Repair/Parts

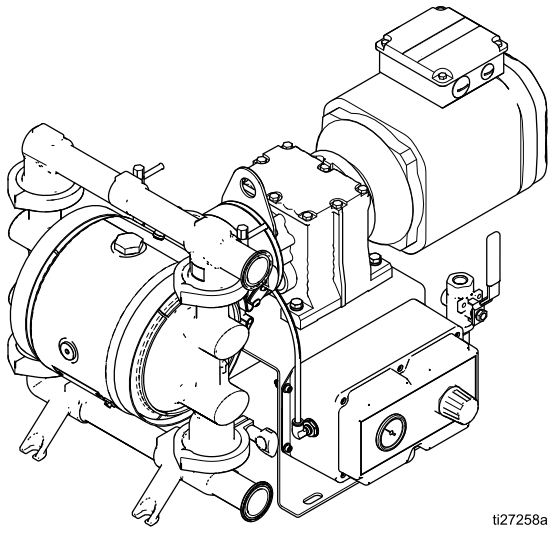
# SaniForce™ 1040e Electric-Operated Diaphragm Pump

3A3168J
EN

**For fluid transfer in indoor sanitary applications. For professional use only.**

**Important Safety Instructions**
Read all warnings and instructions in this manual and in your SaniForce 1040e Operation manual. **Save these instructions.**

*For maximum operating pressures, see the Performance Charts on pages 46–49 of the Operation manual.*
*See pages 6–8 for model information, including approvals.*



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# Contents



# Related Manuals

| Manual Number | Title |
|---|---|
| 3A3167 | SaniForce 1040e Electric-Operated Diaphragm Pump, Operation |

# 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.
- Do not expose compressor box to washdown spray.

### 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 Safety Data Sheet (SDS) 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 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.

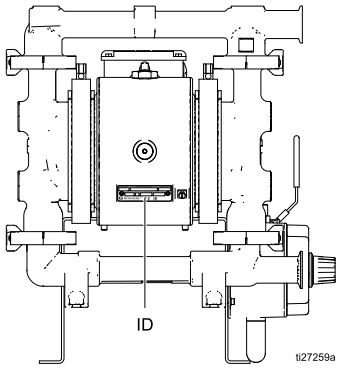
**PERSONAL PROTECTIVE EQUIPMENT**

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.

# 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:** 1040TE-A04AS1-3SSPTPOPT

| 1040 | T | E | A | 04A | S1-3 | SS | PT | PO | 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 | |
|---|---|---|---|---|---|---|---|---|---|
| 1040 | T | Sanitary Stainless Steel | E | Electric | A | Aluminum | 04A | Standard AC Induction Motor with Gearbox |
| | | | | | S | Stainless Steel | 04B | Brushless DC Motor |
| | | | | | | | 04E | NEMA 56 C Gearbox ‡ |
| | | | | | | | 04F | IEC 90 B5 Flange Gearbox ‡ |
| | | | | | | | 05C | Brushless DC Motor (configured for cart-mounted systems) |

| Fluid Covers and Manifolds | | Seat Material | | Ball Material | | Diaphragm Material | | Manifold O-Rings | |
|---|---|---|---|---|---|---|---|---|---|
| S1-3 | Stainless steel, TriClamp | SS | 316 Stainless Steel | CW | Polychloroprene Weighted | PO | PTFE/EPDM Overmold | PT | PTFE |
| S1-4 | Stainless steel, DIN | | | PT | PTFE | PT | PTFE/EPDM 2–Piece | EP | EPDM |
| | | | | SP | Santoprene | SP | Santoprene | | |

| Approvals | |
|---|---|
| All Models are certified to: | CE |
| Models which do not contain Santoprene*: | |
| ‡ Pumps with code 04E or 04F are certified to: | Ex II 2 G ck IIB T3 Gb |

* EC 1935/2004 compliant pumps may be subject to individual national provisions in addition to those specified in the EC regulation. It is the users responsibility to know and follow local laws.

# Overview

The product line offers electric-powered diaphragm pumps in a wide range of models. This section shows the structure of available 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* |
| | Brushless DC | Graco Motor Control – included | NEMA | Yes-120V | None | Yes |
| | | | | Yes-240V | CE | Yes |
| | | | | No† | | No* |
| | None | None | NEMA | None | ATEX & CE | No* |
| | | | IEC | | | |

* Cart Kit 24Y923 is available.
†Compressor Kits 24Y921 (120V) and 24Y922 (240V) are available

**Key Points:**

- Pumps are available with an AC or Brushless DC (BLDC) motor, or with just a gearbox (for applications where a motor is already available).
- Graco recommends the use of a motor soft starter or a VFD (PN 16K911 or 16K912) in the electrical circuit for all installations. See the motor manufacturer's recommendations for proper installation when using either of these components. In all cases, make sure all products are installed in accordance with local codes and regulations.
- BLDC motors are controlled by the Graco Motor Control that is supplied with the pump.

## Relationship Table

Use this table to locate your Graco pump part number. Obtain the configuration number from the designation tag attached to the pump housing. Compare this configuration number against the information provided in the Configuration Number Matrix, page 6 to obtain the types of material being used. Then locate the applicable fluid section repair kit number for the pump.

| Fluid Section Repair Kit | Ball | Diaphragm | Manifold O-ring | Graco Pump Part Number (Pumps with Motors) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Flange Manifold Connection | | | | DIN Manifold Connection | | | |
| | | | | AC Motor | | BLDC Motor | | AC Motor | | BLDC Motor | |
| | | | | Alum | SST | Alum | SST | Alum | SST | Alum | SST |
| 25A291 | CW | SP | EP | 24Y573 | 24Y595 | 24Y584 | 24Y605 | 24Y577 | 24Y600 | 24Y590 | 24Y610 |
| 25A292 | PT | PO | PT | 24Y574 | 24Y596 | 24Y585 | 24Y606 | 24Y580 | 24Y601 | 24Y591 | 24Y611 |
| 25A293 | PT | PT | PT | 24Y575 | 24Y597 | 24Y586 | 24Y607 | 24Y581 | 24Y602 | 24Y592 | 24Y613 |
| 25A294 | SP | SP | PT | 24Y576 | 24Y598 | 24Y587 | 24Y608 | 24Y582 | 24Y603 | 24Y593 | 24Y614 |
| 25A295 | SP | SP | EP | 24Y579 | 24Y599 | 24Y589 | 24Y609 | 24Y583 | 24Y604 | 24Y594 | 24Y615 |

NOTE: Seat and o-ring kit 25A276 available separately

| Fluid Section Repair Kit | Ball | Diaphragm | Manifold O-ring | Graco Pump Part Number (Pumps without Graco Motor) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Flange Manifold Connection | | | | DIN Manifold Connection | | | |
| | | | | IEC Gearbox | | NEMA Gearbox | | IEC Gearbox | | NEMA Gearbox | |
| | | | | Alum | SST | Alum | SST | Alum | SST | Alum | SST |
| 25A291 | CW | SP | EP | 25C095 | 25C117 | 25C084 | 25C106 | 25C099 | 25C121 | 25C088 | 25C110 |
| 25A292 | PT | PO | PT | 25C096 | 25C118 | 25C085 | 25C107 | 25C101 | 25C123 | 25C090 | 25C112 |
| 25A293 | PT | PT | PT | 25C097 | 25C119 | 25C086 | 25C108 | 25C102 | 25C124 | 25C091 | 25C113 |
| 25A294 | SP | SP | PT | 25C098 | 25C120 | 25C087 | 25C109 | 25C103 | 25C125 | 25C092 | 25C114 |
| 25A295 | SP | SP | EP | 25C100 | 25C122 | 25C089 | 25C111 | 25C104 | 25C126 | 25C093 | 25C115 |

NOTE: Seat and o-ring kit 25A276 available separately

# Troubleshooting


- Follow the Pressure Relief Procedure, page 11, before checking or servicing the equipment.
- Check all possible problems and causes before disassembly.

