

# INSTRUCTIONS-PARTS LIST



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

INSTRUCTIONS

## DISPLACEMENT PUMP

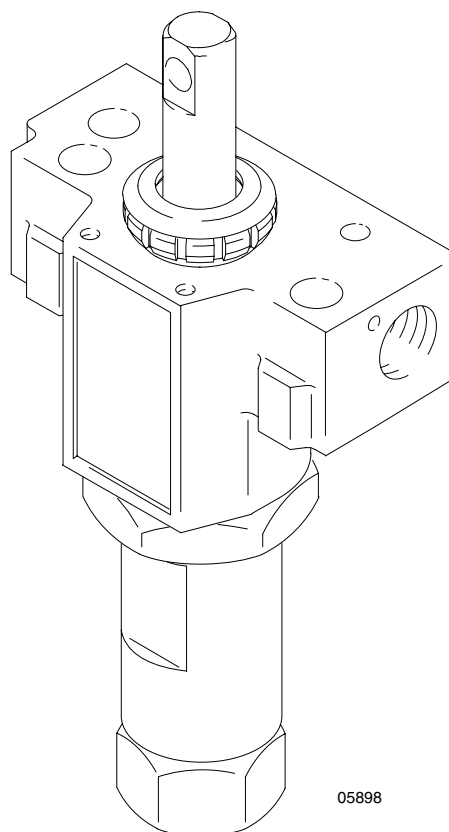
308190 Rev. K

*3000 psi (210 bar) MAXIMUM WORKING PRESSURE*

**Model 236787, Series A**

**Model 235699, Series B**

**Model 241320, Series A**



**Models 236787 and 235699 Shown**

PROVEN QUALITY. LEADING TECHNOLOGY.

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



## INJECTION HAZARD

Spray from the gun, 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 is a serious injury. The injury may look like just a cut, but it is a serious injury. Get immediate medical attention.
- Do not point the gun 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 gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 4 if the spray tip clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating 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.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.



## 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.



## MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 4 to prevent the equipment from starting unexpectedly.

# 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 not sure, call your distributor.
- 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 7 for the maximum working pressure of this equipment.
- 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 containing 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.
- Wear ear protection when operating this equipment.



## 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.

- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying 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 spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.
- Ground the equipment and the object being sprayed.

# Displacement Pump

## ⚠ WARNING



### INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. 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,
- check or service any of the system equipment,
- or install or clean the spray tip.

## Pressure Relief Procedure

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 a grounded metal pail. Trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Open the pressure drain valve. Leave the pressure drain 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 obstruction.

**NOTE 1:** Packing Repair Kit 235703 is available. Parts included in the kit are marked with a \*. Use all the new parts in the kit; **use items 125 and 126 only in Displacement Pumps 235699 and 241320.**

**NOTE 2:** Check the motor brushes and clean the transducer whenever you repack the pump. Replace these parts as needed. See the sprayer manual for instructions.

## Intake valve repair (See Fig 1)

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

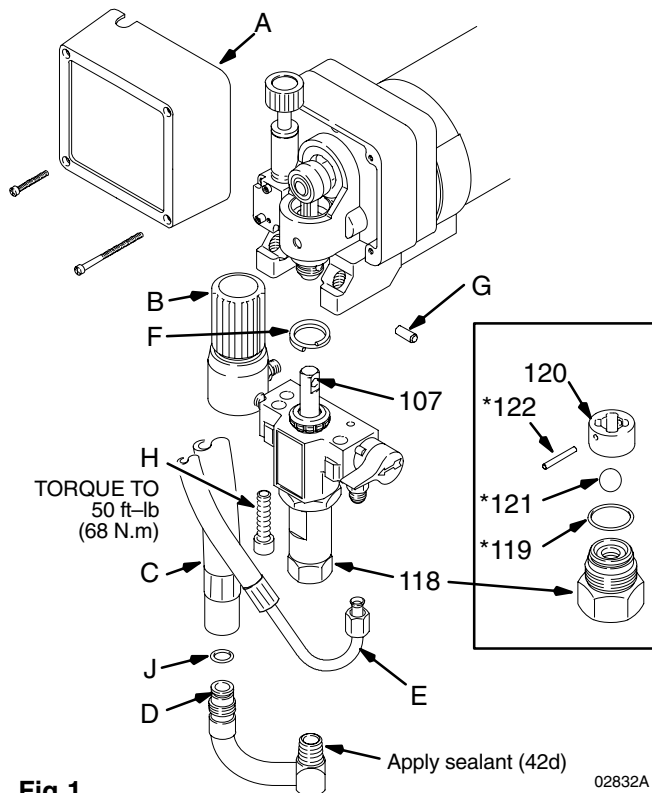
2. Clean and inspect the parts for wear or damage. Replace parts as needed. Use a new o-ring (119\*). If no further service is needed, reassemble the pump.

