INSTRUCTIONS–PARTS LIST

307–890
Rev. D
Supersedes C

This manual contains IMPORTANT WARNINGS AND INSTRUCTIONS
READ AND RETAIN FOR REFERENCE

STAINLESS STEEL, WATERBASE COMPATIBLE, LOW SHEAR

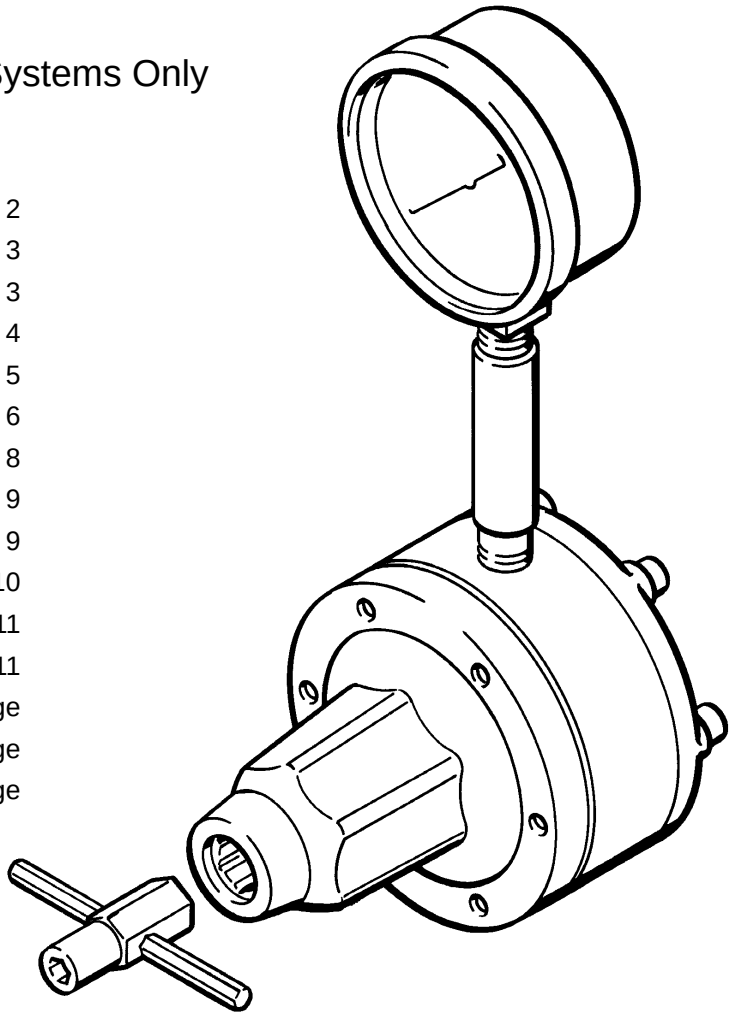
FLUID PRESSURE REGULATOR

250 psi (18 bar) MAXIMUM INLET PRESSURE
20 to 160 psi (1.5 to 11 bar) REGULATED PRESSURE
Fluid Viscosity of 15–300 CPS

Model 222–115, Series C

- Spring Operated
- SST Gauge, 0–300 psi (0–21 bar) Range
- Fluid Flow up to 3 GPM (11 liter/min)

For Use In Circulating Low Pressure Systems Only



CONTENTS

U.S. PATENT NO. 4,003,405; 4.887,639; 4,886,086
AND OTHER PATENTS PENDING

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

SAFETY WARNINGS

FOR PROFESSIONAL USE ONLY. OBSERVE ALL WARNINGS

Read and understand all instruction manuals before operating equipment.

General Safety

Any misuse of the 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 serious bodily injury, such as splashing fluid in the eyes or on the skin, or in fire, explosion or property damage.

ALWAYS relieve all fluid pressure in the system before removing or servicing the regulator. Close the fluid shut-off valve and relieve fluid pressure downstream of the regulator.

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

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

CHECK the regulator weekly and repair or replace worn or damaged parts immediately.

Read and follow the fluid and solvent manufacturer's literature regarding the use of protective eyewear, gloves, clothing, respirator and other equipment.

Fluid Compatibility

BE SURE all fluids and solvents used are chemically compatible with the "Wetted Parts" shown in the **TECHNICAL DATA** on the back cover and with the wetted parts in all other system components. Always read the fluid and solvent manufacturer's literature before using the fluid/solvent in this regulator.

System Pressure

Use this regulator only in low pressure, air spray systems. *NEVER* exceed the 250 psi (18 bar) *MAXIMUM INLET PRESSURE* of this regulator. DO NOT exceed the maximum working pressure of any component or accessory used in your system.

