

XL™ 6500 and 3400 Air Motors

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For use with high performance sealer and coating pumps. For professional use only.

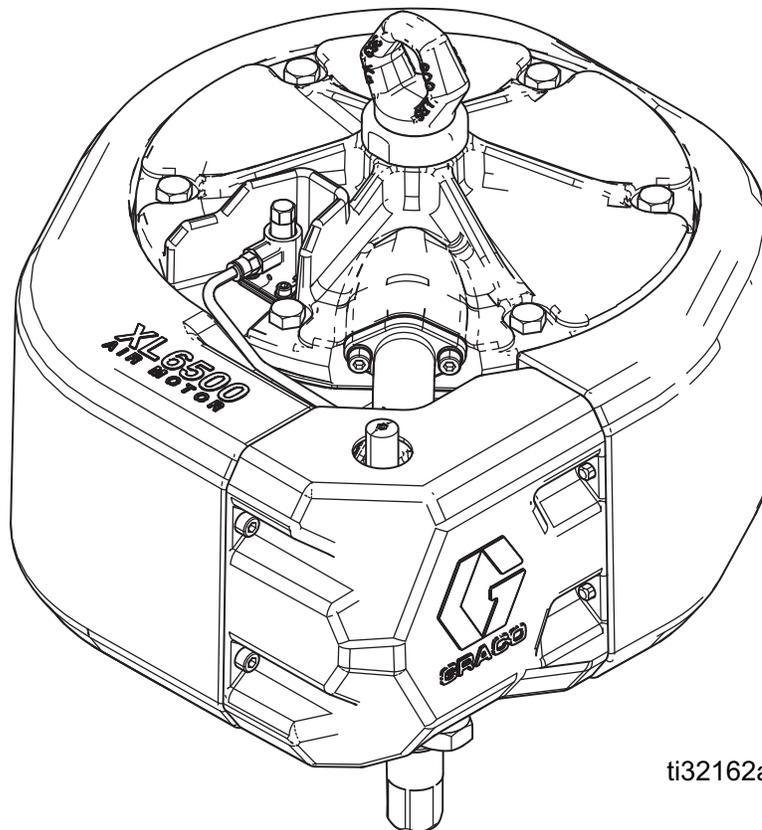
Maximum Working Pressure:
100 psi (0.7 MPa, 7 bar)



Important Safety Instructions

Read all warnings and instructions in this manual and in related manuals. Save all instructions.

See Page 5 for model information.



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Related Manuals

Manual	Description
311762	Xtreme® Lowers, Instructions-Parts
311825	Dura-Flo™ Lowers, Instructions-Parts
334645	King Sprayer Packages, Instructions-Parts
334644	XL™ 10000 Air Motor, Instructions-Parts

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h2 style="margin: 0;">WARNING</h2>	
   	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking). • Ground all equipment in the work area. See Grounding instructions. • Never spray or flush solvent at high pressure. • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static or conductive. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.
 	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.

WARNING

	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately.
	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Specifications in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Specifications in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer. • Do not leave the work area while equipment is energized or under pressure. • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Models

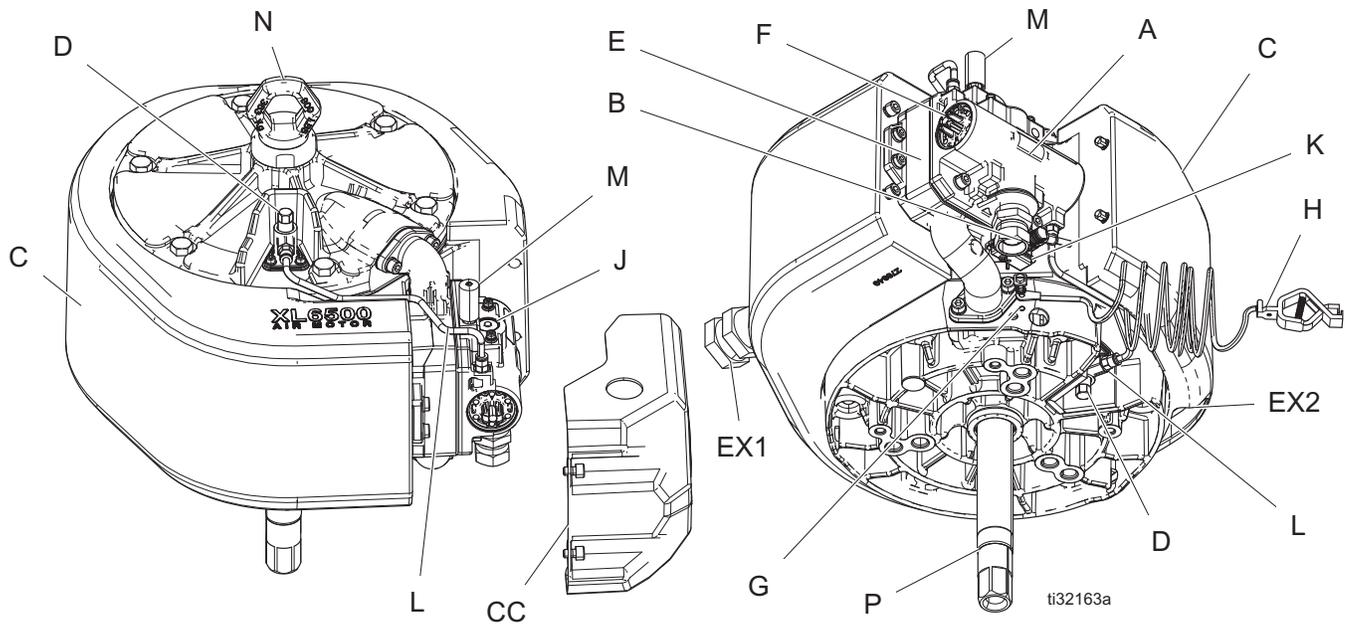
Air Motor Part Matrix

Check your motor's identification plate (ID) for the 6-digit part number of your motor. Use the following matrix to define the construction of your motor, based on the six digits. For example, Motor Part **X L 6 5 D 0** represents an XL motor (**XL**), 6500 cc per stroke (**6 5**), with standard exhaust (**D**) and no accessories (**0**).

XL	6 5		D		0	
First and Second Digits (Motor)	Third and Fourth Digits (motor size in cc per stroke)		Fifth Digit (Exhaust Type)		Sixth Digit (Accessories)	
XL (XL Air Motor)	65	6500 (10.38 in., 264 mm)	D	De-Icing. this motor has a full ported exhaust for the highest pumping performance and virtually no ice build-up compared to other motors.	0	None
	34	3400 (7.5 in., 190 mm)	L	Low Noise. This motor has a slightly slower exhaust than the "D" type and a muffled direct flow nozzle within the main muffler. This means the motor does not have full performance at higher cycle rates. It is quieter with less ice build-up than previous low noise motors.	1	Linear Sensor - Non-Hazardous Area
			R	Remote exhaust. this motor has an aluminum outlet manifold with a 1-1/4 in. npt port for connecting the user's exhaust hose.	2	Linear Sensor - Hazardous Area (XM only)

NOTE: DataTrak available as accessory kits.

Component Identification



Key:

- A Directional Air Valve
- B Air inlet, 3/4 in. npsm union 1 in. npt valve
- C Muffler (Static Free)
- D Pilot Valve (qty. 2)
- E Manifold
- F Manual Shuttle Override Button (qty. 2)
- G Ground Screw
- H Static Ground Cable
- J Plug for Optional DataTrak Solenoid

- K Optional Reed Switch Mount
- L External Pilot Lines
- M De-Ice Bleed Air Valve
- N Lift Ring (800 lb, 363 kg) Maximum
- P Pump Drive Rod
- CC Control Cover
- EX1 Exhaust Port (Remote Exhaust version) 1 1/4 npsm
- EX2 Exhaust Port (D and L versions)

General Information

The XL air motor has two pilot valves operating a cup and plate main air shuttle valve. Air exhausts around the cylinder, through sound absorption materials, and out the rear bottom of the shroud, except in remote exhaust models.

Application

The XL3400 and XL6500 replace the NXT3400 and NXT6500 motors. The XL motors have fewer parts, extended output performance, and superior icing characteristics. Mounting and pump tie rod connections are the same as the NXT motors. The air inlet shifts slightly to the right.

Reciprocating Signal Poppets

The poppet valves are similar to the ones used in the Graco Merkur® motors and many air-operated double diaphragm motors. Poppets are fully accessible and can easily be replaced. They are mounted in thermally isolated housings. This allows for cold weather operation without running the air through the aluminum manifold, which can sometimes get cold enough for airline moisture to freeze and block the signals.

External Pilot Lines

The external pilot lines (L) that run from the shuttle end ports to the pilot valves are run externally in plastic tubing. This allows for cold weather operation without running the air through the aluminum manifold, which can sometimes get cold enough for airline moisture to freeze and block the signals.

Manual Shuttle Override Buttons

There is a manual shuttle override button (F) on each end of the air valve that allows the internal main shuttle valve to be physically moved from one position to the other. Run the motor manually to:

- Move the valve off center due to ice or debris.
- Flush a pump if a pilot valve is plugged, stuck in the open position, or the signal is leaking.

See **Run Motor Manually** on page 9.

Low Pressure Operation

This motor will run at 4–5 psi (27.5–34.4 kPa, 0.27–0.34 bar) to avoid fast break away cycling when flushing the pump.

Performance

The directional air valve (A), manifold (E), and exhaust are larger than the NXT air handling parts in order to exhaust the compressed air from the cylinder after a full stroke. This allows the fluid pressure to come back faster as the piston is driven from the other side. The near square pressure trace that this generates makes for a small change-over pulse, and full pressure output for running multiple guns.

Minimum Icing

The oversizing of all the air handling parts described in the General Information section mean that normal air motor ice buildup has less effect on the pump output.

The motor also has a patent-pending design which allows unobstructed controlled expansion of the exhaust. This allows for all the moisture in the exhaust to freeze before it directly hits anything. The ice crystals then blow out with the exhaust. The thermally isolated poppet valves stay warmer than in previous air motors so that the motor can be used in near freezing ambient temperatures.

Bleed Air

Under extreme icing conditions, use the de-ice bleed air valve (M) to run warm air through the valve and exhaust for de-icing. This is mainly helpful during warm weather, very high humidity applications, or low pressure high cycle rate applications.

Extended Capabilities

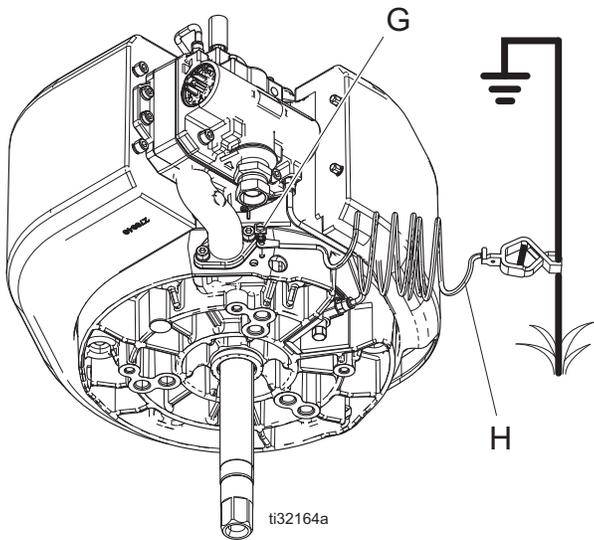
The XL motor will accept:

- DataTrak™ Cycle Counting Kit
- DataTrak™ Cycle Counting with Runaway Protection Kit

Grounding

				
<p>The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.</p>				

Verify that the ground screw (G) is attached and tightened securely to the air motor. Connect the clamp of the static ground cable (H) to a true earth ground.