See the Operation Manual (3A3167) 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. |
| | Insufficient suction pressure | Increase suction pressure. See manual 3A3167. |
| | 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 fluid pressure at stall. | Check valve balls, seats, or o-rings are worn. | Replace. |
| | Manifold clamps or fluid cover clamps 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 (if installed) 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. |
| 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. |

| Problem | Cause | Solution |
|---|---|---|
| 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 clamps or fluid cover clamps. | 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. |
| | Operational parameters are exceeded. | See manual 3A3167 for event codes. |
| **NOTE:** For problems with a Variable Frequency Device (VFD), see your VFD manual. For problems with the Graco Motor Control, see your Operation Manual. | | |

# Repair

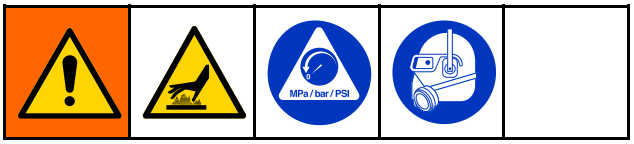
## Pressure Relief Procedure


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 to relieve fluid pressure. Have a container ready to catch the drainage.
4. Close the pump air inlet valve on the pneumatic enclosure.
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, diaphragms, and manifold o-rings in a range of materials. A seat and manifold o-ring kit is also available.

**NOTE:** To ensure proper seating of the check balls, always inspect the seats when replacing the balls. Replace seats as necessary if seating surface shows evidence of wear.

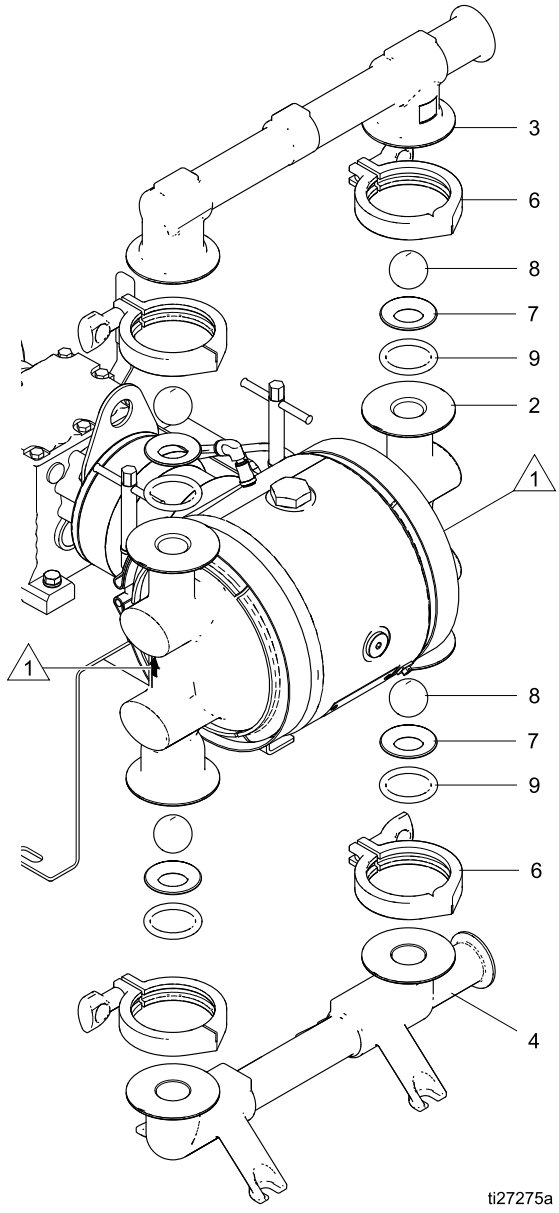
## Disassemble the Check Valves

1. Follow the Pressure Relief Procedure, page 11. Remove power from the motor. Disconnect all hoses.
2. Remove the manifold clamps (6), then remove the outlet manifold (3).
3. Remove the o-rings (9), seats (7), and balls (8).
4. Repeat for the inlet manifold (4), o-rings (9), seats (7), and balls (8).

To continue disassembly, see Disassemble the Diaphragms, page 13.

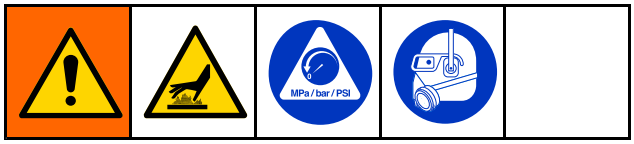
## Reassemble the Check Valves

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 (7–9) and manifolds (3, 4) are assembled **exactly** as shown. The arrows on the fluid covers (2) **must** point toward the outlet manifold (3).




1 Arrow on both covers must point toward outlet manifold

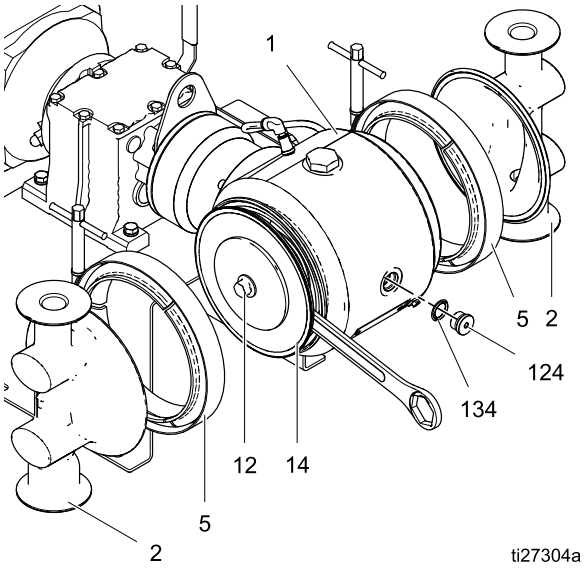
# Diaphragm Repair




## 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 11. 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. Remove the clamps (5) from the fluid covers, then pull the fluid covers off of the pump.




4. Loosen the screws and remove the motor fan cover. Turn the motor fan by hand to move the piston fully to one side.

   **NOTE:** If the pump is still attached to the motor, remove the plug (124) and o-ring (134). 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 16

5. **Overmolded Diaphragms (PO models)**

   a. Hold a 5/8 in. 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. Hold a 5/8 in. wrench on the wrench flats of the exposed piston shaft. Use a 15 mm wrench on the shaft bolt (15) 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 16.

## Reassemble the Diaphragms

Follow all notes in the illustrations on page 15. 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 16, 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 (11) 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 5/8 in. wrench on the wrench flats of the piston shaft. Screw the assembly into the shaft as tight as possible by hand.
   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 13.
   g. Repeat to install the other diaphragm assembly.
3. **All Other Diaphragms-Metal Pumps**
   a. Thoroughly clean or replace the diaphragm bolt (14). Install the o-ring (15).
   b. Assemble the fluid side plate (10), the diaphragm (12), the backup diaphragm (13, if present), and the air side diaphragm plate (11) 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 5/8 in. wrench on the wrench flats of the piston shaft. Screw the bolt onto the shaft and torque to 60–70 ft-lb (81–95 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 13.
   g. Repeat to install the other diaphragm assembly.
4. Attach the fluid covers. The arrow on each fluid cover must point toward the outlet manifold. Tighten the mounting clamp (5).
   **NOTE:** A food grade anti-seize lubricant can be used on the clamp threads to aid assembly.

5. Reassemble the check valves and manifolds. See Reassemble the Check Valves, page 12.

1 Rounded side faces diaphragm.

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

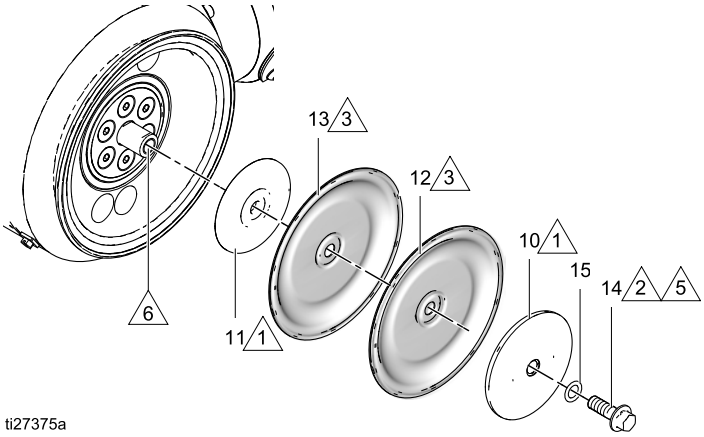
3 AIR SIDE markings on diaphragm must face the center housing.