TYPICAL INSTALLATION

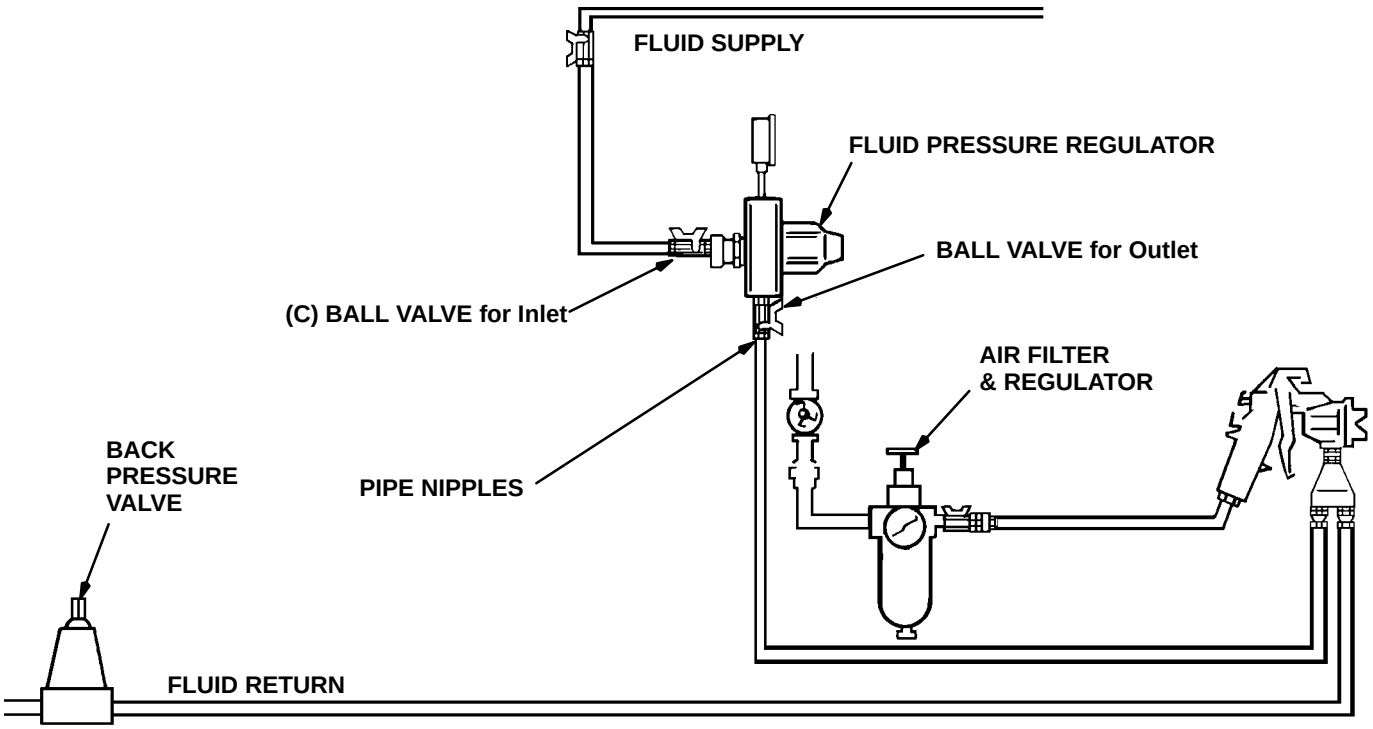


Fig 1

INSTALLATION

Fluid pressure regulators are used for accurate, positive control of fluid pressure to spray guns, dispensing valves or atomizing heads.

Regulators installed at circulating line take-offs are used to reduce main line pressure and maintain desired fluid pressure to spray gun or atomizing head.

Before Installing the Fluid Regulator

1. Determine the placement of the fluid regulator in your system.
2. Install a ball valve at the inlet and outlet of the regulator.
3. Install temporary plumbing between the ball valves.
4. Thoroughly flush the system to remove metal chips and other contaminants and to check for leaks.

CAUTION

To avoid contaminants clogging or damaging the regulator, the new system MUST be cleaned and tested thoroughly before admitting paint to the regulator.

Installing the Fluid Regulator

1. ***MAKE SURE the regulator is in the bypass mode.***

2. Remove the temporary plumbing and install one regulator for each spray gun. See page 10 for regulator dimensions.

   The regulators should be mounted in a vertical position, as shown above, for the best flow and minimum pigment settling. The gauge, if used, MUST be mounted vertically. If the regulator is mounted horizontally an elbow must be used so the gauge will be vertical.

3. Put sealer on threaded connections, except on swivel unions as it interferes with the swivel action.

4. Flush and test the entire system. BE SURE to follow the flushing procedure on page 4.

CAUTION

1. To avoid contaminants clogging or damaging the regulator, the new system MUST be cleaned and tested thoroughly before admitting paint to the regulator. Refer to page 3.

2. It is recommended that this fluid regulator *ONLY* be used in circulation mode, where paint is continuously flowing through the regulator, as the regulator will slowly increase in pressure if the downstream fluid line is shut off.

3. Always use the lowest possible air and fluid pressures for your application. High pressures cause premature spray tip wear.

NOTE: Reference numbers and letters in parentheses in the text refer to the numbers and letters in the figure drawings and parts drawing.

Regulating Fluid Pressure

1. Start the pump and open the fluid shut-off valve (C) to admit paint to the regulator inlet. See Fig 1.

2. Take the regulator out of bypass mode by using the external hex (B) of the key (7) to turn the adjustment screw (8) *fully clockwise* (until it bottoms out).

3. Engage the internal hex (A) of the key (7) with the adjusting screw (8), and turn the key *clockwise* to increase fluid pressure or *counterclockwise* to decrease pressure. See Fig 2. Adjust for the desired spray pattern.

