

## Pressure Compensating Valve

309133C

The pressure compensating valve minimizes the effects of pressure changes from the fluid source and reduces or eliminates material flow variances caused by piston pump changeover and unbalanced pump lowers. Eliminating surge variations adds consistency to the application process.

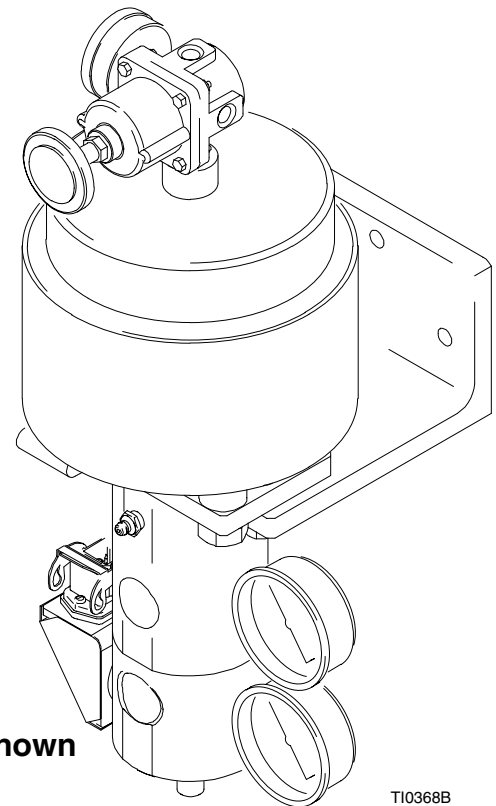
The pressure compensating valve is used:

- in applications requiring a consistent bead size throughout the dispense cycle.
- to overcome the initial surge of material when the dispense valve is opened in a deadhead system.
- with single component materials when viscosities are generally greater than 100,000 cps.



**Read warnings and instructions.**

See page 2 for compensator part nos., ratios, and working pressures.



**Model 243656 Shown**

T10368B

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## Compensator Models

Part No.	Series	Ratio and Type (parts list page)	Maximum Operating Air Pressure	Maximum Operating Fluid Pressure
			MPa, bar (psi)	MPa, bar (psi)
243206	A	51:1 , Heated 120V	0.7, 7.0 (100)	23.8 , 238 (3500)
243654	A	51:1 Ambient	0.7, 7.0 (100)	23.8, 238 (3500)
243655	A	23:1 Ambient	0.7, 7.0 (100)	17.2 , 172.4 (2500)
243656	A	23:1, Heated 240 V	0.7, 7.0 (100)	17.2, 172.4 (2500)
243657	A	51:1, Heated 240 V	0.7, 7.0 (100)	23.8, 238 (3500)
243658	A	23:1, Heated 120V	0.7, 7.0 (100)	17.2, 172.4 (2500)

# 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 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 stated on the equipment or in the **Technical Data** for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- 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.
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# 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 8.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying/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/dispensed.
- Keep the spray/dispense area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray/dispense area.
- Extinguish all open flames or pilot lights in the spray/dispense area.
- Do not smoke in the spray/dispense area.
- Do not turn on or off any light switch in the spray/dispense area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray/dispense 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.



## HOT SURFACE AND FLUID HAZARD

Heated fluid can cause severe burns and can cause equipment surfaces to become very hot.

- Wear protective gloves and clothing when operating this equipment in a heated system.
- Do not touch the metal heat sink when the surface is hot.
- Allow the equipment to cool thoroughly before servicing.

Some heated systems are designed to dispense PUR heated materials. PUR systems are supplied with ventilation hoods, and require proper ventilation and specially designed system components.

# WARNING



## MOVING PARTS HAZARD

Moving parts, such as the air motor piston, 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 10 to prevent the equipment from starting unexpectedly.



## INJECTION HAZARD

Spray from the gun, hose leaks, or ruptured components can inject fluid into your body and cause an extremely serious injury, including the need for amputation. Splashing fluid in the eyes or on the skin can also cause a 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 spray gun at anyone or at any part of the body.
- Do not put hand or fingers over the spray tip.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Do not “blow back” fluid; this is not an air spray gun.
- Check the gun diffuser operation weekly.
- 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 10 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; or install or clean the spray tip.
- Tighten all the 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.

# Unpacking and Repacking

## Unpacking the Product

The pressure compensating valve was carefully packaged for shipment by Graco. When the product arrives, perform the following procedure to unpack the unit:

1. Inspect the shipping box carefully for shipping damage. Contact the carrier promptly if damage is discovered.
2. Unseal the box and inspect the contents carefully. There should not be any loose or damaged parts.
3. Compare the packing slip against all items included in the container. Any shortages or other inspection problems should be reported immediately.
4. Store the box and packing materials in a safe place for future use. Graco recommends that all packing materials be saved in case the unit needs to be shipped again.

# Overview

## Description

The purpose of the pressure compensating valve is to provide a consistent flow of sealant and adhesive material downstream, through a hose, to a dispense valve and nozzle.

The pressure compensating valve applies a precisely regulated air pressure to a rolling diaphragm to open a valve spool. Downstream back pressure is applied to the opposite end of the spool to push it closed. The two opposing forces cause the spool to throttle the material through a tapered valve seat, thereby compensating for any pressure fluctuation.

The area of the spool and the 1" (25.5 mm) stroke of the spool cause it to displace material. When the spool extends into the downstream end of the pressure compensating valve it can provide up to 1.0 cu. inches of material to compensate for the momentary loss of supply pressure. When the spool is retracted beyond the point of shutoff, it will withdraw material from the downstream end. This causes a relieving effect.

