Repair/Parts

Husky™ 1050e

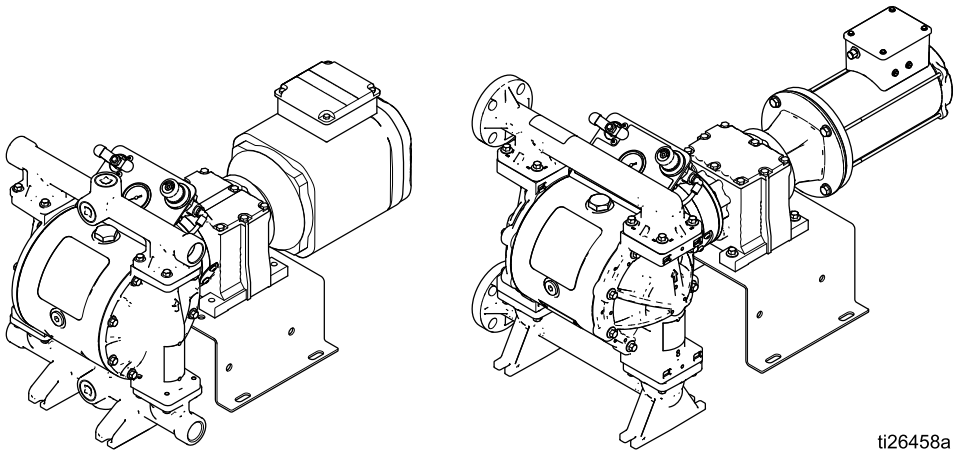
Electric Diaphragm Pump

334189B
EN

1–Inch pumps with electric drive for fluid transfer applications. For professional use only.

Important Safety Instructions
Read all warnings and instructions in this manual and in your Husky 1050e Operation manual. **Save these instructions.**

Maximum Working Pressure: 70 psi (0.48 MPa, 4.8 bar)
See pages 6–8 for model information, including approvals.



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Contents

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.

⚠ WARNING

ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and remove power before disconnecting any cables and before servicing or installing equipment. For cart-mounted models, unplug the power cord. For all other units, disconnect power at the main switch.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
- Wait five minutes for capacitor discharge before opening equipment.
- For cart-mounted models, use only 3-wire extension cords.
- For cart-mounted models, ensure ground prongs are intact on any power and extension cords.
- For cart-mounted models, do not expose to rain. Store indoors.

FIRE AND EXPLOSION HAZARD

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:

- 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 arc).
- Ground all equipment in the work area. See **Grounding** instructions.
- 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.
- **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.

Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:

- Clean plastic parts only in well ventilated area.
- Do not clean with a dry cloth.
- Do not operate electrostatic guns in equipment work area.

WARNING

PRESSURIZED EQUIPMENT HAZARD

Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow the **Pressure Relief Procedure** when you stop spraying/dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- 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 Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- 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.

PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Do not use chlorine bleach.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

WARNING



THERMAL EXPANSION HAZARD

Fluids subjected to heat in confined spaces, including hoses, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.

- Open a valve to relieve the fluid expansion during heating.
- Replace hoses proactively at regular intervals based on your operating conditions.


TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Safety Data Sheet (SDS) to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

BURN HAZARD

Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.

PERSONAL PROTECTIVE EQUIPMENT

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. This protective equipment includes but is not limited to:

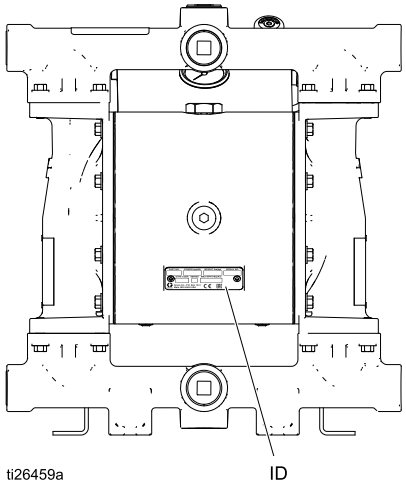
- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Related Manuals

Manual Number	Title
334188	Husky 1050E Electric Double Diaphragm Pump, Operation

Configuration Number Matrix

Check the identification plate (ID) for the Configuration Number of your pump. Use the following matrix to define the components of your pump.



Sample Configuration Number: **1050A-E,A04AA1SSBNBNPT**

1050	A	E	A	04A	A1	SS	BN	BN	PT
Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings

Pump	Wetted Section Material		Drive Type		Center Section Material		Motor and Gearbox	
1050	A	Aluminum	E	Electric	A	Aluminum	04A	Standard AC Induction Motor with Gearbox
	P	Polypropylene			S	Stainless Steel	04B	Brushless DC Motor
	S	Stainless Steel					04C	AC Induction Motor, ATEX✦
							04D	Explosionproof AC Induction Motor ★
							04E	NEMA Gearbox ✚
							04F	IEC Gearbox ✚
							05A	Standard AC Induction Motor with Compressor (120V)
							05B	Brushless DC Motor with Compressor (120V)
							06A	Standard AC Induction Motor with Compressor (240V)
							06B	Brushless DC Motor with Compressor (240V)

Fluid Covers and Manifolds		**Seat Material**		Ball Material		Diaphragm Material		**Manifold O-Rings**	
A1	Aluminum, npt	AC	Acetal	AC	Acetal	BN	Buna-N	– –	Models with BN, FK, or TP seats do not use o-rings
A2	Aluminum, bsp	AL	Aluminum	BN	Buna-N	CO	Polychloroprene Overmold		
P1	Polypropylene, center flange	BN	Buna-N	CR	Polychloroprene Standard	FK	FKM Fluoroelastomer		
P2	Polypropylene, end flange	FK	FKM Fluoroelastomer	CW	Polychloroprene Weighted	GE	Geolast		
S1	Stainless steel, npt	GE	Geolast	FK	FKM Fluoroelastomer	PO	PTFE/EPDM Overmold	PT	PTFE
S2	Stainless steel, bsp	PP	Polypropylene	GE	Geolast	PT	PTFE/EPDM 2–Piece		
		SP	Santoprene	PT	PTFE	PS	PTFE/Santoprene 2–Piece		
		SS	316 Stainless Steel	SP	Santoprene	SP	Santoprene		
		TP	TPE	SS	316 Stainless Steel	TP	TPE		
				TP	TPE				

Approvals	
✦ Aluminum and stainless steel pumps with code 04C are certified to:	II 2 G ck Ex d IIB T3 Gb
✚ Aluminum and stainless steel pumps with code 04E or 04F are certified to:	II 2 G ck IIB T3 Gb
★ Motors coded 04D are certified to:	Class1, Zone 1, AEx d IIB T3 0°C<Ta<40°C
All Models (except 04D, 05A, and 05B) are certified to:	

Overview

The Husky 1050e product line offers electric-powered diaphragm pumps in a wide range of models. Use the selector tool at www.graco.com to configure a pump to meet your needs. This section shows the basic structure of available models. Fluid section options are too numerous to include. The many manifold, seat, ball, and diaphragm options are available on a wide variety of these models.

Center Section	Motor Type	Controller	Gearbox	Compressor	Approval Options	Cart
Aluminum or Stainless Steel	AC	VFD — not included. VFD Kits 16K911 (240V) and 16K912 (480V) are available.	Yes, part of motor	Yes-120V	None	No*
				Yes-240V	CE	No*
				No		No*
			NEMA	No	ATEX and CE	No*
				No	Explosionproof	No*
	Brush-less DC	Graco Motor Control — included	NEMA	Yes-120V	None	Yes
				Yes-240V	CE	Yes
				No		No*
	None	None	NEMA	No	CE	No*
			IEC	No		No*

* Cart Mounting Kit 24Y543 is available.

Key Points:

- Pumps are available with an AC or Brushless DC (BLDC) motor, or with just a gearbox (for applications where a motor already is available).
- AC motors are controlled by a VFD, either purchased separately from Graco (PN 16K911 or 16K912) or supplied by the customer.
- BLDC motors are controlled by the Graco Motor Control that is supplied with the pump.
- The standard AC motor (not ATEX or Explosionproof) and the BLDC motor are available in models without a compressor, with a 120V compressor, or with a 240V compressor.
- The BLDC motor is available in models that are cart mounted. Cart Mounting Kit 24Y543 is available for other models.

Notes

Troubleshooting

- Follow the Pressure Relief Procedure, page 12, before checking or servicing the equipment.
- Check all possible problems and causes before disassembly.

See the Operation Manual (334188) for troubleshooting or error information on the Graco Motor Control.

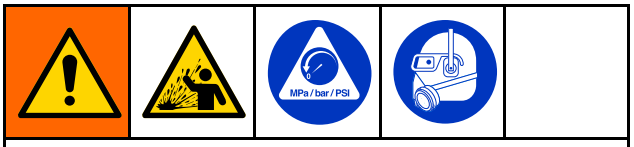
Problem	Cause	Solution
Pump cycles but will not prime and/or pump.	Pump is running too fast, causing cavitation before prime.	Slow down the motor controller (VFD or Graco Motor Control)
	Center section has no air pressure, or air pressure is too low.	Apply air pressure to center section per your application requirements.
	Check valve ball is severely worn or wedged in seat or manifold.	Replace the ball and seat.
	Seat is severely worn.	Replace the ball and seat.
	Outlet or inlet is restricted.	Remove the restriction.
	Inlet fittings or manifolds are loose.	Tighten.
	Manifold o-rings are damaged.	Replace o-rings.
The center section is excessively hot.	The drive shaft is broken.	Replace.
Pump fails to hold pressure at stall.	Check valve balls, seats, or o-rings are worn.	Replace.
	Manifold screws or fluid cover screws are loose.	Tighten.
	Diaphragm shaft bolt is loose	Tighten.
Pump will not cycle.	Motor or controller is wired improperly.	Wire per manual.
	The leak detector has tripped.	Check diaphragm for rupture or incorrect installation. Repair or replace.
Pump flow rate is erratic.	Suction line is clogged.	Inspect; clear.
	Check balls are sticky or leaking .	Clean or replace.
	Diaphragm (or backup) ruptured.	Replace.
Pump makes unusual noises.	Pump is operating near or at stall pressure.	Adjust air pressure or slow the pump speed.

Problem	Cause	Solution
Air consumption is higher than expected.	A fitting is loose.	Tighten. Inspect thread sealant.
	Loose or damaged o-rings or shaft seal.	Replace.
	Diaphragm (or backup) ruptured.	Replace.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm (or backup) ruptured.	Replace.
	Loose manifolds, damaged seats or o-rings.	Tighten manifold bolts or replace seats or o-rings.
	Loose diaphragm shaft bolt.	Tighten.
Pump leaks fluid externally from joints.	Loose manifold screws or fluid cover screws.	Tighten.
	Manifold o-rings worn out.	Replace o-rings.
The controller faults or shuts down.	A GFCI has tripped.	Remove the controller from the GFCI circuit.
	Supply power is poor.	Determine and fix the source of the power problem.
	Air pressure is too high.	Lower the pressure.
NOTE: For problems with a Variable Frequency Device (VFD), see your VFD manual. For problems with the Graco Motor Control, see your 1050e Operation Manual.		