NOTE: Before reducing the regulator pressure, partially relieve pressure in the gun hose to ensure the correct gauge reading. *Remember,* the gage is reading the fluid pressure of the fluid ***downstream*** of the regulator

CAUTION

This regulator is not a flow shut-off device. Using it for that purpose, may cause the regulator to vibrate or chatter.

4. If the fluid regulator vibrates or chatters, turn the key (7) *clockwise* rapidly to increase the pressure until the chattering stops. Then, decrease the fluid pressure to the desired setting.

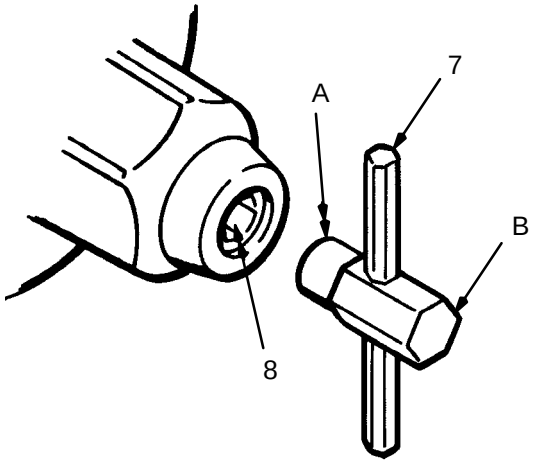


Fig 2

Flushing Procedure

1. Flush the regulator with a compatible solvent whenever the rest of the system is flushed.

CAUTION

To avoid damaging the gauge, remove it if the fluid pressure will exceed the gauge range.

2. Shut off the pump and relieve fluid pressure in the system by opening the back pressure valve or other bypass valve. See Fig 1.

3. Using the external hex (B) of the adjusting key (7), turn the adjustment screw (8) *fully counterclockwise* to open the regulator valve *(bypass mode).* See Fig 2.

NOTE: The adjustment screw (8) must be turned *counterclockwise* until it bottoms out in order to ensure the regulator is in full bypass mode.

4. Flush until thoroughly clean. Always use the lowest possible pressure when flushing.

5. After flushing, use the external hex (B) of the key (7) to turn the adjustment screw (8) *fully clockwise* (until it bottoms out).

TROUBLESHOOTING CHART

WARNING

Pressure Relief Procedure
To reduce the risk of serious bodily injury, including fluid splashing in the eyes or on the skin, before servicing the regulator, always close the fluid shut-off valve and relieve fluid pressure downstream of the regulator.

NOTE: Check all possible remedies in the Troubleshooting Charts before disassembling the regulator.

Reference numbers in parentheses in the chart refer to the numbers in the figure drawings and parts drawing. See the SERVICE Section to repair the regulator.

PROBLEM:	CAUSE	SOLUTION
No pressure regulation	Damaged diaphragm (14).	Replace diaphragm.
	Broken spring (5)	Replace spring.
	Loose disk (18).	Tighten screw (19).
	Foreign particles between disc (18) and housing (1).	Remove particles by disassembling and cleaning parts.
Fluid leaks from under housing (1)	Loose cap (6).	Tighten screws (3).
	Worn diaphragm (14).	Replace diaphragm.
Pressure creeps above setting	Fluid flow shut-off downstream of fluid regulator.	Open fluid flow downstream.
	Damaged diaphragm (14).	Replace diaphragm.
	Foreign particles between disc (18) and housing (1).	Remove particles by disassembling and cleaning parts.
Pressure drops below setting	Empty/clogged supply line	Fill/flush supply line.
	Foreign particles between disc (18) and housing (1).	Remove particles by disassembling and cleaning parts.
	Clogged air spray gun or fluid dispensing valve.	Replace, see gun or valve manual for service instruction.
	Using regulator beyond its rated flow capacity, see back cover.	Install additional regulators.
Fluid leaks from under housing (1)	Loose cover (2).	Tighten screws (3).
	Worn o-ring (4).	Replace o-ring.
Regulator is vibrating or chattering	Regulating a fluid with a viscosity under 15 cps.	Use regulator designed for use with such fluids.
	Using regulator to shut-off flow.	Follow step 3 in **Regulating Fluid Pressure**, page 4.

Disassembly

1. Follow the **Pressure Relief Procedure Warning** on page 5 before servicing the regulator.

2. Remove the regulator from the system.

3. To close the regulator, engage the internal hex (A) portion of the key (7) with the adjusting screw (8) and turn it *counterclockwise* all the way. See Fig 2.

4. Insert a 5/32 allen wrench through the union (20) and loosen the cap screw (19). See Fig 3 or 4.

5. While holding the cap (6) to the housing (1), remove the six cap screws (3), using the key (7) or a 3/16 allen wrench.

6. Remove the cover (2) and cap screw (19), with the disk (18) and valve stem (17), from the housing (1) . Check the PTFE o-ring (4) in the housing for damage and replace if necessary.