Motor Lubrication

Graco does not require lubrication beyond the grease installed at the factory or through regular maintenance. With good quality compressed air and normal ambient conditions XL air motors will run millions of cycles without additional lubrication.

However, if any of the following criteria apply to your system, you will benefit from installing a 3/4 in. air line lubricator in the air line before the air motor or from occasionally adding oil to the air inlet line.

- Air supply does not contain any oil.
- Air supply is very wet.
- Air supply is very dry.
- Air motor is run at low air pressure.
- Air motor is run in unusually hot or cold environments.

Areas that benefit from lubrication:

- Main piston o-rings (13)
- Sliding valve spool (304, 306)
- Motor detent assembly (305)
- Motor shaft seal (4)

Add Lubrication

Methods for adding lubrication are described below.

Lubricate Air Valve

Perform these steps annually, or more often depending on your duty cycle, air pressure, and air quality. Use a high quality lithium-based grease.

- Remove and disassemble the air valve (see **Repair Air Valve** on page 14).
- Grease all visible moving parts, especially detent and valve pistons.

Add Accessory Air Lubricator for Motor Lubrication

- To add a lubricator to an XL3400 or XL6500, order Kit 244841 (see form 406512).
- Add oil to line for whole motor lubrication. Disconnect air line close to the motor and add 1-2 cc of SW30 oil.

NOTE: Adding oil to the air motor will result in some oil being present in the exhaust air.

Minimum Accessories Needed to Run Air Motor

Bleed-type Master Air Valve



Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury from splashing or moving parts. Follow the **Pressure Relief Procedure** on page 13 to remove trapped air.

- Required in your system to relieve air trapped between it and the air motor when the valve is closed.
- Be sure the valve is easily accessible from the pump and located downstream from the air regulator.

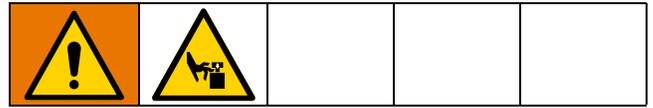
Air Regulator

Required in your system to adjust the air pressure to the motor and fluid outlet pressure of pump. Locate it close to the motor. Install a gauge to read air pressure.

Air Filter

Required in your system to remove harmful dirt and moisture from compressed air supply. The minimum recommended air filtration is 40 micron.

Run Motor Manually



Use the manual override buttons (F) on each end of the air valve to physically move the internal main shuttle valve from one position to the other. Run the motor manually to:

- Move the valve off center due to ice or debris.
 - Flush a pump if a pilot valve is plugged, stuck in the open position, or the signal is leaking
1. Lower the air pressure to approximately 30–40 psi (206 kPa, 2.06 bar – 276 kPa, 2.75 bar) to manually operation the buttons.
 2. If a pilot valve is plugged:
 - a. Press the button on the end where the motor stopped. This will cause the motor to run another cycle.
 - b. Press the button again to finish flushing.
 3. If a pilot valve is stuck in the open position or the signal is leaking:
 - a. Press the button on the opposite end from where the motor stopped and hold it in. This will cause the motor to stroke to the other end.
 - b. Release the button to allow the motor to stroke back.

NOTE: For pilot valve issues, the motor can also be manually operated by disconnecting the pilot tube from the pilot valve and controlling the pilot signal exhaust with your finger.

Troubleshooting



NOTE: To find parts lists for the parts identified in the troubleshooting tables, see page numbers listed in the table below.

Air Motor Model	Parts List Page
XL 3400	24
XL 6500	26

Problem	Cause	Solution
Air motor will not run and there is no obvious exhaust	Check air supply	Supply air to motor inlet.
	Pump is locked up.	Disconnect or remove pump to verify motor operation.
	Ice broke loose in manifold and caught in air valve.	Turn off and exhaust air. Push top and bottom manual shuttle override buttons (F) back and forth until flush with base of valve cap (316). Restart motor.
Air motor doesn't run and large volume of air blows through exhaust outlet on either stroke.	Main motor piston o-ring (6) has failed or main valve. See below.	Replace piston o-ring (6). See Piston Seal Replacement , page 20.
Air exhausts from rear outlet continuously when motor is stalled against fluid valve on one stroke or the other.	Shuttle valve cup (313) and plate (314) failure.	Replace shuttle valve cup (313) and plate (314).
Motor stalled at bottom of stroke with no exhaust at bottom pilot. No exhaust at top pilot.	Bottom pilot valve (D) is not exhausting. Usually ice in the pilot or pilot exhaust port.	Disconnect pilot line (L) for that pilot. If motor changes over, bottom pilot is plugged. Replace pilot valve and/or thaw ice that is blocking air signal.
	Metered air hole in main valve shuttle piston (304) is plugged.	Disconnect pilot line (L). If motor still doesn't change over, shuttle piston metering hole is plugged. Clean or replace shuttle valve piston assembly (304).
Motor stalled at bottom of stroke with exhaust at bottom pilot. Some exhaust at top pilot.	Top pilot or fittings are leaking air when not activated by motor piston.	Tighten fittings leak or replace top pilot valve (D).

Problem	Cause	Solution
Motor stalled at top of stroke with no exhaust at top pilot.	Top pilot valve (D) is not exhausting. Usually ice in the pilot or pilot exhaust port.	Disconnect pilot line for that pilot. If motor changes over, top pilot is plugged. Replace pilot valve and/or thaw ice that is blocking air signal.
	Metered air hole in main valve shuttle piston (304) is plugged.	Disconnect pilot line. If motor still doesn't change over, shuttle piston metering hole is plugged. Clean or replace shuttle valve piston assembly.
Motor stalled at top of stroke with exhaust at top pilot. Some exhaust at bottom pilot.	Bottom pilot or fittings are leaking air when not activated by motor piston.	Tighten fittings leak or replace bottom pilot valve (D).
Air motor "bounces" (does not fully complete its stroke) at top change over.	Leaking bottom pilot valve (D) or fitting.	Thaw any ice in pilot valve, or replace valve (D) if it is not ice.
Air motor "bounces" (does not fully complete its stroke) at bottom change over.	Leaking top pilot valve or fitting.	Thaw any ice in pilot valve, or replace valve (62) if it is not ice.
Air motor pauses at top change over.	Top pilot valve exhaust restricted by dirt or ice.	Swap pilot valve or clear exhaust port.
Air motor pauses at bottom change over.	Bottom pilot valve exhaust restricted by dirt or ice.	Swap pilot valve or clear exhaust port.
Motor runs slower and pump loses fluid pressure on one stroke only.	Ice has collected in air manifold passages, or valve.	Thaw or remove ice. Lower moisture content of compressed air. Reduce load on motor. See below.
Motor runs slower and pump loses fluid pressure on both strokes equally.	Ice has collected where exhaust expands from the shuttle valve plate manifold (E) into the muffler (C)	Open the de-ice bleed air valve (M) on the main shuttle valve. This will bleed some warm air through any-time air is supplied to the motor.

Ice In Air Motor

When compressed air is exhausted, the sudden drop in pressure causes the air temperature to drop below the freezing point. This causes any water liquid or vapor to turn to ice.

Higher air pressures pack high amounts of air and water vapor in each cycle and create more expansion and ice. Higher cycle rates also build up the ice and lower the motor temperature faster. It is important to select the correct motor and pump size to run at a lower pressure, and cycle slower.

Warm humid climates can produce high levels of icing because of the higher humidity levels. Low ambient temperatures near freezing make it easier for the motor parts to drop below freezing.

To minimize ice build-up:

- **Lower the dew point of the compressed air.** Use a refrigerated air dryer, coalescing filter, or desiccant filter to lower the water vapor content of the air.
- **Raise the compressed air temperature.** Warmer air going in helps the motor parts stay above freezing. Compressed air, especially at these volumes, is warm when compressed. Keep the air warm or stay near the compressor to reduce icing.
- Use the bleed air to clear ice build up.

Repair

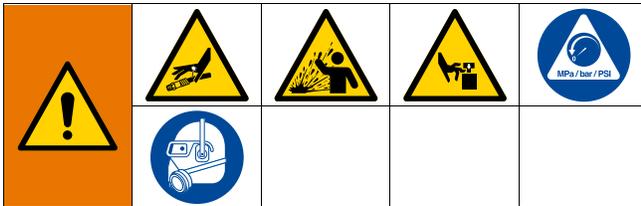
Preventive Maintenance Schedule

The operating conditions of your system determine how often maintenance is required. Establish a preventative maintenance schedule by recording when and what kind of maintenance is needed, and then determine a regular schedule for checking your system.

Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol



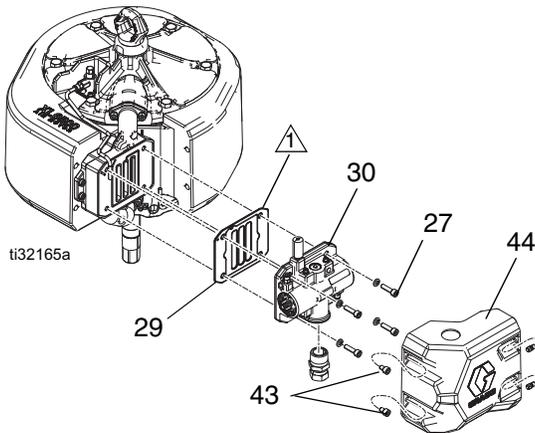
This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing equipment.

1. Engage trigger lock.
2. Close the bleed-type master air valve.
3. Disengage the trigger lock.
4. Hold a metal part of the gun firmly to a grounded metal pail. Trigger the gun to relieve pressure.
5. Engage the trigger lock.
6. Open all fluid drain valves in the system, having a waste container ready to catch drainage. Leave drain valve(s) open until you are ready to spray again.
7. If you suspect the spray tip or hose is clogged or that pressure has not been fully relieved:
 - a. **VERY SLOWLY** loosen tip guard retaining nut or hose end coupling to relieve pressure gradually.
 - b. Loosen nut or coupling completely.
 - c. Clear hose or tip obstruction.

Repair Air Valve



Replace Complete Air Valve



Apply high quality lithium grease.

1. Stop the pump at the middle of its stroke. Follow the **Pressure Relief Procedure**, page 13.
2. Use a 6mm Allen wrench to remove two screws (43) and remove cover (44).
3. Disconnect the air line to the motor and the pilot valve lines to the air valve (30).
4. If installed on air motor, remove reed switch kit and solenoid from air valve (30).
5. Use a 6mm Allen wrench to remove screws (27). Remove the air valve (30) and gasket (29).
6. To install a replacement air valve, continue with step 7. To repair the air valve, go to **Disassemble the Air Valve**, page 14, step 1.
7. Align the new air valve gasket (29) on the manifold, then attach the air valve (30).

NOTE: Use grease to hold the gasket (29) in place. Be sure the bleed air hole in the gasket aligns with the bleed port in the valve manifold.