Repair

Pressure Relief Procedure

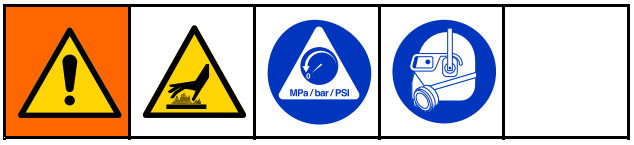
Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is relieved manually. To help prevent serious injury from pressurized fluid, such as splashing in the eyes or on skin, follow the Pressure Relief Procedure when you stop pumping and before you clean, check, or service the equipment.

1. Remove power from the system.
2. Open the dispensing valve, if used.
3. Open the fluid drain valve (L) to relieve fluid pressure. Have a container ready to catch the drainage.
4. Close the pump air valve.
5. **Units with a compressor:** Cycle the valve to bleed any remaining air.

Check Valve Repair



NOTE: Kits are available for new check valve balls and seats in a range of materials. O-ring and fastener kits also are available.

NOTE: To ensure proper seating of the check balls, always replace the seats when replacing the balls. Also, replace the o-rings every time the manifold is removed.

Disassemble the Check Valve

1. Follow the Pressure Relief Procedure, page 12. Remove power from the motor. Disconnect all hoses.
2. **NOTE for plastic pumps:** Use hand tools until thread-locking adhesive patch releases.
3. Use a 10 mm (M8) socket wrench to remove the manifold fasteners (5) and nuts (42; used only on stainless steel models), then remove the outlet manifold (3).
4. Remove the o-rings (8) if present, seats (6), and balls (7).
5. Repeat for the inlet manifold (4), o-rings (8) if present, seats (6), and balls (7).

To continue disassembly, see Disassemble the Diaphragms, page 14.

Reassemble the Check Valve

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. Reassemble in the reverse order, following all notes in the illustration. Put the inlet manifold on first. Be sure the ball checks (6–8) and manifolds (3, 4) are assembled **exactly** as shown. The arrows (A) on the fluid covers (2) **must** point toward the outlet manifold (3).

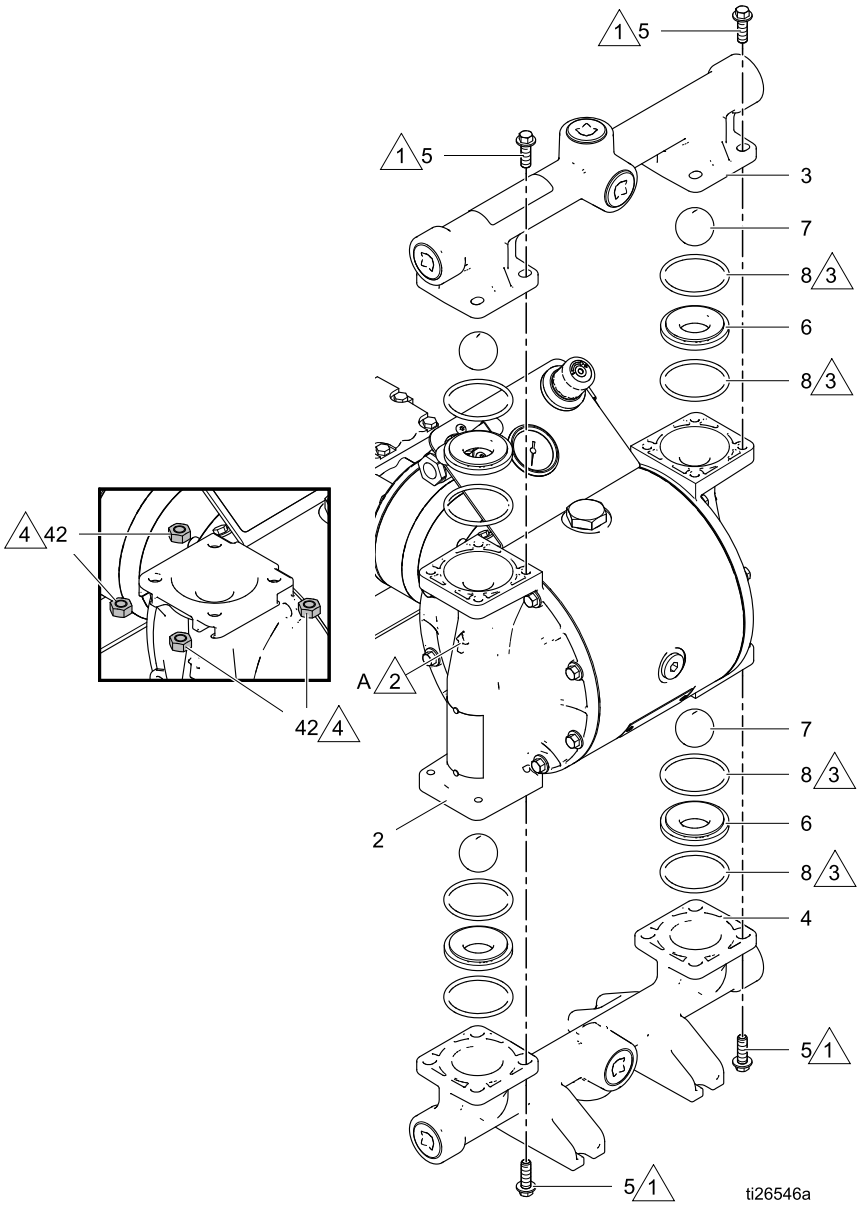


Figure 1 Check valve assembly, aluminum model shown

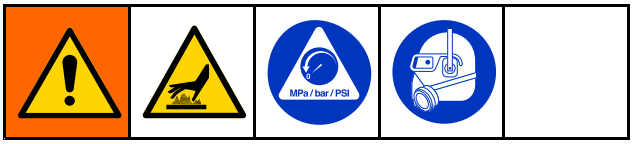
1 Apply medium-strength (blue) thread locker. Torque to 100 in-lb (11.3 N·m). Follow torque sequence. See Torque Instructions, page 21.

2 Arrow (A) must point toward outlet manifold

3 Not used on some models.

4 Stainless steel models include nuts (42).

Diaphragm Repair



Disassemble the Diaphragms

NOTE: Diaphragm kits are available in a range of materials and styles. See Parts section.

1. Follow the Pressure Relief Procedure, page 12. Remove power from the motor. Disconnect all hoses.
2. Remove the manifolds and disassemble the ball check valves as explained in Check Valve Repair, page 12.
3. Use a 10 mm socket wrench to remove the bolts (5) from the fluid covers, then pull the fluid covers off of the pump.

   TIP: On stainless steel pumps, remove the nuts (42) so they do not fall out and get lost.
4.

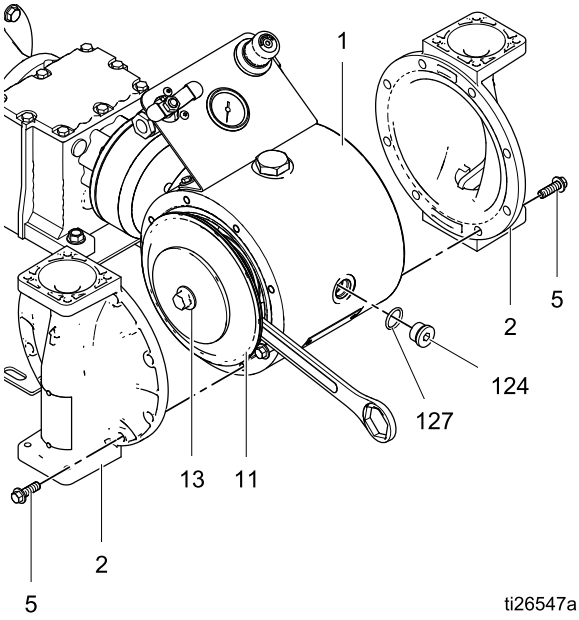
   NOTE: If the pump is still attached to the motor, remove the plug (124) and o-ring (127). Use a 10 mm socket to rotate the shaft clockwise to shift the piston to one side. Socket should move easily [no more than 15 in-lb (1.7 N•m) of torque]. If more torque is required, stop. Remove the motor. See Center Section Repair, page 17.
5. **Overmolded Diaphragms (CO and PO models)**

   a. Hold a 15 mm wrench on the wrench flats of the exposed piston shaft. The diaphragm (12) will screw off by hand. Remove the air side diaphragm plate (11).

   b. Move the piston fully to one side by rotating the drive shaft. On AC Models, move the piston by hand turning the motor fan. (See instructions in step 4). Repeat step 5a.
6. **All Other Diaphragms**

   a. **Metal Pumps:** Hold a 15 mm wrench on the wrench flats of the exposed piston shaft. Use another wrench (same size) on the shaft bolt (13) to remove it. Then remove all parts of the diaphragm assembly.
   Plastic Pumps: Hold a 15 mm wrench on the wrench flats of the exposed piston shaft. Use a 1–1/4 socket or box end wrench on the hex of the fluid side diaphragm plate to remove it. Then remove all parts of the diaphragm assembly.

   b. Move the piston fully to one side by rotating the drive shaft. On AC Models, move the piston by hand turning the motor fan. (See instructions in step 4). Repeat step 6a.



7. To continue with disassembly, see Disassemble the Center Section, page 17.

Reassemble the Diaphragms

Follow all notes in the illustrations on page 16. These notes contain **important** information.

NOTICE

After reassembly, allow the thread locker to cure for 12 hours, or per manufacturer's instructions, prior to operating the pump. Damage to the pump will occur if the diaphragm shaft bolt loosens.

TIP: If you are also repairing or servicing the center section (drive shaft, piston, etc.), see Center Section Repair, page 17, before you put the diaphragms back on.

1. Clean all parts and inspect for wear or damage. Replace parts as needed. Be sure the center section is clean and dry.
2. **Overmolded Diaphragms (PO)**
   a. If a diaphragm setscrew comes loose or is replaced, apply permanent (red) thread locker to diaphragm side threads. Screw into diaphragm until tight.
   b. Assemble the air side plate (10) onto the diaphragm. The rounded side of the plate must face the diaphragm.
   c. Clean the female threads of the piston shaft with a wire brush dipped in solvent to remove any residual thread locker. Apply thread-locking primer and allow it to dry.
   d. Thoroughly clean, then apply medium-strength (blue) thread locker to the threads of the diaphragm assembly.
   e. Hold a 15 mm wrench on the wrench flats of the piston shaft. Screw the assembly into the shaft as tight as possible by hand.