7. Remove the cap (6), adjustment screw (10) with the nut (11), and the spring (5).

8. Unscrew the jam nut (12) from the diaphragm base (16).

9. Remove washer (13) and diaphragms (14 & 15).

10. Remove the gage (22) from the tube (21).

11. Thoroughly clean and inspect all parts. Replace any parts that appear to be worn or damaged.

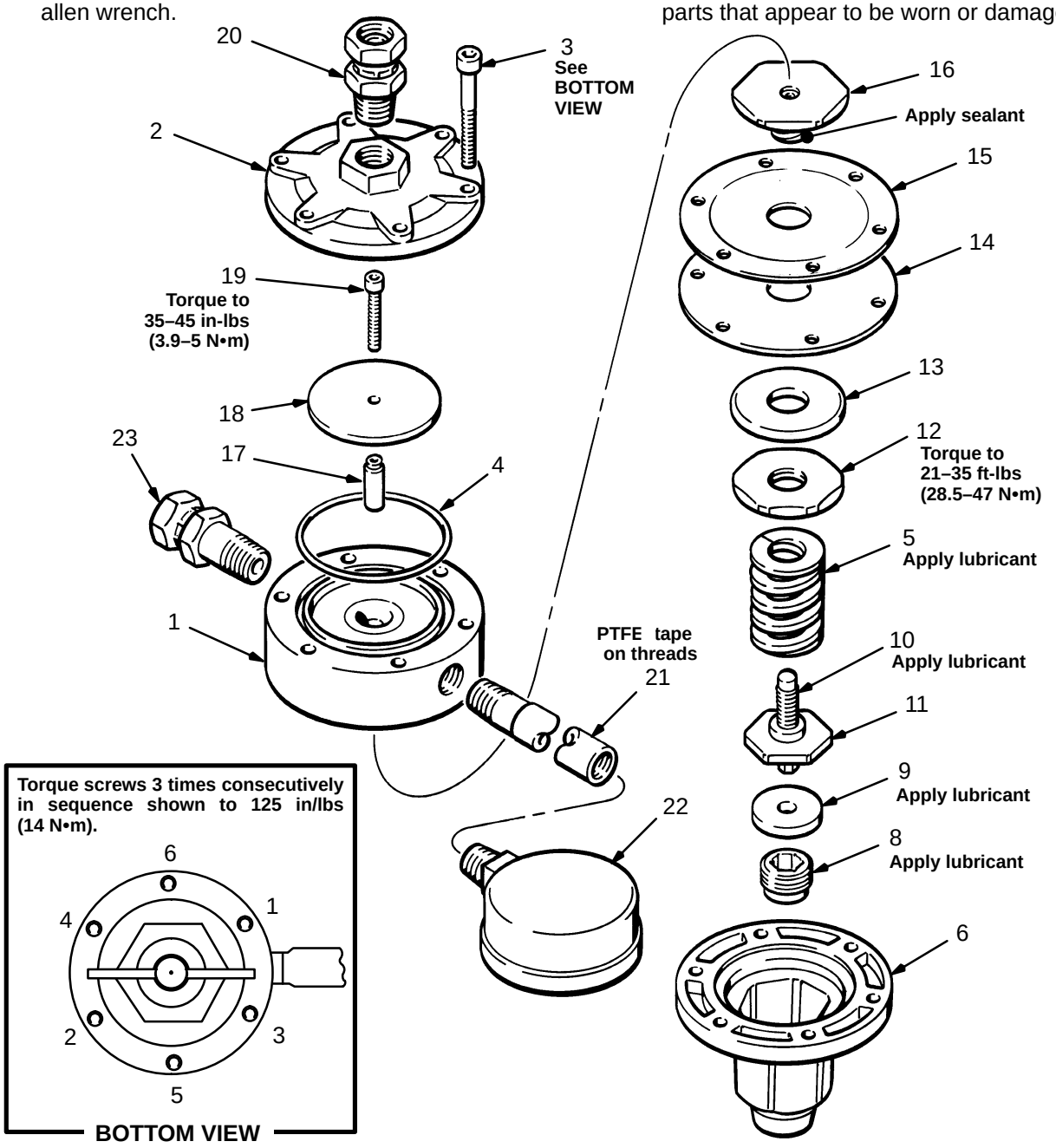


Fig 3

Assembly

1. Apply high strength thread adhesive to the diaphragm base (16) threads.

2. One at a time, place the diaphragm (15), diaphragm (14), and washer (13) on the diaphragm base (16). Align the holes of the two diaphragms.

3. Secure them with the jam nut (12). Torque the jam nut to 21–35 ft-lb (28–47 N•m). See Fig 3 or 4.

4. Coat the outer surfaces of the spring (5), adjustment screw (10), both sides of the washer (9), and adjustment screw (8) with no. 2 lithium base grease.

5. Install the spring onto the adjustment screw (10), and against the nut (11).

6. Place the adjustment screw (8) into the housing (6) and bottom it out as shown in Fig 4.

7. Place the washer (9) into the recess in the housing (6), making sure it lays flat.

8. Place the adjustment screw (10), nut (11), spring (5), and diaphragm assembly (13,14**,** 15, 16) into the cap (6) in the order shown in Fig 3. Carefully align the diaphragm holes with the screw holes in the cap.

9. Place the stem (17) into the base (16), making sure it sits squarely in the recess.

10. Place the housing (1) on the cap (6), aligning the screw holes and being careful not to disturb the stem (17).

11. Apply high strength thread adhesive to the cap screw (19), and place it [with the disk (18)] through the stem (17). Thread the cap screw loosely into the diaphragm base (16). MAKE SURE the stem fits squarely into the disk recess.