8. Reattach the solenoid bracket and the solenoid, if needed.

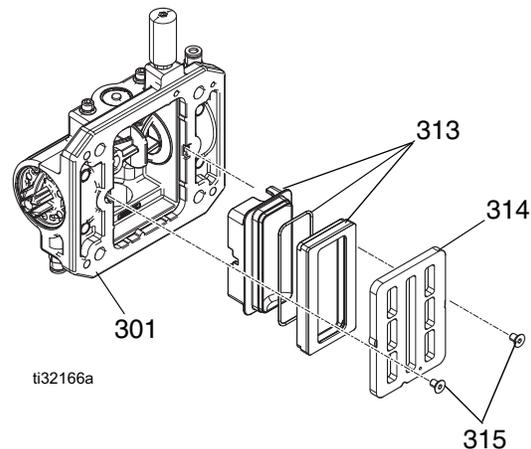
9. Use screw to attach the reed switch assembly to the new air valve, if needed. Be sure the sensor cables are connected properly (see pump or package manual).
10. Reconnect the air line and pilot valve lines to the motor.
11. Re-install cover (44) and tighten two screws (43).

Replace Seals or Rebuild Air Valve

See **Kits and Accessories**, page 29, to order kits for your pump.

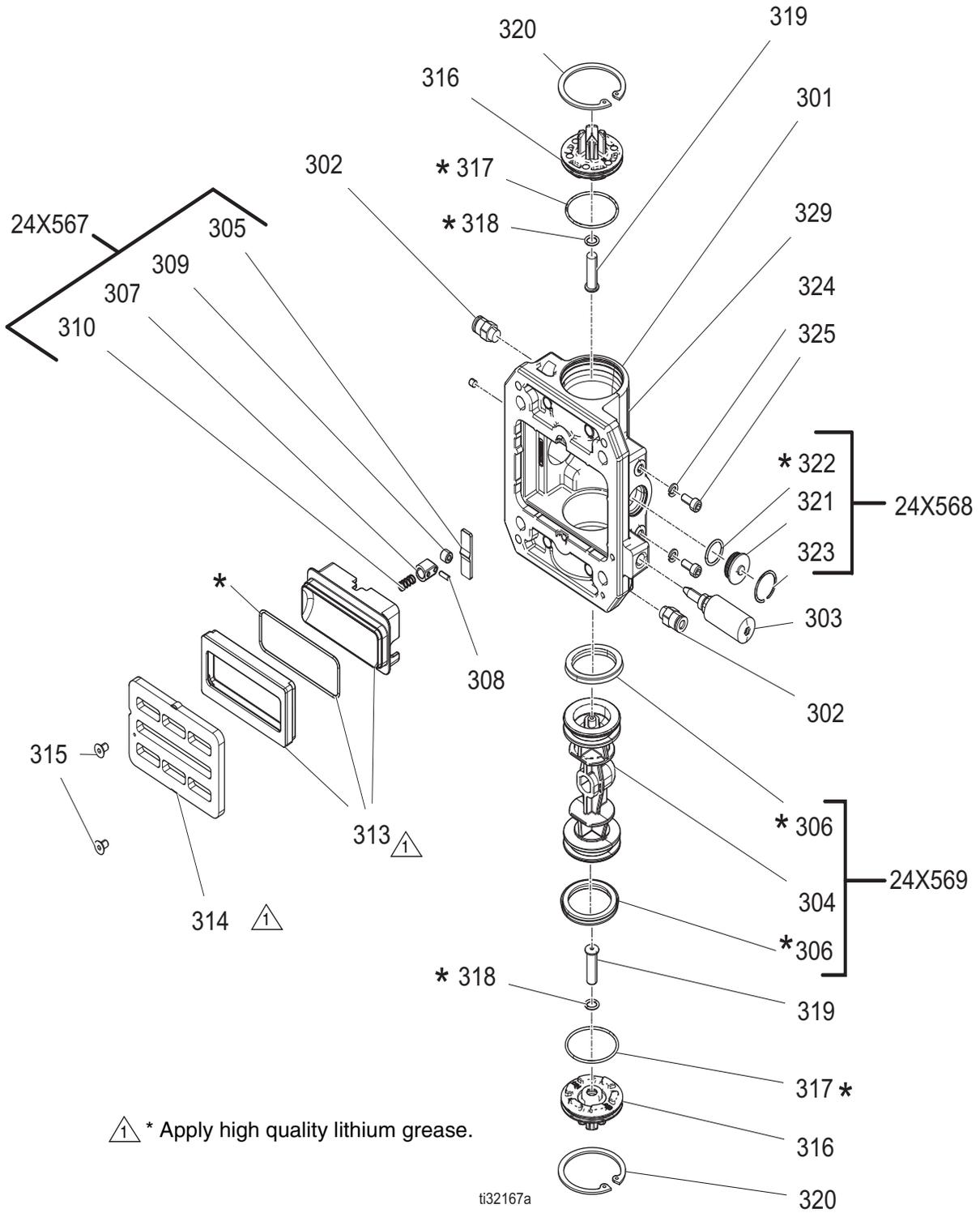
Disassemble the Air Valve

1. Perform steps 1–5 from **Replace Complete Air Valve**, page 14.
2. Use a 3 mm hex key to remove two screws (315). Remove the valve plate (314).
3. Remove the two-piece cup assembly (313), and spring (310).



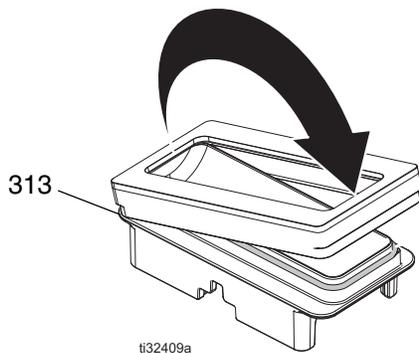
4. Remove the retaining ring (320) from each end. Use the piston (304) to push the end caps (316) out of the ends. Remove end cap o-rings (317).
5. Remove manual shuttle override buttons (319) from inside end caps.
6. Remove manual shuttle override button o-rings (318).
7. Slide out the piston (304). Ramp (305) is adhered to the housing (301) and can be reused.

Repair Air Valve



Reassemble the Air Valve

1. The piston (304) and u-cup seals (306) come pre-assembled. Lubricate the u-cup seals (306) on both ends of the piston (304) and install it in the housing.
2. Lubricate and install the detent assembly (307) into the piston, with the beveled center toward the detent cam.
3. Lubricate and install new o-rings (317) on end caps (316). Lubricate and install new o-rings (318) and manual shuttle override buttons (319) on end caps (316). Install the end caps into the housing.
4. Install a snap ring (320) on each end to hold end caps in place.
5. Install the spring (310).
6. The cup assembly (313) comes pre-assembled and shipped as one part. If for any reason it has come apart, lubricate and install the cup o-ring on the cup body. Align the short ends of the cup base and cup body then slowly bring the cup body together with the cup base. Lubricate the cup assembly. Align the small round magnet with the air inlet.



NOTE: One inside corner is square on each half. Both square corners must be aligned when assembled together.

NOTICE

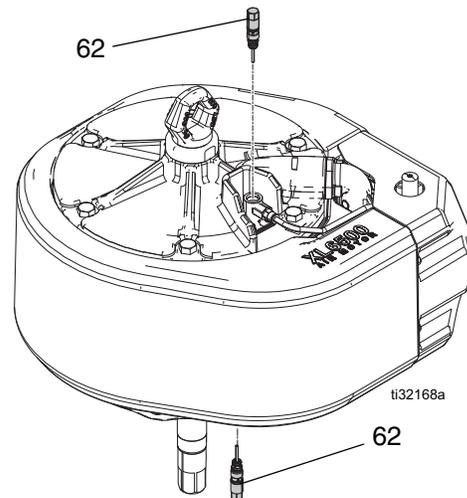
When assembling cup body to cup base, o-ring can be pinched and damage could occur. Use a small round tool to push any protruding portions of the o-ring into the cup base cavity and form a proper seal.

7. Install the valve plate (314). Lightly tighten the screws (315) to hold it in place.

Replace Pilot Valves



1. Stop the pump at the middle of its stroke. Relieve the pressure. See **Pressure Relief Procedure**, page 13.
2. Disconnect the air line to the motor.
3. Use a 1/2 in. or 13 mm socket wrench to remove the old pilot valves (62).
4. Lubricate and install the new pilot valves (62). Torque to 95-105 in-lb (11-12 N•m).



Repair Air Motor



Refer to applicable system manual for alternate air motor removal steps.

Air Motor Seal Kits are available. See **Kits and Accessories**, page 29 for the correct kit for your motor. Parts included in the kit are marked with an asterisk (*). For best results, use all the parts in the kit.

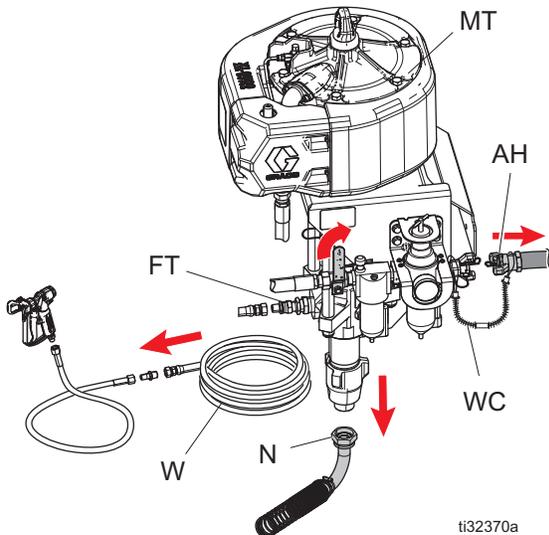
Required Tools

- Set of adjustable wrenches
- Torque wrench
- Rubber mallet
- Thread lubricant
- Anti-seize lubricant 222955
- Loctite® 2760™ or equivalent

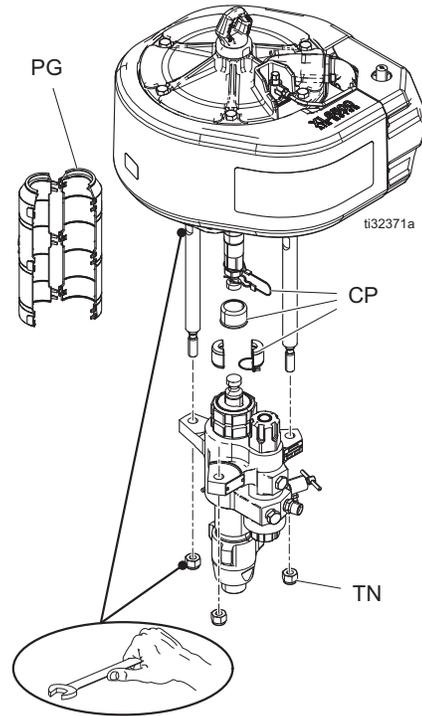
Disconnect and Reconnect Lower

1. Flush the pump, if possible (see package manual). Stop pump at bottom of its stroke. Follow the **Pressure Relief Procedure**, page 13.
2. Disconnect the air hose (AH).
3. Disconnect fluid hose (W). Hold fluid outlet fitting with a wrench to keep it from loosening while you disconnect suction hose (N).