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 60–70 ft-lb (81–95 N•m) at 100 rpm maximum.

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

**2–Piece (PT) Models**

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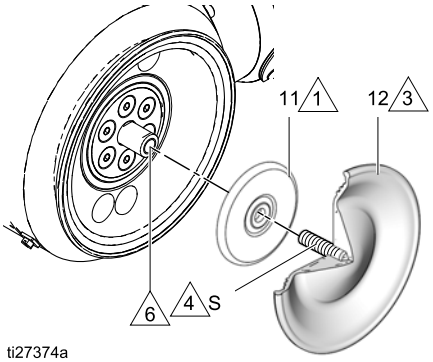
**Overmolded (PO) Models**

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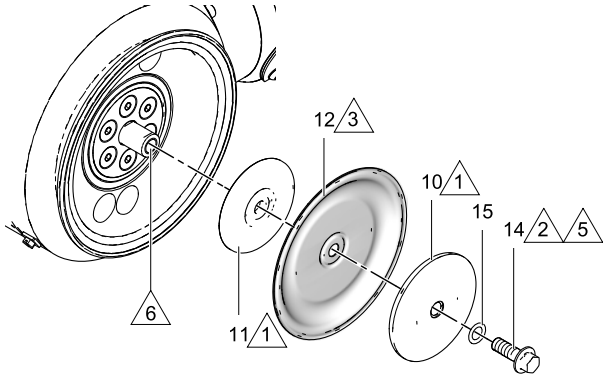
**Standard (SP) Models**

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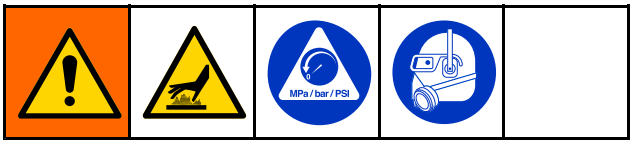
**NOTICE**

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 17.

1. Follow the Pressure Relief Procedure, page 11. Remove power from the motor. Disconnect all hoses.
2. Remove the manifolds and check valve parts as directed in Disassemble the Check Valves, page 12.
3. Remove the fluid covers and diaphragms as directed in Disassemble the Diaphragms, page 13.

   **TIP:** Clamp the gear box bracket (27) 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).

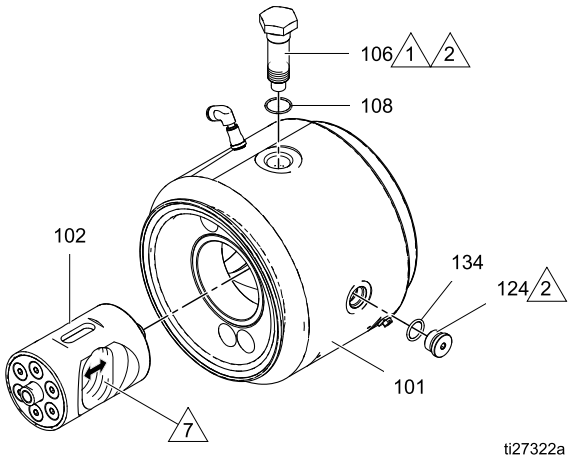
   **TIP:** It may be necessary to tap the pump with a rubber mallet to disengage the coupler.
5. Use a 5/16 hex wrench to remove the plug (124). Use a 30 mm socket wrench to remove the bearing bolt (106) and the o-ring (108) from the top.
6. Turn the shaft so the groove (G) on the drive shaft (112) is at the top, in line with the alignment mark (A) on the center housing.
7. Use a 3/4–16 bolt, screwed into the hole for plug (124), to push out the drive shaft (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 drive shaft alignment or contact your distributor.
8. Remove the seal cartridge (110), the o-ring (109) and the radial seal (111) with o-ring (111a).
9. Slide the piston assembly (102) out of the center.
10. Leave the gearbox coupler (114) attached to the gearbox (118) shaft unless it is damaged. If you need to remove it, first remove the alignment housing (116). Use an 8 mm hex wrench to loosen the screw (115), then remove the gearbox coupler (114).

    **NOTE:** If the coupler does not come off freely, use a bearing puller to remove it. Do not use any prying tools, as damage to the mounting flange on the gearbox could occur.

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 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.

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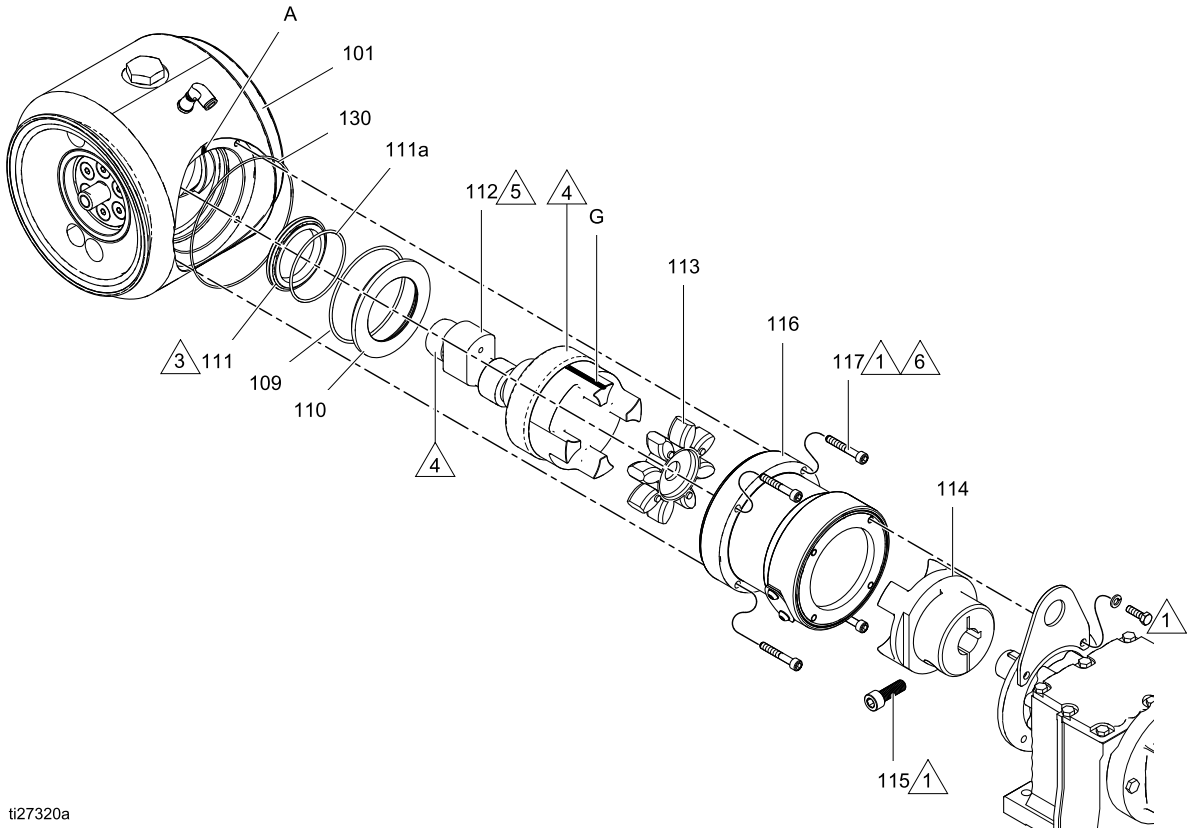
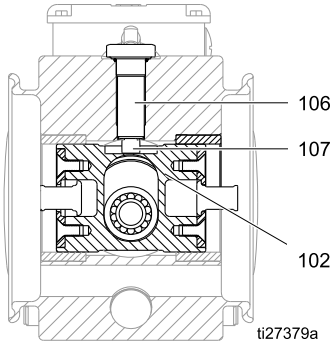



ti27320a

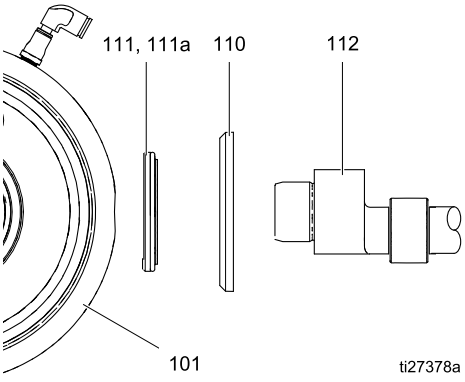
## Reassemble the Center Section

See the illustrations on page 17.

