INSTRUCTIONS-PARTS LIST

307–995

Rev. K
Supersedes Rev. J

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

INSTRUCTIONS

Electronic or Mechanical Lubricant Valve, Metered or Unmetered

In-Line Dispense Valves

1000 psi (70 bar) Maximum Working Pressure (Models 222–451, 222–452, 222–453 only)
1500 psi (103 bar) Maximum Working Pressure (All other models)

FOR USE WITH PETROLEUM-BASED LUBRICANTS ONLY

For use with the following material	Models				
	Without Meter	WIth Electronic Meter		With Mechanical Meter	With Mechanical Meter
		Measuring in Gallon/Quart/ Pint*	Measuring in Liters	Measured in Quarts or Pints	Measures in Liters
Oil	222–411	222–421 †	222–521 ‡	222–451 (quarts)	237–121
Gear Lube	222–412	222–422 † 236–215 †	222–522 ‡	222–452 (pints)	237–122
A.T.F.	222–413	222–423 †	222–523 ‡	222–453 (quarts)	237–123

* Meter is factory-set in quarts.

† These products contain P/N 235–880, which is Factory Mutual approved as intrinsically safe for Class I, Division 1, Groups A,B,C,D.

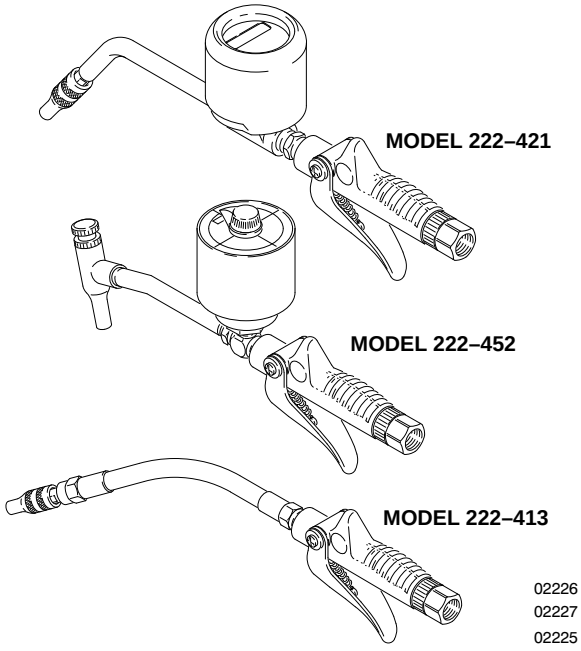
FM APPROVED

‡ These products contain P/N 235–900, which is listed by the Canadian Standards Association as certified as intrinsically safe for Class I, Division 1, Groups A,B,C,D.

CSA®

DISPENSE VALVE

222–648 Without meter or nozzle



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

Table of Contents

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**

Technical Data

Electronic Meter

Flow range*	0.12 to 12.0 gpm (0.456 to 45.6 lpm)
Maximum operating pressure	1500 psi (103 bar)
Weight (bare meter)	1.9 lb (0.95 kg)
Units of measurement	Factory-set in quarts. Display shows quantity in 0.01 increments up to 199.99 gallons, quarts, or pints. Totalizes in gallons or liters up to 19,999 units.
Inlet and outlet	1/2 npt, non-directional flow
Operating temperature range	–4° F to 130° F (–20° C to 55° C)
Storage temperature range	–40° F to 140° F (–40° C to 60° C)
Battery specifications	
Rated discharge current	100 microamps
Rated capacity	1.0 amp hour
Maximum continuous discharge current	1.0 milliamp
Wetted parts	aluminum, nickel, bronze, stainless steel #304, cast ALNICO 8, nitrile rubber

Mechanical Meter

Flow range*	0.4 to 4 gpm (1.5 to 15 lpm)
Maximum operating pressure	1000 psi (70 bar)
Maximum operating temperature	150° F (70° C)
Accuracy	+/– 0.65%
Inlet and outlet	1/2 npt(f)
Weight	2.1 lbs (0.945 kg)

Dispense Valve

Recommended maximum flow*	5.0 gpm (19 lpm) under normal operating conditions
Maximum operating pressure	1500 psi (103 bar)
Weight (without meter)	0.4 lb (0.18 kg)
Inlet and outlet	1/2 npt
Wetted parts	aluminum, carbon steel, music wire, polyurethane, stainless steel, nitrile rubber

* *Tested in No. 10 motor oil. Flow rates vary with fluid pressure and viscosity.*

