged! Disconnect wires from switch. Check switch with ohmmeter. The reading should be infinity with ON/OFF switch OFF, and zero with switch ON. **CAUTION:** A short in motor circuit can damage switch and or motor control board (47).	1. Replace ON/OFF switch. See page 29.
	2. Check for damaged or pinched wires in junction box (59).	2. Replace damaged parts.
Unit will not run on generator but does run on AC power	1. Check the generator's "peak" voltage. This sprayer will not run if the peak voltage is above 190V or below 100V.	1. Use AC power or a different generator.

General Repair Information

WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing fluid or solvent in the eyes or on the skin, or injury from moving parts or electric shock, always follow this procedure whenever you shut off the sprayer, check or service any part of the spray system, install, clean or change spray tips, and whenever you stop spraying.

1. Engage the gun safety latch.
2. Turn the ON/OFF switch to OFF.
3. Unplug the power supply cord.
4. Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Open the pressure drain valve, having a container ready to catch the drainage. Leave the valve open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, VERY SLOWLY loosen the tip guard retaining nut or hose coupling to relieve pressure gradually, then loosen completely. Now clear the tip or hose.

Tool List

These service tools are required.

1/4” Allen wrench: *filter plug*
3/8” Allen wrench: *pump manifold*
3/16” Allen wrench: *gear housing, legs, handle*
5/64” Allen wrench: *pressure adjustment knob*
#1 Phillips® screwdriver: *junction box, front cover, motor shield*
3/8” socket wrench: *motor mount*
5/8” socket wrench: *drain valve, outlet fittings, on/off switch boot, piston*
13/16” socket wrench: *drain valve*
1-1/4” socket wrench: *pump inlet valve*
1/2” open end wrench: *pump rod*
11/16” open end wrench: *piston jam nut*
15/16” open end wrench: *flats of inlet tube*
1-3/4” open end wrench: *pump jam nut*
5/64” drive pin: *drain valve pin*
3” needle nose pliers: *wiring, on/off switch*
Hammer & punch: *packing nut*
Torque wrenches: *various fasteners*

CAUTION

To reduce the risk of a pressure transducer malfunction, properly mate connectors and never pull on a wire to disconnect it.

1. **When disconnecting wires**, use needle nose pliers to separate mating connectors.
2. **When reconnecting wires**, center the flat blade of the male connector in the blade of the female connector.
3. **Route wires carefully** and avoid pinching any wires between covers.

CAUTION

Improper wire routing can result in poor sprayer performance or damage to the pressure transducer.

4. **Keep all screws, nuts, washers, gaskets, and electrical fittings** removed during repair procedures.
5. **Test your repair before regular operation** to be sure the problem is corrected.
6. **If the sprayer does not operate properly**, verify that everything was done correctly. Also refer to the Troubleshooting Guide, page 17, to help identify other possible problems and solutions.

WARNING

To reduce the risk of serious bodily injury, including electric shock, DO NOT touch any moving parts or electrical parts with your fingers or a tool while inspecting the sprayer.

Shut off the sprayer and unplug it as soon as you complete the inspection.

Reinstall all covers, gaskets, screws and washers before operating the sprayer.

WARNING

During operation, the motor and drive housing become very hot and could burn your skin if touched. Flammable materials spilled on the hot, bare motor could cause a fire or explosion.

Motor Test

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 3 before doing this procedure. Unplug the sprayer!

For checking armature, motor winding and brush electrical continuity.

Setup

Remove the drive housing. See page 30. This is to ensure that any resistance you notice in the armature test is due to the motor and not to worn gears in the drive housing.

Remove the motor brush inspection covers (A). See Fig. 13.

Remove the screws (56,75). Lower the control board (47). Disconnect the two leads (C) from the motor to the board. See Fig.12.

Armature Short Circuit Test

Remove the fan cover (B). See Fig.13.

Spin the motor fan by hand. If there are no shorts, the motor will coast two or three revolutions before coming to a complete stop. If the motor does not spin freely, the armature is shorted and the motor must be replaced. See page 28.

Armature, Brushes, and Motor Wiring Open Circuit Test (Continuity)

Connect the two black motor leads (C) together with a test lead. Turn the motor fan by hand at about two revolutions per second. See Fig. 12.

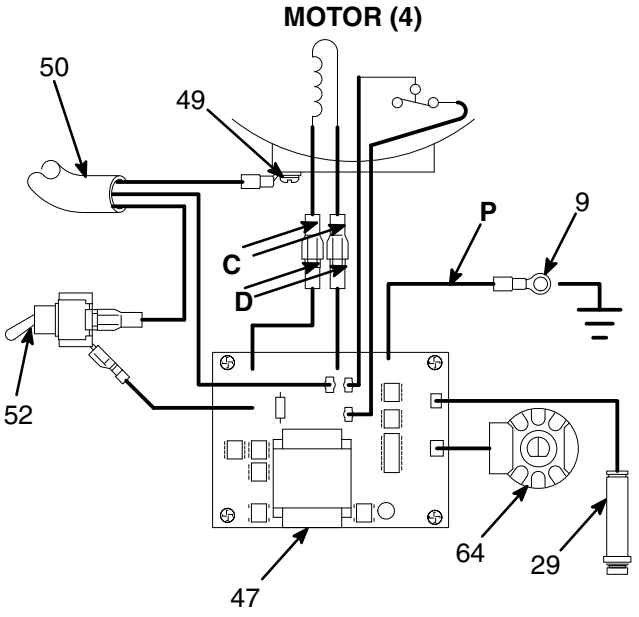


Fig. 12 03000

When turning the fan on a DC motor, normally you sense an even, pulsing resistance. If there is irregular turning resistance, or no turning resistance, check and repair the following as needed: broken brush springs, brush leads, motor leads; loose brush terminal screws or motor lead terminals; worn brushes. See page 23.

If there is still uneven or no turning resistance, replace the motor. See page 28.

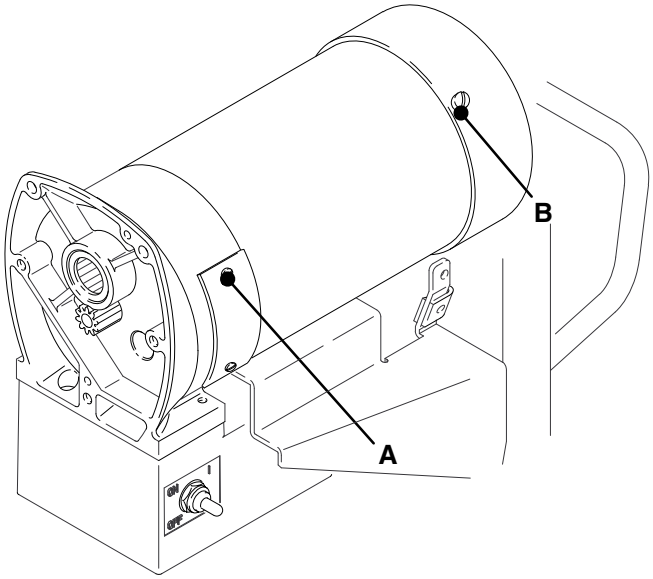


Fig. 13 02991

Motor Brush

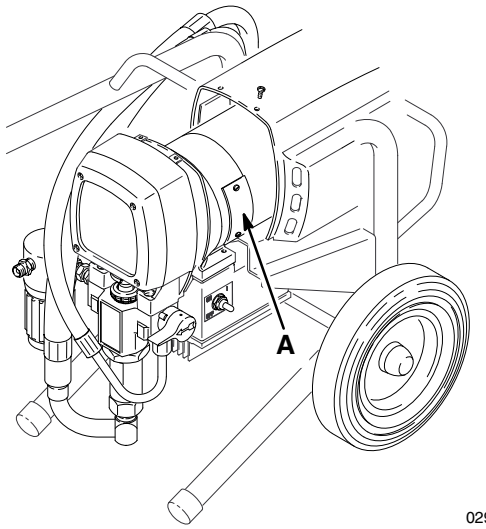
NOTE: Replace brushes when worn to about 0.4 in. (10 mm). Always check both brushes. Brush Repair Kit 235–727 is available.

NOTE: Replacement brushes may last only half as long as the original ones. To maximize brush life, break in new brushes by operating the sprayer with no load (remove the pump connecting rod pin) for at least 1 hour.