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 on page 18 and install it in the center section with the groove on the top, in line with the bearing bolt (106) hole in the center section.
3. Install the bearing (107 [if removed from the bearing bolt]), o-ring (108), and the bearing bolt (106). Apply medium-strength (blue) thread locker to the bearing bolt. Be sure that the bearing (107) is in the groove on the piston, as shown. Be sure that the piston moves freely. Torque the bolt to 15–25 ft-lb (20–34 N•m).




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 (111a†) is on the radial seal. The lips on the radial seal (111†) must face **IN** toward the center.

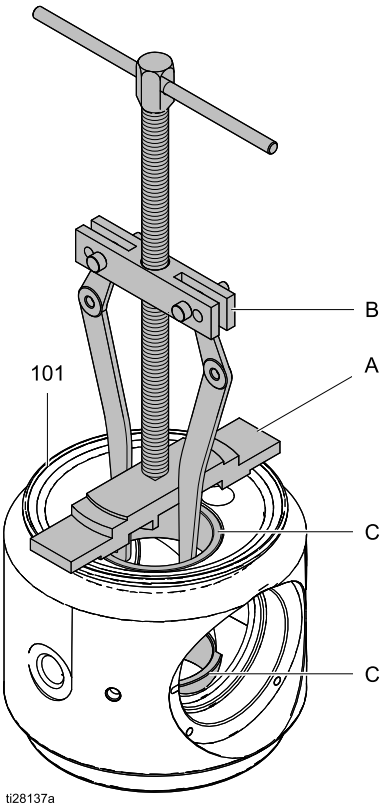



5. Install o-ring (109†).
6. Apply anti-seize lubricant on the mating surfaces of the drive shaft, as shown in the illustration, page 18.
7. Center the piston in the housing and install the drive shaft assembly (112), with the groove (G) facing up, into the center housing (101).
8. Inspect the shaft coupler (114) for wear and replace if needed. Install on the drive shaft.
9. If removed, install the gearbox coupler (114) 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 alignment housing (116) and lifting bracket (139) on the gearbox using the screws (120, 122), washers (119). Torque to 130–160 in-lb (15–18 N•m).
10. Install the alignment housing o-ring (130) on the housing (101).
11. Be sure the gearbox coupler (114) is aligned properly. Turn by hand if needed. Connect the pump to the gearbox assembly, engaging the couplers.
12. 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).
13. Be sure o-ring (134) is on the plug (124). Install the plug and torque to 15–25 ft-lb (20–34 N•m).
14. See Reassemble the Diaphragms, page 14, and Reassemble the Check Valves, page 12.

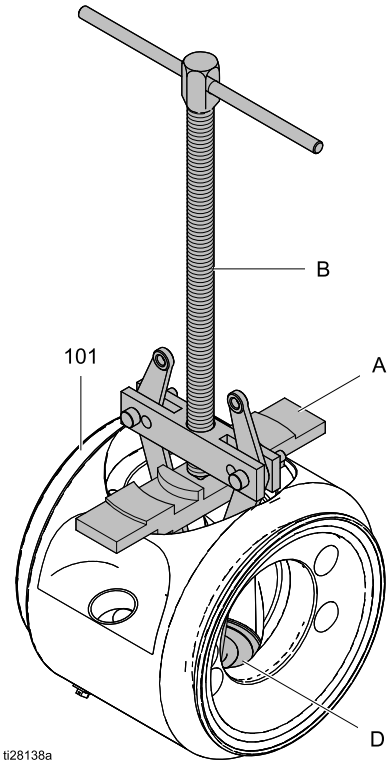
## Replace Center Bearing

**NOTE:** Follow this procedure only if you suspect that the center bearing is damaged. It is not necessary to replace the bearing for normal pump service. You will need Center Section Repair Tool Kit 24Y627. You also will need Bearing Puller Kit 17J718. The tool (A) was designed to work with this bearing puller.

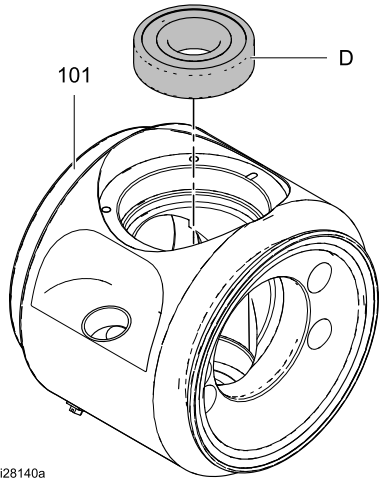
1. Follow all steps in Disassemble the Center Section, page 16.
2. Clamp the center housing (101) in a vise, with one of the bushings facing up.
3. Place the repair tool (A) on the housing with the grooved side down.
4. Remove the bushing (C). Use the upper holes on the medium-sized jaw, and the inner holes on the puller. Be sure that the jaws engage the bottom rim of the bushing. When one bushing is out, turn the housing over and repeat for the other bushing.



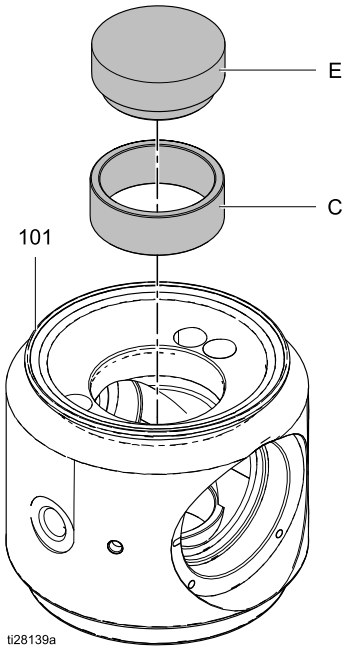

5. Place the center housing (101) in the vise with the bearing (D) side on the bottom.
6. Place the repair tool (A) on the housing with the stepped side down.
7. Remove the bearing (D). Use the lower holes on the medium-sized jaw, and the outer holes on the puller.




8. Use an arbor press to install the new bearing (D) into the center housing (101). Press the bearing to the shoulder in the center housing.

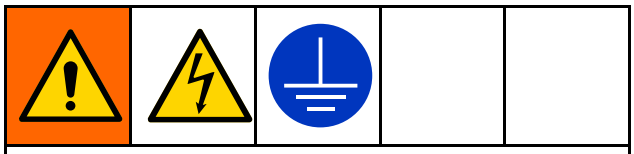


9. Use an arbor press and the press-fit tool (E) to install the two bushings (C). Install the bushings flush with the center housing (101).