      TIP: Insert a fluid cover bolt into the center section. Brace the wrench against a bolt and use two hands to tighten the diaphragm. See illustration in Disassemble the Diaphragms, page 14.
   f. Move the piston fully to one side by rotating the drive shaft. On AC models, move the piston by hand turning the motor fan. See instructions in step 4 of Disassemble the Diaphragms, page 14.
   g. Repeat to install the other diaphragm assembly.
3. **All Other Diaphragms-Metal Pumps**
   a. Thoroughly clean or replace the piston shaft bolt (13). Install the o-ring (34).
   b. Assemble the fluid side plate (9), the diaphragm (11), the backup diaphragm (12, if present), and the air side diaphragm plate (10) on the bolt exactly as shown.
   c. Clean the female threads of the piston shaft with a wire brush dipped in solvent to remove any residual thread locker. Apply thread-locking primer and allow it to dry.
   d. Apply medium-strength (blue) thread locker to the threads of the bolt.
   e. Hold a 15 mm wrench on the wrench flats of the piston shaft. Screw the bolt onto the shaft and torque to 20–25 ft-lb (27–34 N•m).
   f. Move the piston fully to one side by rotating the drive shaft. On AC models, move the piston by hand turning the motor fan.. See instructions in step 4 of Disassemble the Diaphragms, page 14.
   g. Repeat to install the other diaphragm assembly.
4. **All Other Diaphragms-Plastic Pumps**
   a. Thoroughly clean the threads, or replace the entire fluid side plate (9).
   b. Assemble the diaphragm (11), the backup diaphragm (12, if present), and the air side diaphragm plate (10) on the fluid side plate (9) exactly as shown.
   c. Clean the female threads of the piston shaft with a wire brush dipped in solvent to remove any residual thread locker. Apply thread-locking primer and allow it to dry.
   d. Apply medium-strength (blue) thread locker to the screw threads on the fluid side plate (9).
   e. Hold a 15 mm wrench on the wrench flats of the piston shaft. Screw the assembly into the shaft and torque to 20–25 ft-lb (27–34 N•m).

f. Move the piston fully to one side by rotating the drive shaft. On AC models, move the piston by hand turning the motor fan. See instructions in step 4 of Disassemble the Diaphragms, page 14.

g. Repeat for the other diaphragm assembly.

5. Attach the fluid covers. The arrow on each fluid cover must point toward the outlet manifold.

△1 Rounded side faces diaphragm.

△2 Apply medium-strength (blue) thread locker to the threads.

△3 AIR SIDE markings on diaphragm must face the center housing.

△4 If the screw comes loose or is replaced, apply permanent (red) thread locker to diaphragm side threads. Apply medium-strength (blue) thread locker to shaft side threads.

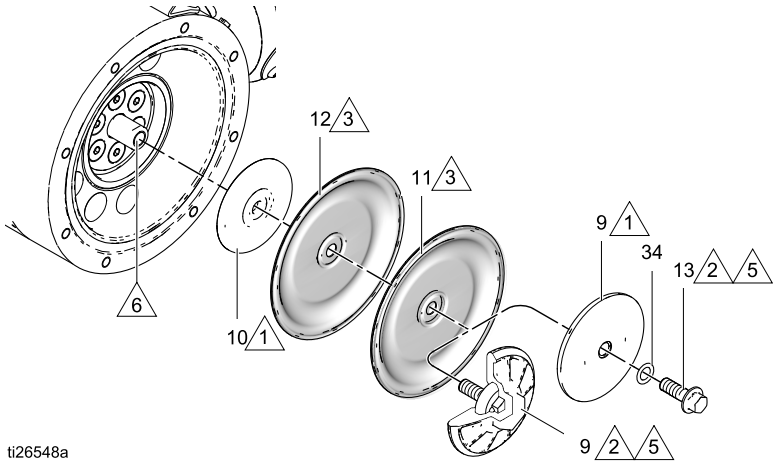
△5 Torque to 20–25 ft-lb (27–34 N•m) at 100 rpm maximum.

△6 Apply primer to the female threads. Allow to dry.

Apply medium-strength (blue) thread locker to the bolt threads. See Torque Instructions, page 21, to tighten.

6. Reassemble the check valves and manifolds. See Reassemble the Check Valve, page 12.

2–Piece (PS or PT) Models



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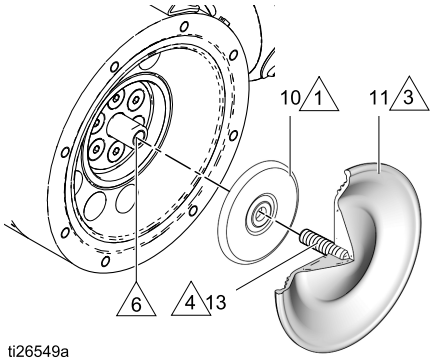
Overmolded (PO and CO) Models



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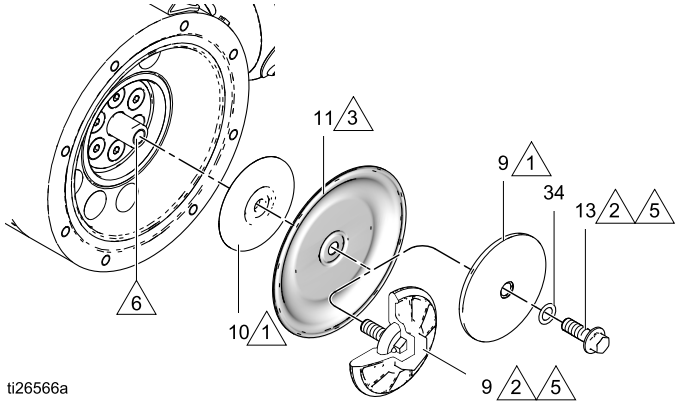
Standard (TP, SP, BN, FK, and GE) Models



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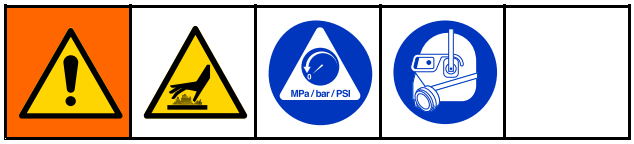
NOTICE

After reassembly, allow the thread locker to cure for 12 hours, or per manufacturer's instructions, prior to operating the pump. Damage to the pump will occur if the diaphragm shaft bolt loosens.

Center Section Repair



Disassemble the Center Section

See the illustrations on page 19.

1. Follow the Pressure Relief Procedure, page 12. Remove power from the motor. Disconnect all hoses.
2. Remove the manifolds and check valve parts as directed in Disassemble the Check Valve, page 12.
3. Remove the fluid covers and diaphragms as directed in Disassemble the Diaphragms, page 14.

   TIP: Clamp the gear box bracket (15) to the bench. Leave the pump connected to the motor.
4. Use a 5 mm hex wrench to remove 4 bolts (117). Pull the pump off of the alignment housing (116).

   TIP: It may be necessary to tap the pump with a rubber mallet to disengage the coupler.
5. Use a 5/16 hex wrench to remove the plug (124). Use a 30 mm socket wrench to remove the bearing bolt (106) and the o-ring (108) from the top.
6. Turn the shaft so the groove on the shaft is at the top, in line with the alignment markings.
7. Use a 3/4–16 bolt to push out the drive shaft assembly (112). You can also use the bearing bolt (106), but remove the bearing (107) first. Be sure that the groove on the drive shaft remains aligned with the markings in the center section.

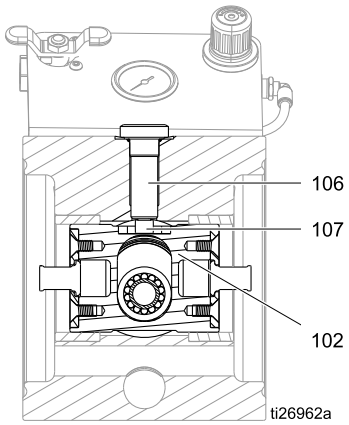
   NOTICE

   Proper alignment is essential. Do not apply more than about 10 in-lb (1.1 N•m) of torque. Excessive torque could strip the housing thread. If you encounter resistance, check alignment or contact your distributor.
8. Remove the seal cartridge (110), the o-ring (109) and the radial seal (111) with o-ring (129).
9. Slide the piston assembly (102) out of the center.
10. Leave the gearbox coupler (114) attached to the gearbox shaft (118) unless it is damaged. If you need to remove it, first remove the screws (128) and the access cover (126) on the alignment housing. Turn the gearbox coupler until you have access to screw (115) on the coupler (114). Use an 8 mm hex wrench to remove the screw (115), then remove the gearbox coupler (114).

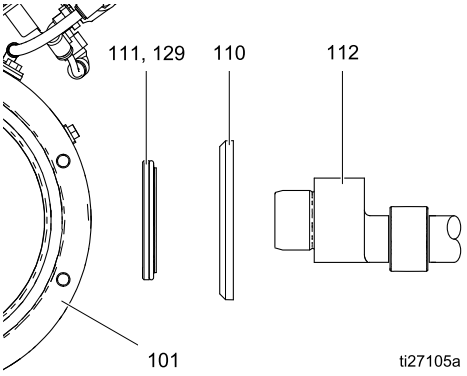
    NOTE: Do not remove the alignment housing (116) unless it is damaged.

Reassemble the Center Section

1. Clean and dry the center housing (101), the center of the piston (102) and the drive shaft (112).
2. Inspect the piston for excessive wear and replace if needed. Grease the piston as shown and install it in the center section with the groove on the top, in line with the alignment markings in the center section.
3. Install the o-ring (108) and the bearing bolt (106). Apply medium-strength (blue) thread locker and torque the bolt to 15–25 ft-lb (20–34 N•m). Be sure that the bearing (107) is in the groove on the piston, as shown. Be sure that the piston moves freely.



4. Be sure the sealing surface of the drive shaft (112) is clean. Install the seal cartridge (110†) and the radial seal (111†) on the drive shaft. Be sure the o-ring (129†) is on the radial seal. The lips on the radial seal (111†) must face **IN** toward the center.



5. Install o-ring (109†).
6. Apply anti-seize lubricant on the mating edges of the drive shaft, as shown in the illustration, page 19.
7. Center the piston in the housing and install the drive shaft assembly (112) into the center housing (101) with the groove facing up.
8. Inspect the shaft coupler (113) for wear and replace if needed. Install on the drive shaft.
9. If removed, install the gearbox coupler (114) in the alignment housing (116) until the coupler seats securely on the shaft. Apply medium strength thread locker and install the screw (115). Torque to 35–45 ft-lb (47–61 N•m). Then install the access cover (126). Torque the screws (128) to 10–20 in-lb (1–2 N•m).
10. Be sure the gearbox coupler (114) is aligned properly. Turn by hand if needed. Connect the pump to the gearbox assembly, engaging the couplers.
11. Apply medium-strength (blue) thread locker and install the housing screws (117). Tighten about 5 turns at a time, in a crisscross pattern, to fully engage the coupler. Torque to 130–160 in-lb (15–18 N•m).
12. Be sure o-ring (127) is on the plug (124). Install the plug and torque to 15–25 ft-lb (20–34 N•m).
13. See Reassemble the Diaphragms, page 15, and Reassemble the Check Valve, page 12.