⚠ WARNING

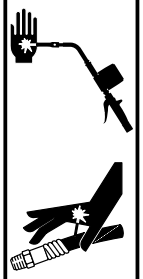
INSTRUCTIONS

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 you operate this equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your Graco representative.
- Do not alter or modify this equipment.
- 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 2 for the maximum working pressure of this component.
- 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 1,1,1–trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids that contain such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.
- 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).
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

⚠ WARNING



INJECTION HAZARD

Spray from the dispensing valve, 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 may look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- Do not point the dispensing valve at anyone or at any part of the body.
- Do not put your hand or fingers over the end of the dispensing valve.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Use only extensions and no-drip tips which are designed for use with your dispensing valve.
- Do not use a low pressure flexible nozzle with this equipment.
- Follow the **Pressure Relief Procedure** on page 7 before you clean, check, or service the equipment.
- Tighten all fluid connections before you operate the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.

Operation

⚠ CAUTION

Never operate the meter with the black plastic cover removed. The cover protects the meter from damage due to impact. Meters are factory sealed to keep moisture and dirt out. See the **Service** section before you service the meter.

⚠ CAUTION

To prevent line contamination, which can cause equipment malfunction or damage, flush the lines before you install this equipment in the system.

To Activate the Digital Display

Press the **RESET** key pad to clear the meter before you start a new dispense cycle. This is the best way to activate the meter, because it also clears the quantity of the last dispense cycle.

You can also activate the digital display by pressing the **TOTAL** key pad or by running fluid through the meter. See Fig. 1.

NOTE: The digital display of the meter goes blank after approximately two minutes of non-use.

Function of TOTAL

When the digital display is blank, press and release the **TOTAL** key pad to display the quantity of the last dispense cycle. See Fig. 2.

To see the accumulated total of fluid dispensed through the meter, press and hold the **TOTAL** key pad. The accumulated total is shown in gallons for the gallon/quart/pint meter, and in liters for the liter meter. The meter can accumulate a running total of up to 19999 gallons or liters dispensed before it returns to zero. See Fig. 3.

Function of RESET

Press the **RESET** key pad to clear the quantity of the last dispense cycle and return the digital display to all zeros. See Fig. 1.

To Change the Measurement Units

(gallon/quart/pint meter only)

The meter is factory-set to dispense in quarts. To change the measurement units, press and hold the **RESET** key pad until the measurement unit on the right side of the digital display is flashing. Then press the **TOTAL** key pad until the desired measurement unit is shown. Release both key pads. See Fig. 4.

⚠ CAUTION

To be sure the proper amount of fluid is dispensed, always use the same measurement unit for a particular fluid.Units should be changed only by authorized employees.

For Maximum Dispensing Accuracy

(gallon/quart/pint meter only)

Set the meter to dispense in pints or quarts when you dispense 1 gallon or less.

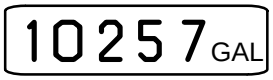
Always press the **RESET** key pad to clear the meter before a new dispense cycle.