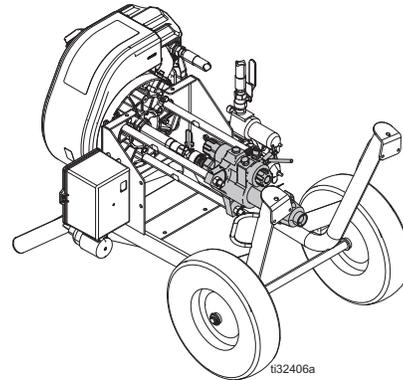
NOTE: Note the relative position of the fluid outlet fitting (FT) of the lower to inlet of the motor (MT) for easier reassembly alignment. If the motor does not require service, leave it attached to its mounting.



4. Remove pump guard (PG) and coupling (CP).



5. Tip the cart onto its back.



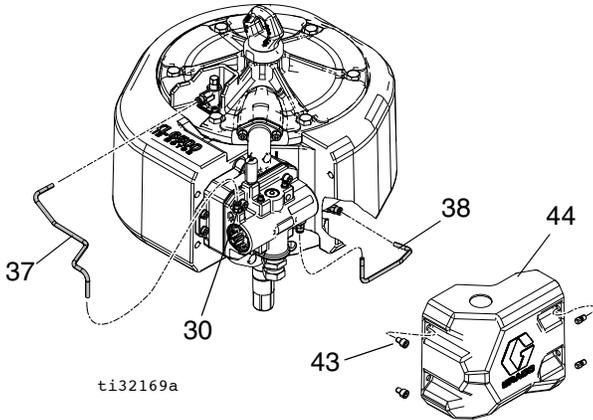
NOTE: Lay rags on the floor to catch TSL that may spill out of the packing nut.

6. Remove the tie rod nuts (TN).
7. Hold the lower and slide it off the tie rods to remove. Refer to the Lower manual to service the lower.
8. Reconnect the lower by following the disconnect steps in reverse order.

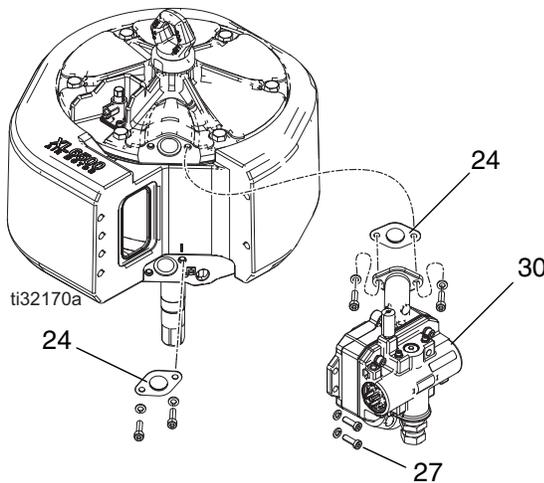
NOTE: Torque nuts to 50-60 ft-lb (68-81 N•m).

Disassemble the Air Motor

1. Follow steps 1 - 7 in **Disconnect and Reconnect Lower**, page 17.
2. Use a 6mm Allen wrench to remove two screws (43) and remove cover (44).
3. Disconnect pilot valve air lines (37, 38) from the air valve (30).



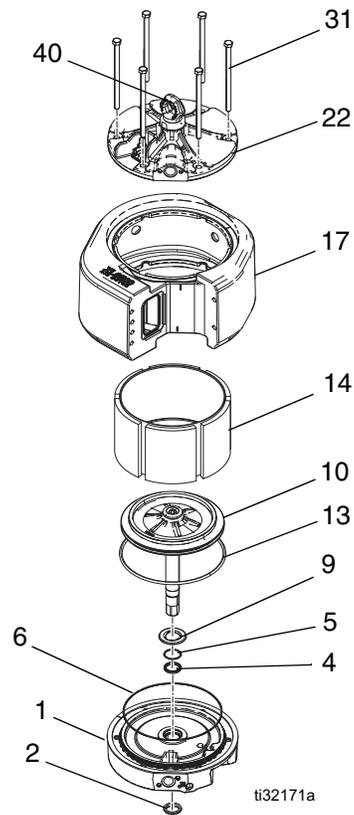
4. Remove six screws (27) and remove the manifold and valve (25, 30) and two gaskets (24). Inspect foam for damage.



8. Slide the piston assembly (10) straight up off the bottom cover (1).

NOTE: The piston and rod are epoxied together and only available as an assembly (10). Do not attempt to take apart the piston and rod assembly.

9. Remove the o-ring (13) from around the piston (10).
10. Use a flathead screw driver to remove the retaining ring (5) from the bottom cover (1).
11. Remove the u-cup seal (4), and wiper (2) from the bottom cover (1).



5. Use a 3/4 in. or 19 mm socket wrench to remove the bolts (31).

6. Remove the top cover (22). Remove the o-ring (6).

NOTE: To break the cover loose, place a pipe or a long wrench handle through the lift ring (40) and hit the pipe.

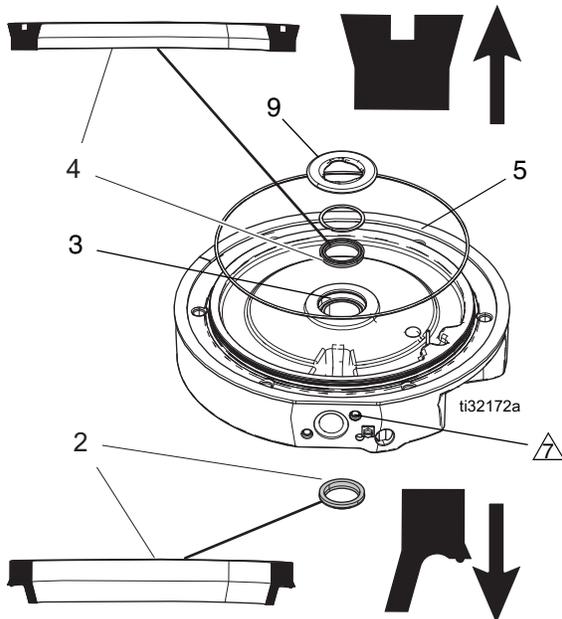
7. Remove the muffler (17) from around the cylinder. Remove the cylinder (14).

Reassemble the Air Motor

NOTE: For additional parts information, see **Parts** beginning on page 24.

NOTE: The bearing (3) is pressed in the bottom cover (1) and is only available with Bottom End Cap Repair kit 17V316 (XL6500) or 17V315 (XL3400).

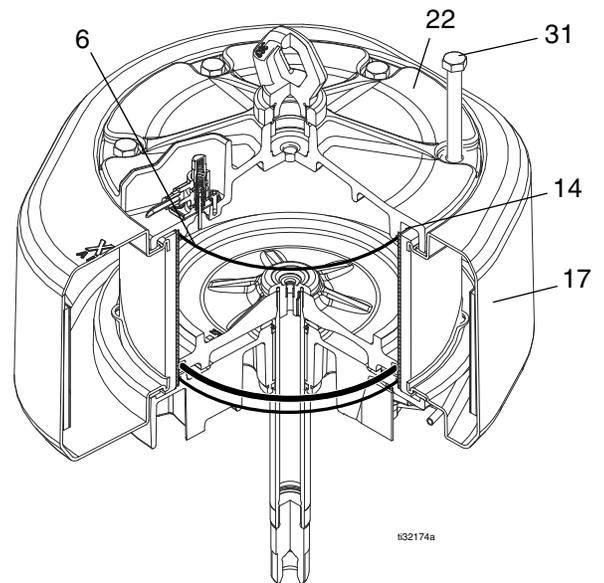
1. Lubricate and install wiper (2) on the bottom cover (1).
2. Lubricate and install new u-cup seal with flange (4), with the lips facing up, in the bottom cover (1) from the bottom. The seal will snap into place.



 Install the muffler (17) around the cylinder (14) and in the groove on the bottom cover (1). Be sure the front opening is lined up with the flat on the bottom cover (1). There are two small lines molded into the muffler. These line up with the closest manifold (25), mount screw holes on the bottom cover (1), and the top cover (22). Be sure both gaskets (16) are on the muffler (17).

3. Lubricate and install the new u-cup seal (4) over the top of the bearing (3) with the lips facing up. Install retaining clip (5). Snap in the new bumper (9).
4. Lubricate the inside of the cylinder (14). Lower the cylinder onto the bottom cover (1).
5. Lubricate and install the o-ring (13) around the piston (10). It will fit loose.

6. Slide the piston assembly (10) down into the cylinder (14). Be sure the o-ring (13) stays in place. Work it carefully into the groove.
7. Lubricate and install the o-ring (6) on the top cover (22).
8. Carefully place the top cover (22) on the cylinder (14) and muffler (17). The flat vertical manifold surfaces of the top and bottom covers must align. Be sure the muffler (17) is in the groove on both the top and bottom covers.



9. Install the bolts (31) hand tight.
10. Tighten the bolts (31) halfway. Work in a crisscross pattern. Then torque to 60 ft-lb (81 N•m).
11. Install two gaskets (24) and screws (27) on manifold (25). Install manifold (25). Torque bolts (27) to 95-105 in-lb (10.7-11.9 N•m).
12. Reconnect the pilot valve air lines (37) to the air valve (30) and poppet valves (62).

Piston Seal Replacement

Removal

Refer to the illustration on the following page for the instructions below.

