



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

INSTRUCTIONS

First choice when
quality counts.™

Rev. C
Supersedes Rev. B
and PCN C

In-Line Valve

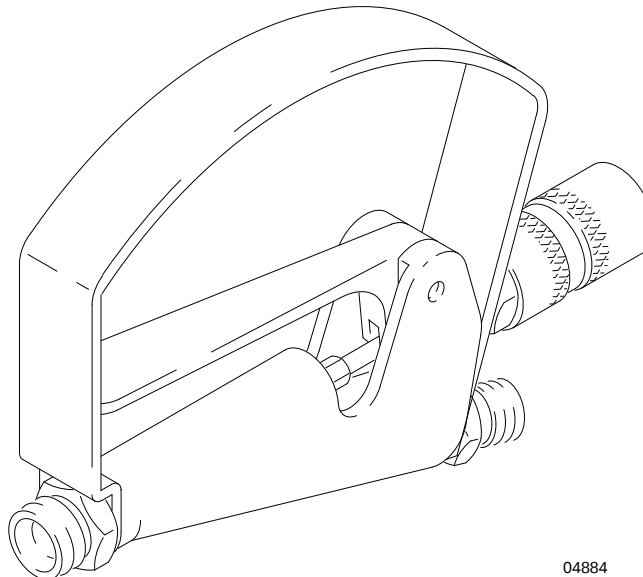
3000 psi (21.0 MPa, 210 bar) Maximum Working Pressure

Model 220-229, Series A

For use in atomizing and non-atomizing fluid applications

WARNING

To reduce the risk of serious injury, including fluid injection, you must attach to the outlet of this valve an appropriate application device such as a spray tip and tip guard, or high pressure extension and/or roller. See **Installation** on page 7 for more details.



04884

Table of Contents

Warnings	2
Installation	6
Operation	8
Service	11
Parts	12
Technical Data	14
Warranty	16
Graco Phone Number	16

Symbols

Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol



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

WARNING



INSTRUCTIONS

EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. Refer to the **Technical Data** on page 14 for the maximum working pressure of this equipment.
- Do not exceed the maximum working pressure of the lowest rated system component. This equipment has a **3000 psi (21.0 MPa, 210 bar) maximum working pressure**.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

! WARNING



INJECTION HAZARD

Spray from the valve, hose leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- Do not point the valve at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the valve when dispensing.
- Be sure the safety knob operates before dispensing.
- Lock the safety knob when you stop dispensing.
- Follow the **Pressure Relief Procedure** on page 8 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- Use only Graco approved hoses. Do not remove any spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.

WARNING



FIRE AND EXPLOSION HAZARD

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

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



TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

[illegible]

Installation

Grounding

To reduce the risk of static sparking, ground the pump and all other dispensing equipment used or located in the dispensing area. Check your local electrical code for detailed grounding instructions for your area and type of equipment. be sure to ground all of the following equipment:

1. *Pump or sprayer:* ground as instructed in you separate pump or sprayer manual.
2. *Air compressor or hydraulic power supply:* ground according to local code and manufacturer's recommendations.
3. *Fluid hoses:* use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
4. *In-line valve:* obtain grounding through connection to a properly grounded fluid hose and pump or sprayer.
5. *Fluid supply container:* according to local code.
6. *Object being sprayed:* according to local code.
7. *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.
8. *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the valve firmly to the side of a grounded metal pail, then trigger the valve.

Installation

NOTE: Numbers and letters in parentheses in the text refer to the numbers and letters in the figures and Parts Drawing.

NOTE: To avoid leaks, use pipe sealant on the tapered male pipe threads.