DIGITAL DISPLAY

Fig. 1

EXAMPLE OF TOTAL FOR LAST DISPENSE CYCLE

Fig. 2



EXAMPLE OF ACCUMULATED TOTAL

Fig. 3

EXAMPLE OF MEASUREMENT UNITS

Fig. 4

Operation

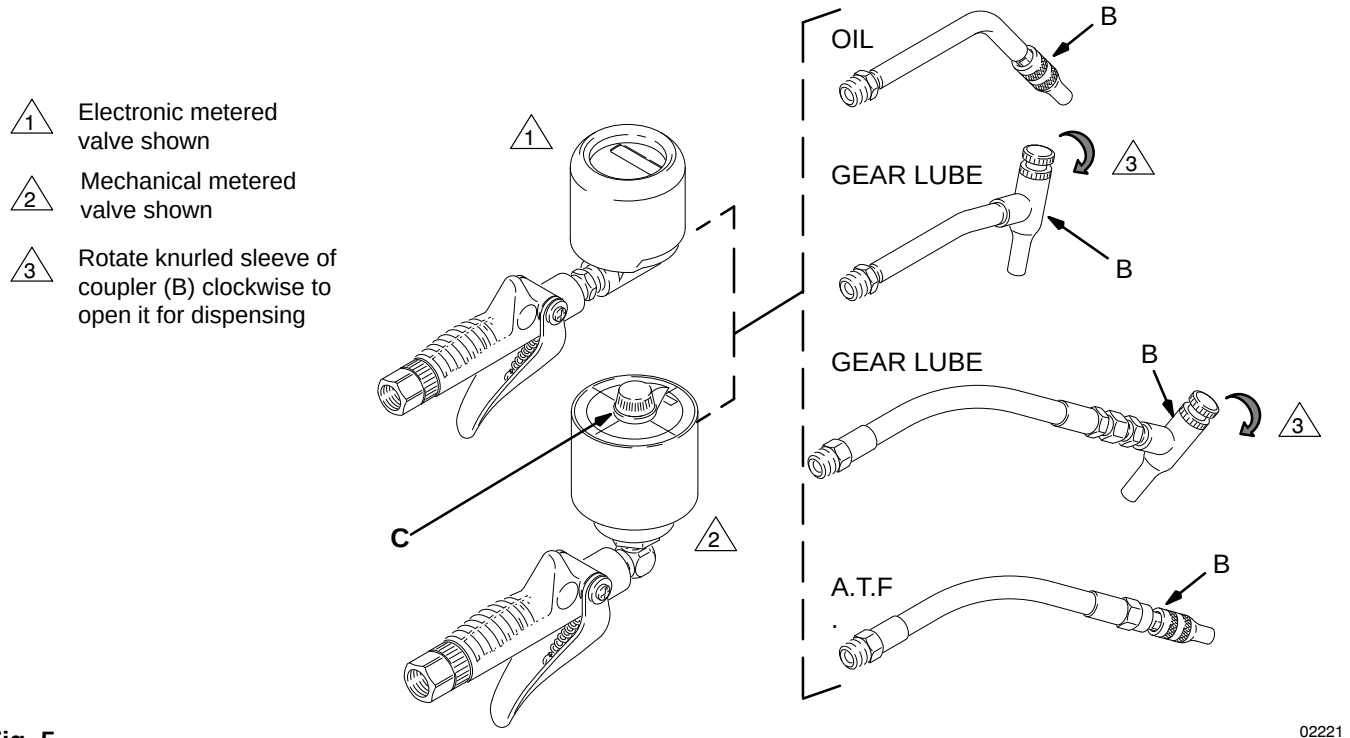


Fig. 5

⚠ WARNING

The electronically metered dispense valves have a *1500 psi (103 bar) Maximum Working Pressure.*

The mechanically metered dispense valves have a *1000 psi (70 bar) Maximum Working Pressure.*

Never exceed the maximum working pressure of the valve you are using or of the lowest rated component in your system, to reduce the risk of a serious bodily injury, including fluid injection.

⚠ WARNING

To reduce the risk of fluid injection, always grasp the nozzle housing (B) from the threaded end, not from the front, when you adjust the nozzle.

To dispense from the non-drip nozzle, turn the knurled sleeve clockwise until it is open. Trigger the valve.

When the dispense cycle is completed, release the trigger and close the nozzle by screwing the knurled sleeve fully counterclockwise.

Electronic Metered Valves

Press the **RESET** key pad on the meter to clear it before the next dispense cycle. See Fig. 1.

Mechanical Metered Valves

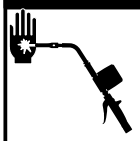
Turn the reset knob (C) **counterclockwise** back to the zero stop. See Fig. 5. If the knob cannot be turned easily, do not force it. Clean and inspect the meter as explained on page 8.

⚠ CAUTION

Do not attempt to manually advance the mechanical meter or force the reset knob past the zero stop. Doing so will damage the meter's gear mechanism.

Troubleshooting

⚠ WARNING



PRESSURIZED EQUIPMENT HAZARD
The equipment stays pressurized until pressure is manually relieved. To reduce the risk of serious injury from pressurized fluid, accidental spray from the dispenser or splashing fluid, follow the **Pressure Relief Procedure** whenever you:

- Are instructed to relieve pressure
- Stop dispensing
- Check, clean, or service any system equipment
- Install or clean fluid nozzles

Pressure Relief Procedure

1. Turn off the power supply to the pump.
2. Trigger the valve into a waste container to relieve pressure.
3. Open any bleed-type master air valves and fluid drain valves in the system.
4. Leave the drain valve open until you have completed repairs and are ready to pressurize the system.

Electronic Meter

NOTE: Before you check or repair the meter, be sure all other valves, controls, and the pump are operating properly.