12. Place the cover (2) onto the housing (1), aligning the screw holes.

13. Place the screws in the screw holes. Tighten them in the order and to the torque shown in Fig 3, Bottom View.

14. Tighten the cap screw (19) to 40–50 in-lbs (4.5–5.6).

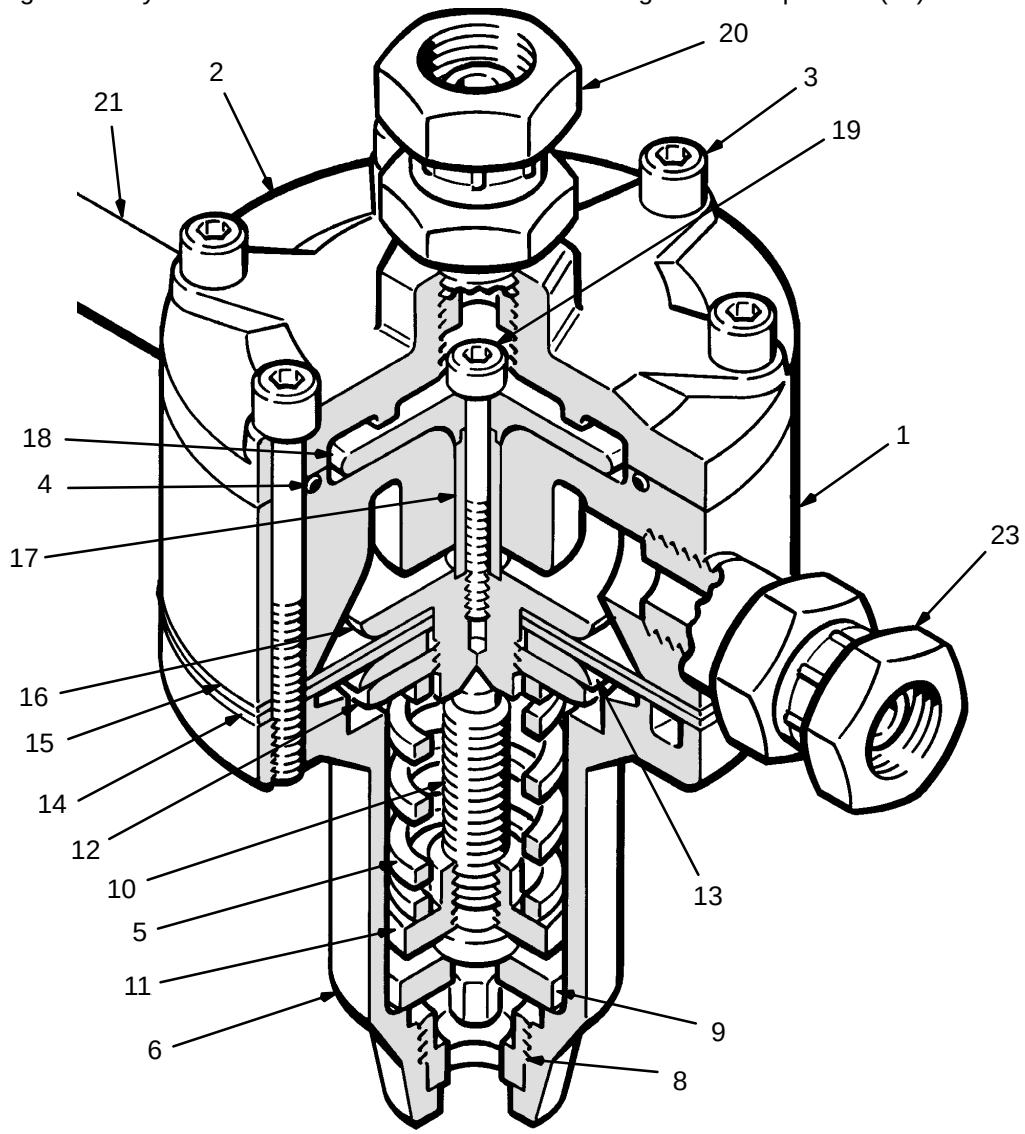
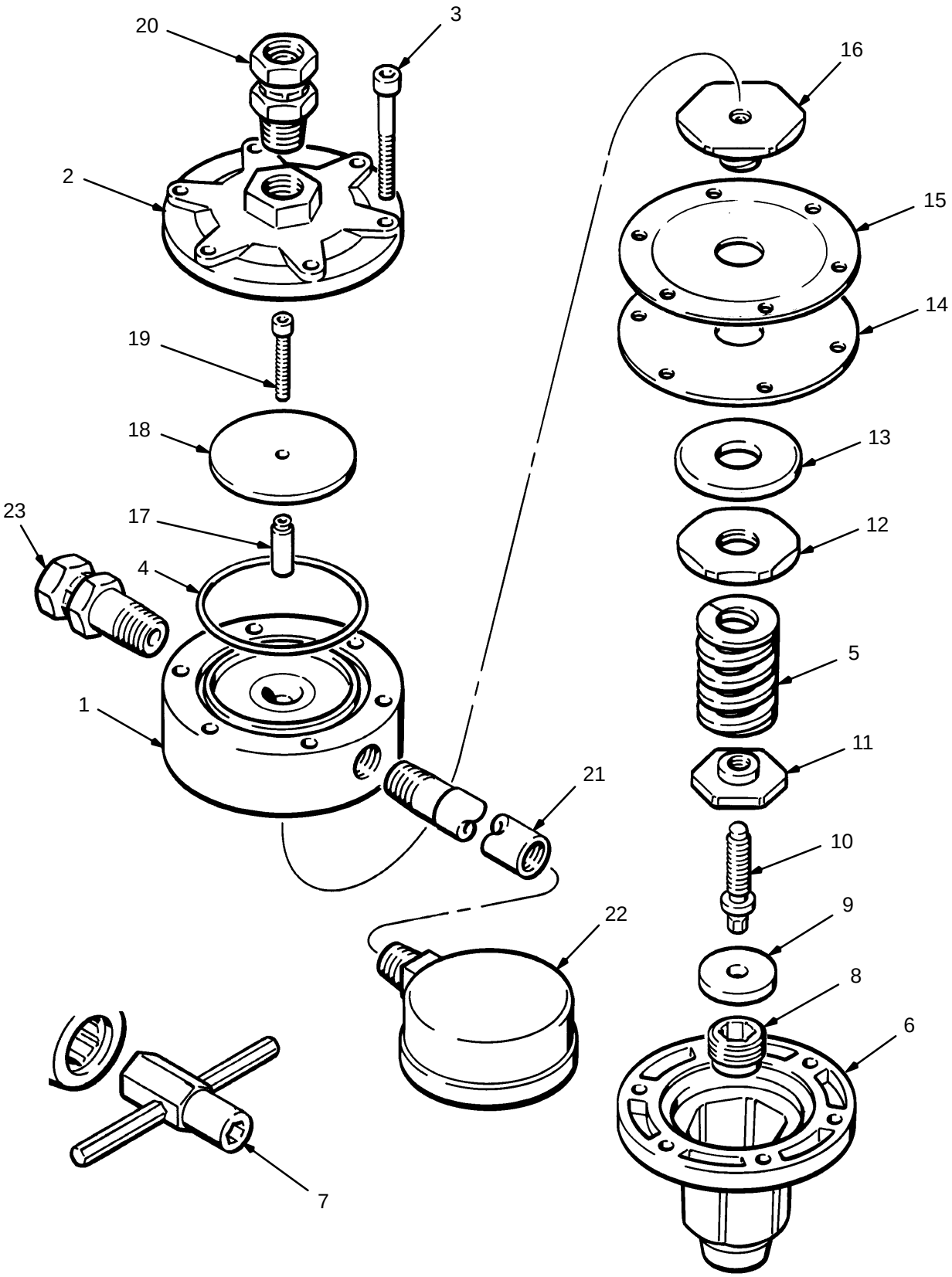