△1 Apply medium-strength (blue) thread locker to threads.

△2 Torque to 15–25 ft-lb (20–34 N•m).

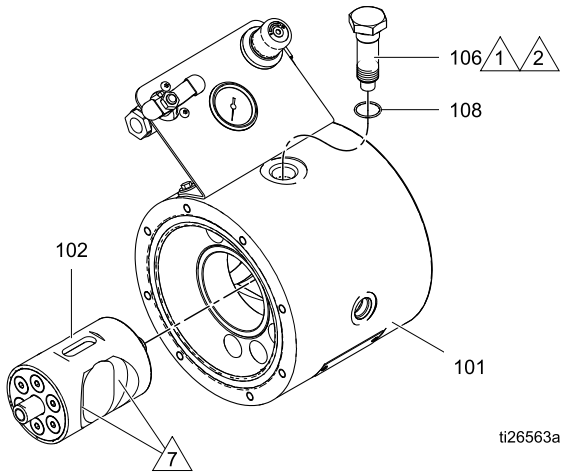
△3 Lips must face **IN** toward the center.

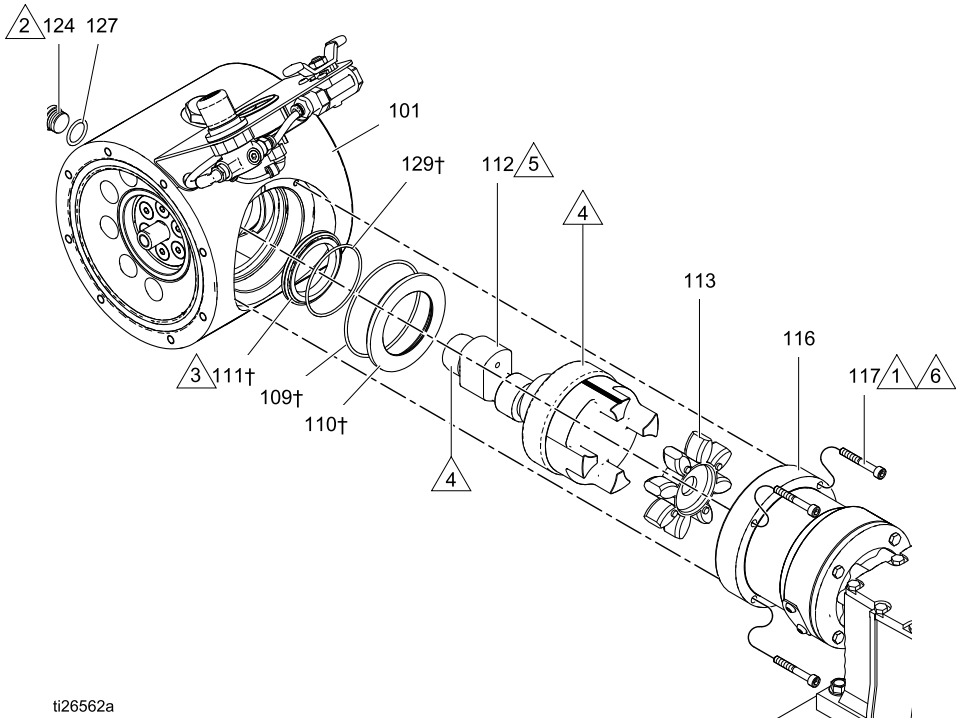
△4 Apply anti-seize lubricant liberally on the radial surfaces of the drive shaft assembly.

△5 Install the drive shaft assembly with the groove facing up.

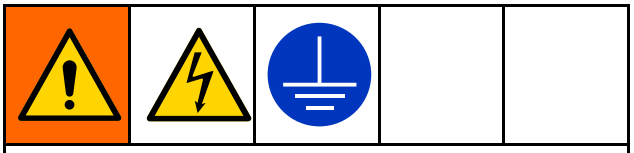
△6 Tighten screws in a crisscross pattern, 5 turns at a time, to engage the coupler evenly. Torque to 130–160 in-lb (15–18 N•m).

△7 Apply lubricant to inner mating surface.



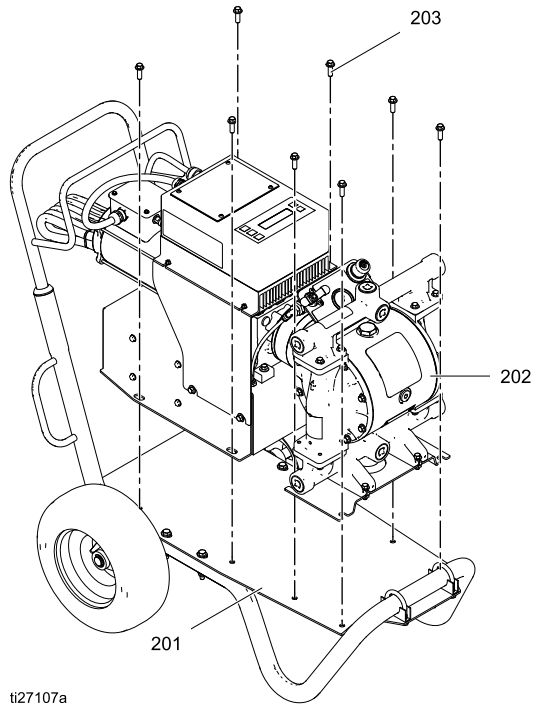


Replace the Compressor

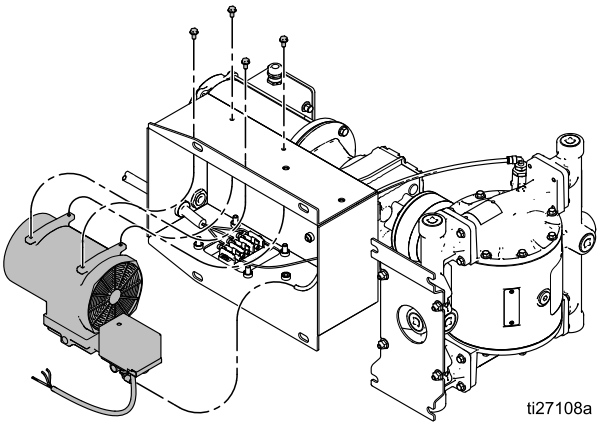


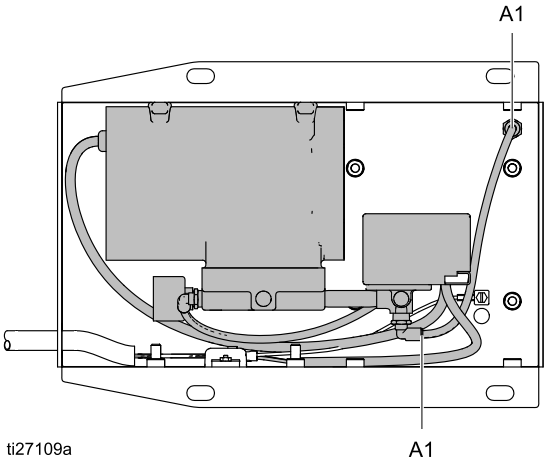
To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

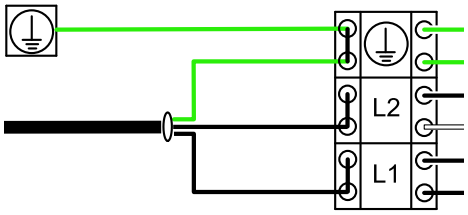
1. Follow the Pressure Relief Procedure, page 12.
2. Remove the 8 bolts (203) holding the pump (202) to the cart (201) or another mounting surface. Use 2 people or a lift to remove the pump.



3. Tip the pump on its side to provide access to the compressor box.
4. Remove the air line (A1) from the compressor. Disconnect the compressor wires at the terminal block (L1, L2, and ground). Remove the four bolts, and carefully pull the compressor out of the box.
5. Use the four bolts to install the new compressor. Connect the air line from A1 to A1, as shown.
6. Connect the wires from the new compressor to the terminal block, as shown.
7. Return the pump to its mounting location or cart. Secure it with the 8 bolts.
8. Return power to the pump.







Torque Instructions

If fluid cover or manifold fasteners have been loosened, it is important to torque them using the following procedure to improve sealing.

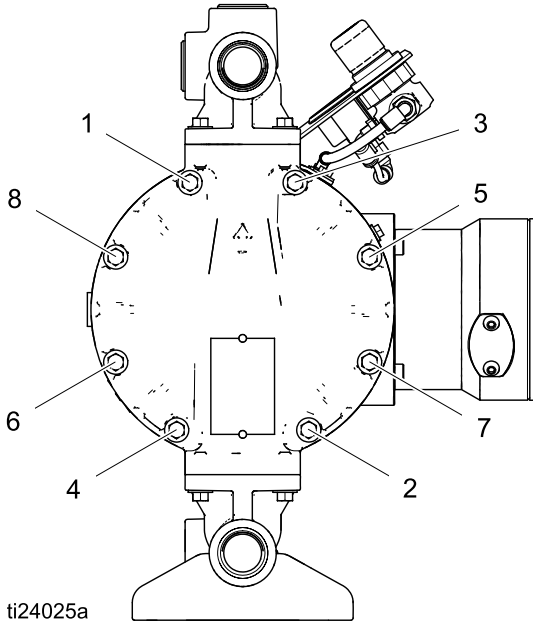
NOTE: Fluid cover and manifold fasteners have a thread-locking adhesive patch applied to the threads. If this patch is excessively worn, the fasteners may loosen during operation. Replace screws with new ones or apply medium-strength (blue) Loctite or equivalent to the threads.

NOTE: Always completely torque fluid covers before torquing manifolds.

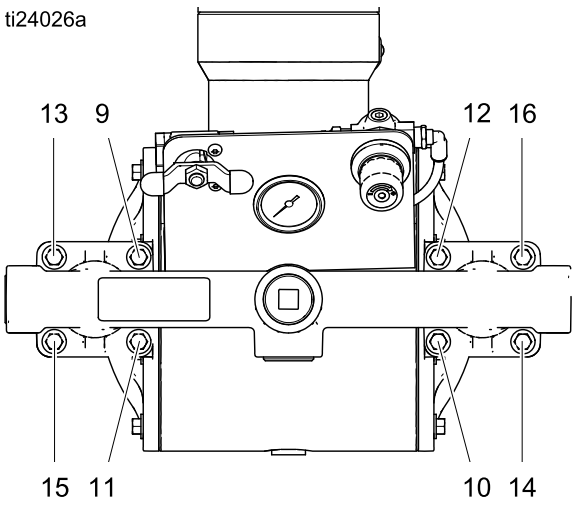
1. Start all fluid cover screws a few turns. Then, turn down each screw just until head contacts cover.
2. Turn each screw by 1/2 turn or less working in a crisscross pattern in the order shown to specified torque.
3. Repeat for manifolds.