Problem	Cause	Solution
Digital display does not activate.	Electronic control is malfunctioning.	Replace the electronic control. **Order Part No. 235–878** for gallons/quarts/pints. **Order Part No. 235–901** for liters.
There is no fluid flow.	Metering unit is malfunctioning.	Replace the metering unit. **Order Part No. 235–873** for gallons/quarts/pints. **Order Part No. 235–904** for liters.
Digital display is dim.	Battery in electronic control is worn.	Replace the electronic control within approximately one week of when you notice the dimness. See the part numbers above.

Dispensing Valve

Problem	Cause	Solution
There is no fluid flow.	Strainer is clogged.	Remove and clean strainer.

Mechanical Meter

Problem	Cause	Solution
There is no fluid flow.	Strainer is clogged.	Remove and clean strainer.
Meter does not register.	Loose cap or dirt in chamber.	Screw cap on tightly with o-ring in proper position, or clean and inspect meter.

Service

Mechanical Meter

1. **Relieve the pressure.**

⚠ WARNING

To reduce the risk of serious injury, when you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

2. Remove the meter from the valve. Unscrew the meter cap (K). Remove the o-ring (J), screen (H), piston and chamber assembly (G), and the planet gear (A). See Fig. 6.
3. Insert a screwdriver into the notch of the chamber assembly (G) and pry off the top chamber (B). See Fig. 7. Remove all parts.
4. Clean and blow dry the parts. Examine the outer surface of the piston and the inner surface of the chamber for pitting or scoring. If any parts are worn or damaged, replace the complete chamber and piston assembly (G).
5. Hold (E) open end up. Insert (D). Insert (C). Align slot and bearing of (B) with parts inside (E) and snap together. Place gear into (B). Place the piston and chamber assembly (G) into the housing and turn it to be sure the gears mesh. With the screen (H) and o-ring (J) in place, tighten the cap (K) firmly into the housing (F).
6. No other parts are user repairable. If your meter still does not work, return it to Graco repair.

Strainer

1. **Relieve the pressure.**
2. Remove the swivel (14) and unscrew the strainer (A).
3. Clean the filter in mineral spirits. Be careful not to damage the strainer element.
4. Reassemble, and torque the swivel to 19 to 21 ft-lb (26 to 28 N-m). See Fig. 8.

NOTE: Also see the parts list on page 10.

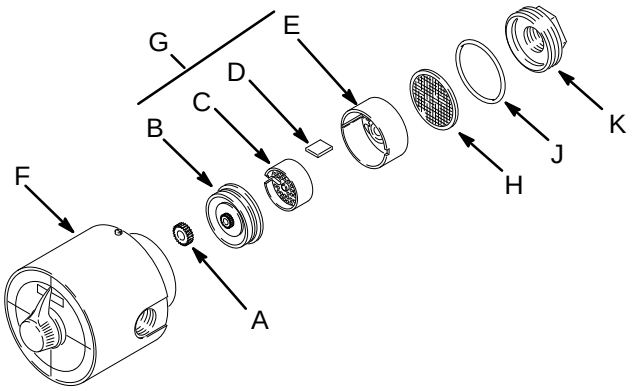


Fig. 6 02219

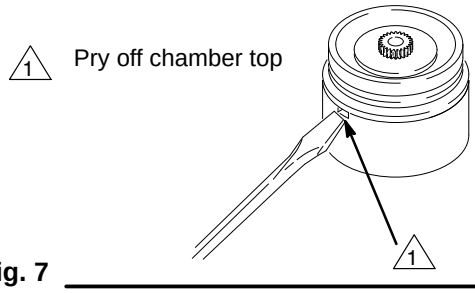


Fig. 7 02224

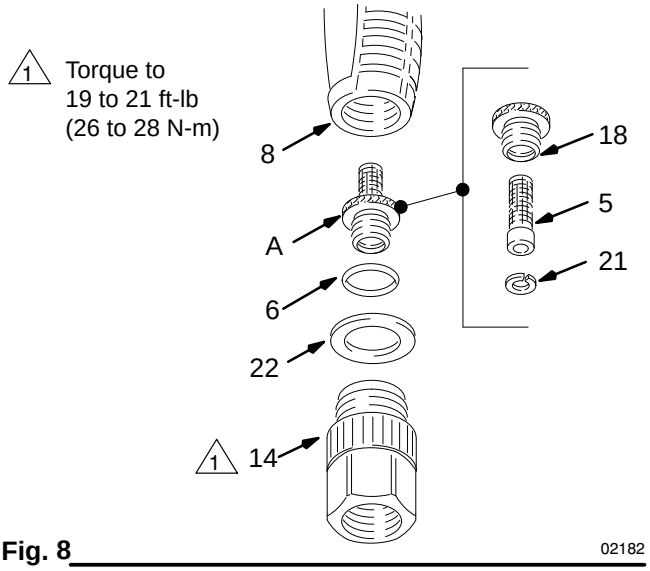


Fig. 8 02182

Service

Electronic Meter

⚠ CAUTION

To avoid damaging the electronic components of the control:

- **Always** use the personal grounding strap provided with a replacement metering unit and electronic control when you remove the cover (1) and while you replace the parts. This strap protects the electronic components from damage due to electrostatic discharge.
- Do not lay anything on the control.
- Be sure the open side of the control faces up if you lay it down.
- Do not twist or force parts. Align parts properly as instructed.

⚠ WARNING

To reduce the risk of a fire, explosion, and serious burns to the body, handle and dispose of a used electronic control (103) properly.

The electronic control contains a lithium battery. Do not short circuit, charge, force over discharge, disassemble, crush, penetrate, incinerate or heat the battery to a temperature above 185° F (85° C). Any misuse or abuse of the battery may cause it to leak or explode.

1. **Relieve the pressure.**

⚠ WARNING

To reduce the risk of serious injury, when you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

2. Attach the disposable grounding wrist strap to your wrist. Connect the adhesive-backed copper foil at the other end to any convenient electrical ground, such as the grounding screw or metal case of a grounded electrical outlet.

3. Lift the bottom edge of the black cover (101) away from the meter (102) and pull the cover off. Remove and discard the screws (106). Lift off the electronic control (103). Remove and discard the large o-ring (104).

4. Install a new metering unit (102) and/or electronic control (103). Install the large o-ring (104) over the lip on top of the metering unit (102). Align the notch on the side of the electronic control (103) with the notch on side of the metering unit (102). Install the new screws (106) and torque them oppositely and evenly to 4 to 6 in-lb (0.45 to 0.68 N-m).

5. Install the cover so the rolled-in edges are parallel with the inlet fluid passage of the metering unit.

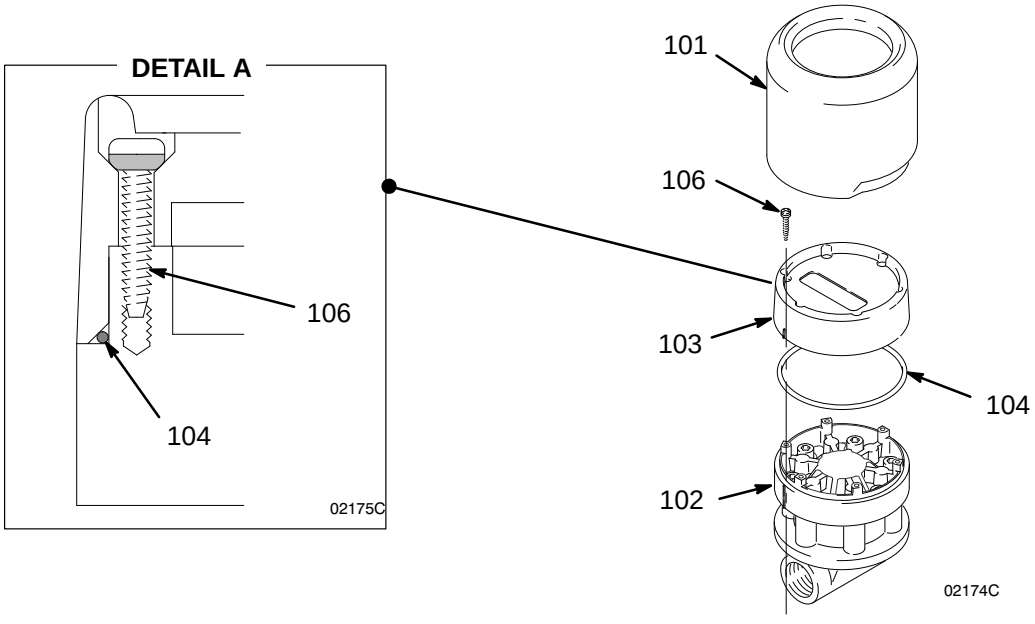


Fig. 9

Service

Valve

NOTE: The top of the pushrod (12) in the valve handle (8) fits into a notch in the cam (9), which is part of the trigger assembly. This is important when you remove or install parts.