Fig 4

PARTS DRAWING



PARTS LIST

REF NO.	PART NO.	DESCRIPTION	QTY
1	187–881	HOUSING, regulator	1
2	187–872	COVER, regulator	1
3	100–642	SCREW, soc hd cap; 1/4–20 x 3/4'' (19 mm)	6
4*	102–857	O-RING,	1
5	106–480	SPRING, compression	1
6	176–135	CAP, regulator	1
7	215–393	KEY, regulator	1
8	176–136	SCREW, adjustment	1
9	176–692	WASHER, flat	1
10	176–691	SCREW, adjustment	1
11	171–855	NUT, adjustment	1
12	171–858	NUT, jam, special	1
13	171–862	WASHER, diaphragm	1
14*	180–051	DIAPHRAGM, Mylar®	1
15*	180–052	DIAPHRAGM; PTFE	1
16	187–871	BASE, diaphragm	1
17*	183–867	STEM	1
18	183–868	DISK	1
19	188–005	SCREW, cap, sch; 10–32 x 1.375" (35 mm)	1
20	235–208	UNION, swivel	1
21	187–877	TUBE, gauge	1
22	187–876	GAUGE, pressure; stainless steel, 300 psi (21 bar)	1
23	235–207	UNION, adapter	1

** Recommended "tool box" spare parts. Keep on hand to reduce down time.*

HOW TO ORDER REPLACEMENT PARTS

1. To be sure you receive the correct replacement parts, kits or accessories, always give all of the information requested in the chart below.
2. Check the parts list to identify the correct part number; do not use the ref. no. when ordering.
3. Order all parts from your nearest Graco distributor.

6 digit Part Number	Qty	Part Description

ACCESSORIES

Accessories must be purchased separately.
Use only **GENUINE GRACO PARTS AND ACCESSORIES.**

AIR FILTER, MOISTURE SEPARATOR WITH REGULATORS 217–075

200 psi (14 bar) MAXIMUM INLET PRESSURE

With two 0–100 psi (0–7 bar) Regulated Ports
With two 0–200 psi (0–14 bar) Unregulated Ports
See 307–476 for detailed instructions.
For moisture separation and to separate air regulation to spray gun and fluid regulator.