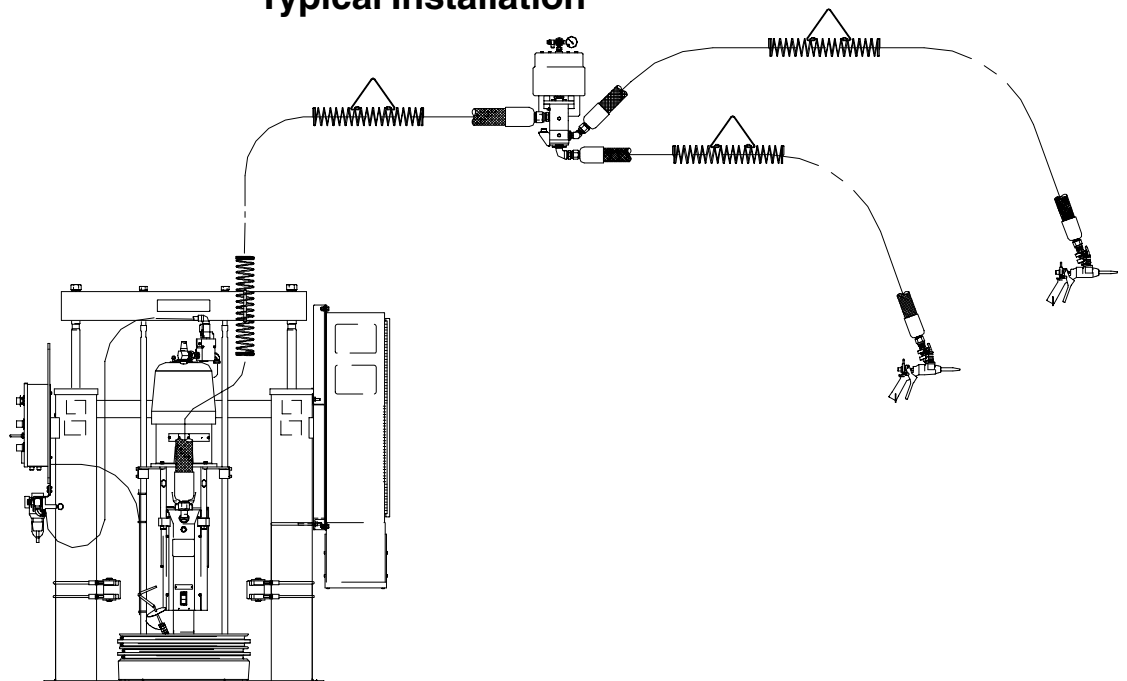
The displacement of the spool is what separates it from regulators. The inlet pressure is balanced against the spool, thus making it immune to changes in upstream pressure. The air cylinder (rolling diaphragm) area versus the area of the end of the spool, give the pressure compensating valve a power ratio, just as a reciprocating pump has a power ratio. The Pressure Compensating Valve is available in 23:1 and 51:1 ratios, ambient or heated models.

Because the inlet pressure is balanced, a low ratio pressure compensating valve may be used with a high ratio pump. Optimum operation will be reached by using the lowest ratio pressure compensating valve to provide the required pressure.

## Operation

The pressure compensating valve is installed with a precision air regulator for the air cylinder in order to provide accurate control. It is also installed with inlet and outlet fluid pressure gauges. To avoid extreme wear, when dispensing material, do not exceed 300 psi differential across the pressure compensating valve (the difference between the inlet and the outlet fluid pressure gauges).

## Typical Installation



# Installation

## Ground The System

### **WARNING**



#### **FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD**

To reduce the risk of fire, explosion, and serious injury, proper electrical grounding of every part of your system is essential. Read the warning section, **FIRE AND EXPLOSION HAZARD**, on page 4 and follow the grounding instructions, below.

The following grounding instructions are minimum requirements for a basic dispensing system. Your system may include other equipment or objects which must be grounded. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Your system must be connected to a true earth ground.

1. **Pump:** ground the pump by connecting a ground wire and clamp as described in your separate pump instruction manual.
2. **Air compressors and hydraulic power supplies:** ground the equipment according to the manufacturer's recommendations.
3. **Fluid hoses:** use only ground fluid hoses with a maximum of 500 feet (150 m) combined hose length to ensure grounding continuity. 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. If the hose resistance exceeds the recommended limits, replace it immediately.
4. **Flo-gun:** ground the gun by connecting it to a properly grounded fluid hose and pump.
5. **Fluid supply container:** ground according to the local code.
6. **Flammable liquids in the dispensing area:** must be kept in approved, grounded containers. Do not store more than the quantity needed for one shift.

7. **All solvent pails used when flushing:** ground 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:** hold a metal part of the gun firmly to the side of a grounded metal pail, then trigger the gun.

## General Information

**NOTE:** Reference numbers and letters in parentheses in the text refer to the callouts in Fig. 1.

A pressure compensating valve can be used in manual and automatic dispensing applications.

### **WARNING**



#### **ELECTROCUTION HAZARD**

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

## Location of the Pressure Compensating Valve

- The pressure compensating valve should be located between the supply pump and dispense valve, as close to the point of disperse as possible.

### **CAUTION**

Downstream hose lengths beyond 15 feet will start to diminish the valve's effectiveness in compensating for surge.

### **WARNING**



#### **PRESSURIZED EQUIPMENT HAZARD**

To reduce risk of injury or equipment damage:

- Make sure all material hose connections are secure.
- Do not pressurize the system until you have verified the system is ready and it is safe to do so.