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

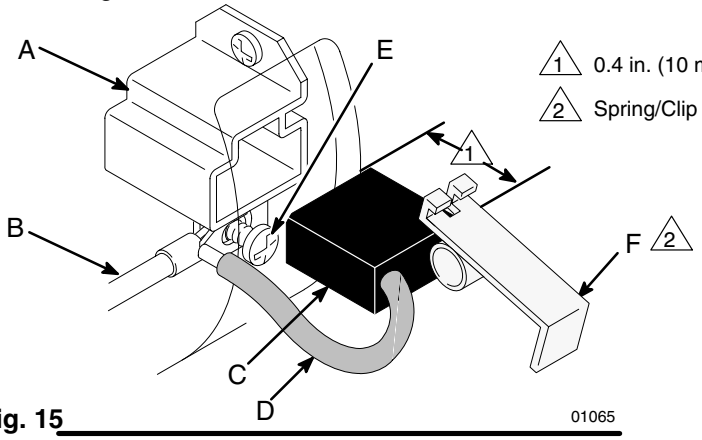
1. Remove the motor shield (2).
2. Remove both inspection covers (A) and their gaskets. See Fig. 14.



02992

Fig. 14

3. Push in the spring/clip (F) and release its hooks from the brush holder (A). Pull out the spring/clip. See Fig. 15.



01065

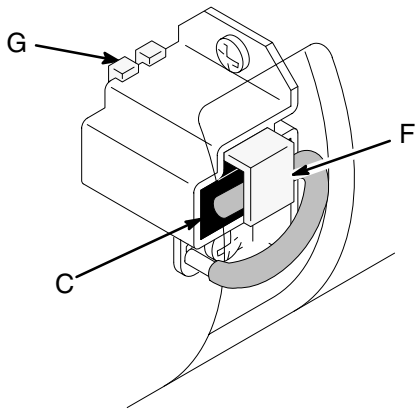
Fig. 15

4. *Loosen* the brush lead terminal screw (E). Pull the brush lead (D) away, but leave the motor lead terminal (B) in place. Remove the old brush. See Fig. 15.
5. Inspect the commutator for excessive pitting, burning or gouging. A black color on the commutator is normal. Have the commutator resurfaced by a qualified motor repair shop if the brushes seem to wear too fast or arc excessively. See Step 10.d.. also.
6. Repeat for the other side.
7. Place a new brush (C) in the holder (A). Slide the terminal under the terminal screw washer (E). Ensure the motor lead (B) is still connected at the screw. Tighten the screw. See Fig. 15.
8. Holding the spring/clip (F) at a slight angle, slide the spring/clip into the brush holder and hook it over the end of the holder (G). See Fig. 16. Pull on the spring/clip to be sure it stays in place. Be sure the brush lead is tucked under the spring/clip tab.
9. Repeat for the other side.
10. **Test the brushes.**
    a. Remove the pump connecting rod pin.
    b. With the sprayer OFF, turn the pressure transducer knob fully counterclockwise to minimum pressure. Plug in the sprayer.
    c. Turn the sprayer ON. Slowly increase the pressure until the motor is at full speed.
    d. Inspect the brush and commutator contact area for excessive arcing. Arcs should not “trail” or circle around the commutator surface.

WARNING

Do not touch the brushes, leads, springs or brush holders while the sprayer is plugged in to reduce the risk of electric shock and serious bodily injury.

11. Install the brush inspection covers and gaskets.
12. **Break in the brushes.** Operate the sprayer for at least one hour with no load. Install the pump connecting rod pin.



01066

Fig. 16

Displacement Pump

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

NOTE: Packing Repair Kit 235–703 is available. Reference numbers of parts included in the kit are marked with an asterisk, i.e., (121*). For the best results, use all the new parts in the kit, even if the old ones still look good.

NOTE: To minimize down time, and for the best sprayer performance, check the motor brushes (see page 23) and clean the transducer (see page 32) whenever you repack the pump. Replace these parts as needed.

Removing the pump (See Fig.17)

1. Flush the pump, if possible. Relieve pressure. Stop the pump with the piston rod (107) in its lowest position, if possible. To lower the piston rod manually, rotate the motor fan blades.

2. Remove the filter (85).

3. While pulling upward on the suction hose (32), unscrew the hose from the inlet tube (38). Unscrew the drain hose (33) from the displacement pump nipple (36).

NOTE: If repairing only the intake valve assembly, go to **Intake valve repair,** on page 25.

4. Use a screwdriver to push the retaining spring (18) up and push out the pin (17).

5. Loosen the screws (21). Remove the pump (20).

Installing the pump (See Fig. 17 and 18)

1. Lightly grease or oil the transducer (29). See Figure XX. Guide the pump over the alignment pins and pressure transducer. Tap it into position with a soft hammer. Tighten the screws (21) to 50 ft-lb (68 N.m).

2. Align the hole in the rod (107) with the connecting rod assembly (15). Use a screwdriver to push the retaining spring (18) up and push in the pin (17). Push the retaining spring (18) into place around the connecting rod.

WARNING

Be sure the retaining spring (18) is firmly in the groove all the way around, to prevent the pin (17) from working loose due to vibration. See Fig. 18.

If the pin works loose, it or other parts could break off due to the force of the pump action. These parts could be projected into the air and result in serious injury or property damage, including the pump connecting rod or bearing housing.

3. Replace the o-ring (27) if it is worn or damaged. See page 34. Reconnect the suction and drain hoses (32,33). Install the front cover (13).

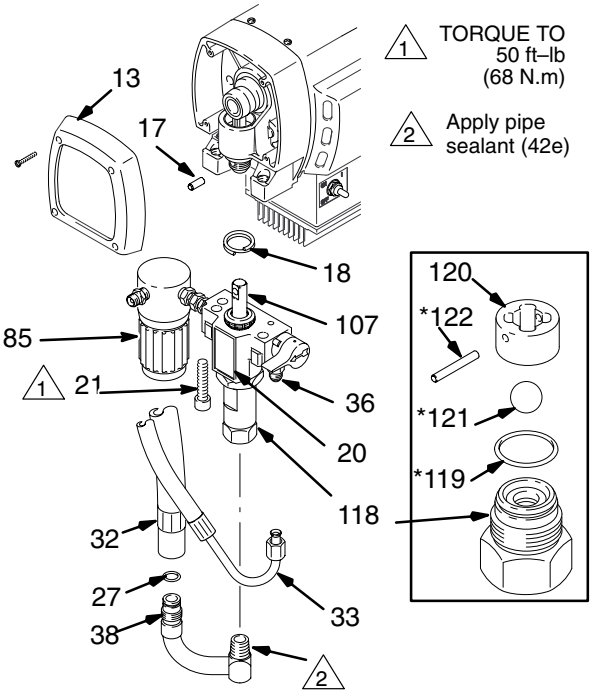


Fig. 17 02993

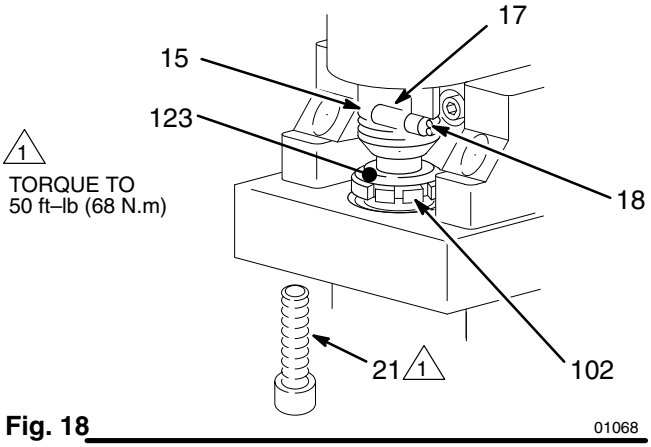


Fig. 18 01068

4. Tighten the packing nut (102) just enough to stop leakage, but no tighter. Fill the packing nut/wet-cup 1/3 full with Graco TSL. Push the plug (123) into the wet-cup.

Intake valve repair (See Fig. 17)

1. Remove the suction hose. See Step 3, **Removing the pump.**

2. Unscrew the intake valve (118). Remove the o-ring (119*), ball guide (120), stop pin (122*) and ball (121*) from the valve.