   Fluid cover and manifold fasteners: 100 in-lb (11.3 Nm)

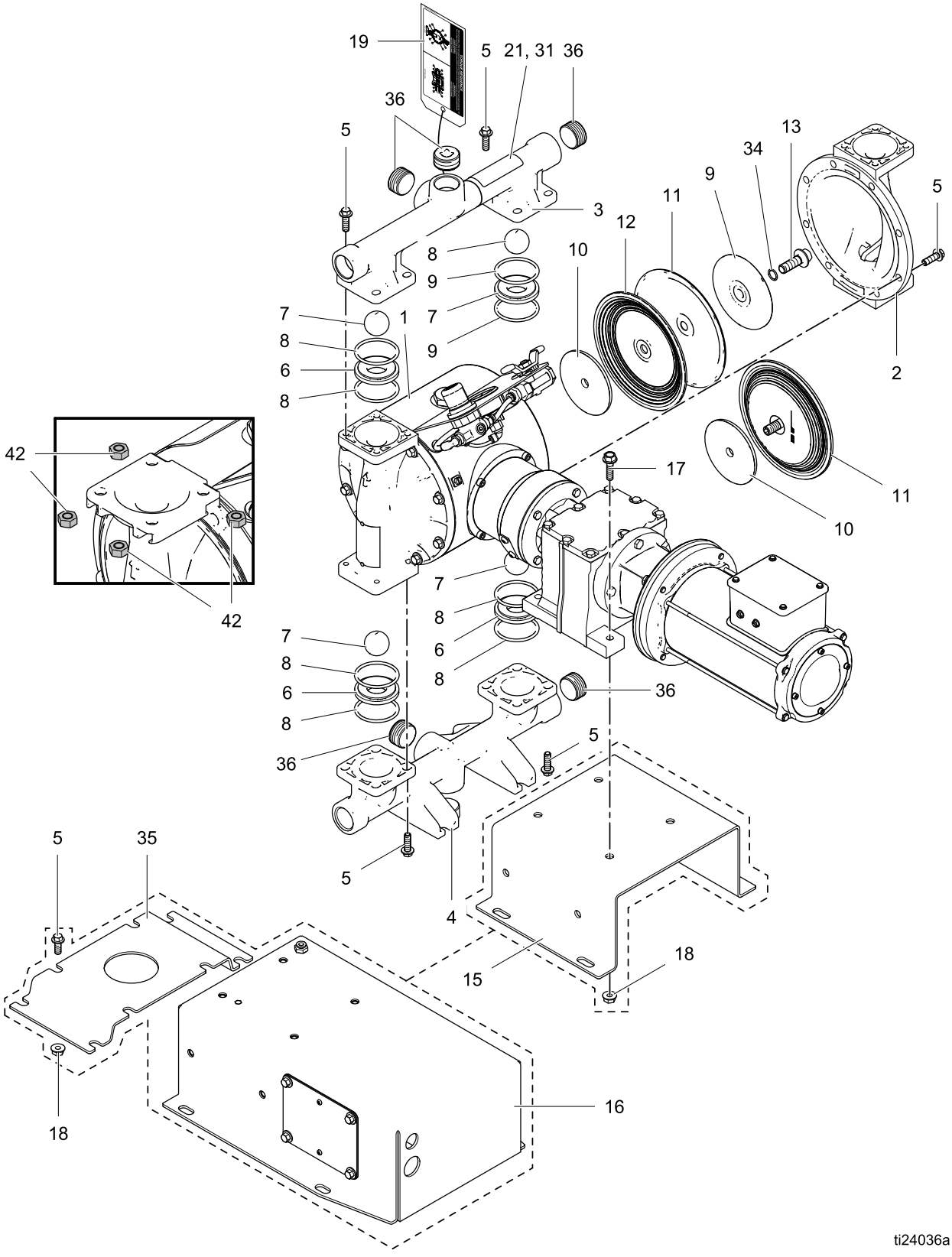
Fluid Cover Screws



Inlet and Outlet Manifold Screws



Parts


19
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Parts/Kits Quick Reference

Use this table as a quick reference for parts/kits. Go to the pages indicated in the table for a full description of kit contents.

Ref.	Part/Kit	Description	Qty.
1	– — —	MODULE, drive	1
2		COVER, fluid	2
	24B653	Aluminum	
	24C050	Polypropylene	
	24C061	Stainless Steel	
3		MANIFOLD, outlet	1
	24B649	Aluminum, npt	
	24B650	Aluminum, bspt	
	24C038	Polypropylene, center flange	
	24C041	Polypropylene, end flange	
	24C057	Stainless Steel, npt	
	24C058	Stainless Steel, bspt	
4		MANIFOLD, inlet	1
	24B651	Aluminum, npt	
	24B652	Aluminum, bspt	
	24C044	Polypropylene, center flange	
	24C047	Polypropylene, end flange	
	24C059	Stainless Steel, npt	
	24C060	Stainless Steel, bspt	
5		FASTENERS, manifold and fluid cover; 8–pack	2 pkg
	24B654	Aluminum	
	24C056	Polypropylene	
	24C064	Stainless Steel	
6		SEAT; 4-pack, includes 8 o-rings where needed,	1 pkg
	24B630	Acetal	
	24B631	Aluminum	
	24B632	Buna-N	
	24B638	FKM Fluoroelastomer	
	24B633	Geolast	
	24B635	Polypropylene	
	24B636	Santoprene	
	24B637	316 Stainless Steel	
	24B634	TPE	

Ref.	Part/Kit	Description	Qty.
7		BALLS, check; 4-pack, includes 8 o-rings	1 pkg
	24B639	Acetal	
	24B640	Buna-N	
	24B643	Polychloroprene	
	24B644	Polychloroprene with SST core	
	24B648	FKM Fluoroelastomer	
	24B641	Geolast	
	24B645	PTFE	
	24B646	Santoprene	
	24B647	316 Stainless Steel	
	24B642	TPE	
8	24B655	O-RING, manifold, (not used on some models); PTFE, 8-pack	1 pkg
9	- — —	PLATE, fluid side; included in Air and Fluid Plate Kits; see page 31.	2
10	- — —	PLATE, air side; included in air and Fluid Plate Kits; see page 31.	2
11		DIAPHRAGM, kit	1 kit
	24B622	Buna-N Standard	
	24B629	FKM Fluoroelastomer Standard	
	24B623	Geolast Standard	
	24B628	Santoprene Standard	
	24B624	TPE Standard	
	24B625	Polychloroprene Overmolded	
	24B626	PTFE Overmolded	
	24B627	PTFE/EPDM Two-Piece	
	24F926	PTFE/Santoprene Two-Piece	
12	- — —	DIAPHRAGM, backup, included with Ref. 12 where needed.	2
13	24C099	BOLT, shaft; kit; includes o-ring (ref. 14)	2
15		BRACKET, gear box, for models without compressor	

Ref.	Part/Kit	Description	Qty.
16		COMPRESSOR, assembly; includes 16a, 16b, 35, and mounting hardware	1
	24Y542	120 Volt	
	24Y541	240 Volt	
16a		COMPRESSOR	1
	24Y544	120 Volt	
	24Y545	240 Volt	
16b	— — —	BOX, compressor	1
17	15U696	SCREW, M8, hex washer head	4
18		NUT, for compressor box	4
	16A390	for aluminum and polypropylene models	
	15U697	for stainless steel models	
19▲		TAG, torque	1
	17G058	for aluminum and stainless steel pumps	
	17G059	for polypropylene pumps	

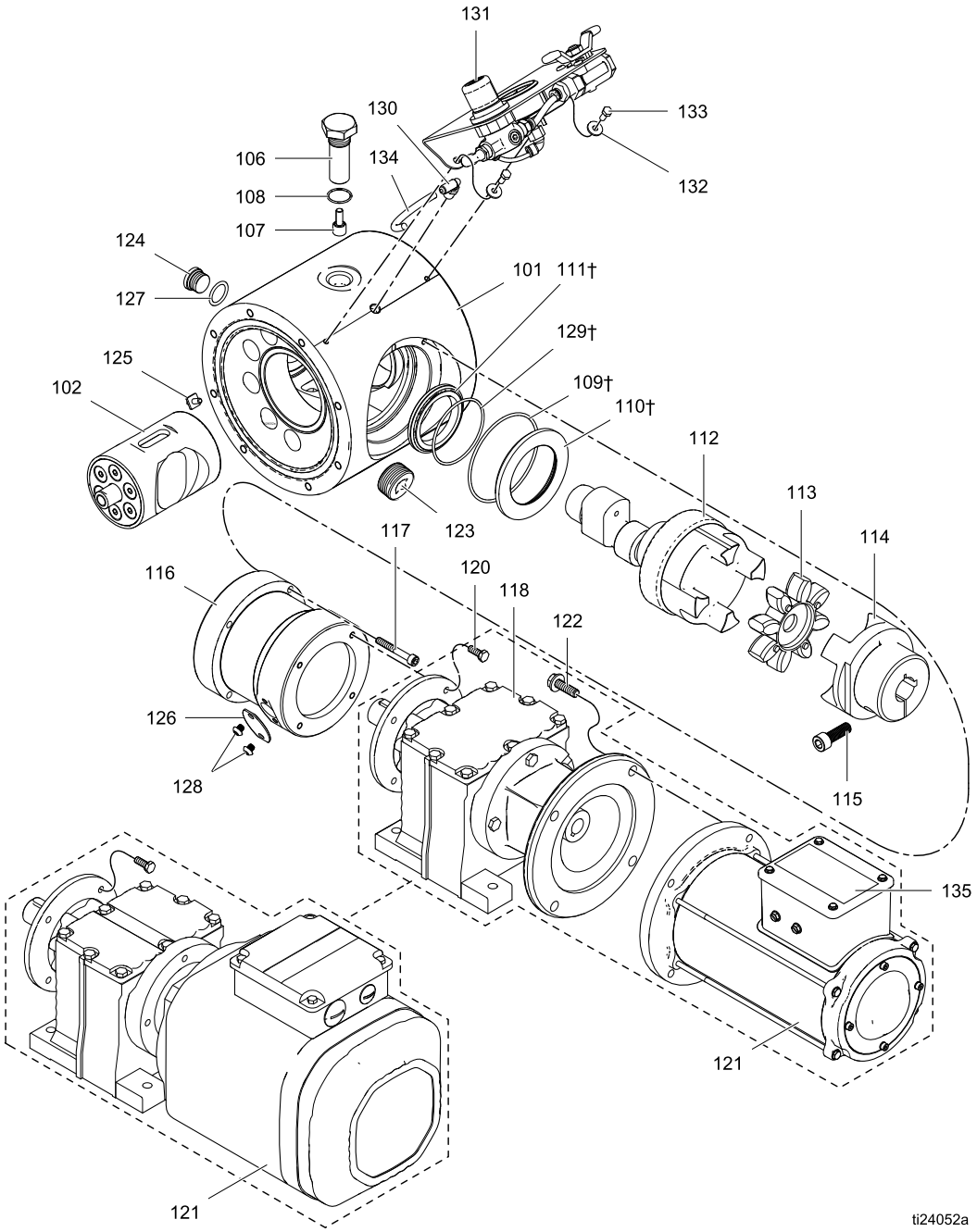
Ref.	Part/Kit	Description	Qty.
21▲	17D277	LABEL, warning	1
31▲	17D278	LABEL, warning, multilingual	1
34	104319	O-RING, for diaphragm shaft bolt; included with Ref. 13	2
35		BRACKET, riser; used for models with a compressor	1
	17D358	for aluminum models	
	17D359	for stainless steel models	
36	24C617	PLUG; 6-pack, aluminum pumps only	1 pkg
37	114153	ELBOW, male, swivel	1
40	24Y514	CONTROL, Husky E-Series	1
41	15Y051	CABLE, M12, 8–Pin	1
42	112257	NUT; for manifold bolts on sst only	16