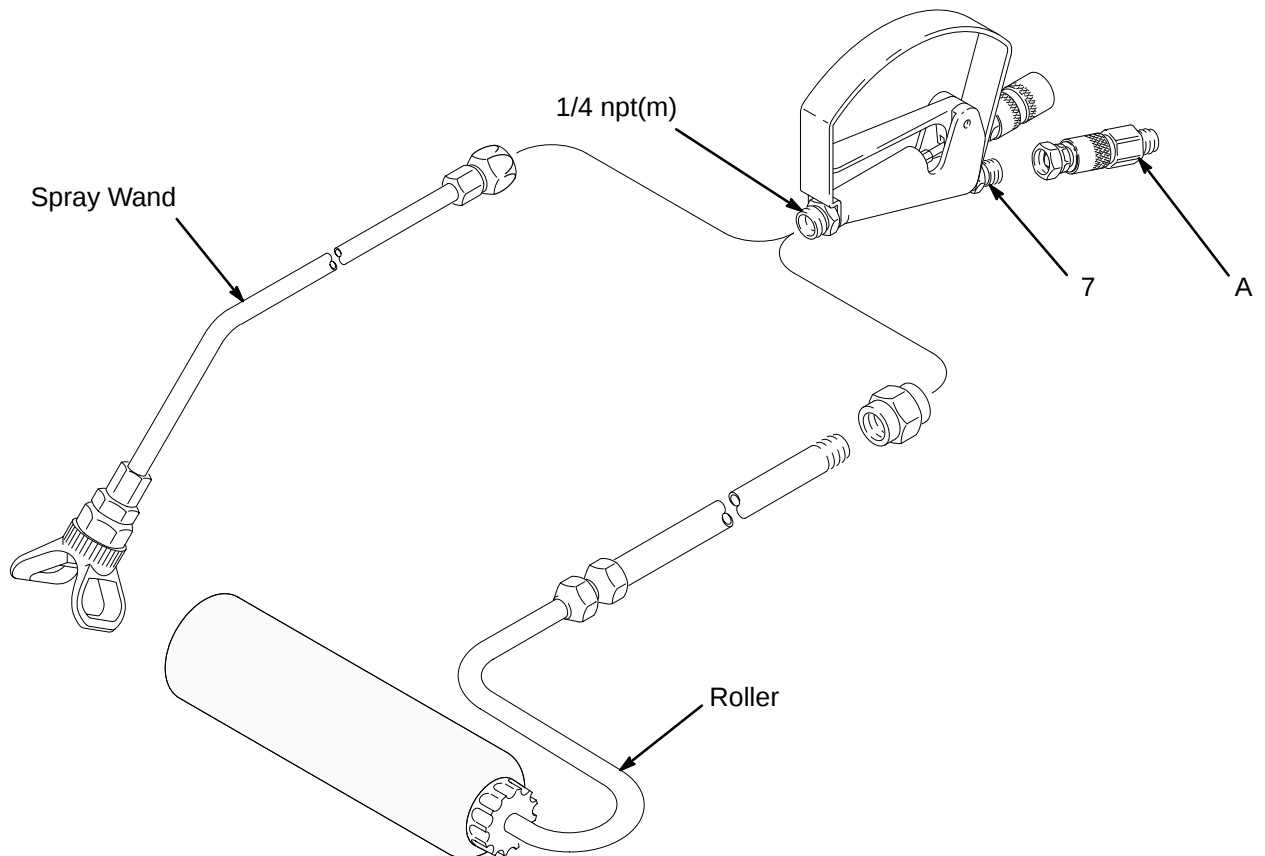
Several accessories are available for use with the In-Line Valve. Choose the application device that is best suited to your needs. See Fig. 1. Refer to the instructions supplied with each accessory for installation information.

For easier valve movement, install a swivel (A) at the valve inlet.

Connect a grounded fluid hose to the swivel (A) or to the 1/4 npsm inlet fitting (7).

WARNING

Be sure your system has a fluid drain valve near the pump fluid outlet to help relieve fluid pressure in the pump, hose, and In-Line Valve; triggering the valve to relieve pressure may not be sufficient.



7525
A

Fig. 1

Operation

Pressure Relief Procedure

WARNING



INJECTION HAZARD

Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

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

1. Engage the valve safety knob.
2. Shut off the power supply to the pump and open any air bleed valves in the system.
3. With an electric sprayer, also unplug the power cord.

4. Disengage the valve safety knob.
5. Hold a metal part of the valve firmly to the side of a grounded metal waste container, and trigger the valve to relieve pressure.
6. Engage the valve safety knob.
7. Open the pump drain valve to help relieve fluid pressure in the pump, hose, and valve. Triggering the valve to relieve pressure may not be sufficient. Have a container ready to catch the drainage.
8. Leave the drain valve open until you are ready to use the system again.

If you suspect that the valve, hose, application device, or spray tip is completely clogged or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut, outlet accessory nut, or hose end coupling and relieve pressure gradually, then loosen completely. Now clear the tip or hose obstruction.

Operation

Startup

WARNING

To reduce the risk of serious injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow the **Pressure Relief Procedure** on page 8 before checking or servicing any part of the system, when installing, cleaning, or changing spray tips and whenever you stop spraying.

Whenever you stop spraying, even for a moment, always engage the valve safety knob. See Fig. 2 and instructions at right. Failure to turn the safety knob can result in the accidental triggering of the valve.