3. Clean and inspect the parts for wear or damage. Replace parts as needed. Use a new o–ring (119*). If no further service is needed, reassemble the pump.

Disassembling the pump (See Fig. 19)

1. Remove the intake valve (118).

2. Loosen the packing nut (102) and plug (123).

3. Use a plastic mallet to tap the piston rod (107) down, and then pull the rod out through the bottom of the cylinder.

4. Remove the packing nut (102) and throat packings.

5. Loosen the jam nut (117). Remove the cylinder (115) and the o-ring (116*).

6. Clamp the flats of the piston rod in a smooth jaw vise. Use an open-end wrench to loosen the nut (110) and then unscrew the piston valve (108).

7. Remove all parts from the piston valve (108).

Reassembling the pump

NOTE: Alternate plastic and leather packings. See Fig. 19. The lips of the throat V-packings face down. The lips of the piston V–packings face up. The lips of seal 125* face down. Incorrect installation damages the packings and causes pump leaks.

NOTE: Soak the leather packings in oil before reassembling the pump.

1. Check the outside of the piston rod (107) and the inside of the cylinder (115) for wear. Replace worn parts to ensure a good seal with the new packings.

2. Stack these parts onto the piston valve (108) one at a time: the backup washer (126*) and u–cup (125*), the female gland (114*), alternately three plastic (112*) with two leather packings (113*), and the male gland (111*). See Fig. 20.

3. Tighten the nut (110) onto the piston valve (108) to 2 in-lb (0.23 N.m). See Fig. 21.

Note the alignment of the piston (108) to the nut (110). Maintain this alignment through Step 8.

4. Clean all residue from the piston valve threads. Apply one drop of adhesive, supplied, to the threads.

5. Place the ball (109*) on the piston valve (108). See Fig. 20.

CAUTION

Step 8, tightening the piston valve into the rod, is critical. Follow the procedure carefully to avoid damaging the packings by overtightening.

6. Hand tighten the valve into the piston rod just until the nut (110) contacts the rod. See Fig. 21.

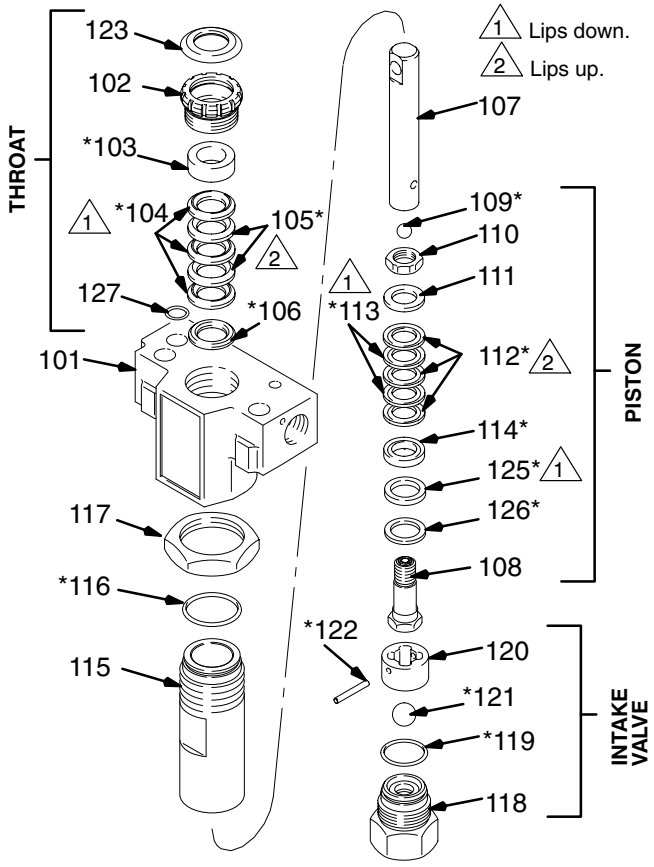


Fig. 19 03149

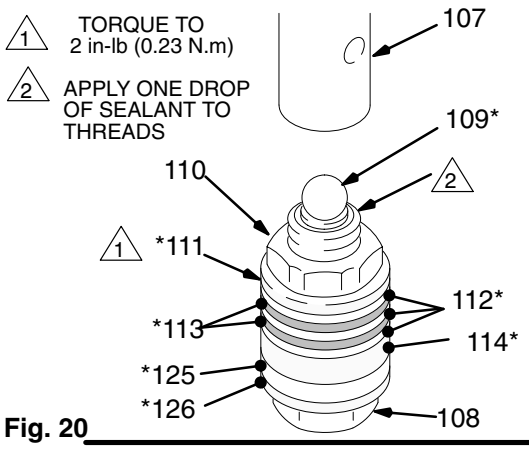


Fig. 20

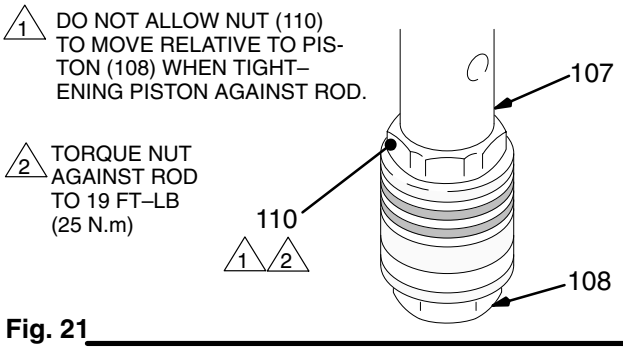


Fig. 21

7. Place the flats of the rod (107) in a smooth jaw vise.

8. **CAREFULLY** tighten the nut (110) against the piston rod to 19 ft-lb (25 N.m). See Fig. 21. Use two wrenches to maintain the alignment mentioned in Fig. 21.

9. Stack these parts one at a time into the top of the manifold (101): the male gland (106*), alternately three plastic packings (104*) with two leather packings (105*), and then the female gland (103*). See Fig. 23.

10. Install the packing nut (102) and plug (124), but leave loose for now. See Fig. 23.

11. Place a new o–ring (116*) firmly in the cylinder groove. See Fig. 22.

12. Coat the piston rod and packings with oil. Carefully slide the assembly **INTO THE TOP OF THE CYLINDER (115)**. See Fig. 22.

13. Put the manifold in a vise. Fully thread the jam nut (117) onto the cylinder (115). Guide the rod/cylinder assembly down through the manifold (101). Screw the cylinder (115) into the manifold. See Fig. 22.

14. Place the ball guide (120), stop pin (122) and ball (121*) in the cylinder (115). Screw the intake valve into the cylinder and torque to 53 ft-lb (71 N.m). This will also properly torque the cylinder into the manifold. See Fig. 22.