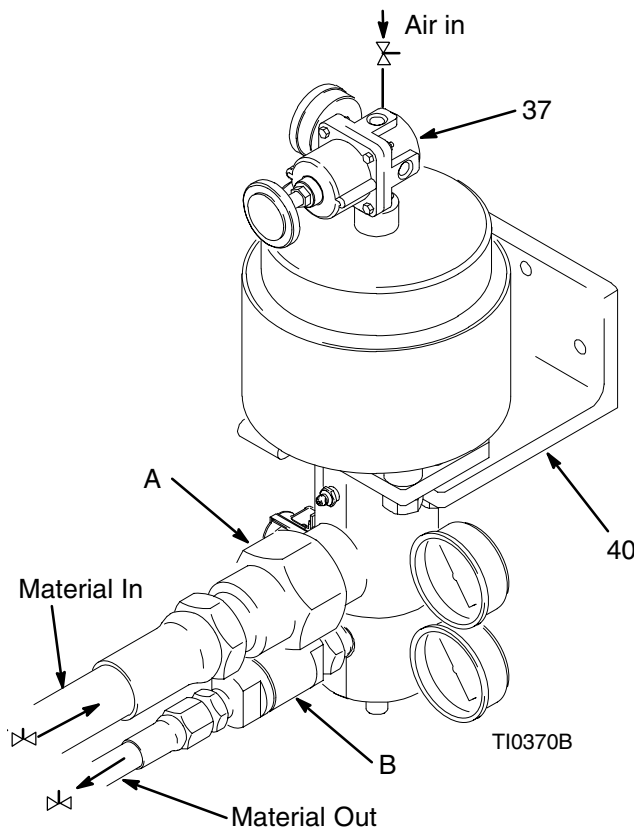
# Installation

## Installing the Pressure Compensating Valve

Before mounting the pressure compensating valve, extra inlet/outlet plugs and insulating wrap (for heated units only) need to be assembled. There are two inlets and outlet ports. Decide which are to be used and plug the others. Completely wrap the steel fluid housing with provided insulation wrap and tape.

To install the pressure compensating valve:

- Mount the pressure compensating valve.
- Connect the air line.
- Connect the inlet and discharging hose.



**Fig. 1**

1. Using the attached mounting bracket (40), secure the pressure compensating valve to a rigid support or a wall capable of supporting 75 pounds. See Fig. 1.
2. Connect the air line to the pressure compensating valve's regulator (37). See Fig. 1.

3. Connect the material supply hose to the pressure compensating valve's inlet port (A) and connect the material discharge hose to the pressure compensating valve's outlet port (B). See Fig. 1.

**NOTE:** It is recommended the compensator be isolated with shutoff valves for air and material inlet/outlet lines.

## WARNING

To reduce the risk of over-pressurizing your system, which could result in component rupture and cause serious injury, never exceed the specified maximum incoming air pressure to the pumps (see the **Technical Data** in the pump manual).

## Pressure Compensator Set Up

1. Ensure that air pressure is supplied to the ram and pump.
2. For models with heaters, bring the system to the operating temperature.
3. Set the pressure compensating valve's air regulator to maximum (full open).
4. Place a waste container under material dispense valve.
5. Slowly increase the supply pump pressure and fill the entire system.
6. Once the system is fully primed, adjust the supply pump pressure until the desired, non-regulated, material flow rate is achieved.
7. Increase the supply pump material pressure by 300 psi.
8. Decrease the pressure compensator air regulator until the desired flow rate is achieved.
9. Decrease the supply pump pressure until the material flow surges, then increase the pressure until the surge is eliminated.
10. Final material flow rate adjustments can now be done with the pressure compensator air regulator.
11. Record all regulator and material pressures for future reference.

**NOTE:** The difference between the inlet and outlet pressure on the pressure compensating valve should not exceed 300 psi.

# Installation

- To change the differential across the pressure compensating valve, adjust the precision air regulator pressure up or down to bring the fluid pressure gauges to within the 300 psi tolerance (obtain a pressure difference as close as possible to zero psi).
- Adjust the air regulator when the material is being dispensed.
  - By increasing the air pressure to the cylinder, you increase the outlet fluid pressure.
  - By decreasing the air pressure you decrease the outlet fluid pressure.
- Ensure that the pressure compensating valve's piston always floats and does not extend to the end of its stroke and remain there. Check this by watching the spool between the air cylinder and the main body of the pressure compensating valve.
  - The spool should move down when the supply pump changes its stroke and move up when the supply pump pressure is returned to normal.
  - If the spool does not retract, slightly reduce the air pressure to the air cylinder. When the dispense valve is closed the spool will retract slightly, causing a relieving effect in the dispense hose.

## Pressure Relief Procedure

This procedure is described in the instruction manual that was supplied with your system. Please refer to that document.

### WARNING



#### MOVING PARTS HAZARD

Follow the **Pressure Relief Procedure** in your separate system manual before checking or repairing the ram or any other part of the system and when shutting down the system. Keep hands and fingers away from the follower plate, fluid pump inlet, and lip of the fluid container when raising or lowering the ram to reduce the risk of pinching or amputating hands or fingers.

During operation, also keep hands and fingers away from limit switches to reduce the risk of pinching or amputating hands or fingers.

### WARNING



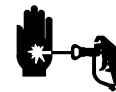
**The material and equipment will be hot!** To reduce risk of injury, wear eye protection, gloves and protective clothing when installing, operating, or servicing this dispensing system.

### WARNING



**HIGH PRESSURES CAN CAUSE SERIOUS PERSONAL INJURY.** Be sure to **OPEN THE DISPENSE VALVE DURING SYSTEM HEATUP** to alleviate pressure which might occur in the system due to material expansion.

### 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, 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
- install or clean the spray tip/nozzle

# Maintenance

Table 1 shows the preventive maintenance schedule for the Pressure Compensating Valve.

**Table 1. Preventive Maintenance Schedule**



<b>Schedule</b>	<b>Component Description</b>
Weekly	Compensator body
	Remove plug to visually inspect grease. If a lot of pumped material is present, disassemble following instructions on page 13. Clean or replace components as needed.
Weekly	Lubricate the components
	Remove plug to visually inspect grease. If needed, lubricate with Gray Mobilith SCH220 grease.
Daily	Spool floats freely
	Watch the spool between the air cylinder and the main body of the pressure compensating valve. The spool should move up and down when the supply pump pressure returns to normal. If the spool does not retract, slightly reduce the pressure to the air cylinder.