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

Center Section

Sample Configuration Number

Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT



Ref	Part	Description	Qty
101		HOUSING, center, assembly; includes plugs (Ref. 23 and ref. 24)	1
	24Y525	Aluminum (**Axxx**)	
	24Y526	Stainless Steel (**Sxxx**); also includes o-ring (Ref. 27)	
102	24Y565	PISTON, assembly	1
106		BOLT, bearing; includes Ref. 107 and Ref. 108	1
	24Y532	for aluminum center housing (**Axxx**)	
	24Y533	for stainless steel center housing (**Sxxx**)	
107	- — —	BEARING, cam follower. included with Rev. 106	1
108	- — —	O-RING, Size 019, Fluoroelastomer; included with Ref. 106	1
109†	102769	O-RING, Size 153, Buna-N	1
110†	— — —	CARTRIDGE, seal	1
111†	- — —	SEAL, radial, includes o-ring (ref. 129)	1
112	24Y524	SHAFT, drive, assembly; includes o-ring (Ref. 109), cartridge (Ref. 110) and seal (Ref. 111)	1
113	24Y522	COUPLER, shaft	1
114	24Y521	COUPLER, gearbox; Includes screw (ref. 115)	1
115	– — —	SCREW, socket head, M10 x 30 mm	1
116		HOUSING, alignment, assembly; includes screws (Refs. 117 and 128) and access cover (Ref. 126)	1
	24Y527	Aluminum (**Axxx**)	
	24Y528	Stainless steel (**Sxxx**)	
117		SCREW, socket head, M6 x 40 mm	4
118		GEARBOX	1
	17F839	IEC; used on **x04F** models	
	17A603	NEMA; used on **x04B, x05B, x06B**, **x04C**, **x04D**, and **x04E** models	
120	112117	SCREW, cap, hex head, M6 x 16 mm	4

Ref	Part	Description	Qty
121		MOTOR	1
	24Y520	AC, used on **x04A, x05A, and x06A** models	
	17F734	ATEX; used on **x04C** models	
	17F745	EX; used on **x04D** models	
122	112586	SCREW, cap, hex head, 5/16 x 1; used on **x04B, x05B, x06B**, **x04C**, and **x04D** models	4
123		PLUG, pipe, headless	1
	121497	for aluminum center housing (**Axxx**)	
	122348	for stainless steel center housing (**Sxxx**)	
124		PLUG, front access	1
	295607	for aluminum center housing (**Axxx**)	
	24Y534	for stainless steel center housing (**Sxxx**); includes o-ring (Ref. 127)	
125		SCREW, ground, M5 x 0.8	1
126		COVER, access; includes screws (Ref. 128)	1
	24Y529	for aluminum center housing (**Axxx**)	
	24Y530	for stainless steel center housing (**Sxxx**)	
127	558730	O-RING	1
128		SCREW, button head, M6 x 6 mm	2
129†	- — —	O-RING, Included with ref. 111	1
130	111162	ELBOW, 1/8–27 npt	1
131	24Y531	CONTROLS, air, includes elbow (Ref. 130), washer (Ref. 132), tubing, and screw (Ref 133).	1
132	110170	WASHER	1
133	106190	SCREW	1
135▲	15J075	LABEL, warning	1

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

† *Included in Shaft Seal Repair Kit.*

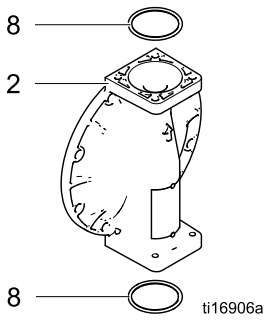
Fluid Covers and Manifolds

Sample Configuration Number

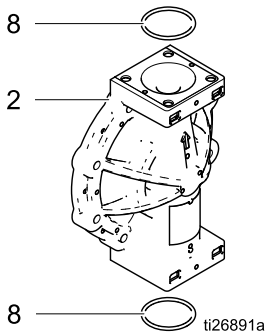
Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

Fluid Cover Kits
Kits include:
1 fluid cover (2)
4 o-rings (8)

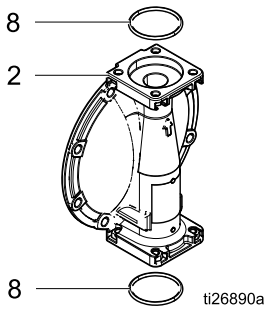
Aluminum

P1, P2	24B653	

Polypropylene

P1, P2	24C050	

Stainless Steel

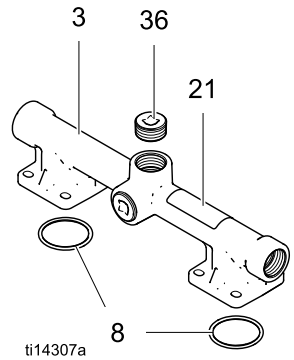
P1, P2	24C061	

NOTE: Outlet manifolds include a Warning label. Replacement warning labels, signs, tags, and cards are available at no cost.

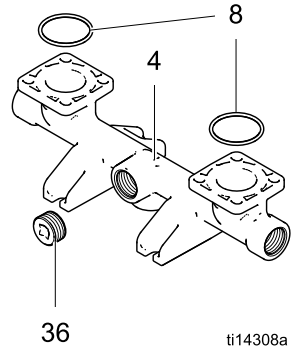
Manifold Kits

Aluminum
Kits include:
1 manifold (3)
1 plug (36)
4 o-rings (8)
1 safety label (outlet manifolds only;▲21)

Outlet (3)

A1	24B649	
A2	24B650	

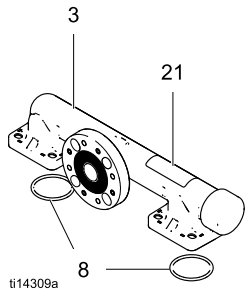
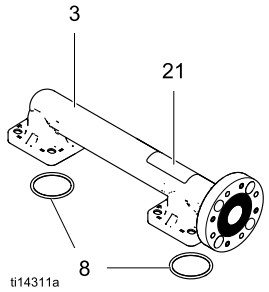
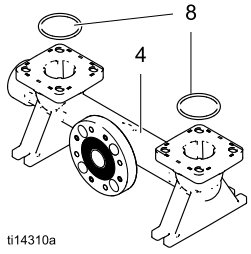
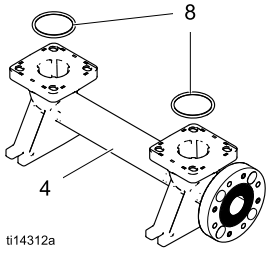
Inlet (4)

A1	24B651	
A2	24B652	

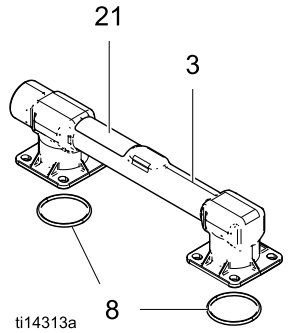
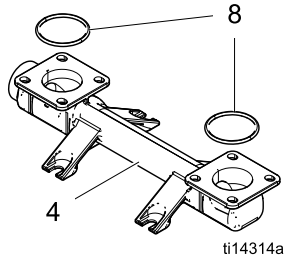
Sample Configuration Number

Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

Polypropylene
Kits include:
1 manifold (3)
4 o-rings (8)
1 safety label (outlet manifolds only;▲21)

Outlet (3)		
P1	24C038	
P2	24C041	
Inlet (4)		
P1	24C044	
P2	24C047	

Stainless Steel
Kits include:
1 manifold (3)
4 o-rings (8)
1 safety label (outlet manifolds only;▲21)

Outlet (3)		
S1	24C057	
S2	24C058	
Inlet (4)		
S1	24C059	
S2	24C060	

Manifold/Fluid Cover Fastener Kits	
A1, A2	24B654
Kit includes: • 8 bolts; carbon steel, hex washer head; M8 x 25	
P1, P2	24C056
Kit includes: • 8 bolts, 300 series stainless steel; hex flange, M8 x 32 • 8 nuts	
S1, S2	24C064
Kit includes: • 8 bolts, 300 series stainless steel; hex washer head, M8 x 20 • 8 nuts	

Seats and Check Balls

Sample Configuration Number

Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

Seat Kits	
AC	24B630
AL	24B631
BN	24B632
FK	24B638
GE	24B633
PP	24B635
SP	24B636
SS	24B637
TP	24B634

Kits include:

- 4 seats (6), material indicated in table.
- 8 o-rings (8), PTFE, not used on models with Buna-N, FKM, or TPE seats.

Ball Kits	
AC	24B639
BN	24B640
CR	24B643
CW	24B644
FK	24B648
GE	24B641
PT	24B645
SP	24B646
SS	24B647
TP	24B642

Kits include:

- 4 balls (7), material indicated in table.
- 8 o-rings (8); not used on models with Buna-N, FKM, or TPE seats.

Diaphragms

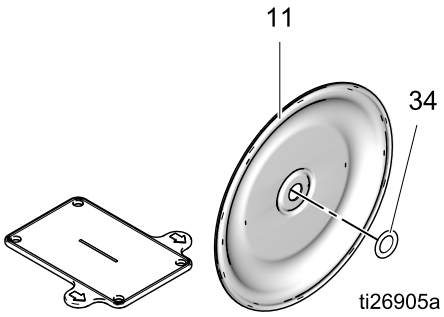
Sample Configuration Number

Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

1–Piece Bolt-Through Diaphragm Kits	
BN	24B622
FK	24B629
GE	24B623
SP	24B628
TP	24B624

Kits include:

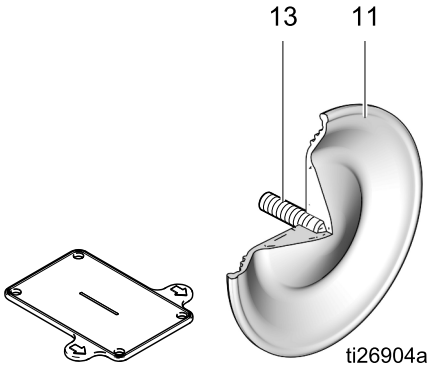
- 2 diaphragms (11), material indicated in table
- 2 o-rings (34); used on metal pumps
- 1 diaphragm install tool; not used
- 8 o-rings (8); not used on models with Buna-N, FKM, or TPE seats.