WARNING

The wallet-sized warning card provided with this valve should be kept with the operator at all times. The card contains important treatment information should a fluid injection injury occur. Additional cards are available at no charge from Graco, Inc.

1. Refer to the Operation section of the manual for the application device you are using on the In-Line Valve.
2. If you are using a tip guard directly on the valve or a spray wand, do not install the spray tip until the pump/sprayer and system are fully primed.

3. Start the pump/sprayer according to the instruction supplied with it.
4. Always use the lowest pressure necessary to get the desired results. Higher pressure causes premature wear of the system, and if using a paint roller, causes paint to squirt out, instead of flowing evenly.
5. Use a full-open, full-close trigger action. Whenever you stop spraying, engage the safety knob.

How to Use the Safety Knob

To engage the safety knob, turn the knob fully clockwise; this locks the needle in the forward position, making the valve inoperative. To disengage the safety knob, turn the knob fully counterclockwise. See Fig. 2.

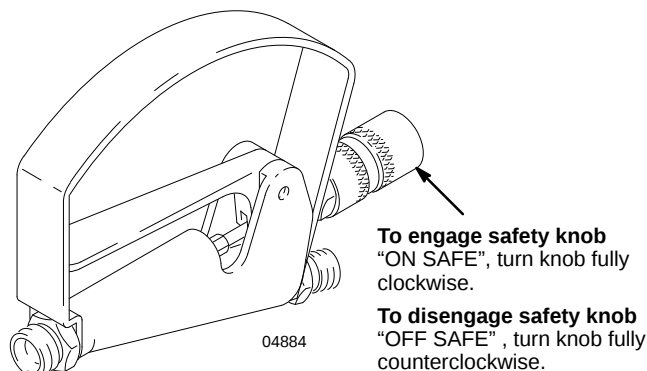


Fig. 2

Maintenance

Lubrication

Oil the exposed part of the valve rod (18) and trigger pivot. See Fig. 3.

Daily Cleaning

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

⚠ WARNING

Before flushing, be sure the entire system and flushing pails are properly grounded. Refer to Grounding on page 6. **Relieve the pressure**, and remove the spray tip (if used) from the valve. Always use the lowest possible fluid pressure, and maintain firm metal-to-metal contact between the valve and pail during flushing to reduce the risk of fluid injection, static sparking, or splashing.

Use this cleanup procedure at the end of each work day.

1. **Relieve the pressure.**
2. Remove the spray tip, if used.
3. Flush the pump/sprayer and system as instructed in your separate pump/sprayer manual.
4. If you are using an adjustable extension, pump it in and out several times during flushing, then extend it and leave it extended while completing the flushing.

⚠ CAUTION

To avoid corrosion, never leave water or water-based fluid in the valve overnight or longer.

If flushing with water, be sure to follow the water with mineral spirits to protect the valve and packings from corrosion.

Troubleshooting

If the valve keeps spraying after the trigger is released, the valve rod (18) may be obstructed, worn or damaged, or may need adjusting.

To check for proper needle adjustment, engage the safety knob (4) and check the trigger “free play”. It should be 1/8 –5/16 in. (3–8 mm). See Fig. 3. If it is not, adjust the needle as follows.

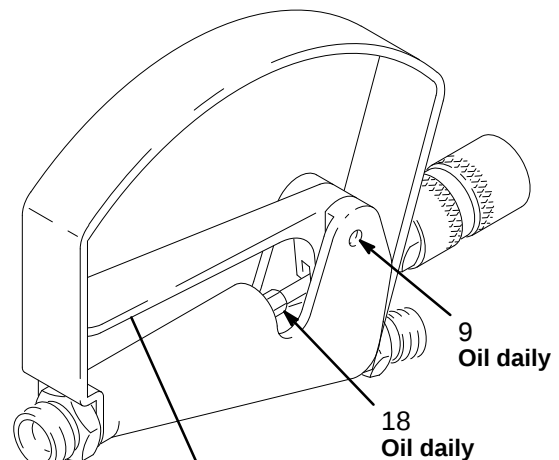
Adjusting the Needle

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

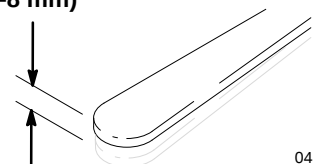
1. **Relieve the pressure.**
2. Unscrew the safety knob assembly (4).
3. Hold the adjusting nut (13) with an adjustable wrench. See the Parts Drawing on page 12. Then thread the capscrew (1) a few turns into the adjusting nut.
4. Push the adjusting nut (13) forward as far as possible and check for 1/8–5/16 in. (3–8 mm) free play. See Fig. 3. Adjust the screw as necessary, and then tighten the adjusting nut.
5. Screw the safety knob (4) into the valve.