# Troubleshooting

Problem	Cause	Solution
Outlet material pressure not consistent.	Inlet pressure is too low.	Adjust inlet pressure from supply pumps.
	Internal throat seals, o-rings and/or plunger are worn.	Replace seals, inspect, and/or replace plunger.
Outlet pressure builds up while not dispensing.	Internal throat seals, o-rings and/or plunger are worn.	Replace seals, inspect, and/or replace plunger.
Material is leaking externally.	Internal seals are worn.	Replace seals.
Not enough outlet pressure.	Material regulator is not calibrated correctly.	See pressure compensator setup on page 9.
	Supply pumps are set too low or turned off.	Verify supply.
Material pressure gauge readings do not change when the flow rate is adjusted.	Material gauges are damaged.	Replace.
	Pressure adjustment range is exceeded.	Calibrate the pressure in a lower pressure range.
Plunger does not float	Seal is worn.	Replace seal.
Air regulator does not display consistent pressure reading.	Improper regulator setting.	Replace or repair air regulator.
	Regulator not functioning properly	
Air is not getting to regulator.	Air hose not connected or loose.	Attach or tighten air hose to regulator.

# Service

**NOTE:** Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawing on pages 16–19.

 <b>WARNING</b>	
	<b>EQUIPMENT MISUSE HAZARD</b> Exercise care when mounting and handling the Pressure Compensating Valve to prevent equipment damage or personal injury.

## Disassembly

1. Disconnect all hoses connecting the pressure compensating valve to the gun and heating units.
2. On heated models, remove insulation wrap.
3. Remove the two bolts (41), washers (42), and nuts (43) holding mounting bracket (40) to the mounting plate (14).
4. Remove the two cap screws (25, 56) and two spacers (13, 55).
5. Carefully remove the air cylinder (1) and the piston (8) from the compensator body (16) and block outlet (11).
6. Loosen the adjusting nut (2) while holding piston (8) on the wrench flats. Remove piston (8) from the air cylinder (1) by turning piston counterclockwise.
7. Remove the four cap screws (3) holding the mounting plate (14) to the compensator body (16).
8. Remove the mounting plate (14).
9. Remove the bearing plunger (5) from inside the compensator body (16).
10. Remove the o-ring (6) from the top groove on the outside of the bearing plunger (5). Remove the lip seal (45) located inside the bearing plunger (5).
11. Remove the lip seal (9) located inside the compensator body (16).
12. Turn the compensator body (16) over. Remove the four screws (12) holding the top and bottom halves of the compensator body together.
13. Remove the two screws (19) securing the heater cover (23) to the block outlet (11). Remove the heater cover (23) to access the two screws (20) securing the heating unit to the block outlet (11). Remove the screws (20) and washers (21).
14. Carefully remove the cartridge heater (28, 57) and RTD temperature sensor (27) from the block outlet (11).
15. Remove the o-ring (10) and throttle adapter (17) from the opening in the center of the lower compensator body section.
16. Remove the lip seal (9).
17. Carefully inspect the lip seals (9, 45), washers (21), throttle adapter (17), and o-rings (6, 10) for wear and weakness. If they are worn or damaged, replace them.
18. Carefully inspect the piston (8). If it is damaged or the surface scored, replace it.

## CAUTION

Use only high temperature synthetic grease or Graco cartridge no. 115982. Use of any other grease may result in unit failure or system contamination.

## Reassembling the Compensator

1. Generously grease lip seal (9) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Carefully insert the lip seal (9), with the lips facing down, in the opening located in the bottom of the compensator body (16).
2. Generously grease the throttle adapter (17) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Insert the throttle adapter (17) over the lip seal (9) in the opening on the bottom of the compensator body (16). Place o-ring (10) on top of throttle adapter (17).
3. Coat the heater (28, 57) and RTD temperature sensor (27) with Lubricant Thermal Compound (31), and insert into their proper locations in the bottom of the compensator body (16).
4. Position the heater (28, 57) and RTD temperature sensor (27) wires in the slots located in the block outlet (11).
  - Allow sufficient lead wire length to be able to rotate the connector bracket  $\pm 180^\circ$ .

# Service

5. Carefully align the block outlet (11) and compensator body (16) and secure using the four screws (12). Torque screws (12) to 45 ft-lb. (61 N•m).
6. Secure the heating unit to the block outlet (11) using the two screws (20) and washers (21).
7. Replace the heater cover (23) and screws (19).
8. Turn the heater over. Generously grease the lip seal (9) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Carefully insert lip seal (9), with the lips facing down, in the center opening located on the top of the compensator body (16).
9. Generously grease o-ring (6) with high temperature synthetic grease or Graco cartridge no. 115982 (48). Position it in the groove located around the outside of the bearing plunger (5).
10. Generously grease rod lip seal (45) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Place the lip seal (45), with the lips facing down, inside the bearing plunger (5).
11. Lightly grease the entire bearing plunger (5) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Carefully insert the bearing plunger (5) in the opening on the top of the compensator body (16).
12. Attach the mounting plate (14) to the compensator body (16) using the four cap screws (3). See Fig 1. which shows the correct orientation of the mounting plate (14) to the compensator body (16).
13. On heated models, wrap with insulation.
14. Replace the nut (2) on the air cylinder (1).
15. Screw the piston (8) into the air cylinder and secure with nut (2).
  - When the cylinder is retracted, you should have gap of 0.44" (11.0 mm) between the base of the air cylinder and the nut.
16. Lightly coat the piston (8) and bearing plunger (5) with high temperature synthetic grease or Graco cartridge no. 115982 (32). Carefully slide the compensator body (16) over the piston (8).
17. Attach the mounting bracket (40) to the air cylinder (1) using bolts (25, 56) and spacers (13, 55). Torque bolts to 45 ft-lb. (61 N•m).
18. Using the grease gun (44) and high temperature synthetic grease or Graco cartridge no. 115982 (32), slowly grease the bearing through fitting (15) until grease is seen coming out of the opposite side of the port.
19. Replace plug (4).