15. Torque the cylinder jam nut (117) to 73 ft–lb (98 N.m). See Fig. 22.

16. Install the pump. See page 24.

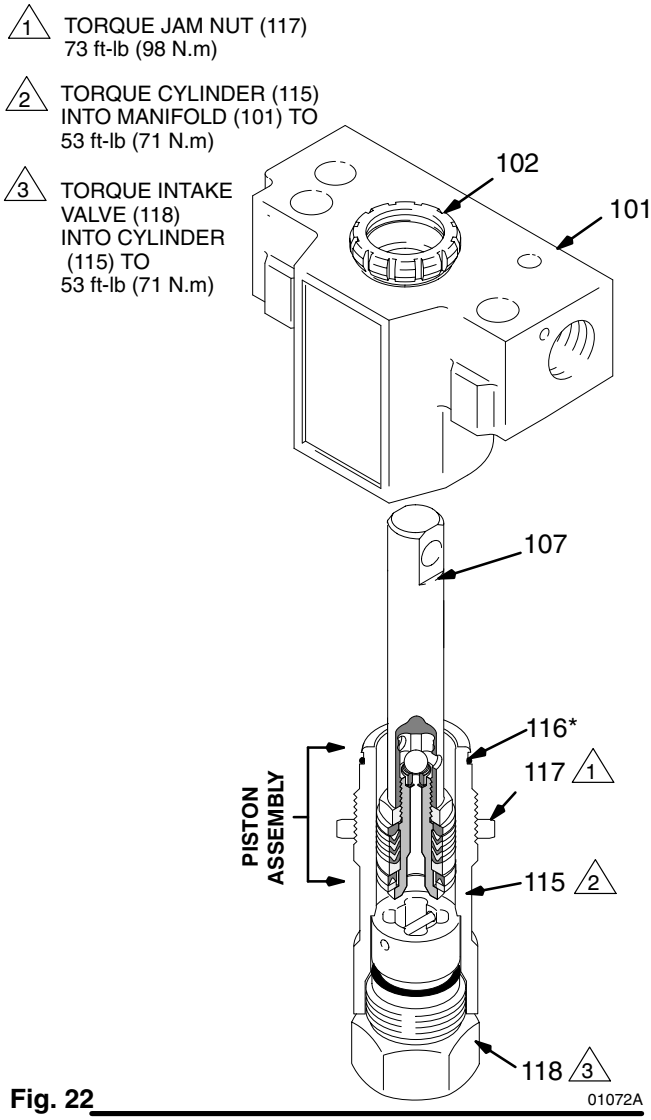

1 TORQUE JAM NUT (117) 73 ft-lb (98 N.m)
2 TORQUE CYLINDER (115) INTO MANIFOLD (101) TO 53 ft-lb (71 N.m)
3 TORQUE INTAKE VALVE (118) INTO CYLINDER (115) TO 53 ft-lb (71 N.m)
102
101
107
116*
117 1
PISTON ASSEMBLY
115 2
118 3
01072A

Fig. 22

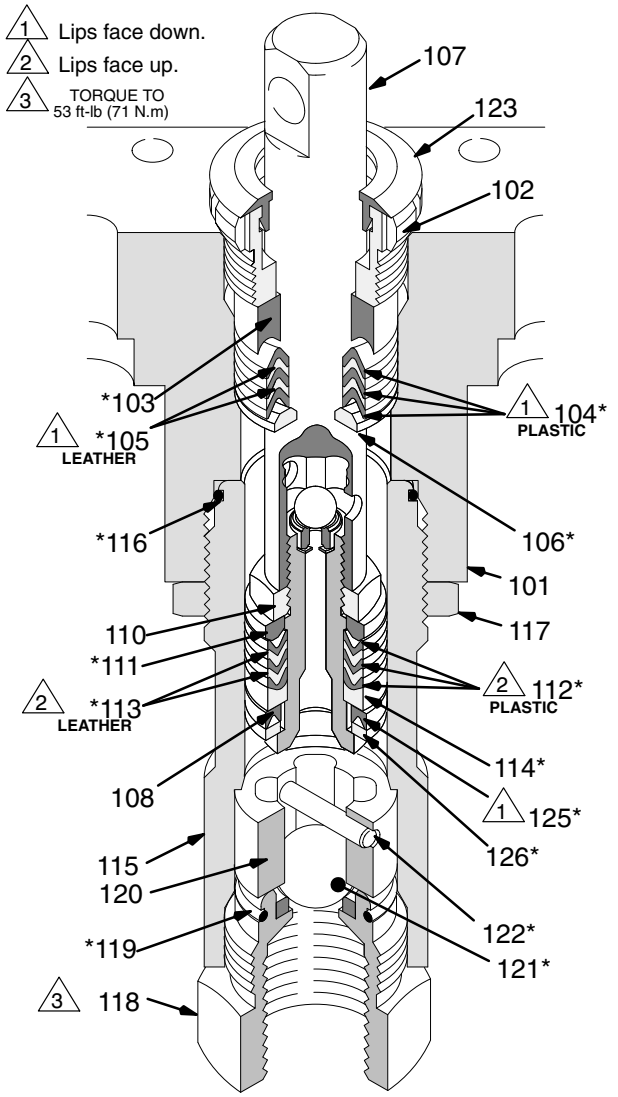

1 Lips face down.
2 Lips face up.
3 TORQUE TO 53 ft-lb (71 N.m)
107
123
102
*103
1 *105 LEATHER
1 104* PLASTIC
*116
106*
101
110
117
*111
2 *113 LEATHER
2 112* PLASTIC
114*
108
1 125*
126*
115
120
122*
*119
121*
3 118
03147

Fig. 23

Motor

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

NOTE: See Fig. 26 except where noted.

1. Relieve pressure.
2. Remove the motor shield (4).
3. Try to stop the pump with the piston rod (107) in its lowest position. To lower the piston rod manually, rotate the motor fan blades. Use a screwdriver to push the retaining spring (18) up and push out the pin (17). See Fig. 24.
4. Remove the shroud (4).
5. Lift the connecting rod. Remove the screws (56,75) and lower the control card (47). Disconnect the motor wires and the pressure transducer wire (A) from the motor control board. Refer to Fig. 26.
6. Remove the drive housing cover (13). Remove the control card (47), screws (71), and junction box (59).
7. Turn the displacement pump rod (107) so the pin hole aligns with the bottom drive housing screw (19). See Fig. 25. Remove the three drive housing screws and lockwashers (19,6). See Fig. 25 and 26.
8. Remove the two motor screws and lockwashers (5,6).
9. Tap the lower rear of the drive housing (11) with a plastic mallet to loosen the motor. Pull the drive housing straight off the motor while guiding the harness (A) from the motor. Do not allow the gear (16) to fall. Read the CAUTION on page 30.
10. Remove the two screws (46) and lift the motor off the cart (1).
11. Align the new motor with the cart and reinstall the screws (46).
12. Assemble the drive housing to the motor. Follow steps 8 to 14 on page NO TAG. Install the junction box.
13. Connect the wires in the junction box. Refer to Fig. 12. Install the control card.
14. Connect the piston rod (107) to the drive housing; see page 24, **Installing the Pump**, Step 2 and the WARNING following it.
15. Install the shroud (4).

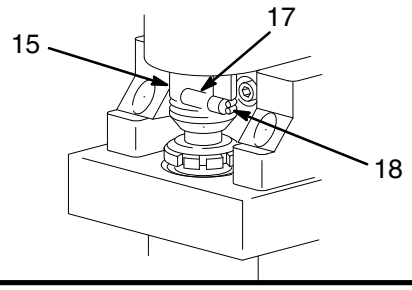


Fig. 24 01068

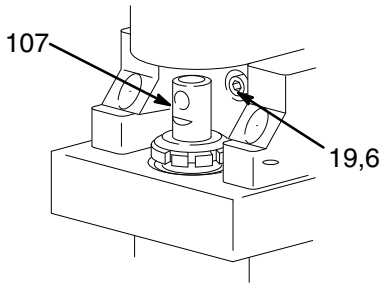


Fig. 25 01074

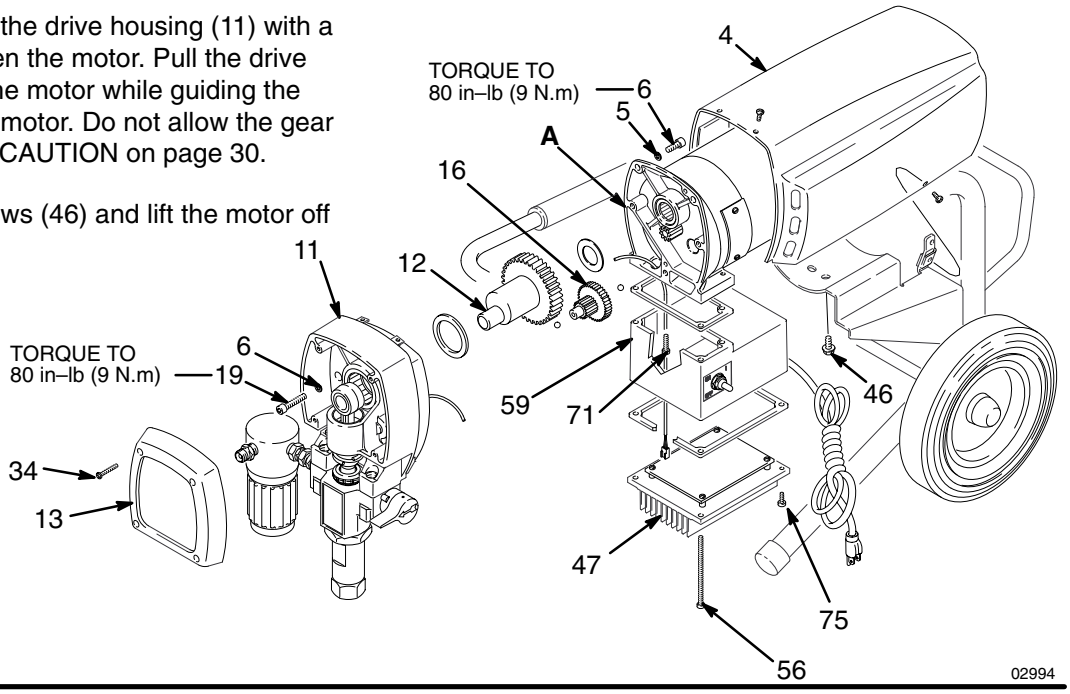


Fig. 26 02994

Motor Control Board

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

1. Remove the screws (56,75) and lower the control card (47). See Fig. 26.
2. Disconnect the motor wires (C) and the two connectors (D) from the motor control board (47). Observe where connections are made. See Fig. 12.
3. Remove the screw (9) from the ground wire (G) and remove the board.
4. Install the new motor control board. Reconnect all wires and secure it to the junction box (59).