If necessary, disassemble and repair the valve as instructed on page 11.



04884

Free Play
1/8–5/16 in.
(3–8 mm)



04885

Fig. 3

Service

Before you start:

Be sure all the necessary repair parts are available. A packing repair kit, Part No. 220–445, is available. For the best results, use all the parts in the repair kit.

Disassembly



WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

1. **Relieve the pressure.** Then disconnect the fluid hose and dispensing device.
2. Unscrew the valve seat (19). See the Parts Drawing on page 12. Unscrew the pivot screw (9) and remove the trigger (15).
3. Grasp the hex of the safety knob (4) with a 11/16 in. open end wrench and unscrew the knob assembly from the valve body.
4. Grasp the flats of the adjusting nut (13) with an adjustable wrench and pull it out far enough to loosen the cap screw (1) using a 3/32 in. socket head wrench.
5. Use a 3/8 in. open end wrench to unscrew the packing screw (14).
6. Push the valve rod (18) out the front of the valve.
7. Use a hooked pick to carefully remove the v-packings (10) and glands (11, 12) from the valve.
8. Clean all parts thoroughly in a compatible solvent, dry and inspect for damage. Replace the parts as needed.

Reassembly

1. Lubricate the smooth shaft of the rod (18). Insert the threaded end of the rod through the front of the valve and through the back.
2. One at a time, slide the male gland (12) and the six v-packings (10) [with the lips of the v-packings facing the front of the valve] onto the valve rod and slide them into the packing cavity. Insert the female gland (11); press it gently into the packing cavity to help seat the packings.
3. Screw the packing screw (14) loosely into the cavity.
4. Install the trigger (15) and pivot (9).
5. Place a washer (2) on the valve rod and thread the adjusting nut (13) onto it.
6. Hold the adjusting nut (13) with an adjustable wrench. Then thread the cap screw (1) a few turns into the adjusting nut.
7. Push the adjusting nut (13) forward as far as possible and check for 1/8–5/16 in. (3–8 mm) trigger free play. See Fig. 3. Adjust the screw as necessary, and then tighten the adjusting nut.