## Notes

[illegible]

# Parts List

## 23:1 Ratio Compensators Model Nos. 243655, 243656, & 243658

**Note: The parts listed below are not used in all models.**

† Used on model 243655 only

◆ Used on model 243658 only

● Used on model 243656 only

★ Used on models 243656 and 243658 only

□ See 120 volt wiring diagram on page 20

▲ See 240 volt wiring diagram on page 20

✓ Part not shown

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
2	C07179	ADJUSTING Nut	1				
3	C38372	SCREW, cap, hex head	4	32✓	115982	LUBRICANT, synthetic	1
4	C19252	PLUG, flush 1/8"	1	33◆	102794	NUT, hex	4
5	195647	BEARING, plunger	1	34◆	C19950	SCREW, cap, SCH	4
6	106258	O-RING, packing viton	1	36◆✓	C07536	TUBE, heat shrink	3"
8	C07131	PISTON	1	37	C06101	REGULATOR, 1/4 npt, 1.75"	1
9	C07124	SEAL, PTFE	2	39	C36260	GAUGE, air	1
10	C20138	O-RING, packing viton	2	40	C52578	BRACKET, mounting	1
11	195646	BLOCK, outlet	1	41	100003	BOLT, hexagon 3/8"-16 x 1.5"	2
12	C19834	SCREW, cap socket 3/8" x 1.25"	4	42	100133	WASHER, lock	2
13†	C07135	SPACER	2	43	100307	HEX, nut, 3/8"-16	2
14	C07111	MOUNTING PLATE	1	44✓	551189	GREASE GUN, 3 oz. cartridge	1
15	C07113	FITTING, lubricant	1	45	115751	SEAL, rod	1
16	195645	COMPENSATOR, body	1	46◆✓	189930	LABEL, caution	1
17	C07133	ADAPTER, throttle	1	47★✓	290228	LABEL, caution	1
18◆□	C78480	CONNECTOR, AMPH, 6-Pin, 16 GA	1	51★	C34045	SPACER	1
19★	C19269	SCREW	2	53	C07166	AIR CYLINDER	1
20★	112166	SCREW, cap, 1/4"-20 x .75"	2	54✓	156971	FITTING, reducing 3/8" x 1/4" npt	1
21★	C19197	WASHER, plain, USS 3/16"	2	55★✓	C07208	SPACER	2
22★	C34043	BRACKET	1	56★✓	C19075	SCREW, cap, hex head 5/8" X 2.5	2
23★	C34040	COVER	1	57▲●	115863	CARTRIDGE HEATER 240 volt	1
24✓	C06323	GAUGE, fluid	2	58●	100171	SCREW, machine	2
25†	C19794	SCREW, cap, 3/4"-10 x 2.5	2	59●	115860	INSERTS, female, crimp terminal	1
27★□	C32255	RTD TEMPERATURE SENSOR 7.8"	1	60●	115862	CONNECTOR, male, crimp	7
28◆□	115864	CARTRIDGE HEATER, 120 volt	1	61●	115861	BULKHEAD, housing	1
29✓	C34137	INSULATOR, fiberglass	100"	62▲●	C07569	WIRE, lead	6"
30✓	C33049	TAPE, adhesive, fiberglass	100"	63▲●	112144	SCREW	1
31✓	073019	LUBRICANT, thermal compound		64▲●	101674	TERMINAL RING, ground	1



# Parts

## 23:1 Ratio Models: 243655, 243656, and 253658

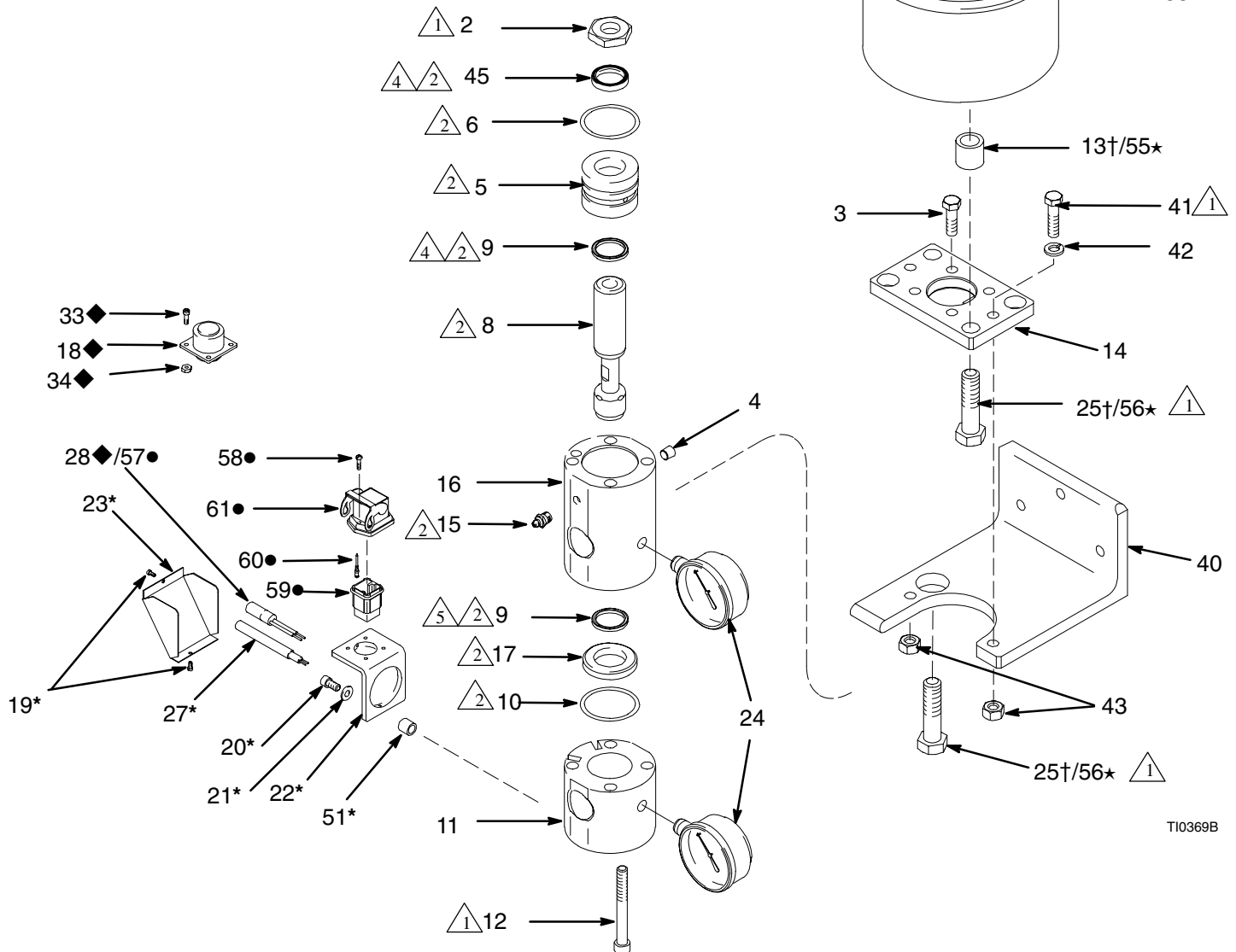
- △1 Torque to 45 ft lbs
- △2 Generously lubricate using high temperature synthetic grease or Graco cartridge no. 115982 only.
- △3 When the cylinder is fully retracted there should be a gap of .44" between the base of the air cylinder and the nut.
- △4 Lips face down
- △5 Lips face up