Valve Handle Repair

1. **Relieve the pressure.**

⚠ WARNING

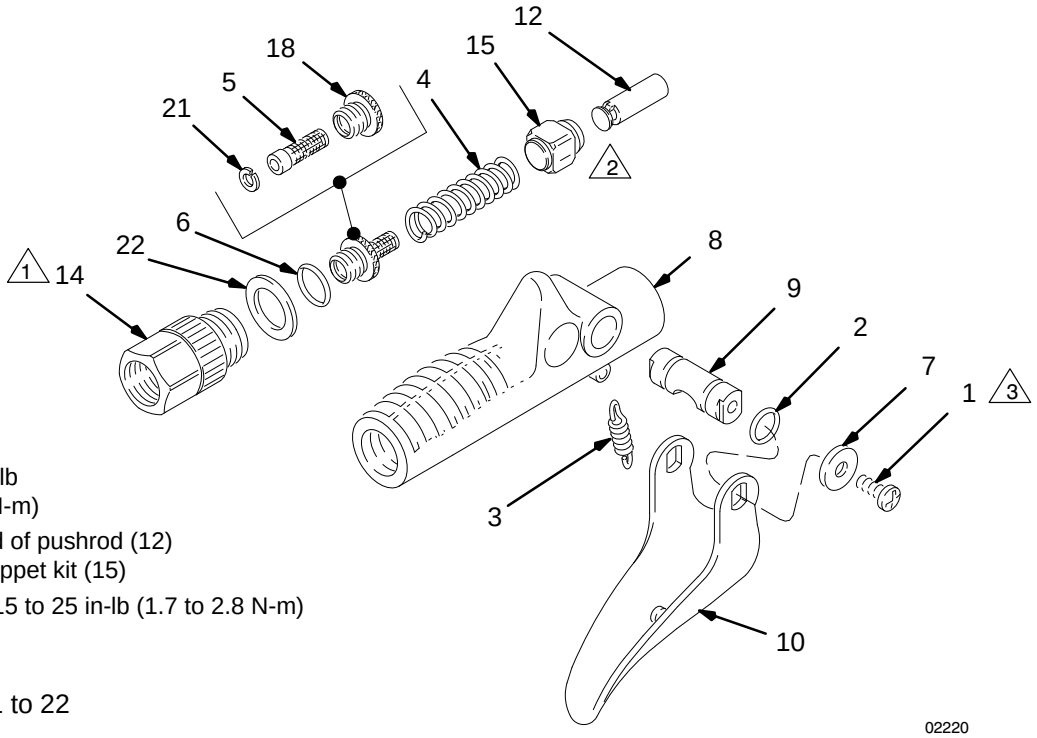
To reduce the risk of serious injury, when you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

2. When you replace any part of the valve handle assembly, unscrew the swivel (14) and remove the parts.
3. Reference the parts drawing below, and reassemble the valve. Make sure you install all the parts correctly. The top of the pushrod (12) must rest in the notch of the cam (9).

Trigger Repair

1. **Relieve the pressure.**
2. When you replace the quad ring seal (2) or the cam (9), remove the valve handle parts first. Then install the cam and seals before you install the valve handle parts.
3. Be sure the notches of the cam (9) fit into the flats of the trigger (10).

Parts – Valve



1 Torque to 19 to 21 ft-lb (26 to 28 N-m)

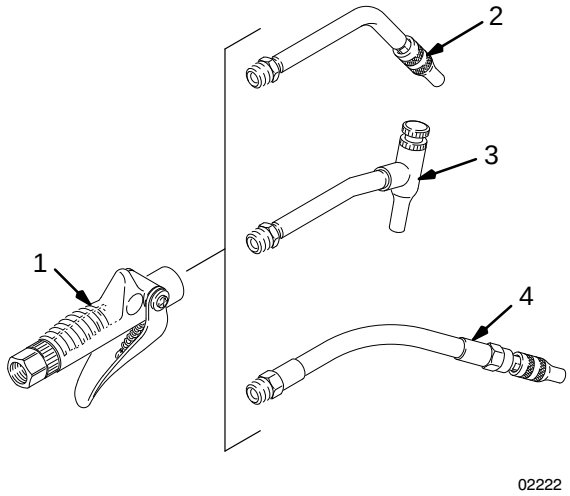
2 Closed end of pushrod (12) towards poppet kit (15)