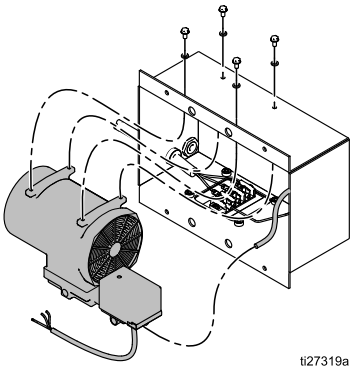

10. Follow all steps in Reassemble the Center Section, page 18.

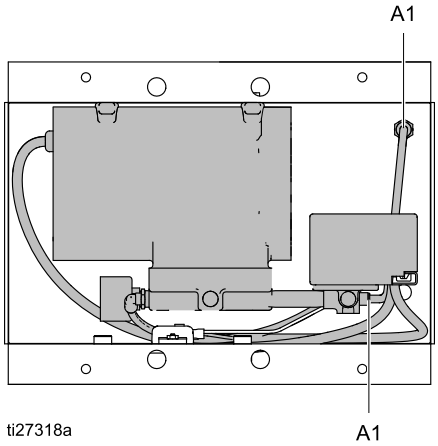
## Replace the Compressor

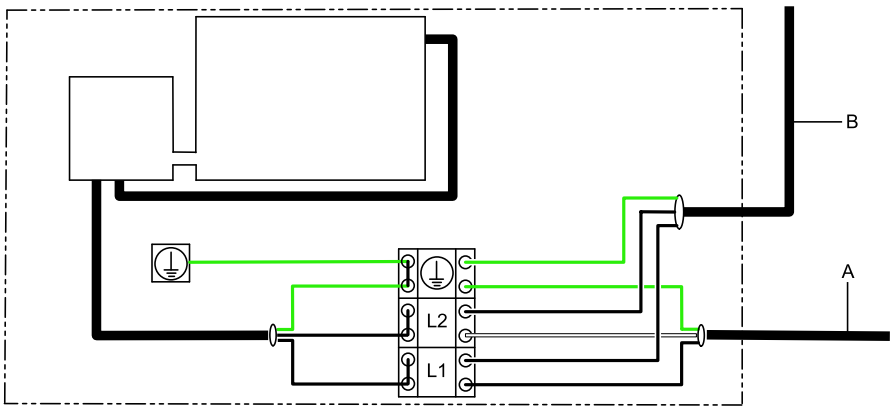


To avoid injury from fire, explosion, or electric shock, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

1. 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.
2. Use the 4 bolts and 4 lock washers to install the new compressor. Apply medium-strength (blue) thread locker to the threads. Connect the air line from A1 to A1, as shown.
3. Connect the wires from the new compressor to the terminal block, as shown.
4. Return the pump to its mounting location. Secure it with the 8 bolts.
5. Return power to the pump.

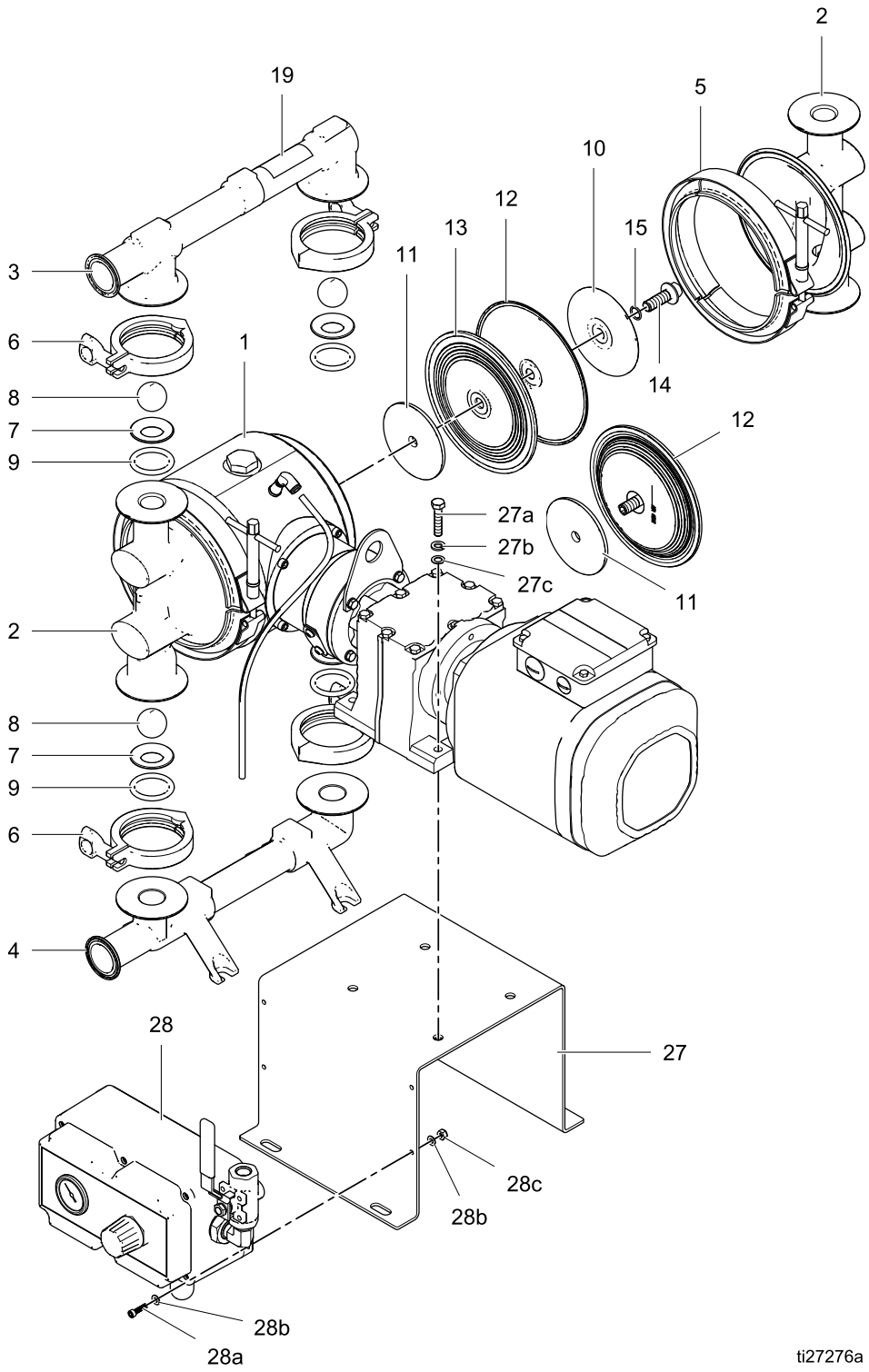



**KEY**
**A** To power supply
**B** To controller

# Parts


2
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27b
27c
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27
28c
28b
28b
28a
ti27276a

## 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 | 277262 | COVER, fluid | 2 |
| 3 | | MANIFOLD, outlet, SST | 1 |
| | 277266 | Flange | |
| | 24U581 | DIN | |
| 4 | | MANIFOLD, inlet, SST | 1 |
| | 277265 | Flange | |
| | 24U580 | DIN | |
| 5 | 15G698 | CLAMP, cover | 2 |
| 6 | 620223 | CLAMP, TriClamp | 4 |
| 7 | 25A276 | SEAT, includes o-rings (Ref. 9); see page 24 | 4 |
| 8 | | BALLS, check | 4 |
| | 15H832 | Polychloroprene weighted | |
| | 112088 | PTFE | |
| | 112092 | Santoprene | |
| 9 | | O-RING, manifold‡ | 4 |
| | 15J280* | PTFE | |
| | 15H827* | EPDM | |
| 10 | 15C039 | PLATE, fluid side, SST, for PT & SP diaprhragms | 2 |
| 11 | | PLATE, air side, aluminum | 2 |
| | 188607 | for PT & SP diaphragms | |
| | 15H809 | for PO diaphragms | |
| 12 | | DIAPHRAGM, kit; see page 25 | 1 kit |
| | 25A297 | Santoprene Standard (SP) | |
| | 25A296 | PTFE Overmolded (PO) | |
| | 25A298 | PTFE/EPDM 2-Piece (PT) | |