† Used on model 243655 only

◆ Used on model 243658 only

● Used on model 243656 only

\* Used on models 243656 and 243658 only



T10369B

# Parts List

## 51:1 Ratio Compensators Model Nos. 243206, 243654 & 243657

**Note: The parts listed below are not used in all models.**

- ◆ Used on model 243206 only
- Used on model 243657 only
- ★ Used on models 243206 and 243657 only
- ◇ Used on all models except 243654
- Used on model 243654 only
- See 120 volt wiring diagram on page 20
- ▲ See 240 volt wiring diagram on page 20
- ↗ Part not shown

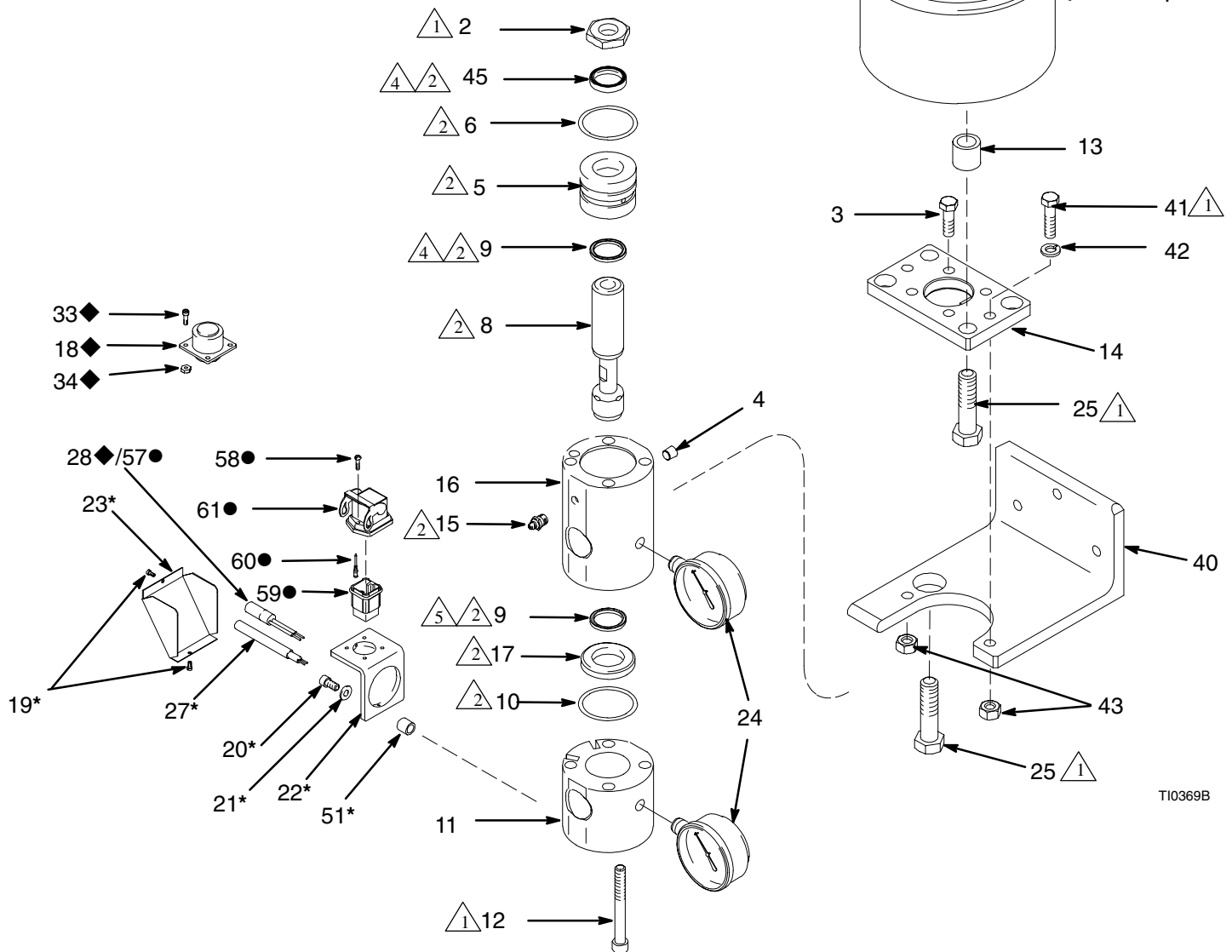
Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	C07109	AIR CYLINDER	1	32↗	115982	LUBRICANT, synthetic	1
2	C07179	ADJUSTING Nut	1	33◆	102794	NUT, hex	4
3	C38372	SCREW, cap, hex head	4	34◆	C19950	SCREW, cap, SCH	4
4	C19252	PLUG, flush 1/8"	1	35↗	C19254	PLUG, pipe, flush, 1/4"	1
5	195647	BEARING, plunger	1	36◆↗	C07536	TUBE, heat shrink	3"
6	106258	O-RING, packing viton	1	37	C06101	REGULATOR, 1/4 npt, 1.75"	1
8	C07131	PISTON	1	38	164856	FITTING, reducing, 3/8" x 1/4 npt (m)	1
9	C07124	SEAL, PTFE	2	39	C36260	GAUGE, air	1
10	C20138	O-RING, packing viton	2	40	C52578	BRACKET, mounting	1
11	195646	BLOCK, outlet	1	41	100003	BOLT, hexagon 3/8"-16 x 1.5"	2
12	C19834	SCREW, cap socket 3/8" x 1.25"	4	42	100133	WASHER, lock	2
13	C07135	SPACER	2	43	100307	HEX, nut, 3/8"-16	2
14	C07111	MOUNTING PLATE	1	44↗	551189	GREASE GUN, 3 oz. cartridge	1
15	C07113	FITTING, lubricant	1	45	115751	SEAL, rod	1
16	195645	COMPENSATOR, body	1	46◆↗	189930	LABEL, caution	1
17	C07133	ADAPTER, throttle	1	47★↗	290228	LABEL, caution	1
18◆□	C78480	CONNECTOR, AMPH, 6-Pin, 16 GA	1	51★	C34045	SPACER	1
19★	C19269	SCREW	2	52○↗	C19254	PLUG, pipe flush	1
20★	112166	SCREW, cap, 1/4"-20 x .75"	2	57▲●	115863	CARTRIDGE HEATER 240 volt	1
21★	C19197	WASHER, plain, USS 3/16"	2	58●	1100171	SCREW, machine	2
22★	C34043	BRACKET	1	59●	115860	INSERTS, female, crimp terminal	1
23★	C34040	COVER	1	60●	115862	CONNECTOR, male, crimp	7
24↗	C06323	GAUGE, fluid	2	61●	115861	BULKHEAD, housing	1
25	C19794	SCREW, cap, 3/4"-10 x 2.5	2	62▲●	C07569	WIRE, lead	6"
27★□	C32255	RTD TEMPERATURE SENSOR 7.8"	1	63▲●	112144	SCREW	1
28◆□	115864	CARTRIDGE HEATER, 120 volt	1	64▲●	101674	TERMINAL RING, ground	1
29↗	C34137	INSULATOR, fiberglass	100"				
30↗	C33049	TAPE, adhesive, fiberglass	100"				
31↗	073019	LUBRICANT, thermal compound					