Overmolded Diaphragm Kit	
CO	24B625
PO	24B626

Kits include:

- 2 overmolded diaphragms (11), material indicated in table.
- 2 diaphragm set screws (13)
- 1 diaphragm install tool; not used
- 1 packet anaerobic adhesive
- 1 packet sealant



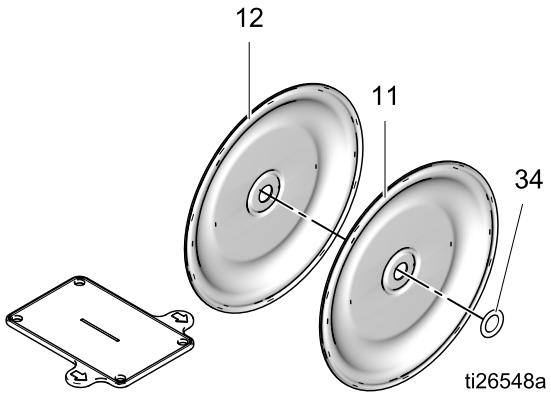
Sample Configuration Number

Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

2-Piece Bolt-Through Diaphragm Kit	
PS	24F926
PT	24B627

Kits include:

- 2 diaphragms (11), PTFE
- 2 backup diaphragms (12), material indicated in table
- 2 o-rings (34); used on metal pumps
- 1 diaphragm install tool; not used
- 8 o-rings (8); PTFE



Diaphragm Shaft Bolt	
Metal Pumps	24C099

Kits include:

- 1 bolt (13); stainless steel, M12 x 35
- 1 o-ring (34)

Air and Fluid Plate Kits	
A1, A2	24C035
P1, P2	24C036
S1, S2	24C062

Kits for aluminum and stainless steel pumps include:

- 1 air side diaphragm plate (10)
- 1 fluid side diaphragm plate (9)
- 1 o-ring (34)
- 1 bolt (13)

Kits for polypropylene pumps include:

- 1 air side diaphragm plate (10)
- 1 fluid side diaphragm plate (9, includes bolt)

Manifold Seals

Sample Configuration Number

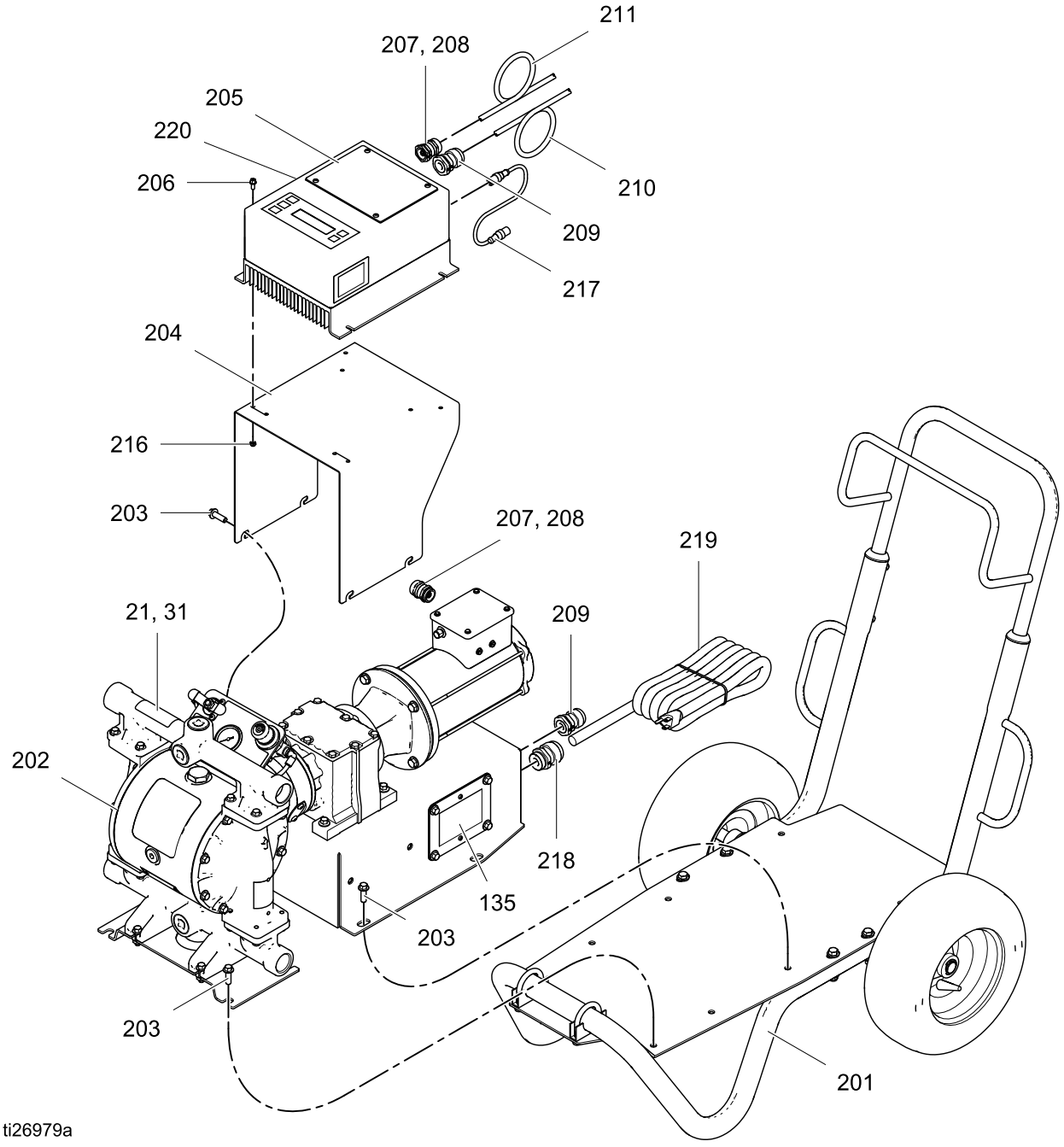
Pump Model	Wetted Section Material	Drive	Center Section Material	Gear Box and Motor	Fluid Covers and Manifolds	Seats	Balls	Diaphragms	Manifold O-Rings
1050	A	E	A	04A	A1	SS	BN	BN	PT

Manifold O-Ring Kits	
PT	24W212

Kits include:

- 8 o-rings (9), PTFE; not used on models with Buna-N, FKM, or TPE seats.

Cart



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Cart-Mounted Models

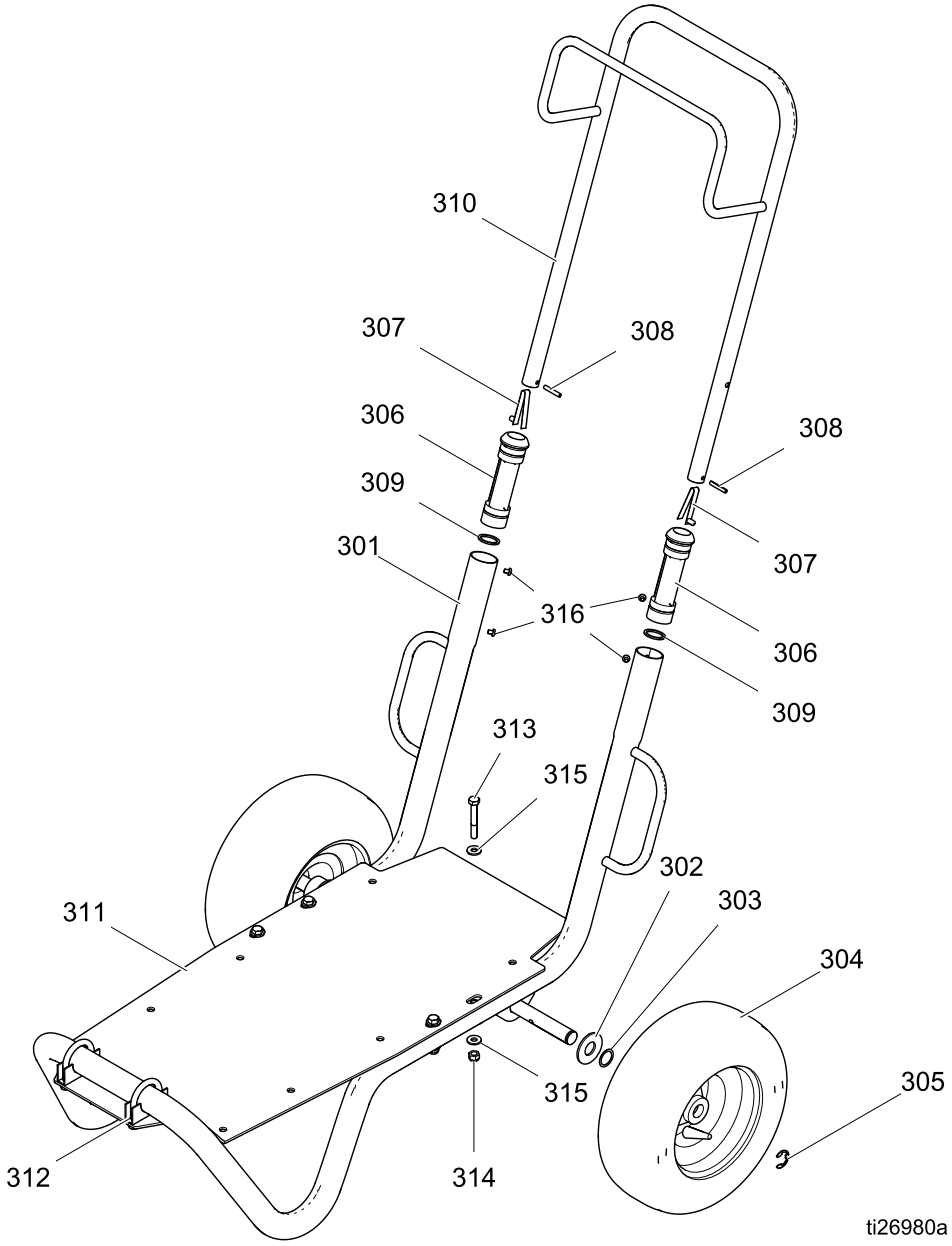
Ref	Part	Description	Qty
201	24Y543	CART; includes screws (Ref. 203)	1
202	See Table	PUMP	1
203	115643	SCREW; M8–1.25 x 25 mm	12
204	24Y537	BRACKET, control box; Included screws (203, 206) and nuts (216).	1
205	24Y514	CONTROLLER, Graco Motor Control	1
206	116344	SCREW, M5–0.8 x 12 mm	4
207	— — —	CONNECTOR, strain relief	2
208	— — —	NUT, grounding, strain relief	2
209	— — —	CONNECTOR, strain relief	2
210	— — —	CABLE, tray rated, 2.7 ft (0.8 m)	1
211	— — —	CABLE, motor, shielded, 1.7 ft (0.5 m)	1
216	105332	NUT, lock	4
217	17F709	CABLE, M12, 8–pin, 1 ft (0.3 m)	1
218	— — —	CONNECTOR, strain relief	1
219	— — —	CORD, power (120V)	1
220	17B772	LABEL, warning	1
19		TAG, torque	1
	17G058	for aluminum and stainless steel pumps	
	17G059	for polypropylene pumps	
21	17D277	LABEL, warning	1
31	17D278	LABEL, warning, multilingual	1
135▲	15J075	LABEL, warning	1