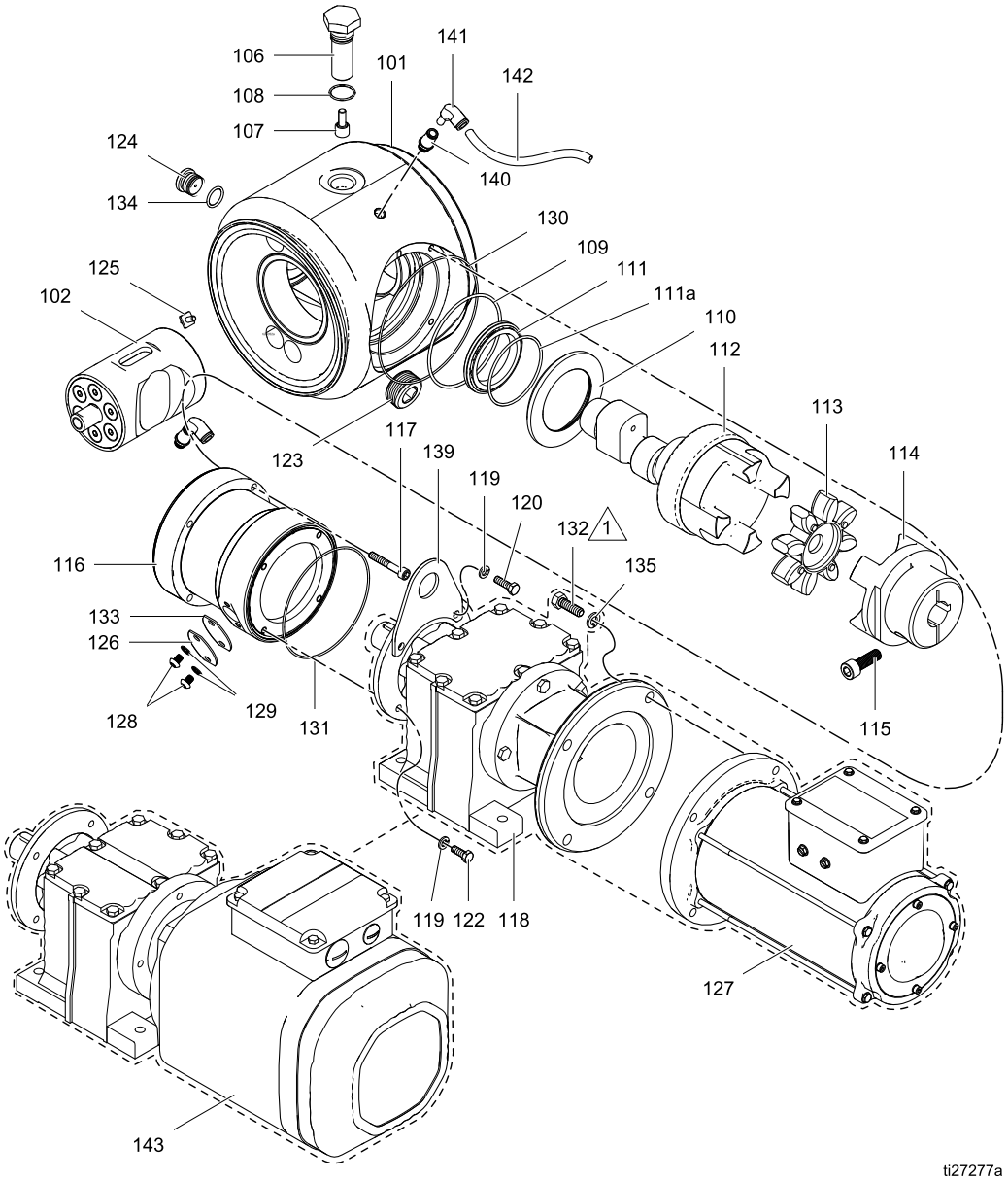
| Ref. | Part/Kit | Description | Qty. |
|---|---|---|---|
| 13 | 15H985 | DIAPHRAGM, backup, included with PT diaphragm (Ref. 12). | 2 |
| 14 | 24C099 | BOLT, diaphragm; kit; includes o-ring (ref. 15) | 2 |
| 15 | 104319 or none | PACKING, o-ring, for models with Santoprene or PTFE/EPDM 2-Piece diaphragm (Ref. 12) | 2 |
| 19▲ | 17D277 | LABEL, safety | 1 |
| 27 | 24Y914 | BRACKET, gearbox mounting, includes 27a, 27b, 27c | 1 |
| 27a | 17J526 | SCREW, cap, hex head, 5/16–18 x 1.5 in. | 4 |
| 27b | 112904 | WASHER, lock | 4 |
| 27c | 105473 | WASHER, flat, | 4 |
| 28 | 24Y986 | ENCLOSURE, pneumatic, includes 28a, 28b, 28c | 1 |
| 28a | 17J085 | SCREW, cap, socket head, 10–24 x 3/4 in. | 4 |
| 28b | 513505 | WASHER | 8 |
| 28c | 17J079 | NUT | 4 |
| 33▲ | 17D278 | LABEL, warning, multilingual | 1 |

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

* These parts are included in the fluid section repair kit which may be purchased separately. Refer to the **Relationship Table**, page 8 to determine the kit for your pump.

‡ An alternative of four PTFE o-rings encapsulated in fluoroelastomer is available in kit 24Z915, which may be purchased separately.

# Drive Module




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

| Ref | Part | Description | Qty |
|---|---|---|---|
| 101 | | HOUSING, center, assembly; includes items (Ref. 123, 124, 134) | 1 |
| | 24Y781 | Aluminum (**A**) | |
| | 24Y899 | Stainless Steel (**S**) | |
| 102 | 24Y565 | PISTON, kit | 1 |
| 106 | | BOLT, bearing; includes Ref. 107 and Ref. 108 | 1 |
| | 24Y532 | for aluminum center housing (**A**) | |
| | 24Y533 | for stainless steel center housing (**S**) | |
| 107 | 17B332 | BEARING, cam follower. included with Ref. 106 | 1 |
| 108 | 116291 | 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. 111a) | 1 |
| 111a† | — — — | O-RING, seal | 1 |
| 112 | 24Y524 | SHAFT, drive, assembly; includes o-ring (Ref. 109), cartridge (Ref. 110) and seal (Ref. 111 and 111a) | 1 |
| 113 | 24Y522 | COUPLER, shaft | 1 |
| 114 | 24Y521 | COUPLER, gearbox; Includes screw (ref. 115) | 1 |
| 115 | 17F767 | SCREW, socket head, M10 x 30 mm | 1 |
| 116 | | HOUSING, alignment, assembly; includes screws (Refs. 117 and 128) and access cover (Ref. 126) | 1 |
| | 25A273 | Aluminum (**A04x**) | |
| | 25A272 | Stainless steel (**S04x**) | |
| 117 | 17J299 | SCREW, socket head, M6 x 40 mm | 4 |
| 118 | | GEARBOX, | 1 |
| | 24Y913 | for BLDC motor (**A04B, S04B**) | |
| | 25C166 | NEMA (**A04E, S04E**) | |
| | 25C167 | IEC (**A04F, S04F**) | |