## Removing the pump (See Fig 1)

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 (B), if your sprayer has one.
3. While pulling upward on the suction hose (C), unscrew the hose from the inlet tube (D). Unscrew the drain hose (E) from the displacement.
4. Use a screwdriver to push the retaining spring (F) up and push out the pin (G).
5. Loosen the screws (H) and remove the pump.

## Installing the pump (See Fig 1 and 2)

1. Mount the pump on the drive housing. Tap it into the alignment pins with a soft hammer. Tighten the screws (H) to 50 ft-lb (68 N.m).
2. Align the hole in the rod (107) with the connecting rod assembly (J). Use a screwdriver to push the retaining spring (F) up, and push in the pin (G). Push the retaining spring into place around the connecting rod.



# Displacement Pump

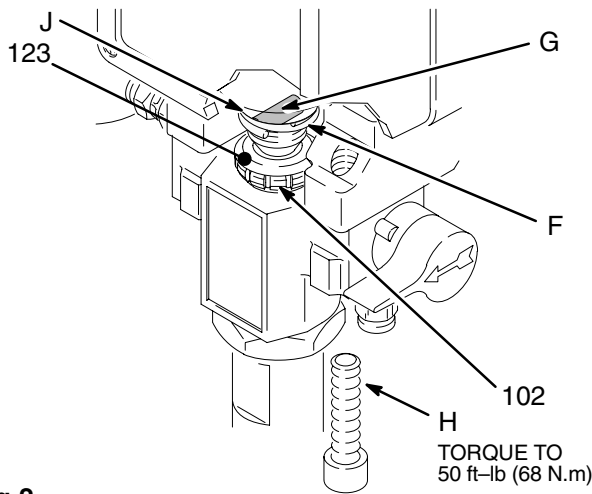


Fig 2

## ⚠ WARNING

Be sure the retaining spring (F) is firmly in the groove all the way around, to prevent the pin (G) from working loose due to vibration. See Fig 2.

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 (J) if worn or damaged. Reconnect the suction and drain hoses.
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.

### Disassembling the pump (See Fig 3)

1. Remove the intake valve (118). See page 4.
2. Unscrew 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 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 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 1:** Alternate plastic and leather packings. See Fig 3. The lips of the throat V-packings face down. The lips of the piston V-packings face up. Incorrect installation damages the packings and causes pump leaking.

**NOTE 2:** 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:  
*Models 235699 and 241320 only:* the backup washer (126\*) and u-cup (125\*), then  
*All Models:* the female gland (114\*), alternately three plastic (112\*) with two leather packings (113\*), and the male gland (111\*). See Fig 4.
3. Tighten the nut (110) onto the piston valve (108) to 2 in-lb (0.23 N.m). See Fig 4.

**NOTE 3:** 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 a strip of adhesive, supplied, to the threads.
5. Place the ball (109\*) on the piston valve (108). See Fig 4.

## ⚠ CAUTION

Step 6, 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 5.