AIR FILTER–REGULATOR 106–146

1/2 npt size, with 0–200 psi (0–14 bar) gauge

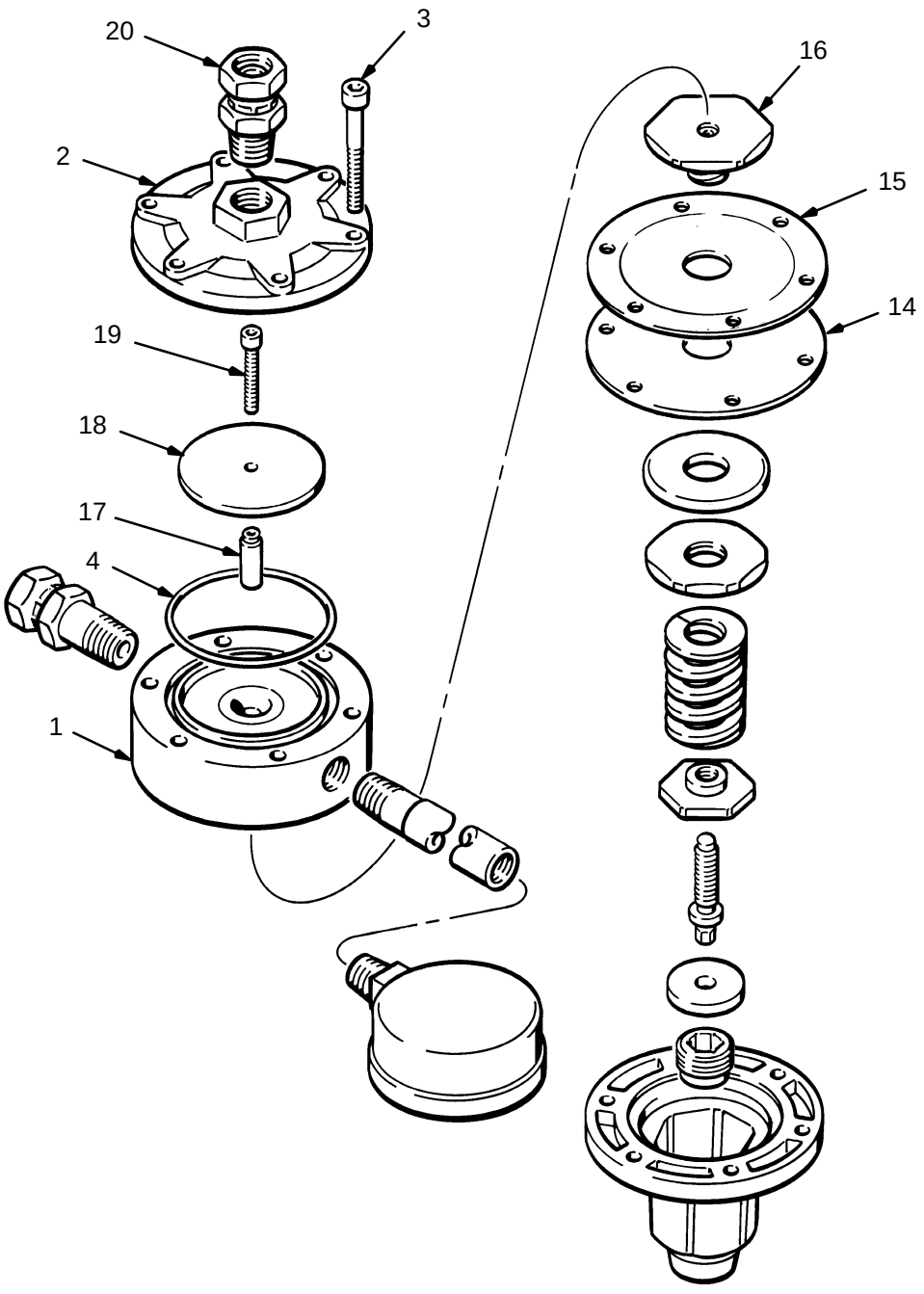
FLUID PRESSURE GAUGES

0–100 psi (1–7 bar) Range
171–200 Stainless Steel

0–200 psi (1–14 bar) Range
170–757 Stainless Steel

Part No. 223–783 Conversion Kit, Series B

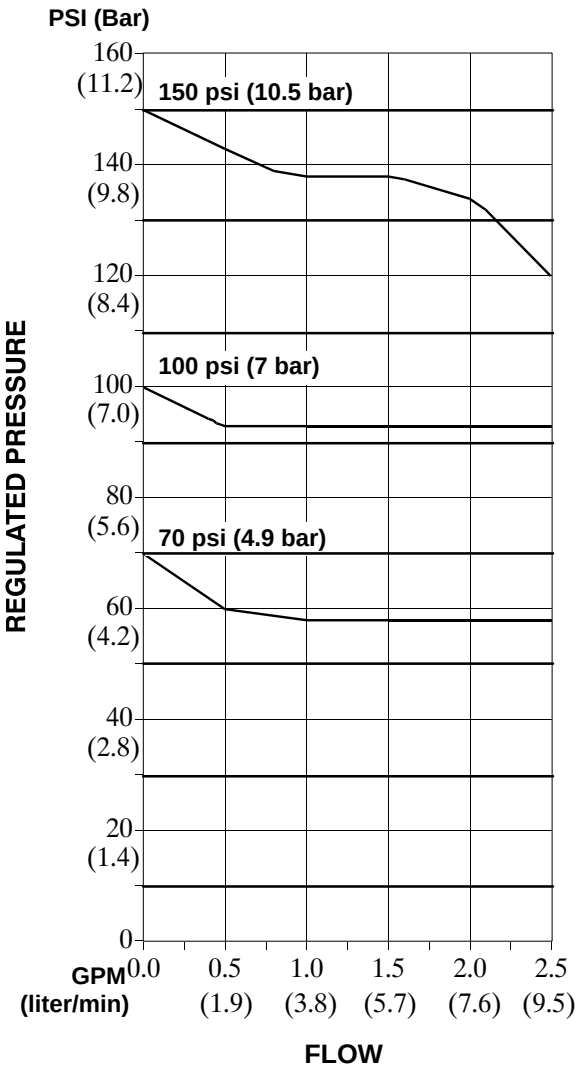
For converting Fluid Pressure Regulator 217–314 to
Model 222–115 Low Shear Fluid Pressure Regulator