# Parts

### 51:1 Ratio Models: 243206, 243654, and 253657

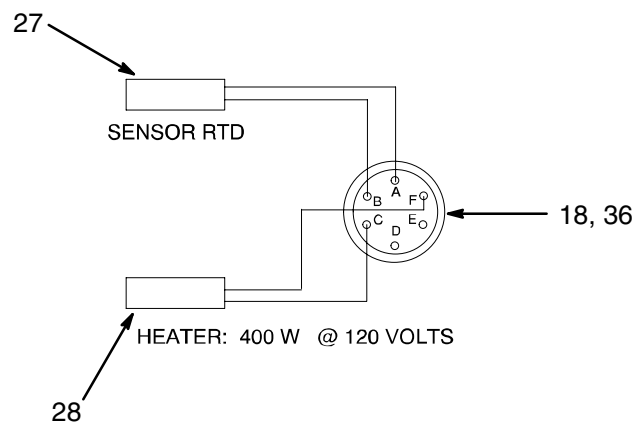
- 1 Torque to 45 ft lbs
- 2 Generously lubricate using high temperature synthetic grease or Graco cartridge no. 115982 only.
- 3 When the cylinder is fully retracted there should be a gap of .44" between the base of the air cylinder and the nut.
- 4 Lips face down
- 5 Lips face up

- ◆ Used on model 243206 only
- Used on model 243657 only
- \* Used on models 243206 and 243657 only



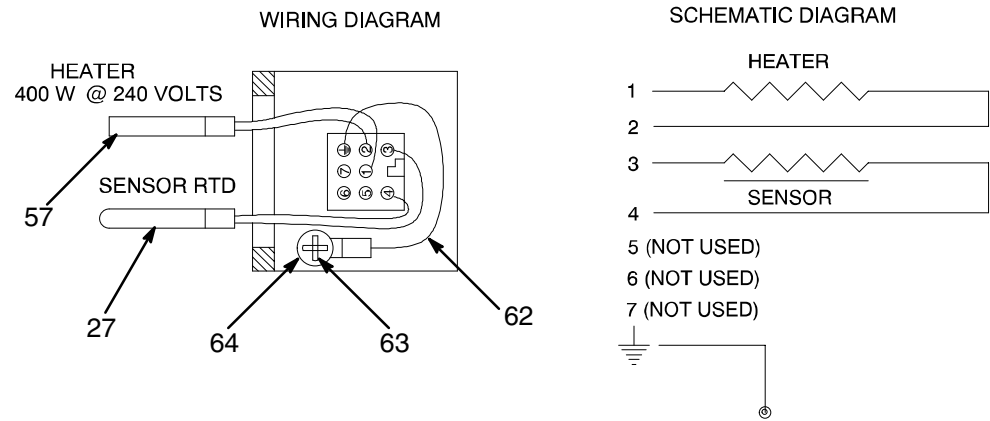
Wiring Diagram

120 Volt Models



NOTE: ALLOW SUFFICIENT LEAD WIRE LENGTH TO BE ABLE  
TO ROTATE CONNECTOR BRACKET ± 180°.