CAUTION

Be sure the flat blade of the insulated male connector is centered in the wrap–around blade of the female connector when the connections are made.

Route all wires carefully to avoid interference with the motor control board or junction box.

These precautions are essential to reduce the risk of a malfunction.

Power Supply Cord

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

1. Remove the screws (56, 75) and lower the control card (47). See Fig. 26.
2. Disconnect the power supply cord leads (P), including the green wire to the grounding screw (9). See Fig. 12.
3. Loosen the strain relief bushing (51). Remove the power supply cord (50).
4. Install the new cord (50) in the reverse order of disassembly.
5. Install the control card. Be sure no leads are pinched between the card and other components.

On/Off Switch

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

1. Remove the screws (56,75) and lower the control card (47). See Fig. 28.
2. Remove the rubber boot (55). See page 36.
3. Disconnect the black wires from the ON/OFF switch (52) and remove the switch. See Fig. 12.
4. Install the switch so the internal tab of the anti–rotation ring (54) engages with the vertical groove in the threads of the switch, and the external tab engages with the slot of the junction box. See page 36.
5. Powder the inside of the rubber boot (55) with talcum, then shake the excess out of the boot. Install the nut and rubber boot and tighten.
6. Reconnect the ON/OFF switch black wires.
7. Install the control card. Be sure no leads are pinched between the motor control board or other components.

Drive Housing, Connecting Rod, Crankshaft

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

NOTE: Inspect parts as they are removed. Replace parts that are worn or damaged.

1. Remove the displacement pump. See page 24.
2. Remove the shroud (4).
3. Lower the control card (47) and remove the pressure transducer (29). See page 32.

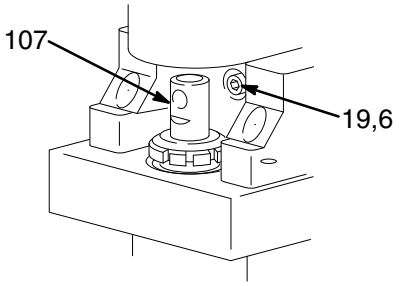


Fig. 27 01074

4. Turn the displacement pump rod (107) so the pin hole aligns with the bottom drive housing screw (19). See Fig. 27. Remove the three drive housing screws and lockwashers (19,6). Also see Fig. 28.
5. Remove the two motor screws and lockwashers (5,6). See Fig. 28.
6. Tap the lower rear of the drive housing (11) with a plastic mallet to loosen the motor. Pull the drive housing straight off the motor.

CAUTION

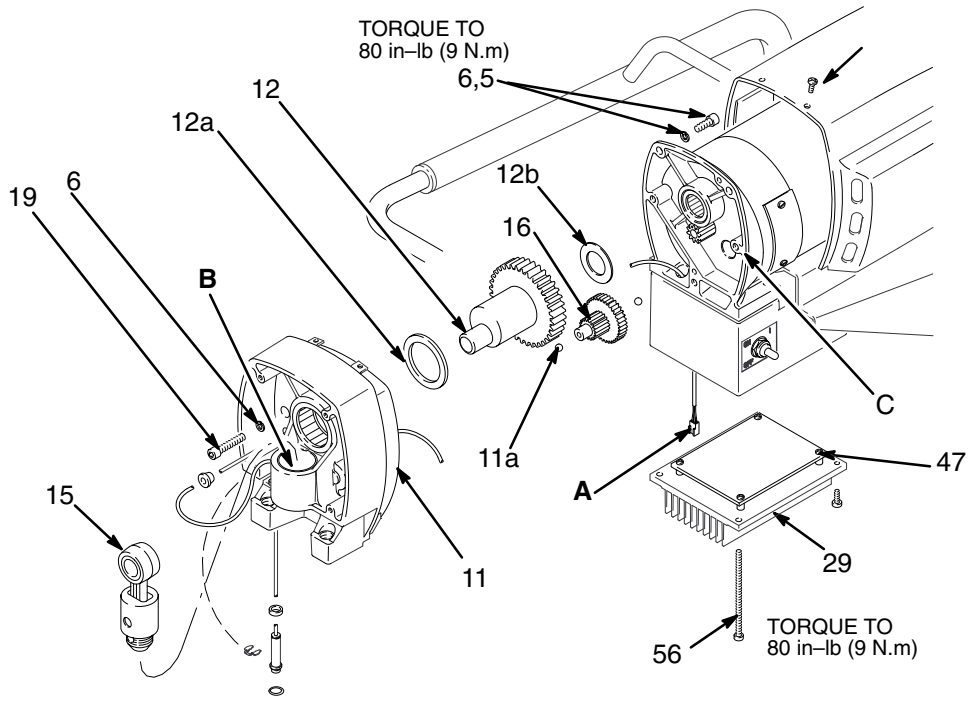
Do not allow the gear (16) to fall; it may stay attached to the drive housing or to the motor.

Do not lose the thrust balls (11a or 4a) or let them fall between the gears, which will damage the drive housing if not removed. The balls, which are heavily covered with grease, usually stay in the gear recesses, but could be dislodged. If the balls are not in place, the bearings will wear prematurely.

7. Remove and inspect the crankshaft (12) and the connecting rod (15). Replace all damaged or worn parts.
8. Install the connecting rod.
9. Lubricate the inside of the connecting rod bearing with SAE non-detergent oil. Pack the roller bearing and gears with the grease supplied.

NOTE: The gears and bearings between the drive housing (11) and motor front end bell (C) should contain a total of 3 fl oz (29 cc) of grease.

10. Place the large washer (12a) and then the small washer (12b) on the crankshaft (12).
11. Rotate the crank to the top of the stroke and insert crankshaft (12). Align the gears and push the drive housing (11) straight onto the motor and the locating pins. Install the screws (19, 5) and their lockwashers (6). Torque to 80 in–lb (9 N.m).
12. Install the pressure transducer. See page 32.
13. Install the displacement pump. See page 24.
14. Install the front cover (13).
15. Replace the shroud (4).



Note: Filter not shown

Fig. 28

02995

Pressure Transducer

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

NOTE: See Fig. 28 and 29 for this procedure.

NOTE: The pressure transducer (29) cannot be repaired or adjusted. If it malfunctions, replace it.

Removal

1. Remove the displacement pump (20). See page 24.
2. Remove the front cover (13). Remove the screws (56,75). Lower the motor control card.
3. Disconnect the harness connector from the motor control board (47). Remove grommet (77).
4. Remove the retaining ring (72). Pull the pressure transducer down and out past the drive housing (11).
5. Guide the harness (A) through the motor and drive housing and remove the pressure transducer.
6. Inspect the spacer (76) and seal (7) for damage. Replace the seal (7) only if it is cut, nicked, or if leakage occurred. See page 33.

Installation

1. Using a small piece of solid copper or mild steel wire (approx. 12”), form a small hook and place it in the passage of the bottom of the motor. Guide it up and out the hole in the drive housing.
2. Pass a spacer (76) over the harness connector (A) and down into position at the bottom of the transducer (29).
3. Guide the harness up through the leg and notch of the drive housing (11). Secure the guide wire over the connector.
4. While pulling the guide wire out through the bottom of the motor, guide the harness through the drive housing and motor castings.
5. Place the grommet (77) over the harness and push into position in the drive housing hole.
6. Feed the excess harness cable through the grommet and fully seat the transducer body into the hole in the drive housing leg. Secure it with the retaining ring (72).
7. Attach the connector to the control board. Replace the cover(13) and board (47) taking care not to pinch any wires between the components.