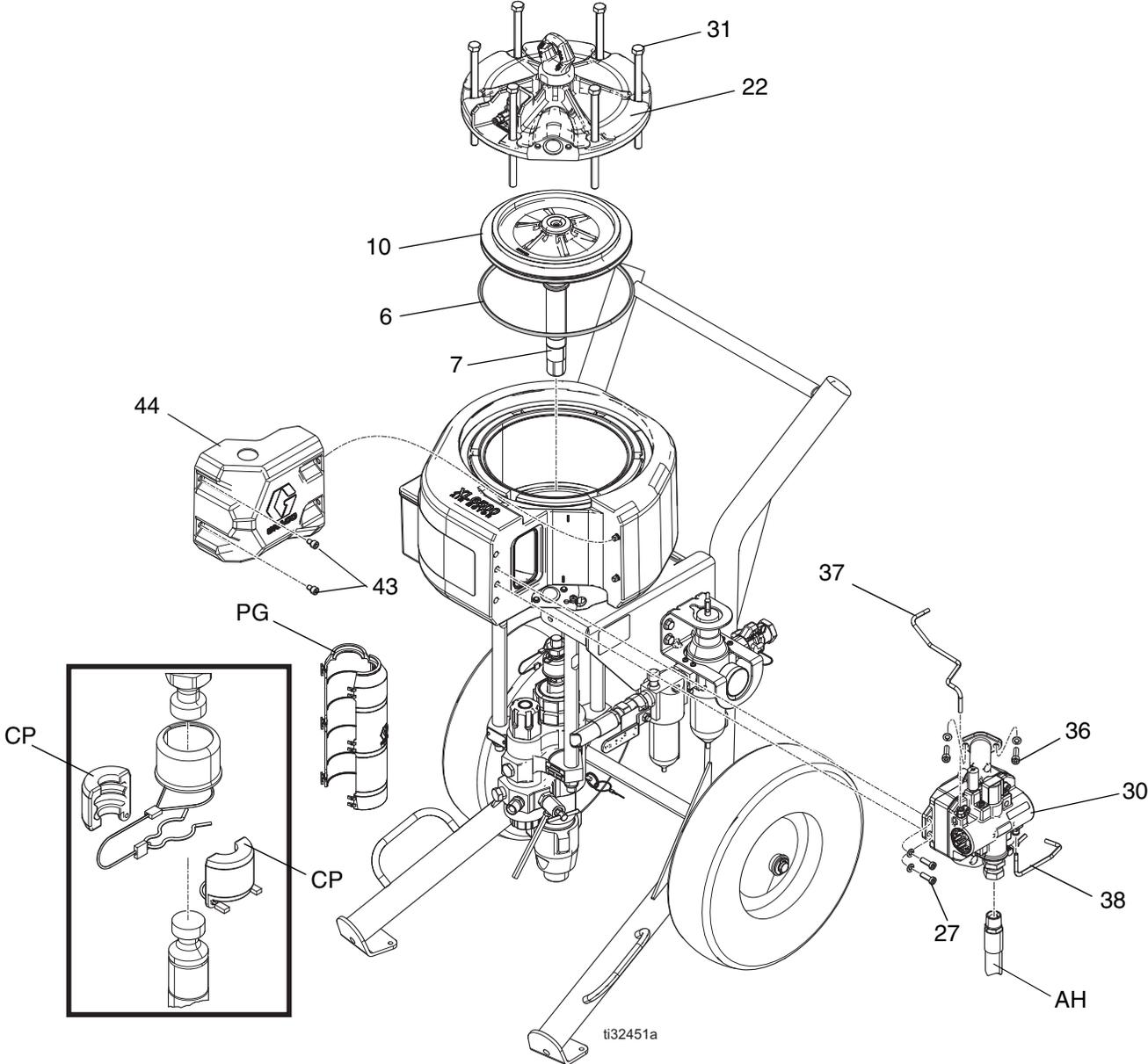


1. Follow the **Pressure Relief Procedure**, page 13.
2. Remove air intake hose (AH).
3. Remove pump guard (PG) and coupling (CP).
4. Remove two screws (43) and air valve cover (44).
5. Remove pilot lines (37, 38).
6. Remove two screws (27), four screws (36) and air valve assembly (30).
7. Remove six bolts (31) on top of motor cover (22), then remove cover.
8. Slide piston rod (7) up to push piston (10) out the top of the motor.
9. Remove piston seal (6).

Replacement

1. Use grease to lubricate piston seal (6).
2. Install piston seal (6) onto piston (10).
3. Push piston rod (7) up. Guide piston seal (6) into motor cavity, then push piston seal down and into place with the piston.
4. Replace motor cover (22).
5. Tighten the bolts (31) halfway. Work in a crisscross pattern. Then torque to 60 ft-lb (81 N•m).
6. Install the air valve assembly (30) and tighten four screws (36) and two screws (27).
7. Install pilot lines (37, 38).
8. Install air valve cover (44) and tighten two screws (43).
9. Install coupling (CP) and pump guard (PG).
10. Install air intake hose (AH).

Piston Seal Replacement

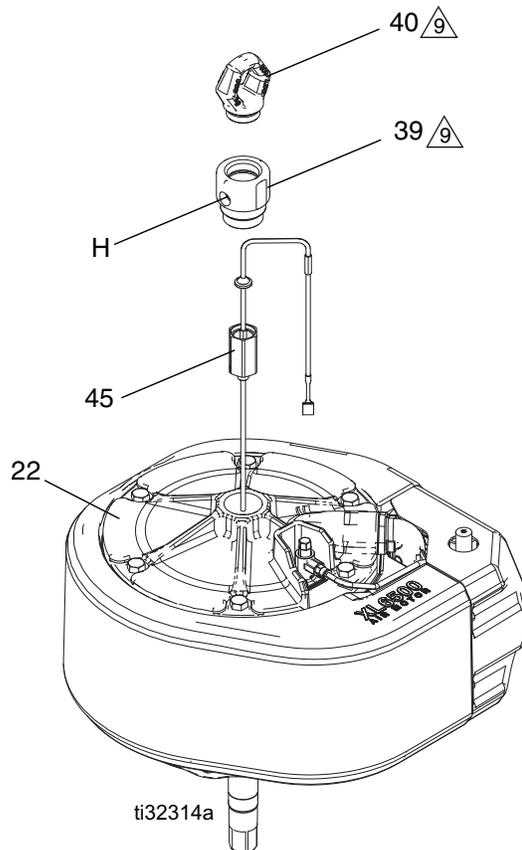


Replace the Linear Sensor (if present)



1. Stop the pump at the middle of its stroke. Follow the **Pressure Relief Procedure**, page 13.
2. Disconnect the air line to the motor.
3. Hold the adapter (39) with a wrench to keep it from turning, and unscrew the lift ring (40).
4. Thread the cable back through the hole (H) in the side of the adapter (39) and extend it out to the top of the adapter.
5. Unscrew the adapter (39) and sensor (45). Lift the sensor straight up out of the air motor.
6. Apply thread adhesive to the new sensor housing. Screw the sensor (45) into the top cap. Torque to 30-36 ft-lb (40.6-48.8 N•m).
7. Apply thread adhesive to the adapter (39). Extend the sensor cable straight up out the top of the adapter, then screw the adapter into the top cap. Torque to 30-36 ft-lb (40.6-48.8 N•m).
8. Thread the sensor cable through the hole (H) in the side of the adapter, and reconnect it to the circuit board. Carefully slide the housing onto the air valve. Thread the screws in by hand, then torque to 100 in-lb (11.3 N•m).

9. Apply thread adhesive to the lift ring (40). Hold the adapter (39) with a wrench to keep it from turning, and torque the lift ring to 30-36 ft-lb (40.6-48.8 N•m).
10. Reinstall the top cover (22).
11. Reconnect the air line to the motor.

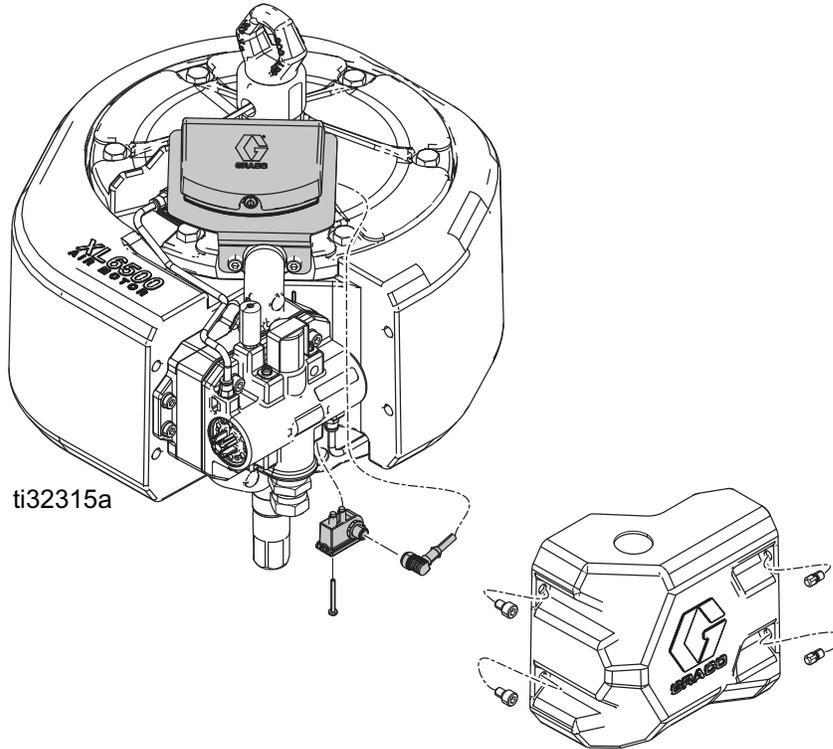


 Torque to 33 +/- 3 ft-lb (44 +/- 4 N•m).

Remote DataTrak Connection Kits 24x550 and 24x552

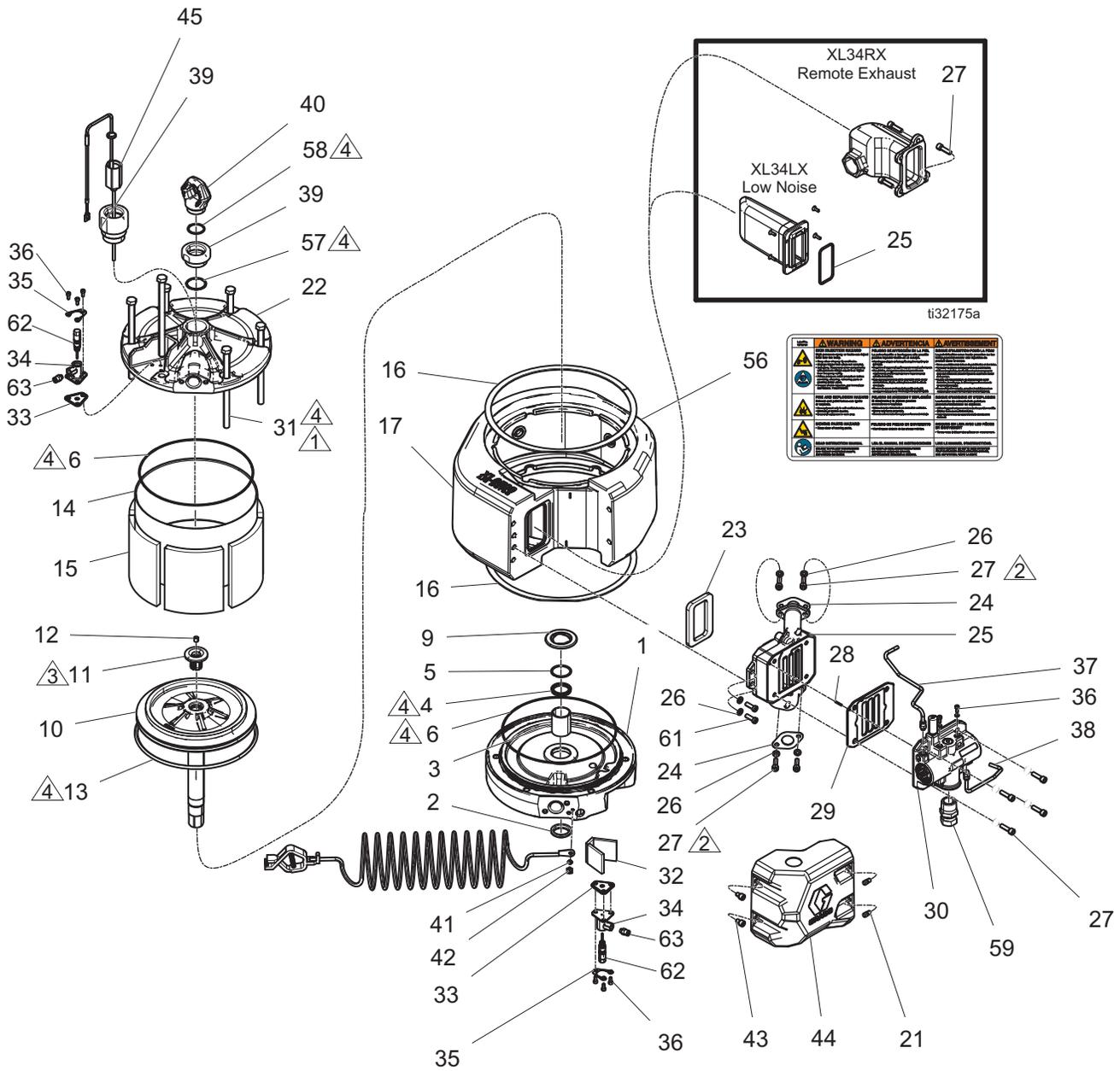


NOTE: For installation instructions, see DataTrak Kits Installation and Parts manual.