240 Volt Models



# Repair Kits and Accessories

*Use Only Genuine Graco Parts and Accessories*

## Compensating Valve Repair Kit 233082

For all 23:1 and 51:1 models ordered after May 2000.

Ref. No.	Part No.	Description	Qty.
6	106258	O-RING, packing viton	1
9	C07124	SEAL, PTFE	2
10	C20138	PACKING, O-RING	1
29	C34137	SHEET FIBERGLASS	100"
30	C33049	TAPE, high temperature	100"
45	115751	SEAL, rod	1

## Compensating Valve Upgrade Kit 243464

For all 19:1 compensating valves with aluminum fluid sections ordered before May 2000.

Ref. No.	Part No.	Description	Qty.
	111178	O-RING, air cap	2
	C07189	SEAL	2
	C20135	O-RING	2
	195633	BEARING	1
	115750	SEAL	1
	195634	WASHER	1

To repair a 19:1 Compensating Valve that has been upgraded with Kit 243464, order each of the following:

Ref. No.	Part No.	Description	Qty.
	C07199	REPAIR KIT (Includes 111178, C07189, and C20135)	1
	115750	SEAL	1

## Connector Accessory Kit

Used to mate the Graco Pressure Compensating Valve to a non-Graco heating controller. NOTE: The control end connector is provided and wired by customer.

Ref. No.	Part No.	Description	Qty.
	244021	KIT, loft (3 m); cable and valve end connector	1

## Grease Gun

For all models.

Ref. No.	Part No.	Description	Qty.
44	551189	GREASE GUN	1

## Grease Cartridge

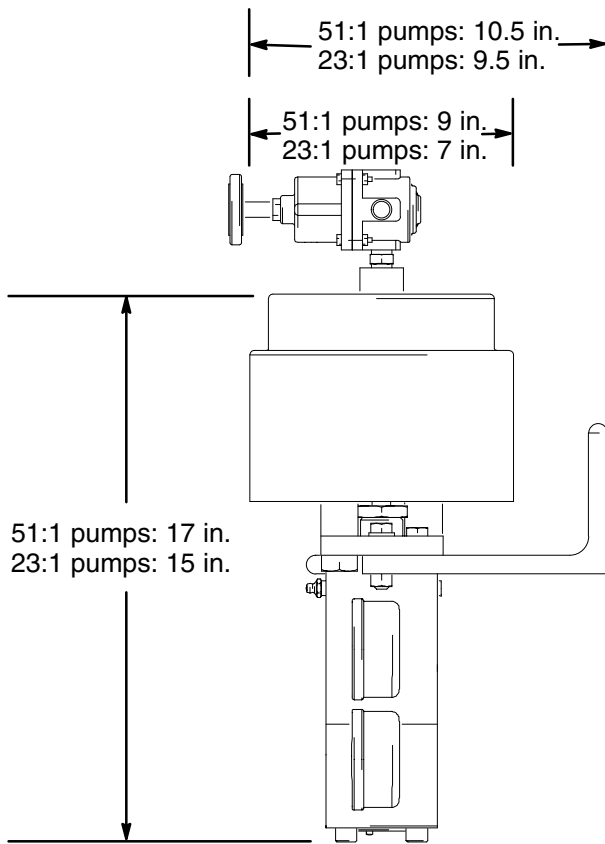
For use with Grease Gun Part No. 551189.

Ref. No.	Part No.	Description	Qty.
32	115982	GREASE CARTRIDGE, high temperature grease	1

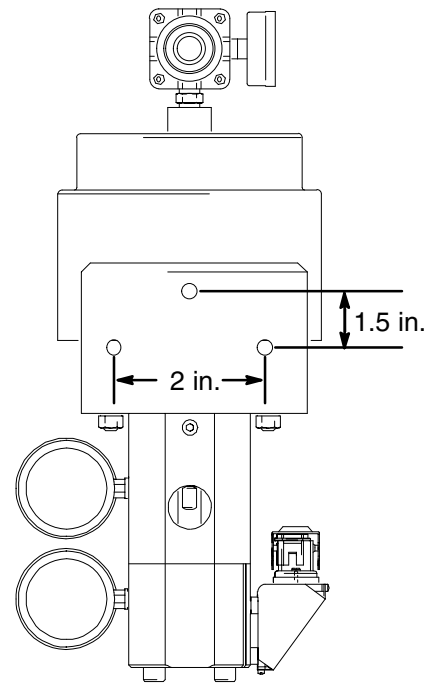
# Technical Data

Category	Data
Fluid Inlet	1 npt(f)
Fluid Outlet	1 npt (f)
Air Inlets	1/4 npt (f)
Voltage Required (heated models)	120 volts for models 243206 and 243658
	240 volts for models 243656 and 243657
Output Wattage	400 watts
Maximum recommended pressure drop	300 psi
Maximum air inlet pressure	250 psi ( 1.70 MPa, 17.0 bar)
Maximum operating pressure	100 psi (0.7 MPa, 7.0 bar)
Maximum Temperature	400° F ( °C)
Weight	23:1 ratio pumps 48 pounds, 51:1 ratio pumps 62 pounds
Dimensions	26.5" x 14" x 14"

# Dimensions



**Side View**



**Back View**

# Graco Standard Warranty

Graco warrants all equipment 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.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

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, 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**

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# Graco Phone Numbers

**TO PLACE AN ORDER**, contact your Graco distributor, or call one of the following numbers to identify the distributor closest to you:

**1-800-367-4023 Toll Free**  
**612-623-6921**  
**612-378-3505 Fax**

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**Sales Offices:** Minneapolis, Detroit  
**International Offices:** Belgium, Korea, Hong Kong, Japan  
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