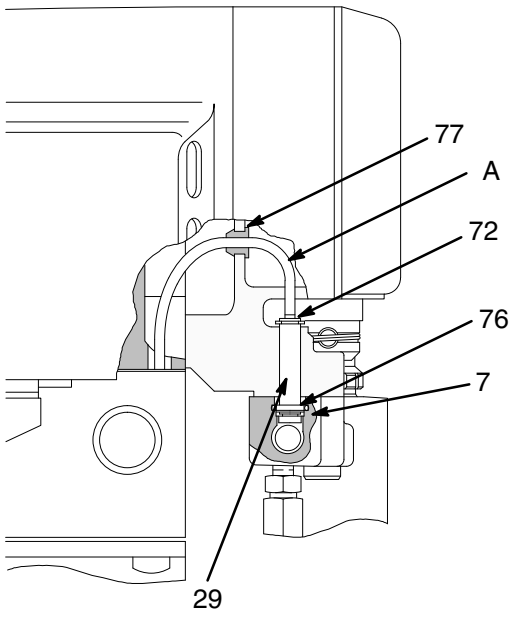


Fig. 29 02996

Pressure Transducer Seal

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

NOTE: The PTFE seal is unaffected by most solvents and materials. Replacement of the seal is recommended only when leakage has occurred.

Removal

1. Remove the displacement pump (20). See page 24.
2. Using a wooden or plastic probe (such as a toothpick), dislodge the packing (7) from its recess in the manifold (101).
3. Remove the packing and clean the manifold recess with solvent and cloth or cotton swabs. Inspect for nicks or scratches in the o–ring area.

Installation

1. Lightly coat the cleaned packing recess in the manifold with a light grease or oil.
2. Heat the packing (7) in hot water for several minutes.
3. Using fingertips or a blunt wooden or plastic probe, install the packing into the recess. Be careful not to cause kinks or bends in the packing during installation.
4. Lightly grease or oil the transducer (29) and install the pump (20). See page 24.

NOTE: Excess pressure from the probes or fingernails will damage the packing and cause subsequent leakage.

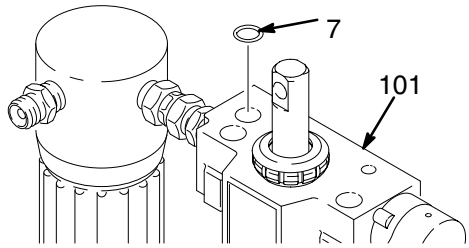


Fig. 30 02997

Suction Hose

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

CAUTION

Misalignment or cross-threading will damage the parts and/or create shavings which can cause the o–ring (27) to leak.

1. Remove the drain hose (33) from the clip.
2. Pull upward on the suction hose (32) while unscrewing it from the inlet tube (38). The hose coupling (A) threads will engage and the hose will separate from the tube.
3. Replace the o–ring (27) if it is worn or damaged.
4. Lubricate the o–ring (27) and the inlet tube (38) threads with light grease.
5. Align the suction hose coupling (A) with the threads of the inlet tube (38). Tighten the hose onto the tube at least 4 turns to ensure that the threads have disengaged and can function as a swivel joint.

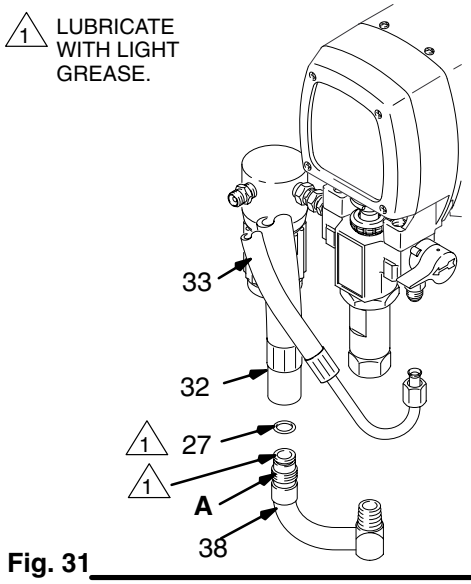


Fig. 31 02998

Drain Valve

WARNING

To reduce the risk of serious injury, follow the **Pressure Relief Procedure Warning** on page 21 before doing this procedure. Unplug the sprayer!

1. Turn the handle (45) to the closed position. Drive out the pin (44). Remove the handle.

2. Remove the base (43).

3. Unscrew the drain valve (42). The gasket (42a) and seat (42b) will stay in the valve.

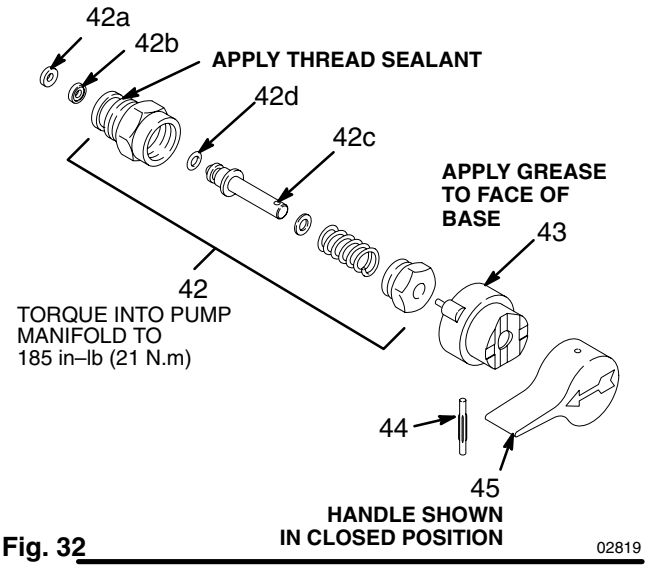


Fig. 32

Repair

1. Unscrew the spring retainer from the valve body. Remove the spring, washers and stem/ball. Clean any debris from the ball or seat area.

2. If replacing the gasket (42a) or seat (42b), pry out the gasket.

NOTE: Whenever the gasket (42a) is removed, replace it with a new one.

1. Coat the o–ring (42d) with grease. Press the stem (42c) into the valve body. Install the spring, washers and spring retainer into the valve body.

2. Place the seat (42b) in the valve body so the lapped side is toward the ball. Apply a small amount of grease to the new gasket (42a) and install it in the valve body.

NOTE: The gasket will protrude from the end of the valve until the valve is tightened into pump, which correctly seats the gasket.