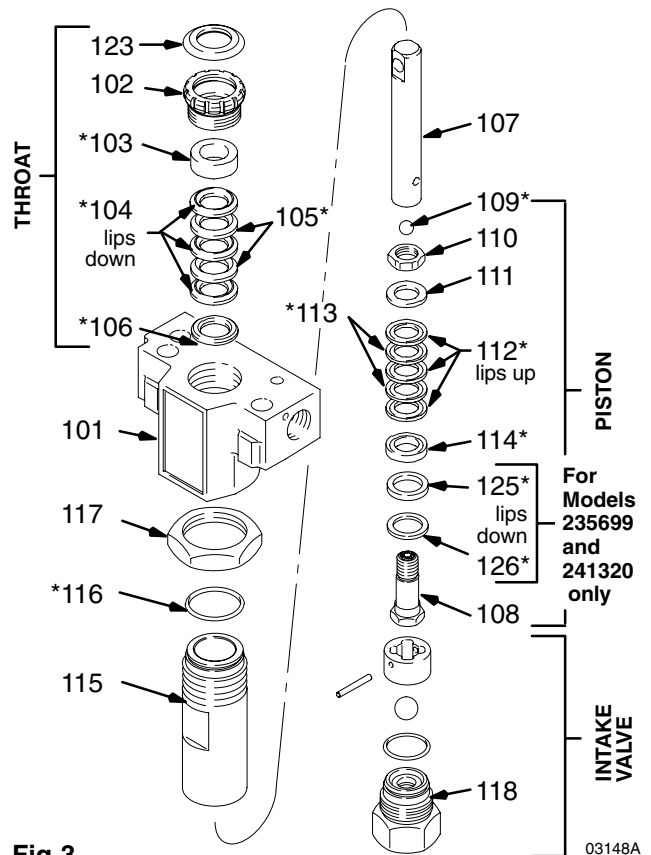
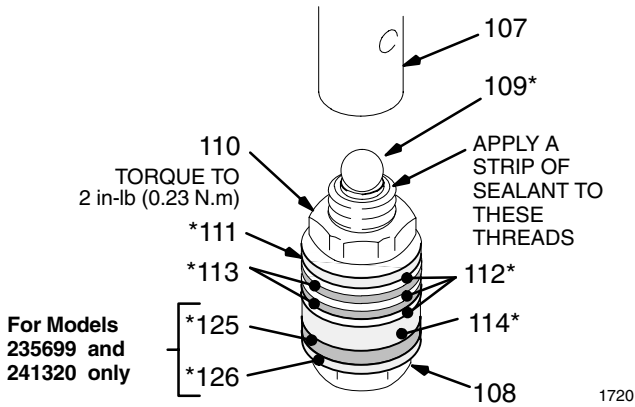
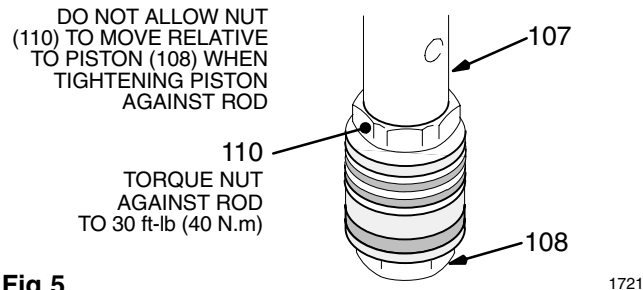


Fig 3

# Displacement Pump

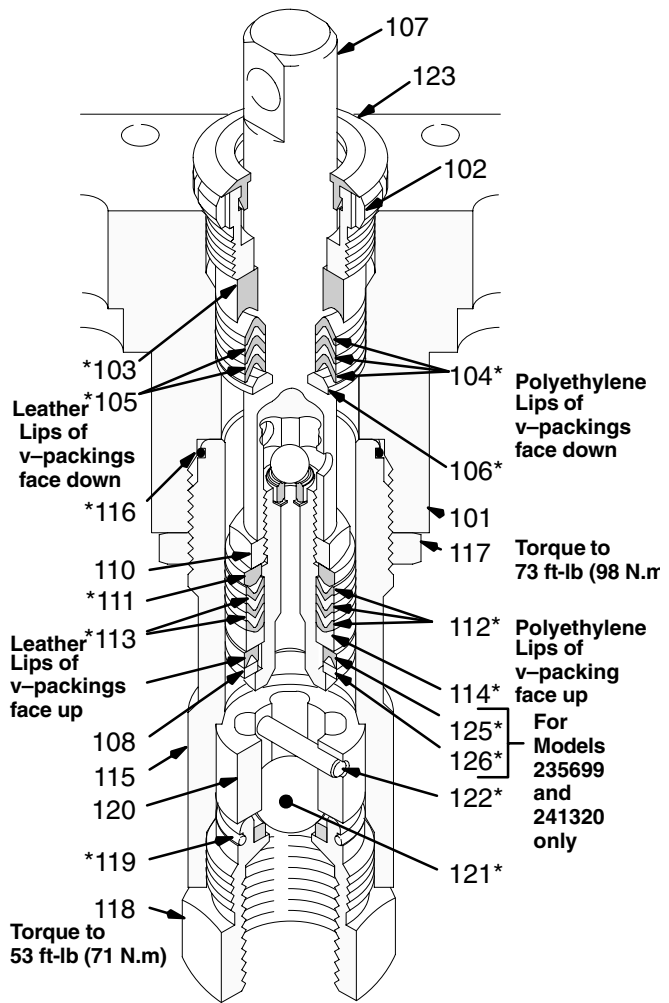


**Fig 4**



**Fig 5**

7. Place the flats of the rod (107) in a vise.
8. **CAREFULLY** tighten the nut (110) against the piston rod to 30 ft-lb (40 N.m). See Fig 5.  
Use two wrenches to maintain the alignment mentioned in NOTE 3, to the left.
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 6.