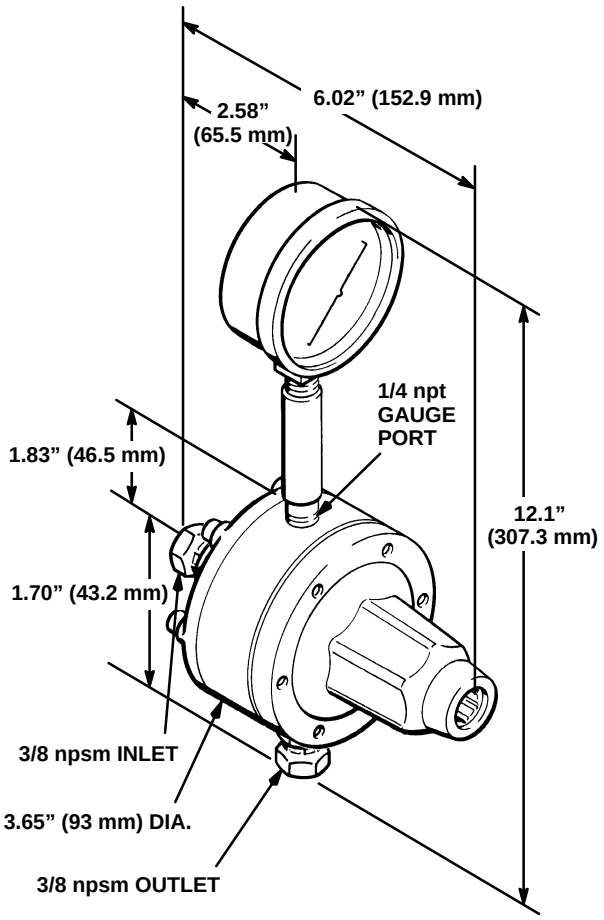
REF NO.	PART NO.	DESCRIPTION	QTY
1	187–881	HOUSING, regulator	1
2	187–872	COVER, regulator	1
3	100–642	SCREW, soc hd cap; 1/4–20 x 3/4'' (19 mm)	6
4	102–857	O-RING, PTFE	1
14	180–051	DIAPHRAGM, Mylar	1
15	180–052	DIAPHRAGM; PTFE	1
16	187–871	BASE, diaphragm	1
17	183–867	STEM	1
18	183–868	DISK	1
19	188–005	SCREW, cap, sch; 10–32 x 1.375” (35 mm)	1
20	235–208	UNION, swivel	1

PERFORMANCE CHART

TEST MEDIA: 65 CPS at 200 psi (14 bar) inbound



DIMENSIONAL DRAWING



SERVICE INFORMATION

This manual was changed from Rev C to Rev D to make the changes listed below.

Assembly Changed	Status	Ref No.	Part No.	Name
222–115 Regulator & 223–783 Conv. Kit	OLD	1	183–862	Housing
	NEW		187–881	
	OLD	2	183–863	Cover
	NEW		187–872	
	OLD	16	183–866	Base
	NEW		187–871	
	OLD	19	183–869	Screw
	NEW		188–005	
	OLD	20	222–117	Union
	NEW		235–208	

Assembly Changed	Status	Ref No.	Part No.	Name
	OLD	21	170–745	Tube
	NEW		187–877	
	OLD	22	178–482	Gauge
	NEW		187–876	
	OLD	23	207–642	Union
	NEW		235–207	

NOTE: Changed Regulator 222–115 series letter to C. Changed Conversion Kit 223–783 series letter to B.

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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

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

DISCLAIMERS AND LIMITATIONS

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

EQUIPMENT NOT COVERED BY GRACO WARRANTY

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

TECHNICAL DATA

Maximum Inlet Pressure: 250 psi (18 bar)

Regulated Pressure Range: 20–160 psi (1.5–11 bar)

Maximum Flow Capacity: 2.5 GPM (9.5 liter/min) with 65 cps fluid at 200 psi (14 bar) inbound pressure

Wetted Parts: 304 & 316 Stainless Steel, 17–4PH Stainless Steel, Hard Chrome, 431 Stainless Steel, PTFE

PTFE ® is a registered trademark

GRACO PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call Graco: **1–800–328–0211 Toll Free**

FOR TECHNICAL ASSISTANCE, service repair information or answers about the application of Graco equipment, call: **1–800–543–0339 Toll Free**

Factory Branches: Atlanta, Chicago, Dallas, Detroit, Los Angeles, Mt. Arlington (N.J.)
Subsidiary and Affiliate Companies: Canada; England; Switzerland; France; Germany; Hong Kong; Japan; Korea

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

PRINTED IN U.S.A. 307–890 1–89 Revised 12–92