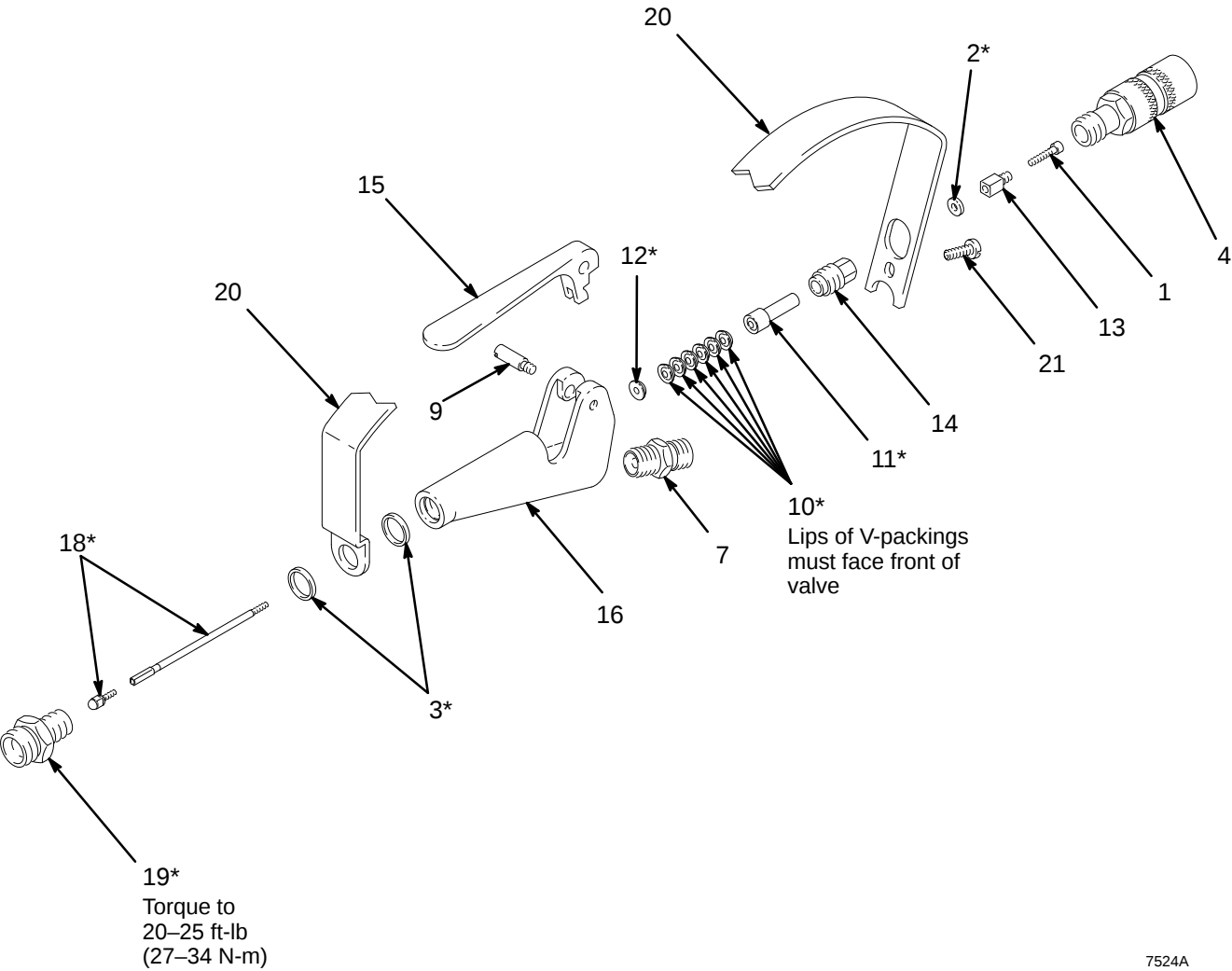


WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

8. Screw the safety knob (4) into the valve.
9. Screw the valve seat (19) into the front of the valve and torque to 20–25 ft-lb (27–34 N•m). Be sure the washer (3) is in place between the seat and trigger guard.
10. Tighten the packing screw (14) just enough to stop leakage; over-tightening will result in leaking.

Parts



7524A

Parts

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1	104-301	CAPSCREW, soc hd; #5-40 x 5/8"	1	13	165-676	NUT, adjusting	1
2*	151-395	WASHER, flat	1	14	165-677	SCREW, packing	1
3*	168-845	GASKET, copper	2	15	190-660	TRIGGER, valve	1
4	210-170	SAFETY KNOB, trigger	1	16	181-595	HOUSING, valve, control	1
5†	172-479	TAG, instruction (not shown)	1	18*	205-629	ROD, valve	1
6†	179-761	TAG, warning (not shown)	1	19*	220-228	SEAT, valve	1
7	162-453	NIPPLE, hex; 1/4 npsm x 1/4 npt, 1-3/16" long	1	20	224-707	GUARD, trigger; Includes warning plate	1
9	165-086	SCREW, handle pivot	1	21	110-037	SCREW, ph hd mach; 310-24 x 1/2	1
10*	165-672	V-PACKING; Teflon®	6	24†	179-960	CARD, warning (not shown)	1
11*	165-674	GLAND, female, brass	1	* Supplied in Repair Kit 220-445.			
12*	165-675	GLAND, male, brass	1	† Extra warning cards and tags can be ordered from Graco at no charge.			

Technical Data

Category	Data
Maximum Fluid Working Pressure	3000 psi (21.0 MPa, 210 bar)
Fluid Valve Orifice Size	0.188 in. (4.78 mm) dia.
Fluid Inlet	1/4 npsm
Fluid Outlet	1/4 npt
Wetted Parts	Aluminum, Tungsten Carbide, Stainless Steel, Zinc-plated Steel, Teflon®, Brass, Delrin®
Length	8.125 in. (206 mm)
Height	5 in. (127 mm)
Weight	14 oz. (410 g)

Teflon® and Delrin® are registered trademarks of the DuPont Co.

Manual Change Summary

- This manual was revised to include the changes from PCN C.

[illegible]

The Graco Warranty

Graco warrants all equipment listed in this manual which is manufactured by Graco 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. With the exception of any special extended or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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

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

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

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, gas engines, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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

FOR GRACO CANADA CUSTOMERS

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

Graco Phone Number

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

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

Sales Offices: Minneapolis, Detroit, Los Angeles
Foreign Offices: Belgium, Canada, England, Korea, France, Germany, Hong Kong, Japan

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

PRINTED IN U.S.A. 307-756 February 1986, Revised July 1997