3 Torque to 15 to 25 in-lb (1.7 to 2.8 N-m)

Model 222–648
Includes items 1 to 22

Ref No.	Part No.	Description	Qty
1	110–637	SCREW, 10–24 x 3/8”	2
2	110–173	SEAL, quad ring	2
3	110–174	SPRING, extension	1
4	110–175	SPRING, compression	1
5	185–415	STRAINER	1
6	155–500	O-RING, nitrile rubber	1
7	160–172	WASHER, plain	2
8	185–222	HANDLE	1
9	185–257	CAM	1
10	185–258	TRIGGER	1
12	185–320	PUSHROD, valve	1
14	202–994	VALVE SWIVEL, 1/2” thread	1
15	222–647	POPPET KIT	1
18	185–408	HOUSING, strainer	1
21	110–340	RING, retaining, internal	1
22	111–853	GASKET	1

Parts – Unmetered Dispense Valves



Model 222–411 – For Oil

Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
2	203–265	NOZZLE, oil	1

Model 222–412 – For Gear Lube

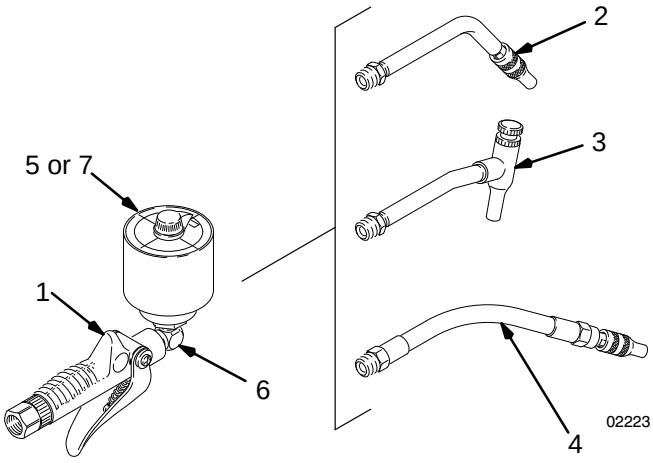
Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
3	201–701	NOZZLE, gear lube	1

Model 222–413 – For A.T.F.

Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
4	203–687	NOZZLE, A.T.F.	1

** See parts on page 10.*

Parts – Mechanical Metered Dispense Valves



Model 222–451 – For Oil
Includes items 1,2,5,6,8

Model 237–121 – For Oil
Includes items 1,2,6,7,8

Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
2	203–265	NOZZLE, oil	1
5	157–779	METER, 16 quart, totalizing	1
6	108–478	ELBOW	1
7	157–958	METER, liter, totalizing	1
8▲	172–479	TAG, Warning (not shown)	1

Model 222–452 – For Gear Lube
Includes items 1,3,5,6,8

Model 237–122 – For Gear Lube
Includes items 1,3,6,7,8

Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
3	201–701	NOZZLE, gear lube	1
5	157–771	METER, 8 pint, totalizing	1
6	108–478	ELBOW	1
7	157–958	METER, liter, totalizing	1
8▲	172–479	TAG, Warning (not shown)	1

Model 222–453 – For A.T.F.
Includes items 1,4,5,6,8

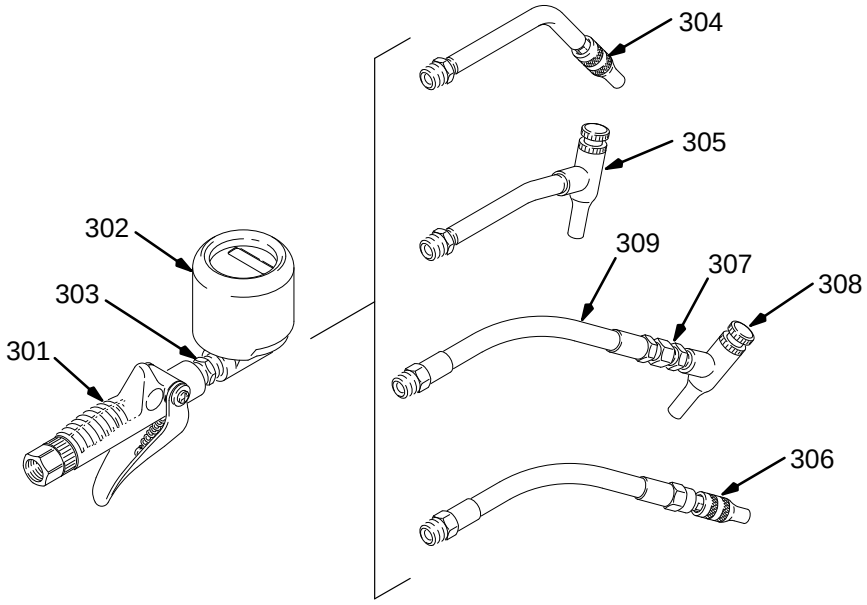
Model 237–123 – For A.T.F.
Includes items 1,4,6,7,8