Parts

XL 6500



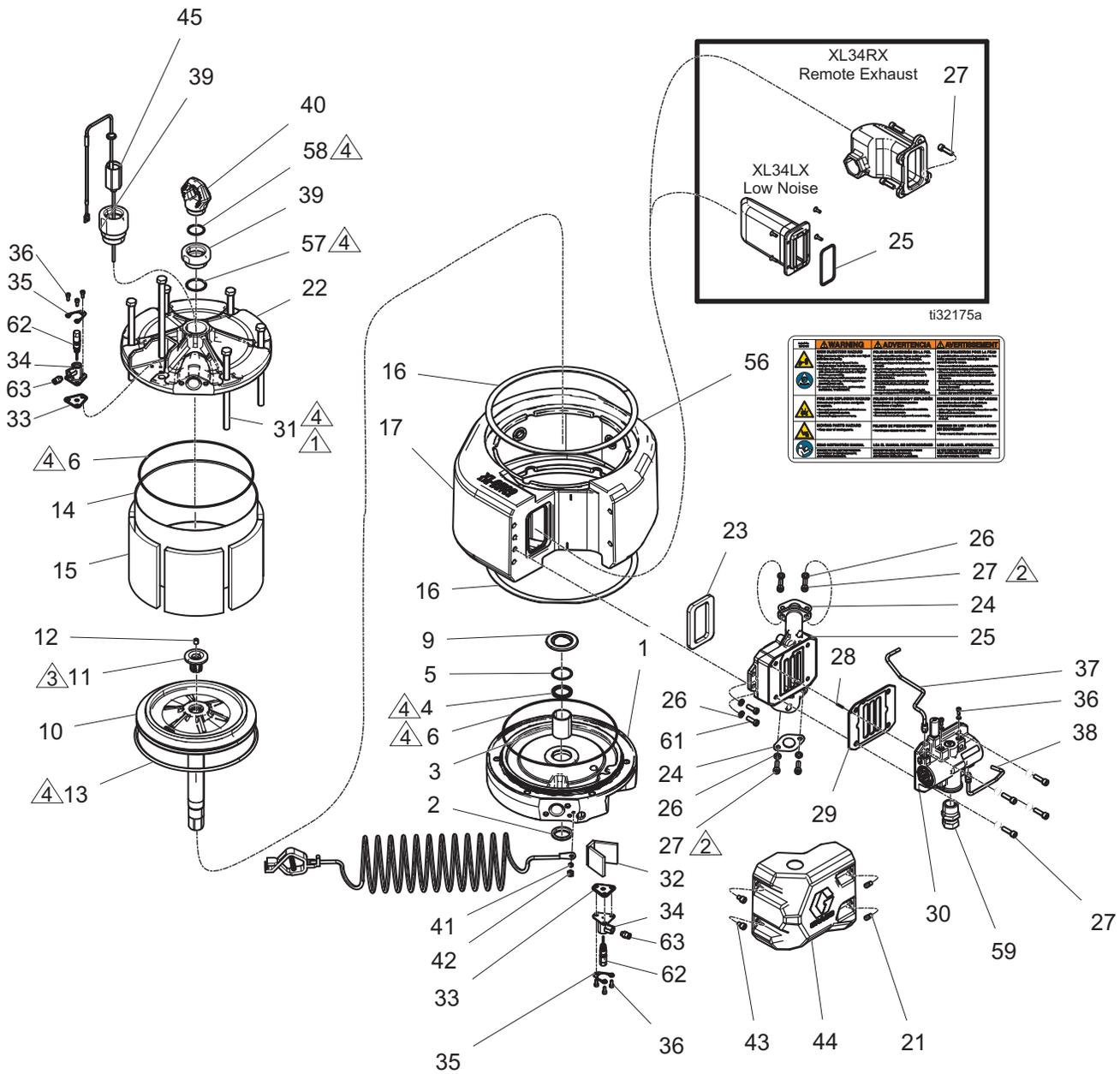
- △1 Torque evenly to 80 ft/lb (108 N•m).
- △2 Torque to 120 in/lb (13.5 N•m).
- △4 Apply lithium grease.
- △ Gasket seam aligns with exhaust hole.

XL6500 Parts List

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
1	17V316	COVER, bottom, motor, XL6500, mach	1	29	17A102	GASKET, valve	1
2	17M826	SEAL, rod, wiper, 1.375 OD shaft	1	30		VALVE, air, XL motor	1
3	-----	BEARING, sleeve, 1.375 ID, 1.625 OD	1		17V344	Standard	
4	17U129	PACKING, u-cup, 1.375 ID x 1.687 OD	1		17V345	Low noise	
5	17U128	RING, retaining, flat spiral	1	31	119050	BOLT, cap, hex head	6
6	17N415	O-RING, size 178, buna, nitrile	2	32	17S075	FOAM, temp barrier, poppet	1
7	-----	SHAFT, piston rod motor 1.38 OD	1	33	17M851	GASKET, poppet housing	2
8	17N950	ADAPTER, rod	1	34	24Z895	VALVE, poppet assembly	2
9	277366	BUMPER, motor, lower	1	35	17S929	ISOLATOR, poppet housing	2
10	17V320	PISTON, motor, XL6500	1	36	117026	SCREW, shcs m5 X 12	8
11	NXT106	BUMPER, piston	1	37	17R463	TUBE, pilot air, top, XL6500	1
12	15G747	MAGNET, linear sensor	1	38	17R464	TUBE, pilot air, top, XL6500	1
13	122675	O-RING, packing, 10.125 ID	1	39	16D001	ADAPTER, lift ring	1
14	17V314	CYLINDER, motor, 6500, fiberglass (includes 15)	1	40	NXT103	RING, lift, sst 1 9/16 thrd	1
15	120135	FOAM, damper, 6500 cylinder	3	41	111307	WASHER, lock, external	1
16	17V001	FOAM, strip, vinyl, 1/2 x 3/16	2	42	116343	SCREW, ground	1
17	17V318	MUFFLER, machined, XL6500	1	43	127463	SCREW, cap, socket head	2
21	17R716	STUD, threaded, plastic	2	44	17M776	COVER, air valve, xl6500 motor	1
22	24Z589	COVER, top, motor, XL6500	1	56▲	15F674	LABEL, safety, motor	1
23	17N539	GASKET, manifold exhaust	1	57	108014	PACKING, o-ring	1
24	17M850	GASKET, manifold	2	58	C20987	PACKING, o-ring	1
25	24Z591	MANIFOLD, exhaust, XL6500	1	59	15F073	FITTING, union, reducing, 1 in. x 3/4 in.	1
26	107542	WASHER, lock, spring	6	61	117379	SCREW, cap, m8 x 25	2
27	109114	SCREW, cap, sch	8	62	242550	VALVE, poppet	2
28	295447	PIN, dowel	1	63	115671	FITTING, 1/8 npt x 1/4 tube	2

▲ Replacement Warning labels, signs, tags, and cards are available at no cost.

XL3400 Parts



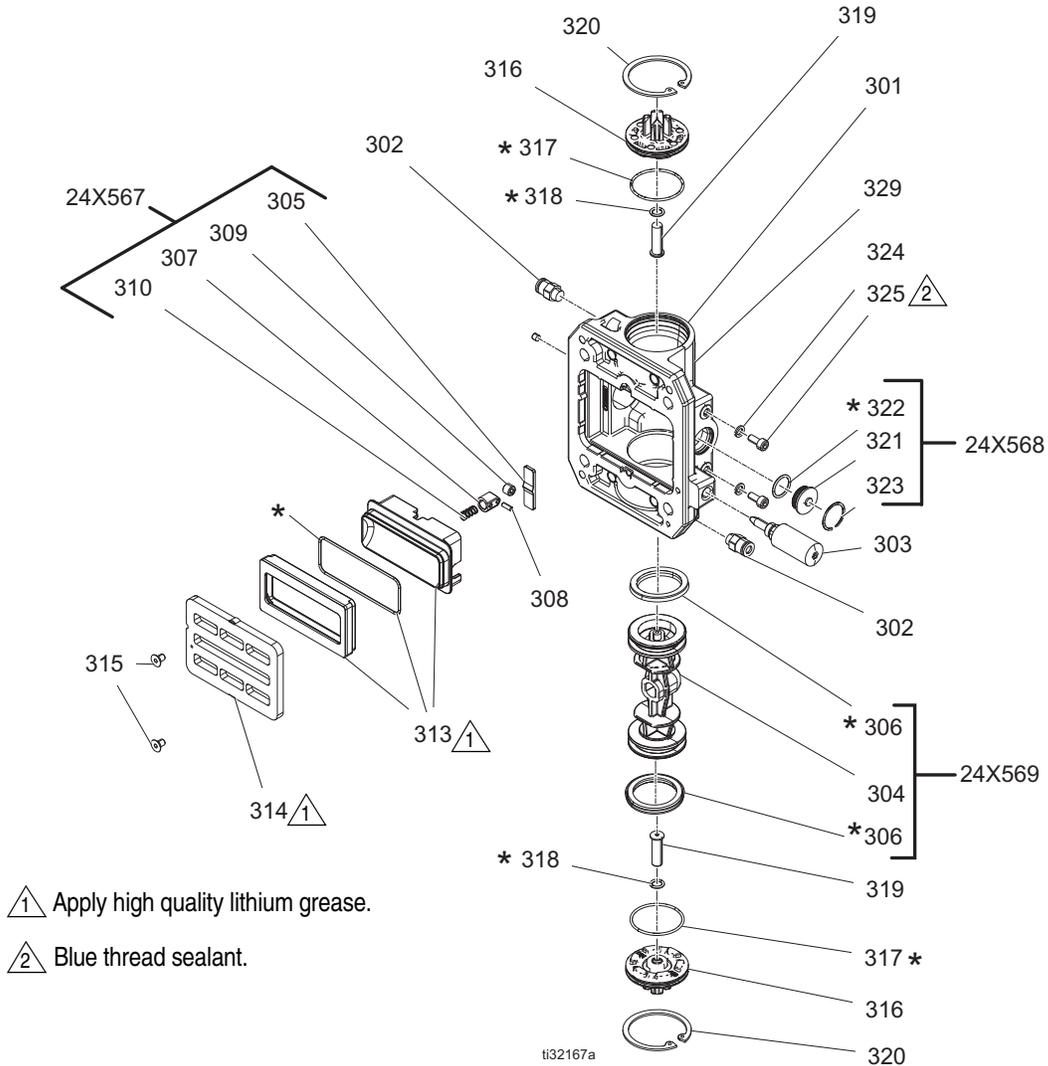
- Torque evenly to 80 ft/lb (108 N•m).
- Torque to 120 in/lb (13.5 N•m).
- Apply lithium grease.
- Gasket seam aligns with exhaust hole.