**Fig 6**

10. Install the packing nut (102) and plug (124), but leave loose for now. See Fig 7.

# Displacement Pump

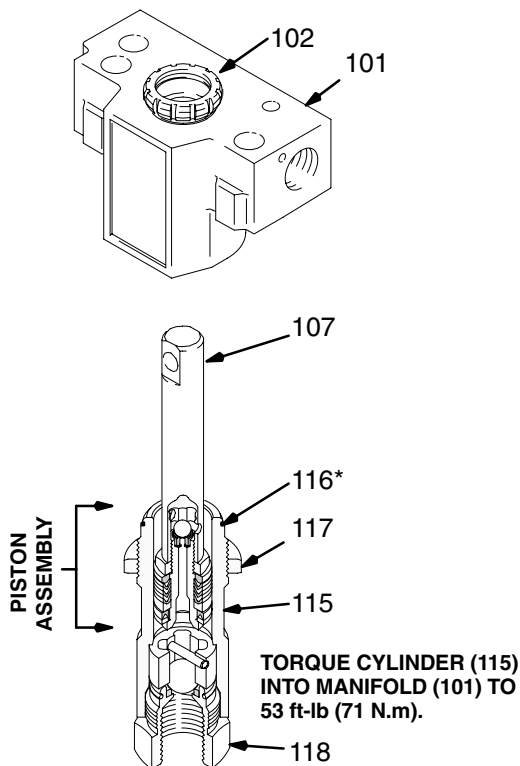


Fig 7

05118

11. Place a new o-ring (116\*) firmly in the cylinder (115) groove. See Fig 7.
12. Coat the piston rod and packings with oil. Carefully slide the assembly **INTO THE TOP OF THE CYLINDER (115)**. See Fig 7.
13. Place the intake valve (118) in a vise and assemble its parts. See page 4. Screw the cylinder (115) onto the valve (118). Turn the jam nut (117) all the way down. See Fig 7.

14. Put the manifold in a vise. Guide the rod/cylinder assembly up through the manifold (101). Screw the cylinder (115) into the manifold and tighten to 53 ft-lb (71 N.m). See Fig 7.
15. Tighten intake valve (118) to 53 ft-lb (71 N.m). See Fig 7.
16. Tighten the cylinder jam nut (117) to 73 ft-lb (98 N.m). See Fig 7.
17. Install the pump. See page 4.

## Technical Data

Working Pressure Range . . .	0–3000 psi (0 – 210 bar)
Cycles/Gallon (liter) . . . . .	620 (164)
Pump Inlet Size . . . . .	1/2 npt(f)
Pump Outlet Size . . . . .	1/4 npt
Wetted Parts	
236787, 235699 . . . . .	Stainless steel, Carbon steel, Aluminum, Polyethylene, Delrin®, Leather
241320 . . . . .	Stainless steel, Carbon steel, Polyethylene, Delrin®, Leather

**NOTE:** Delrin® is a registered trademark of the DuPont Company.

## Graco Phone Number

**TO PLACE AN ORDER**, contact your Graco distributor, or call this number to identify the distributor closest to you: **1-800-690-2894 Toll Free**