Replacement

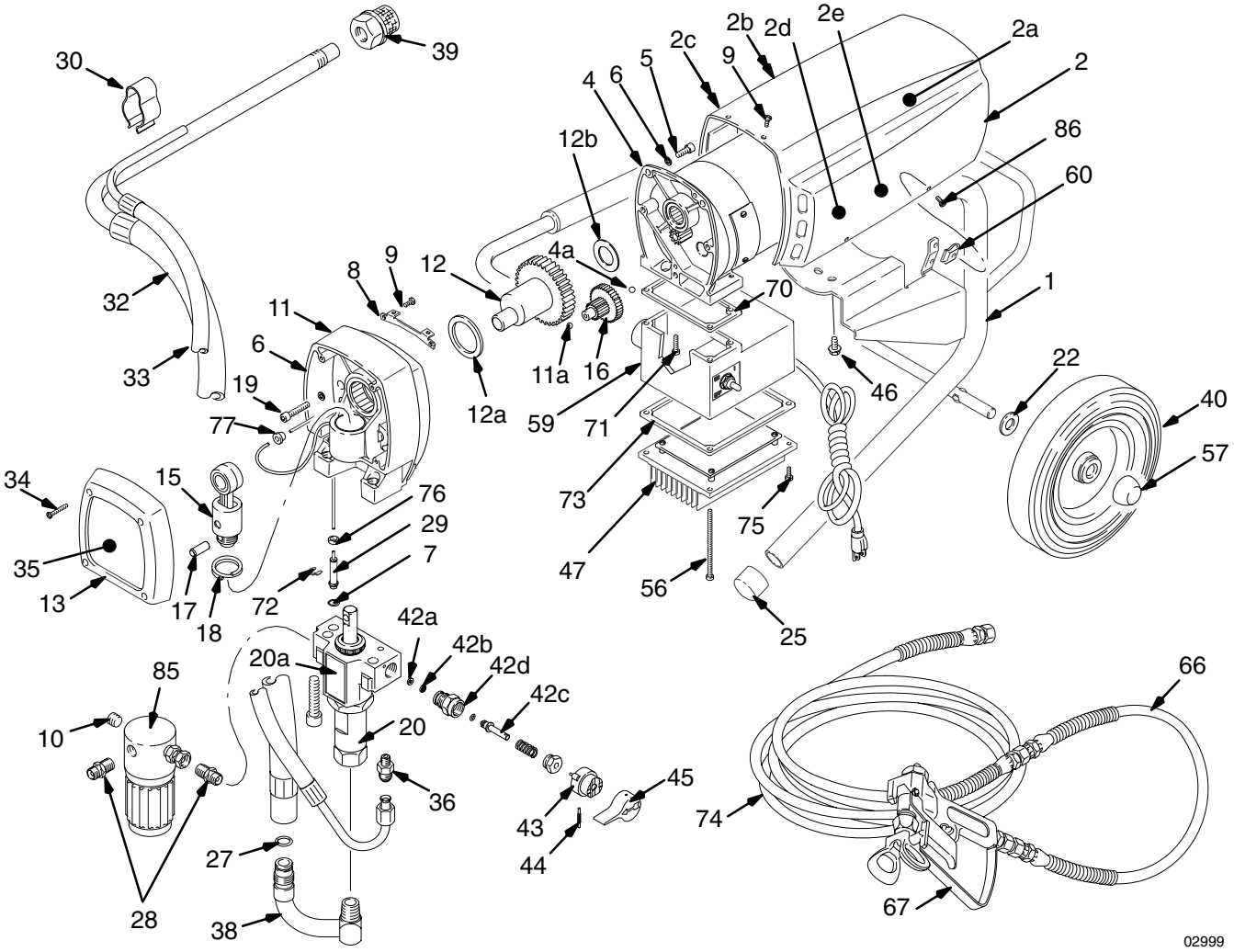
1. Apply a small amount of thread sealant (42e) onto the valve (42) threads. Tighten the valve into the pump manifold to 185 in–lb (21 N.m).

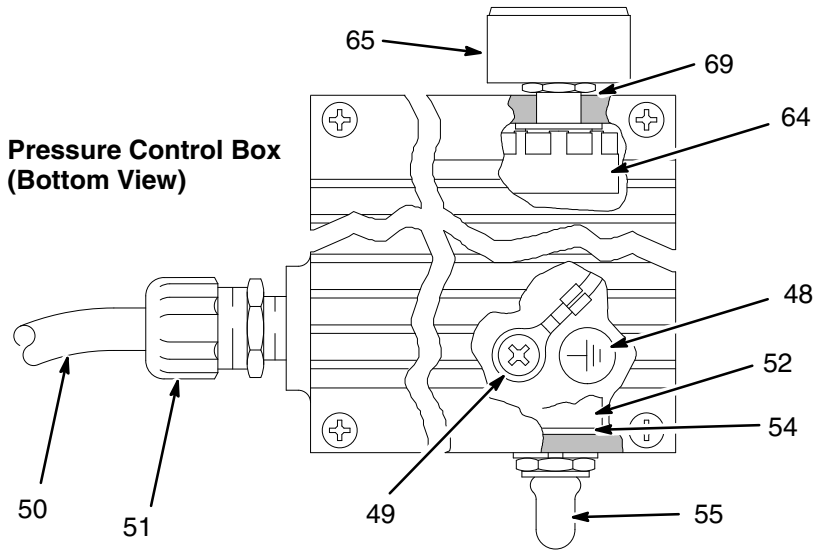
2. Lightly grease the face of the base (43) and install the base. Turn the stem so the pin hole is vertical.

3. Securely install the handle (45) and drive the pin (44).

Complete Sprayer Parts

Model 231–307 & 231–325, Series A





Complete Sprayer Parts

Model 231–307 & 231–325, Series A

Ref. No.	Part No.	Description	Qty.
1	236–523	KIT, replacement,cart, U–600	1
2	236–358	KIT, shield, motor, U–600	1
2a	189–490	LABEL, ID, Ultra 600	1
2b	189–491	LABEL, ID, Ultra 600	1
2c▲	187–784	LABEL, DANGER, French	1
2d▲	187–791	LABEL, DANGER, English	1
2e▲	187–975	LABEL, WARNING, elec shock	1
4	236–360	KIT, motor, electric, DC	1
4a	100–069	BALL, thrust	1
4b	107–265	TERMINAL, 3/16” (M) QC, 16 AWG	1
4c	107–504	TERMINAL, 3/16”, (F), QC, 18 AWG	1
4e▲	187–784	LABEL, DANGER, French	
4f▲	187–791	LABEL, DANGER, English	1
4g▲	187–975	LABEL, WARNING, elec shock	1
5	101–682	SCREW, sch, 1/4–20 x .625	2
6	105–510	LOCKWASHER, 1/4 hi–collar	5
7	104–319	PACKING, o–ring, PTFE	1
8	189–270	BRACKET, shield	1
9	108–865	SCREW, panh	5
10	100–721	PLUG, pipe, 1/4 npt, headless	1
11	236–362	KIT, housing, drive, U–600	1
11a	100–069	BALL, thrust	1
12	218–242	CRANKSHAFT, U–500	1
12a	107–434	BEARING, thrust, front	1
12b	180–131	BEARING, thrust, rear	1
13	236–366	KIT, cover, front, U–600	1
15	218–359	CONNECTING, rod assy	1
16	218–364	GEAR, assy, 2nd stage	1
17	176–818	PIN, straight	1
18	176–817	SPRING, retaining	1
19	103–345	SCREW, sch, 1/4–20 x 1.25	3
20	236–361	KIT, pump, displacement	1
20a	188–663*	LABEL, WARNING	1
21	111–706	SCREW, mach, sch, 7/16 x 1.75	2
22	109–570	WASHER, plain 1/2”	2
25	111–611	CAP, tubing	2
27	104–938	PACKING, o–ring	1
28	162–453	NIPPLE, 1/4 npt x 1/4 npsm	2
29	236–364	KIT, transducer, pressure control	1
30	111–602	CLIP, spring	1
32	187–624	HOSE, suction, swivel	1
33	187–652	HOSE, assy drain	1
34	107–209	SCREW, filh, 8–32 x 1.0	4
35	189–111	LABEL, cover, front	1
36	111–612	ADAPTER, tube	1
38	187–627	TUBE, inlet, swivel	1
39	235–004	STRAINER, 3/4 unf	1
40	112–607	WHEEL, semi–pneumatic	2
42	235–014	VALVE, drain	1
42a	111–699	GASKET, seat valve	1
42b	187–615	SEAT, valve, lapped	1
42c	224–968	STEM, drain valve	1
42d	168–110	O–RING, stem	1
42e	110–110	SEALANT, pipe (not shown)	1
43	224–807	VALVE, base	1
44	111–600	PIN, grooved	1
45	187–625	HANDLE, drain valve	1
46	110–997	SCREWS, 1/4–20 x .625	2
47	236–368	KIT, motor control board	1
48▲	186–620	LABEL, ground terminal	1
49	110–037	SCREW, mach, pnh, 10–24 x .500	1
50	236–354	CORD, power set	1
51	108–295	BUSHING, strain relief	1
52	105–679	SWITCH, toggle	1
54	105–658	RING, locking	1
55	105–659	BOOT, toggle	1
56	112–381	SCREW, panh, 10–24 x 3.5	2
57	112–612	CAP, hub	2
59	189–105	HOUSING, junction box	1
60	112–400	NUT, self–retaining	2
61	112–373	KNOB, pressure adjustment	1
64	236–352	POTENTIOMETER, pressure adjustment	1
65	185–565	LABEL, knob	1
66*	214–701	HOSE, whip, 3/16” x 3’	1
67*	220–955	SPRAY GUN, contractor	1
68	206–994	LIQUID, throat seal (not shown)	1
69	112–382	NUT, shaft sealing	1
70	112–158	GASKET, motor	1
71	112–379	SCREW, filh, 10–24 x 0.75	2
72	112–396	RING, external retaining	1
73	112–159	GASKET, heatsink	1
74*	223–541	HOSE, 1/4” x 50’	1
75	112–380	SCREW, panh, 8–32 x 0.5	2
76	189–269	SPACER, transducer	1
77	189–483	GROMMET, cable	1
85	235–677	FILTER, fluid (see manual 308–249)	1
86	112–598	SCREW, trusshead, 8–32	2