XL3400 Parts List

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
1	17V315	COVER, bottom, motor, XL3400, mach	1	30	17V344	VALVE, air, XL standard	1
					17V345	VALVE, air, XL low noise	1
2	17M826	SEAL, rod, wiper, 1.375 OD shaft	1	31	119050	BOLT, cap, hex head	6
3	-----	BEARING, sleeve, 1.375 ID, 1.625 OD	1	32	17S075	FOAM, temp barrier, poppet	1
4	17U129	PACKING, u-cup, 1.375 ID x 1.687 OD	1	33	17M851	GASKET, poppet housing	2
5	17U128	RING, retaining, flat spiral	1	34	24Z895	VALVE, poppet assembly	2
6	17U130	O-RING, size 166, buna nitrile	2	35	17S929	ISOLATOR, poppet housing	2
7	-----	SHAFT, piston rod motor 1.38 OD	1	36	117026	SCREW, shcs M5 X 12	8
8	17N950	ADAPTER, rod	1	37	17T943	TUBE, pilot air, top, XL3400	1
9	277366	BUMPER, motor, lower	1	38	17T944	TUBE, pilot air, bottom, XL3400	1
10	17V319	PISTON, motor, XL3400	1	39	16D001	ADAPTER, lift ring	1
11	15G478	BUMPER, piston	1	40	NXT103	RING, lift, sst 1 9/16 thrd	1
12	15G747	MAGNET, linear sensor	1	41	111307	WASHER, lock, external	1
13	122434	O-RING, packing	1	42	116343	SCREW, ground	1
14	17V313	CYLINDER, motor, 3400, fiberglass (includes 15)	1	43	127463	SCREW, cap, socket head	2
15	120418	FOAM, dampener 3400 cyl quiet	3	44	17M776	COVER, air valve, XL6500 motor	1
16	17V002	FOAM, strip, vinyl, 1/2 x 3/16	2	56▲	15F674	LABEL, safety, motor	1
17	17V317	MUFFLER, XL3400, kit	1	57	108014	PACKING, o-ring	1
21	17R716	STUD, threaded, plastic	2	58	C20987	PACKING, o-ring	1
22	24Z966	COVER, top, motor, XL3400	1	59	15F073	FITTING, union, reducing, 1 in. x 3/4 in.	1
23	17N539	GASKET, manifold exhaust	1	61	117379	SCREW, cap, m8 x 25	2
24	17M850	GASKET, manifold	2	62	242550	VALVE, poppet	2
25	24Z591	MANIFOLD, exhaust, XL6500	1	63	115671	FITTING, 1/8 npt x 1/4 tube	2
26	107542	WASHER, lock, spring	6				
27	109114	SCREW, cap, sch	8				
28	295447	PIN, dowel	1				
29	17A102	GASKET, valve	1				

▲ Replacement Warning labels, signs, tags, and cards are available at no cost.

Air Valve Parts (17V344 - Standard Valve, 17V345 - Low Noise Valve)



Parts List

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
301	-----	HOUSING, air valve, XL, machined	1	317*	104010	PACKING, o-ring	2
302	115671	FITTING, connector, male	2	318*	154741	PACKING, o-ring	2
303	24Z604	VALVE, needle, assembly	1	319	17S646	PIN, reset, XL air valve	2
304	-----	PISTON, air valve, XL	1	320	557832	RING, retaining	2
305	-----	CAM, detent, XL	1	321	-----	PLUG, valve, molded	1
306	-----	PACKING, u-cup	2	322*	104130	PACKING, o-ring	1
307	-----	PISTON, detent	1	323	-----	RING, retaining	1
308	-----	PIN, detent	1	324	112903	WASHER, lock, spring	2
309	-----	ROLLER, detent	1	325	117026	SCREW, shcs M5 X 12	2
310	-----	SPRING, detent	1	326	-----	LUBRICANT, grease	1
313	17N630	BASE, CUP, VALVE, AIR, XL, lapped	1	327	-----	SEALANT, anaerobic, blue	1
314	16X648	PLATE, valve, air, XL, lapped	1	328	-----	ADHESIVE, cyanoacrylate	1
315	-----	SCREW, flat head, M5, thread form	2				
316	17N617	CAP, valve, air, XL, machined	2				

* Included in o-ring Kit 24X563.

Kits and Accessories

Table 1 XL Air Motor Repair Kits

Part No.	Description	Air Motor Parts Ref.
NXT103	Lift Ring	(40)
6500: 17V320 3400: 17V319	Piston/Rod Assembly Repair Kit	
15G478	Bumper and magnet	(11)
15G747	Piston and adapter	(12)
-----	Shaft, Piston, Rod	(4)
6500: 3400:	Air Motor Soft Parts Repair Kit	
-----	O-ring, Cylinder (2)	(6)
155685	Packing, O-ring, middle, poppet	(62x)
-----	Packing, U-cup, shaft	(62x)
154741	Packing, O-ring, bottom, poppet	(62x)
197650	O-ring, Buna, top, poppet	(62x)
-----	O-ring, piston	(13)
-----	Packing, U-cup	(4)
-----	Wiper, Rod	(2)
-----	Ring, Retaining	(5)
-----	Gasket, End Cap (2)	(24)
-----	Gasket, Muffler	(16)
24X565	Gasket, valve	(29)
17M851	Gasket, poppet	(33)
17N539	Gasket, exhaust	(23)

6500: 17V316 3400: 17V315	Bottom Cover Repair Kit	
-----	Bumper	(9)
-----	Bearing, Sleeve	(3)
-----	Packing, U-cup	(4)
-----	Wiper, Rod	(2)
-----	Ring, Retaining	(5)
-----	Cover, Bottom	(1)
6500: 17V318 3400: 17V317	Muffler Repair Kit	
15F674	Label, warning	(56)
-----	Internal foam	
-----	Gasket, muffler	(16)
6500: 17V314 3400: 17V313	Cylinder Repair Kit	
-----	O-ring	(6)
-----	Foam, Dampers	(15)
-----	Cylinder, Motor	(14)
17V322	Low Noise Kit (Std to Low Noise)	

Table 2 XL Air Motor Repair Kits

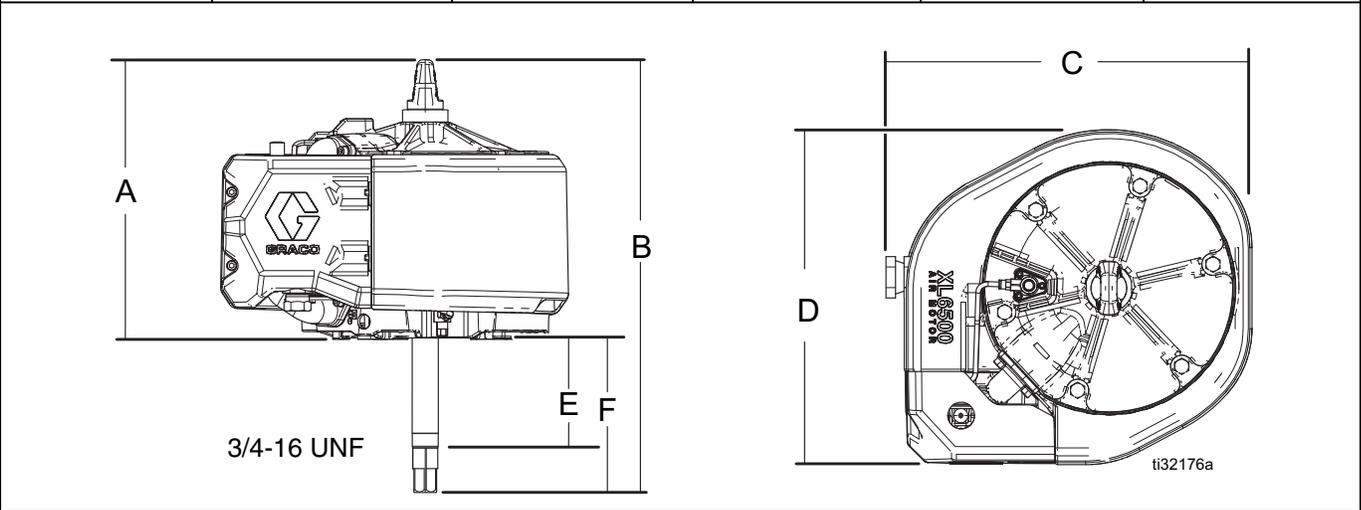
Part No.	Description	Air Motor Part Ref.
17V344	Repair, Complete Valve Assembly	
-----	Valve, Air, XL	(30)
17R950	Gasket, Valve	(29)
24X563	Repair, Valve O-rings	
104010	O-ring (2)	(317)
154741	O-ring (2)	(318)
295640	O-ring (1)	(313)
104130	O-ring (1)	(322)
17V347	Repair, Base/Cup Assembly	
-----	Base	(313)
-----	Cup	(313)
295640	O-ring	(313)
-----	Plate, Valve	(314)
-----	Screw, M3 (2)	(315)
17R950	Gasket, Air Valve	(29)
24X567	Roller Assembly	
-----	Piston, Detent	(307)
-----	Cam, Detent	(305)
-----	Spring, detent	(310)
-----	Roller, Detent	(309)
-----	Pin, Detent	(323)
24X568	DataTrak Plug Assembly	
104130	Packing, O-ring	(322)
-----	Plug, Valve	(321)
-----	Ring, Retaining	(323)
24X569	Valve Piston w/Seals Repair Kit	
-----	Piston, Valve	(304)
-----	Packing U-Cup	(306)
24Z604	Needle Valve	(303)