# Parts Drawing & List – Displacement Pump

## Model 236787 Series A

Includes items 101 to 124

## Model 235699, Series B

Includes items 101 to 126

## Model 241320, Series A

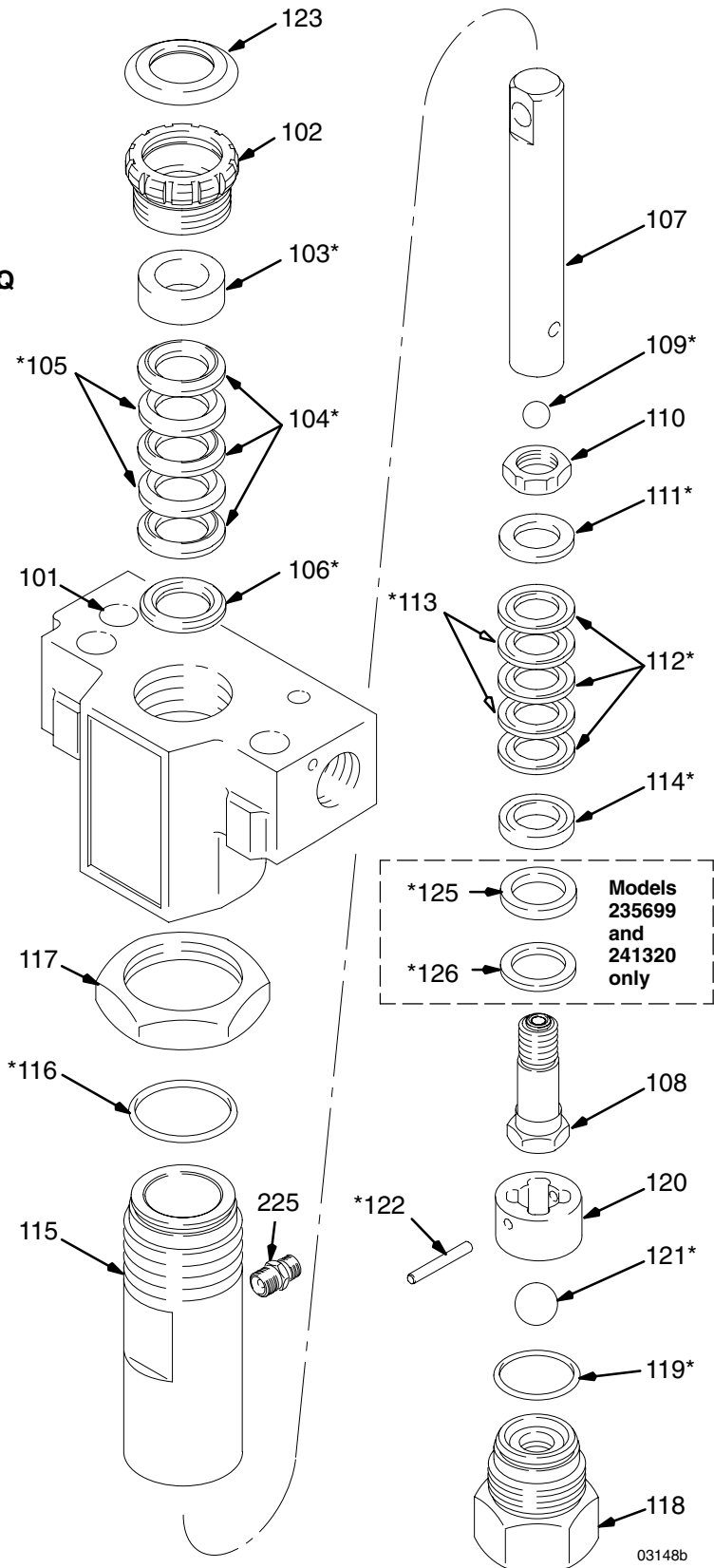
Includes items 101 to 126

Ref No.	Part No.	Description	yQ
101		PUMP MANIFOLD	1
	187611	Models 236787 and 235699	
	191949	Model 241320	
102	176758	PACKING NUT	1
103	176757*	GLAND, female, throat	1
104	176997*	V-PACKING, UHMW polyethylene, throat	3
105	176755*	V-PACKING, leather, throat	2
106	176754*	GLAND, male, throat	1
107		DISPLACEMENT ROD	1
	187613	Model 236787	
	235709	Models 235699 and 241320	
108		PISTON VALVE	1
	224808	Model 236787	
	218197	Models 235699 and 241320	
109	105444*	BALL, 5/16", piston	1
110	176751	NUT, hex, 1/2-20 unF-2b	1
111	176750*	GLAND, male, piston	1
112	176882*	V-PACKING, UHMW polyethylene, piston	3
		V-PACKING, leather, piston	
113	176749*	V-PACKING, leather, piston	2
114	180073*	GLAND, female, piston	1
115		CYLINDER, pump	1
	236786	Model 236787	
	235708	Models 235699 and 241320	
116	108526*	PACKING, o-ring, PTFE	1
117	187614	JAM NUT, 1-3/8-18 unF-2b	1
118	224966	INLET VALVE	1
119	111603*	PACKING, o-ring, PTFE	1
120	176760	BALL GUIDE	1
121	105445*	INLET BALL, 1/2"	1
122	176759*	BALL STOP PIN	1
123	180656	PLUG	1
124	102969*	SEALANT (not shown)	1
125	105522*	PACKING, u-cup, polyurethane	1
126	186652*	WASHER, backup, steel	1
225	157350	ADAPTER, 3/8 npt x 1/4 npt	1

### \*Supplied in Repair Kit 235703.

Keep a repair kit on hand to reduce down time.

Use items 125 and 126 in Displacement Pumps 235699 and 241320 only.



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

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