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

Table 1 Pumps Used on Cart-Mounted Models

Cart Model	Pump Model (ref. 203)
24Y388	648190
24Y552	648250
24Y553	648183
24Y554	648243
24Y555	648180
24Y556	648240
24Y557	648187
24Y558	648247
24Y559	650110
24Y560	650154
24Y561	651908
24Y562	651944

Cart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Ref	Part	Description	Qty
301	— — —	FRAME	1
302	156306	WASHER, flat	2
303	116038	WASHER, wave spring	2
304	119420	WHEEL, pneumatic	2
305	120211	E-RING, retaining	2
306	192027	SLEEVE	2
307	112827	BUTTON, snap	2
308	101354	PIN, spring, straight	2

Ref	Part	Description	Qty
309	15J645	WASHER	2
310	24M397	HANDLE	1
311	— — —	PLATE	1
312	— — —	CLAMP	2
313	108481	SCREW, 5/16–18 X 2.25	4
314	111040	NUT, lock	4
315	100527	WASHER	8
316	109032	SCREW, #10–32 x 0.25	4

Kits and Accessories

Motor Feedback Cables

M12, 8–pin

Part	Description
17F709	1.0 ft; 0.3 m
15Y051	9.8 ft; 3.0 m
16X521	24.6 ft; 7.5 m
16P791	52.5 ft; 16 m

Leak Sensor Kit 24Y661

Upgrade kit, to add a leak sensor to an existing system. Includes leak sensor and bushing.
NOTE: Also purchase a cable from the following selections. For systems using a Graco Motor Control, order an extension cable from the first section. For systems using a VFD, order a field-wireable cable from the second section.

Leak Sensor/PLC Extension Cables

M8, 4–pin

Part	Description
121683	9.8 ft; 3.0 m
17H349	24.6 ft; 7.5 m
17H352	52.5 ft; 16 m

Leak Sensor Cables; Field Wireable (for VFDs)

M8, 4–pin

Part	Description
17H389	9.8 ft; 3.0 m
17H390	24.6 ft; 7.5 m
17H391	52.5 ft; 16 m

Compressor Upgrade Kits 24Y542 (120V) and 24Y541 (240V)

Upgrade kits include compressor, compressor box, brackets, and mounting hardware.

Bearing Puller Kit 24Y627

Includes tools needed to remove the bearing from the center section.

PLC Control Cable

M8, 4–pin

Part	Description
17H365	9.8 ft; 3.0 m
17H366	24.6 ft; 7.5 m
17H367	52.5 ft; 16 m

Graco Motor Control Kit 24Y514

Replacement kit includes Graco Motor Control with necessary software.

Software Upgrade Kit 17H104

Upgrade kit includes software token and instructions.
NOTE: Also purchase Programming Cable Kit 24Y788.

Technical Data

	US	Metric
Husky 1050e Electric Double Diaphragm Pump		
Maximum fluid working pressure	70 psi	0.48 MPa, 4.8 bar
Maximum incoming air pressure	150 psi	1.03 MPa, 10.3 bar
Center section air charge range	20 to 80 psi	0.14–0.55 MPa, 1.4–5.5 bar
Maximum air consumption	<0.2 scfh	<0.006 cubic meters/hour
Air inlet size	3/8 in. npt(f)	
Maximum suction lift (reduced if balls don't seat well due to damaged balls or seats, lightweight balls, or extreme speed of cycling)	Wet: 29 ft Dry: 16 ft	Wet: 8.8 m Dry: 4.9 m
Maximum size pumpable solids	1/8 in.	3.2 mm
Ambient air temperature range for operation and storage. **NOTE:** Exposure to extreme low temperatures may result in damage to plastic parts.	32° F–104° F	0° C–40° C
Fluid displacement per cycle	0.14 gallons	0.53 liters
Maximum free-flow delivery	39 gpm	148 lpm
Maximum pump speed	280 cpm	
Fluid Inlet and Outlet Size		
Aluminum and Stainless Steel	1 in npt(f) or 1 in bspt	
Polypropylene	1 in. ANSI/DIN Raised Face Flange	
Electric Motor		
AC, Standard CE (04A, 05A, 06A)		
Power	2 HP	
Speed	1800 rpm (60 Hz) or 1500 rpm (50 Hz)	
Gear Ratio	8.16	
Voltage	3–phase 230V / 3–Phase 460V	
AC, ATEX (04C)		
Power	2 HP	
Speed	3420 rpm (60 Hz)	
Gear Ratio	11.86	
Voltage	3–phase 240V / 3–Phase 415V	

	US	Metric
AC, Explosionproof (04D)		
Power	2 Hp	
Speed	3450 rpm (60 Hz)	
Gear Ratio	11.86	
Voltage	3–phase 230V / 3–Phase 460V	
BLDC (04B, 05B, 06B)		
Power	2.2 Hp	
Speed	3600 rpm	
Gear Ratio	11.86	
Voltage	320 VDC	
Noise Data		
Sound Power (measured per ISO-9614–2)		
at 70 psi fluid pressure and 50 cpm	71 dBa	
at 30 psi fluid pressure and 280 cpm (full flow)	94 dBa	
Sound Pressure [tested 3.28 ft (1 m) from equipment]		
at 70 psi fluid pressure and 50 cpm	61 dBa	
at 30 psi fluid pressure and 280 cpm (full flow)	84 dBa	
Weight		
Compressor	28 lb	13 kg
Graco VFD	6 lb	3 kg
Graco Motor Control	10.5 lb	4.8 kg
Cart Models		
24Y388, 24Y552, and 24Y588	184.5 lb	83.7 kg
24Y559 and 24Y560	182 lb	82.6 kg
24Y561 and 24Y562	200 lb	90.7 kg
Aluminum Pump with Aluminum Center		
With AC Motor and Gearbox	106 lb	48 kg
With DC Motor and Gearbox	90 lb	41 kg
Polypropylene Pump with Aluminum Center		
With AC Motor and Gearbox	103.5 lb	47 kg
With DC Motor and Gearbox	87.5 lb	40 kg
Polypropylene Pump with Stainless Steel Center		
With AC Motor and Gearbox	135 lb	61 kg
With DC Motor and Gearbox	119 lb	54 kg

	US	Metric
Stainless Steel Pump with Aluminum Center		
With AC Motor and Gearbox	121.5 lb	55 kg
With DC Motor and Gearbox	105.5 lb	48 kg
Stainless Steel Pump with Stainless Steel Center		
With AC Motor and Gearbox	153 lb	69 kg
With DC Motor and Gearbox	137 lb	62 kg
Wetted Parts		
Wetted parts include material(s) chosen for seat, ball, and diaphragm options, **plus the pump's material of construction: Aluminum, Polypropylene, or Stainless Steel**		
Non-wetted parts		
Aluminum	aluminum, coated carbon steel, bronze	
Polypropylene	stainless steel, polypropylene, coated carbon steel, bronze	
Stainless Steel	stainless steel, aluminum, coated carbon steel, bronze	
Technical Specifications for the Graco Motor Control (All installations and wiring must comply with NEC and local electrical codes.)		
DC Power Supply	Class 2 Power Supply only	
Approvals	UL508C	
Conformity	CE-Low Voltage (2006/95/EC), EMC (2004/108/EC), and RoHS (2011/65/EU) Directives	
Ambient Temperature	-40°F – 104°F	–40°C – 40°C
Environment Rating	Type 4X, IP 66	
Overtemperature Sensing Specifications (The drive is provided with a means to accept and act upon a signal from a thermal sensor in the motor. Motor overtemperature sensing is required to provide the motor overload protection.)	0–3.3 VDC, 1mA maximum	
Input Specifications		
Input Line Voltage	120/240 VAC, line-to-line	
Input Line Phasing	Single Phase	
Input Line Frequency	50/60 Hz	
Input Current per Phase	16A	
Maximum Branch Circuit Protection Rating	20A, Inverse Time Circuit Breaker	
Short Circuit Current Rating	5 kA	

	US	Metric
Output Specifications		
Output Line Voltage	0–264 VAC	
Output Line Phasing	Three Phase	
Output Current (Current limit, set via the software, is provided as a secondary protection from motor overload.)	0–12A	
Output Power	1.92 KW / 2.6 hp	
Output Overload	200% for 0.2 seconds	

Fluid Temperature Range

NOTICE
Temperature limits are based on mechanical stress only. Certain chemicals will further limit the fluid temperature range. Stay within the temperature range of the most-restricted wetted component. Operating at a fluid temperature that is too high or too low for the components of your pump may cause equipment damage.

Diaphragm/Ball/Seat Material	Fluid Temperature Range			
	Aluminum or Stainless Steel Pumps		Polypropylene	
	Fahrenheit	Celsius	Fahrenheit	Celsius
Acetal (AC)	10° to 180°F	-12° to 82°C	32° to 150°F	0° to 66°C
Buna-N (BN)	10° to 180°F	-12° to 82°C	32° to 150°F	0° to 66°C
FKM Fluoroelastomer (FK)*				
Geolast® (GE)	-40° to 150°F	-40° to 66°C	32° to 150°F	0° to 66°C
Polychloroprene overmolded diaphragm (CO) or Polychloroprene check balls (CR or CW)				
Polypropylene (PP)	32° to 150°F	0° to 66°C	32° to 150°F	0° to 66°C
PTFE overmolded diaphragm (PO)	40° to 180°F	4° to 82°C	40° to 150°F	4° to 66°C
PTFE check balls or two-piece PTFE/EPDM diaphragm (PT)	40° to 220°F	4° to 104°C	40° to 150°F	4° to 66°C
Santoprene® check balls or 2–piece PTFE/Santoprene diaphragm (PS)	-40° to 180°F	-40° to 82°C	32° to 150°F	0° to 66°C
TPE (TP)	-20° to 150°F	-29° to 66°C	32° to 150°F	0° to 66°C

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale 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.

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For the latest information about Graco products, visit www.graco.com.
For patent information, see www.graco.com/patents.

To place an order, contact your Graco Distributor or call to identify the nearest distributor.

Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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Original Instructions. This manual contains English. MM 334188

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International Offices: Belgium, China, Japan, Korea

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