Table 3 Accessories

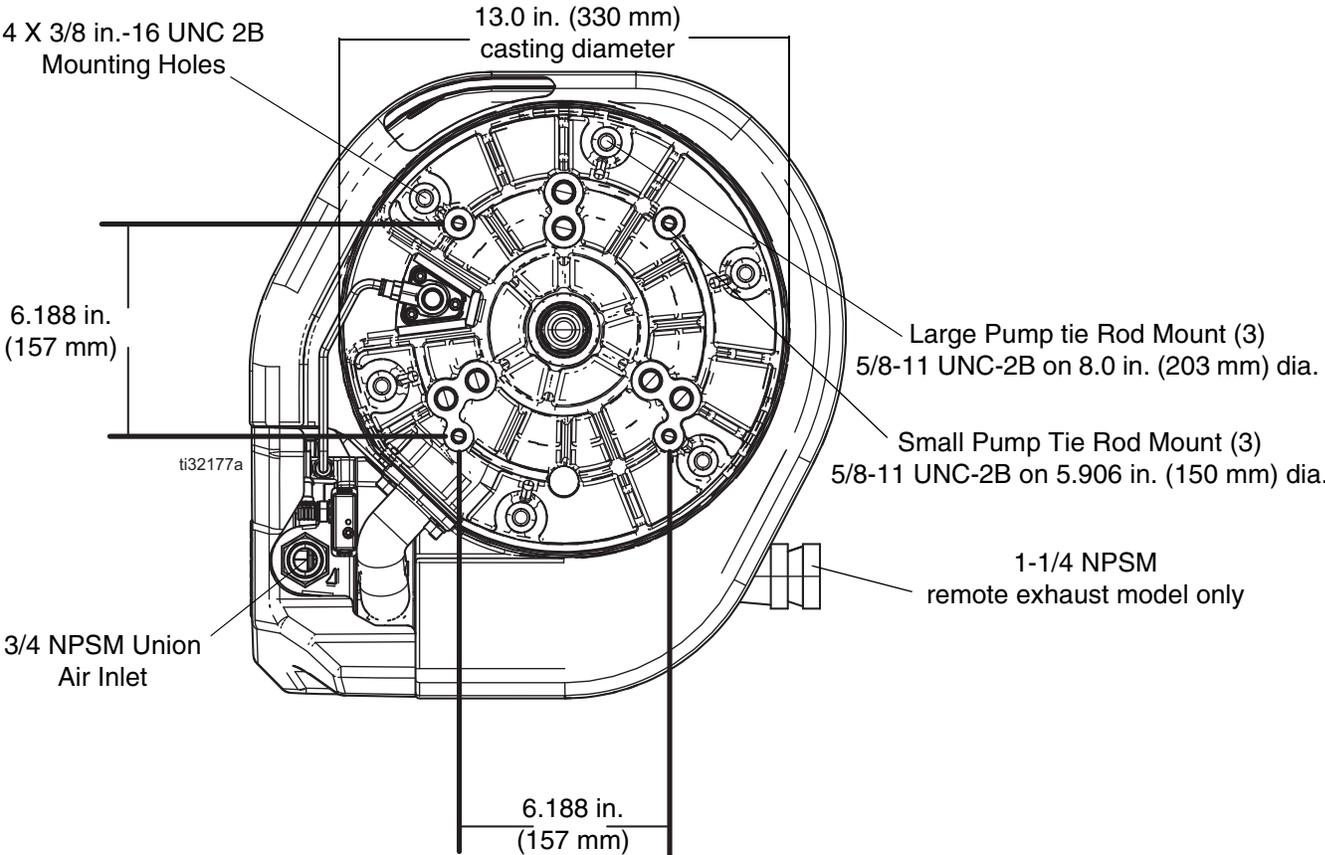
Part	Description
256893	Linear Sensor, potted, XM
287839	Linear Sensor, HLS motors
24X550	Kit, Reed Switch and Solenoid, DataTrak, XL bracket
24X552	Kit, Reed Switch, DataTrak, XL bracket
17V322	Kit, convert to low noise

Dimensions (Model XL6500)

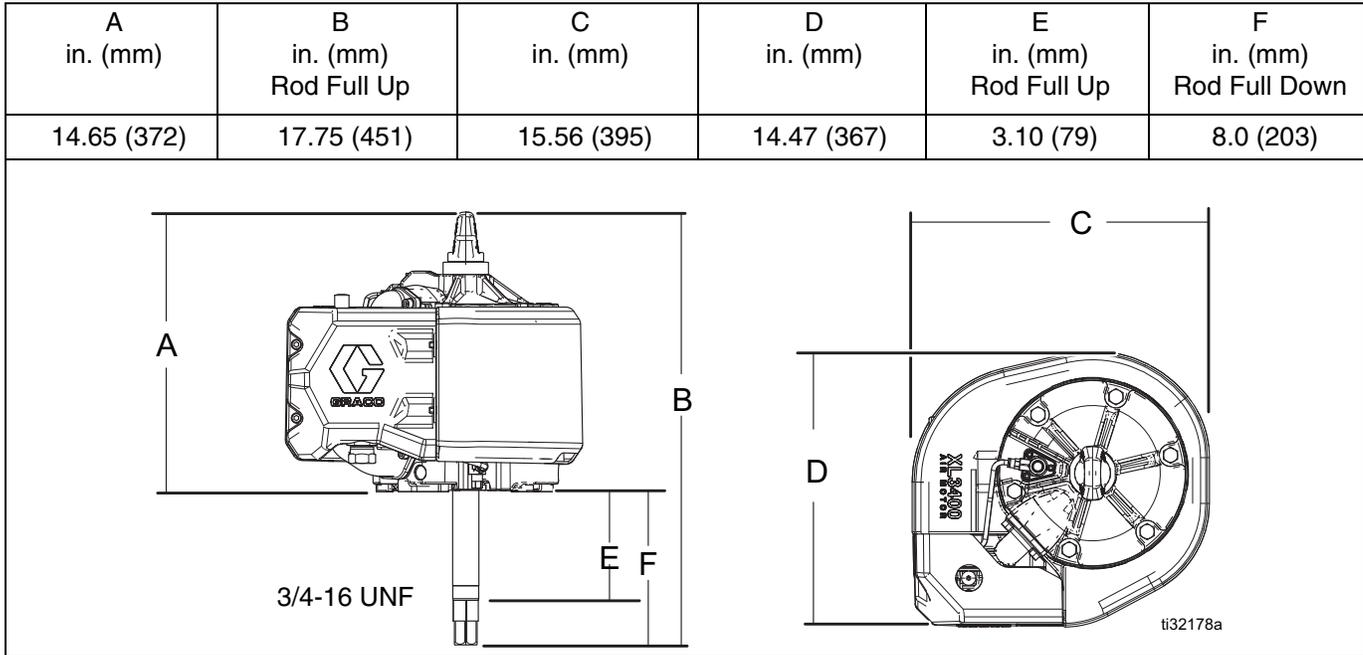
A in. (mm)	B in. (mm) Rod Full Up	C in. (mm)	D in. (mm)	E in. (mm) Rod Full Up	F in. (mm) Rod Full Down
14.65 (372)	17.75 (450)	18.20 (462)	17.54 (446)	3.10 (79)	8.0 (203)



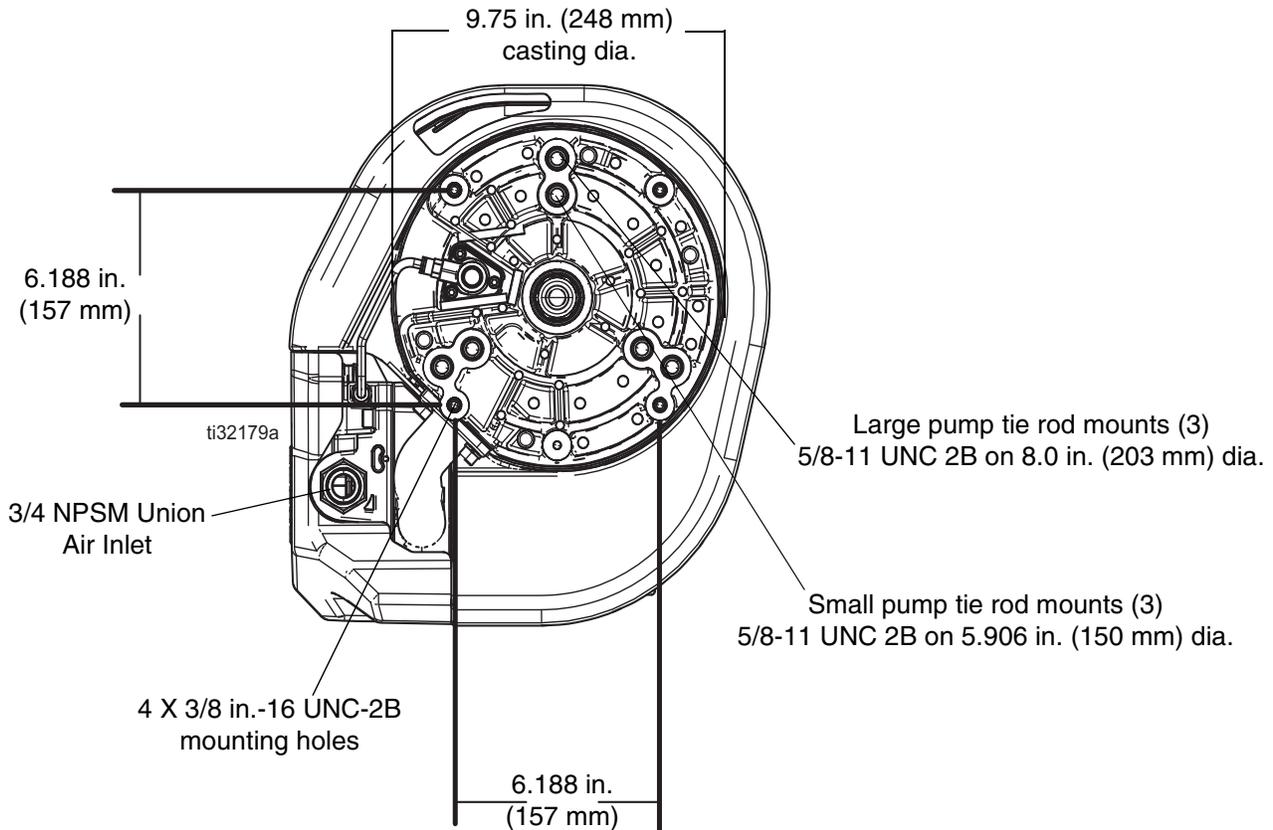
Mounting Hole Diagram



Dimensions (Model XL3400)



Mounting Hole Diagram



Technical Specifications

All Models of XL Air Motors		
	US	Metric
Air Inlet Pressure		
Maximum Operating Range	100 psi 7 - 100 psi	0.7 MPa, 7 bar .05 - 0.7 MPa, 0.5-7 bar
Minimum Air Filtration	0.0016 in. (325 mesh)	40 micron
Air Inlet Size	3/4 npsm(f) union in 1 in. npt valve housing	
Temperature Operating Range	32° - 140° F	0° - 60° C
Motor Stroke Length		
Nominal	4.75 in.	121 mm
Bumper to Bumper	4.90 in.	125 mm
Maximum Cycle Rate	60 cycles/minute	
Remote Exhaust Models Outlet Connection	1-1/4 npsm(f) union	
Model XL 6500 Size		
Motor Effective Area		
Down Stroke	84.54 in. sq.	545 mm sq.
Up Stroke	83.06 in. sq.	536 mm sq.
Motor Cylinder Inside Diameter	10.375 in.	264 mm
Weight	69 lb	31 kg
Sound Data		
XL65DX (De-Ice Full Performance Model)		
Sound Power - Measured at 70 psi (0.48 MPa, 4.8 bar) at 15 cpm per ISO-9614-2	96 dBA	
Sound Pressure - Tested 3.28 ft (1 meter) from equipment per ISO-9614-2	81.48 dBA	
XL65Lx (Low Noise Model)		
Sound Power - Measured at 70 psi (0.48 MPa, 4.8 bar) at 15 cpm per ISO-9614-2	92 dBA	
Sound Pressure - Tested 3.28 ft (1 meter) from equipment per ISO-9614-2	77.48 dBA	
Model XL 3400 Size		
Motor Effective Area		
Down Stroke	44.18 in. sq.	285 mm sq.
Up Stroke	42.7 in. sq.	276 mm sq.
Motor Cylinder Inside Diameter	7.5 in.	191 mm
Weight	50 lb	23 kg
Sound Data		
XL34Dx (De-Ice Full Performance Model)		
Sound Power - Measured at 70 psi (0.48 MPa, 4.8 bar) at 15 cpm per ISO-9614-2	## dBA	
Sound Pressure - Tested 3.28 ft (1 meter) from equipment per ISO-9614-2	## dBA	
XL34Lx (Low Noise Model)		
Sound Power - Measured at 70 psi (0.48 MPa, 4.8 bar) at 15 cpm per ISO-9614-2	## dBA	
Sound Pressure - Tested 3.28 ft (1 meter) from equipment per ISO-9614-2	## dBA	

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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.

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