***Not supplied with sprayer, Model 231–325**

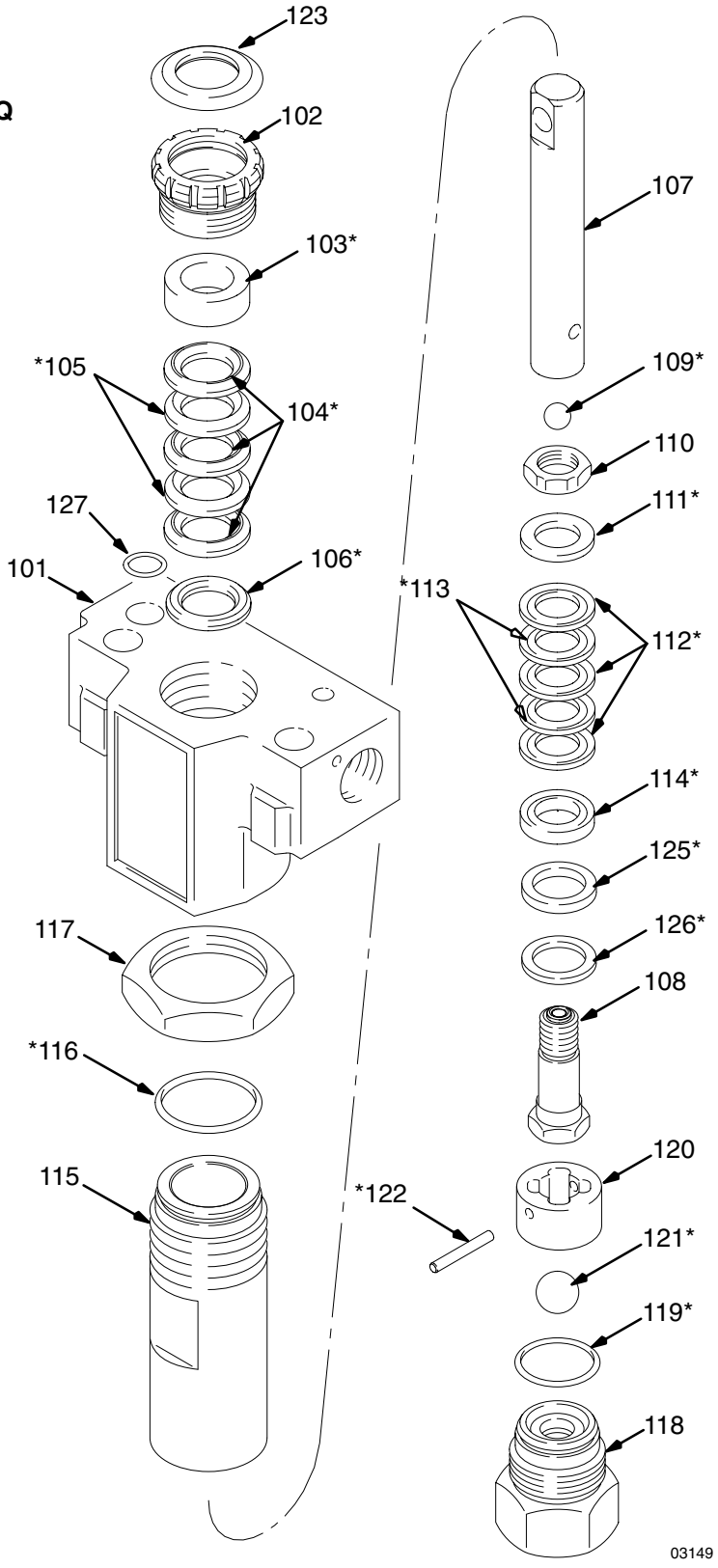
▲Extra Warning Labels available free

Displacement Pump Parts

Model 236–361 Series A

Ref No.	Part No.	Description	Qty
101	236–365	MANIFOLD, pump	1
102	176–758	PACKING NUT	1
103	176–757*	GLAND, female, throat	1
104	176–997*	V–PACKING, plastic, throat	3
105	176–755*	V–PACKING, leather, throat	2
106	176–754*	GLAND, male. throat	1
107	235–709	DISPLACEMENT ROD	1
108	218–197	PISTON, valve	1
109	105–444*	BALL, 5/16", piston	1
110	176–751	NUT, hex, 1/2–20 unf–2b	1
111	176–750*	GLAND, male, piston	1
112	176–882*	V–PACKING, plastic, piston	3
113	176–749*	V–PACKING, leather, piston	2
114	180–073*	GLAND, female, piston	1
115	235–708	CYLINDER, pump	1
116	108–526*	PACKING, o–ring, PTFE	1
117	187–614	NUT, jam,1-3/8 18 unef–2b	1
118	224–966	INLET VALVE	1
119	111–603*	PACKING, o–ring, PTFE	1
120	176–760	GUIDE, ball	1
121	105–445*	BALL, 1/2", inlet	1
122	176–759*	PIN, ball stop	1
123	180–656	PLUG	1
124	102–969*	SEALANT	1
125	105–522*	PACKING, u-cup, polyurethane	1
126	186–652*	WASHER, backup, steel	1
127	104–319	PACKING, o–ring, manifold	

***Supplied in Repair Kit 235–703**
Keep a repair kit on hand to reduce down time.



Technical Data

Power Requirements	120 VAC, 60Hz, 1 phase, 15 amp minimum
Generator	3000 Watt minimum
Working Pressure Range	0–2750 psi (0 – 195 bar)
Motor	3/4 HP
Cycles/Gallon (liter)	530 (140)
Delivery	0.55 gpm (2.1 lpm)
Tip Size	one gun to 0.025 new tip *with latex at 2000 psi (138 bar)*
Power Cord	No. 14 AWG, 3 wire, 6' (1.8 m)
Inlet Paint Strainer	12 mesh (1525 micron) Stainless Steel Screen, reusable
Outlet Filter	60 mesh (250 micron)
Pump Inlet Size	1/2 npt(f)
Fluid Outlet Size	1/4 npsm
Wetted Parts:	
Displacement Pump	Stainless steel, Carbon steel, Aluminum, Polyethylene, Delrin®, Leather
Filter	Aluminum, Steel, PTFE, Stainless steel

NOTE: D

Dimensions

Weight (dry w/o packaging)	50 lb (23 kg)
Height	21 in (533 mm)
Length	22 in (559 mm)
Width	15 in (381 mm)

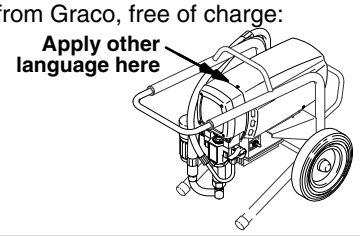
Accessories

DANGER LABELS

The English language DANGER label shown on page 1 is also on your sprayer. If you have painters who do not read English, order one of the following labels to apply to your sprayer. The drawing below shows the best placement of these labels for good visibility.

Order the labels directly from Graco, free of charge:
1–800–328–0211

French	**187–784**
Spanish	**185–956**
German	**185–961**
Greek	**186–041**
Korean	**186–045**
English	**187–791**



The Graco Ultra® 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 Ultra 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.

Phone Numbers

TO PLACE AN ORDER, contact your Gracodistributor, or call this number to identify the distributor closest to you: **1–800–367–4023 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or assistance regarding the application of equipment: **1–800–543–0339 Toll Free**

Sales Offices: Atlanta, Chicago, Dallas, Detroit, Los Angeles, Mt. Arlington (N.J.)
Foreign Offices: Canada; England; Korea; Switzerland; France; Germany; Hong Kong; Japan

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