Ref No.	Part No.	Description	Qty
1*	222–648	VALVE	1
4	203–687	NOZZLE, A.T.F.	1
5	157–779	METER, 16 quart, totalizing	1
6	108–478	ELBOW	1
7	157–958	METER, liter, totalizing	1
8▲	172–479	TAG, Warning (not shown)	1

* *See parts on page 10.*

▲ *Replacement Warning tags available for free.*

Parts – Metered In-Line Dispense Valves



02221

With Gallon/Quart/Pint Meter

Model 222–421 – For Oil

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–880	METER, gal/qt/pt *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
304	203–265	NOZZLE, oil	1

Model 222–422 – For Gear Lube

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–880	METER, gal/qt/pt *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
305	201–701	NOZZLE, gear lube	1

Model 236–215 – For Gear Lube

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–880	METER, gal/qt/pt *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
307	156–971	NIPPLE	1
308	201–540	NOZZLE, Gear Lube	1
309	109–160	HOSE	1

Model 222–423 – For A.T.F.

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–880	METER, gal/qt/pt *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
306	203–687	NOZZLE, A.T.F.	1

With Liter Meter

Model 222–521 – For Oil

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–900	METER, liter *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
304	203–265	NOZZLE, oil	1

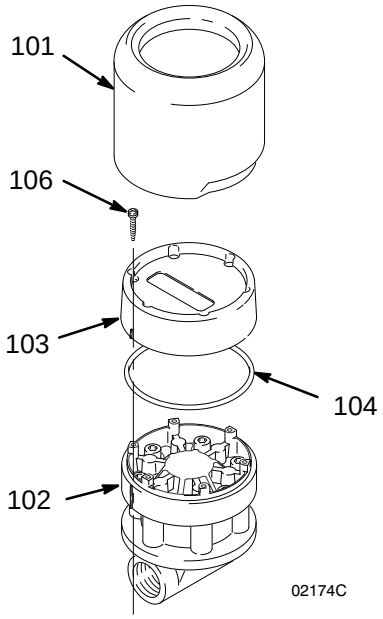
Model 222–522 – For Gear Lube

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–900	METER, liter *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
305	201–701	NOZZLE, gear lube	1

Model 222–523 – For A.T.F.

Ref No.	Part No.	Description	Qty
301	222–648	VALVE *see page 10*	1
302	235–900	METER, liter *see page 14*	1
303	158–491	NIPPLE, 1/2" npt	1
306	203–687	NOZZLE, A.T.F.	1

Parts – Electronic Meter



Model 235–880, Meter – Gallon/Quart/Pint
Includes replaceable items 101 to 106.

Ref No.	Part No.	Description	Qty
101	109–118	COVER	1
102	235–873*	METERING UNIT – gal/qt/pt	1
103	235–878*	ELECTRONIC CONTROL – gal/qt/pt	1
104	109–137	O-RING	1
106	112–093	SCREW	6

Model 235–900, Meter – Liter
Includes replaceable items 101 to 106.

Ref No.	Part No.	Description	Qty
101	109–118	COVER	1
102	235–904*	METERING UNIT – liter	1
103	235–901*	ELECTRONIC CONTROL – liter	1
104	109–137	O-RING	1
106	112–093	SCREW	6

* *Replacement screws and o-rings included with items 102 and 103.*

⚠ WARNING

Use only genuine Graco replacement parts. The use of any other parts may impair the intrinsic safety of this meter. This could result in a failure which causes serious bodily injury and/or substantial property damage.

Manual Change Summary

The current revision of this manual contains the following changes:

- A caution about flushing the lines is added to the **Operation** section on page 5.
- The electronic meter bezel-mounting bosses (shown in Fig. 9 on page 9 and in the **Parts** drawing above) are raised by 0.18 in.

Notes

The Graco Electronic Dispense Valve Warranty and Disclaimers

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven defective, with the exception of defects in the electronic meter control, including the battery, 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.

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

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

PRINTED IN U.S.A. 307–995 May 1989, Revised January 1996