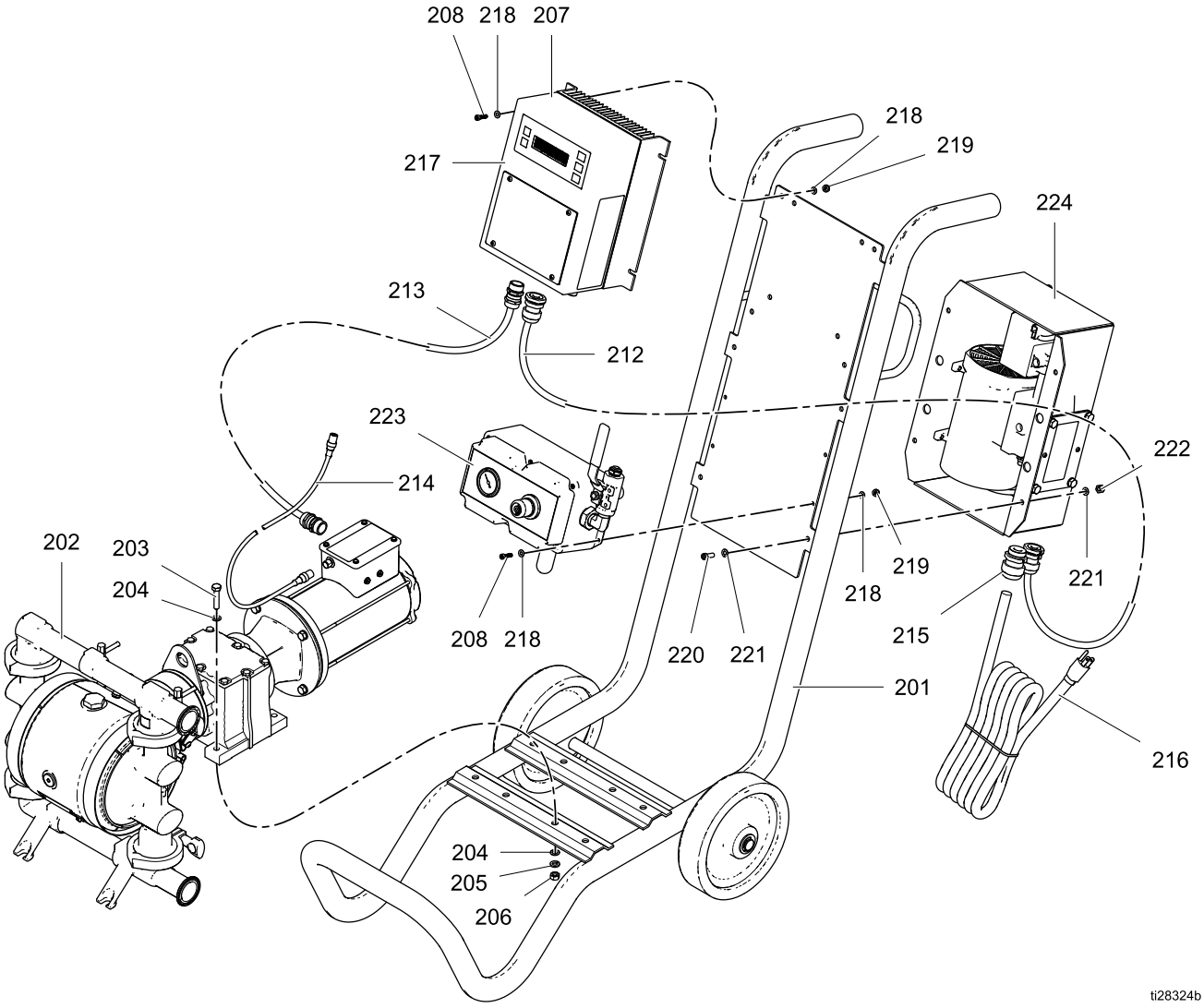
| Ref | Part | Description | Qty |
|---|---|---|---|
| 119 | — — — | WASHER | 4 |
| 120 | — — — | SCREW, cap, hex head, M6 x 16 mm | 2 |
| 122 | — — — | SCREW, cap, hex head, M6 x 20 mm | 2 |
| 123 | 24D735 | PLUG, pipe, headless | 1 |
| 124 | 24Y534 | PLUG, front access includes o-ring (Ref. 134) | 1 |
| 125 | 116343 | SCREW, ground, M5 x 0.8 | 1 |
| 126 | 25F274 | COVER, access; includes items (Ref. 128, 129, 133) | 1 |
| 127 | 24Y780 | MOTOR, BLDC | 1 |
| 128 | — — — | SCREW, button head, M6 x 6 mm | 2 |
| 129 | — — — | WASHER | 2 |
| 130 | 120812 | SEAL, o-ring, size 048, buna-n | 1 |
| 131 | 112343 | PACKING, o-ring | 1 |
| 132‡ | — — — | SCREW, cap, hex head, 3/8–16 x 1 in. (BLDC only) | 4 |
| 133 | — — — | GASKET | 1 |
| 134 | 558730 | O-RING | 1 |
| 135‡ | — — — | WASHER, lock, 5/16 in. (BLDC only) | 4 |
| 139 | 17J099 | RING, lift | 1 |
| 140 | 17J467 | FITTING, 1/8 npt | 1 |
| 141 | 113308 | FITTING, elbow | 1 |
| 142 | C12509 | TUBE | 1 |
| 143 | 24Y779 | GEARMOTOR, AC; includes items (Ref. 119, 120, 122) | 1 |
| ▲ | 15J075 | LABEL, warning | 1 |

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

† *Included in Shaft Seal Repair Kit 24Y536.*

‡ *Included in Motor Kit 24Y780.*

## Cart-Mounted Models



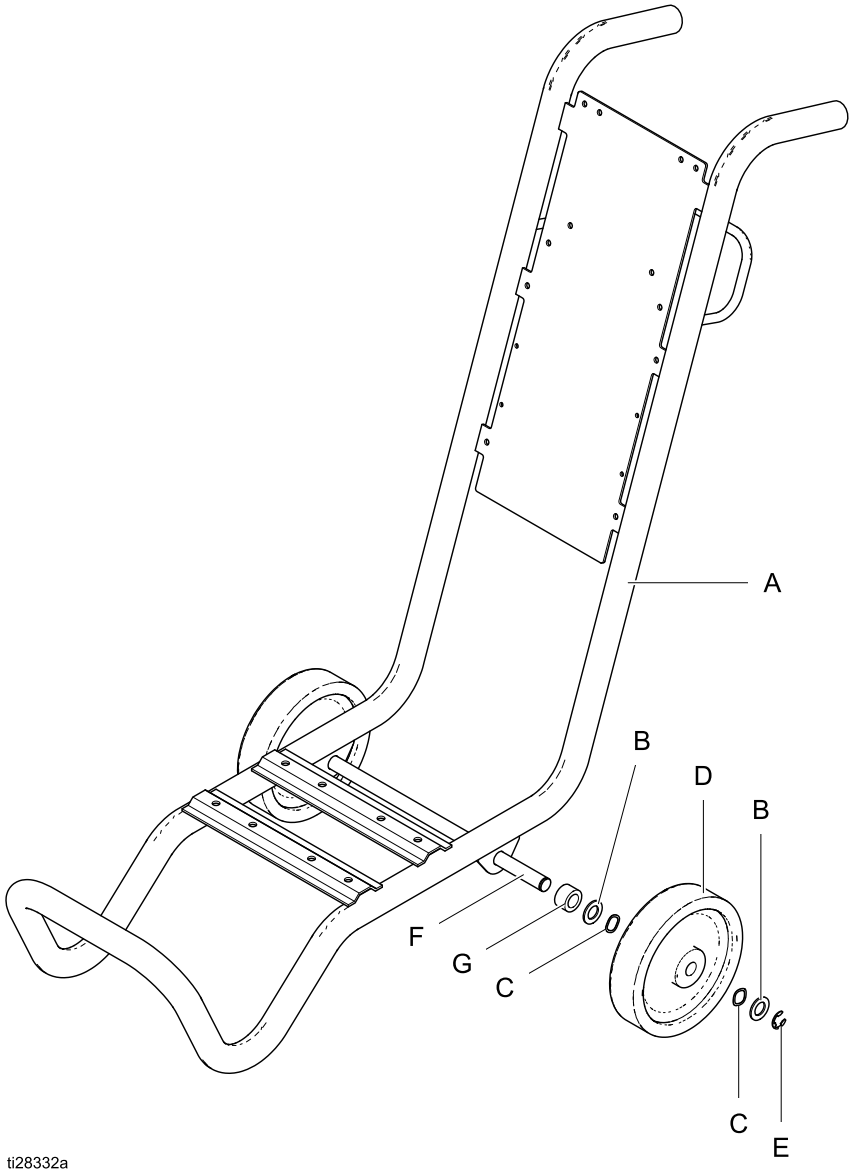
| Ref | Part | Description | Qty |
|---|---|---|---|
| 201 | 24Y923 | CART (includes items a-g) | 1 |
| 202 | See table | PUMP | 1 |
| 203 | — — — | SCREW, hex cap 5/16 | 4 |
| 204 | — — — | WASHER, plain 5/16 | 8 |
| 205 | — — — | WASHER, split lock 5/16 | 4 |
| 206 | — — — | NUT, hex 5/16 | 4 |
| 207 | 24Y514 | CONTROLLER, Graco Motor | 1 |
| 208 | — — — | SCREW, socket hd cap #10 | 8 |
| 212 | 17L371 | CABLE, Compressor | 1 |
| 213 | 17L369 | CABLE, Motor | 1 |
| 214 | 17K777 | CABLE, M12 Communication | 1 |
| 215 | — — — | STRAIN RELIEF, Power Cable | 1 |
| 216 | See table | CORD, Power, 120V | 1 |
| 217▲ | 17B772 | LABEL, warning | 1 |
| 218 | — — — | WASHER, plain #10 | 16 |
| 219 | — — — | NUT, locking #10 | 8 |
| 220 | — — — | SCREW, socket hd cap 1/4” | 4 |
| 221 | — — — | WASHER, plain 1/4” | 8 |
| 222 | — — — | NUT, locking 1/4” | 4 |
| 223 | 24Y986 | CONTROL, pneumatic | 1 |
| 224 | See table | COMPRESSOR | 1 |

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

| Cart Model | Pump Model | Compressor | Power Cord |
|---|---|---|---|
| 25A672 | 25A879 | 24Y921 – 120V | 17G703 |
| 25A703 | 25A880 | 24Y921 – 120V | 17G703 |
| 25A704 | 25A881 | 24Y921 – 120V | 17G703 |
| 25A705 | 25A882 | 24Y921 – 120V | 17G703 |
| 25A706 | 25A879 | 24Y922 – 240V | None |
| 25A707 | 25A880 | 24Y922 – 240V | None |
| 25A708 | 25A881 | 24Y922 – 240V | None |
| 25A709 | 25A882 | 24Y922 – 240V | None |

## Cart

This parts breakdown reflects item 201.

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| Ref | Part | Description | Qty |
|---|---|---|---|
| A | — — — ◊ | FRAME, cart | 1 |
| B | — — — †◊ | WASHER, flat | 4 |
| C | — — — †◊ | WASHER, spring | 4 |
| D | — — — †◊ | WHEEL | 2 |
| E | — — — †◊ | E-RING | 2 |
| F | 17H262◊ | AXLE | 1 |
| G | — — — †◊ | BEARING | 2 |

† Parts are included in Wheel Kit 24Z092 (one side only).
◊ All parts are included in Cart Kit 24Y923.

## Seats

*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 |
|---|---|---|---|---|---|---|---|---|---|
| 1040 | T | E | A | 04A | S1–3 | SS | PT | PT | PT, EP |

| Seat Kits | |
|---|---|
| SS | 25A276 |

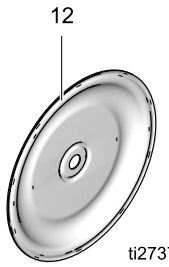
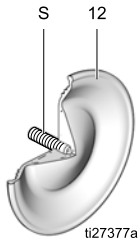
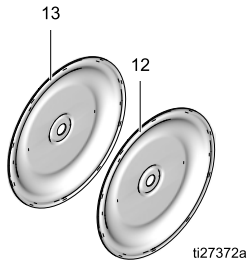
Kits include:

- 4 SST seats (7)
- 4 PTFE o-rings (9)
- 4 EPDM o-rings (9)

## 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 |
|---|---|---|---|---|---|---|---|---|---|
| 1040 | T | E | A | 04A | S1–3 | SS | PT | PT | PT |

| | | |
|---|---|---|
|  | SP | Santoprene Diaphragm<br>Kit 25A297 includes:<br>• Kits include: 2 diaphragms (12) |
|  | PO | PTFE Overmolded Diaphragm<br>Kit 25A296 includes:<br>• 2 overmolded diaphragms (12) with set screws (S)<br>• 1 packet anaerobic adhesive<br>• 1 packet sealant |
|  | PT | PTFE 2-Piece Diaphragm<br>Kit 25A298 includes:<br>• 2 diaphragms (12)<br>• 2 backup diaphragms (13) |

## Kits and Accessories

**Motor Feedback Cables**
M12, 8–pin (both ends)

| 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 (both ends)

| 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 (one end, flying leads on the other end)

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

**Compressor Kits 24Y544 (120V) and 24Y545 (240V)**
Kit contains only a compressor.

**Compressor Upgrade Kits 24Y921 (120V) and 24Y922 (240V)**
Upgrade kits include compressor, compressor box, brackets, and mounting hardware.

**Center Section Repair Tool Kit 24Y627**
Includes tools needed to remove the bearing from the center section.

**Bearing Puller Kit 17J718**
Includes an interchangeable bearing puller set.

**PLC Control Cable**
M8, 4–pin (one end, flying leads on the other end)

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

**Controller-to-Motor Cables**
Preassembled cable to wire the motor controller to the motor. Includes cable, strain reliefs, and terminals.

| Part | Description |
|---|---|
| 17L368 | 1.0 ft; 0.3 m |
| 17S306 | 9.8 ft; 3.0 m |

**Compressor-to-Controller Cables**
Preassembled cable to wire the compressor to the motor controller. Includes cable, strain reliefs, and terminals.

| Part | Description |
|---|---|
| 17L370 | 2.0 ft; 0.6 m |
| 17S308 | 9.8 ft; 3.0 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.

**Sanitary Cart Kit 24Y923**
Stainless steel cart with wheels.

**ATEX Motor Kit 25C081**
(For European hazardous locations)

Kit contains motor and SST mounting harware. Motor is ATEX rated II2 G Ex d IIB T3 Gb; IP55. Mounting flange is IEC90 B5 and fits pumps with gearbox 25C167 and pumps with gearbox and motor configuration codes **A04F** and **S04F**.

**Explosion-Proof Motor Kit 25C082**
(For North American hazardous locations)

Kit contains motor and SST mounting harware. Motor is rated Class I Group C & D; Class II Group F & G; IP54. Mounting flange face dimensions are NEMA 56 C and fits gearbox 25C166 and pumps with gearbox and motor configuration codes **A04E** and **S04E**.

# Technical Data

| | US | Metric |
|---|---|---|
| **SaniForce 1040e Electric-Operated Double Diaphragm Pump** | | |
| Maximum fluid working pressure | 70 psi | 0.48 MPa, 4.8 bar |
| Air pressure operating range | 20 to 80 psi | 0.14 to 0.55 MPa, 1.4 to 5.5 bar |
| 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<br>Dry: 16 ft | Wet: 8.8 m<br>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 | 0.10 gallons | 0.38 liters |
| Maximum free-flow delivery | 35 gpm* | 132.5 lpm* |
| Maximum pump speed | 280 cpm | |
| **Fluid Inlet and Outlet Size** | | |
| Aluminum and Stainless Steel | 1.5 in. sanitary flange or 40 mm DIN 11851 | |
| **Electric Motor** | | |
| AC, Standard CE (04A) | | |
| Power | 2 HP | |
| Speed | 1800 rpm (60 Hz) or 1500 rpm (50 Hz) | |
| Gear Ratio | 8.16 | |
| Voltage | 3–phase 230V / 3–Phase 460V | |
| BLDC (04B) | | |
| Power | 2.2 HP | |
| Speed | 3600 rpm | |
| Gear Ratio | 11.86 | |
| Voltage | 320 VDC | |
| **Motorless Gearbox** | | |
| NEMA (04E) | | |
| Mounting Flange | NEMA 56 C | |
| Gear Ratio | 18.08 | |
| IEC (04F) | | |
| Mounting Flange | IEC 90 | |
| Gear Ratio | 18.08 | |
| **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 | |

| | US | Metric |
|---|---|---|
| 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 | |

* Varies by pump model. See performance charts for your model.

## Weights

| Pump Material | | Motor/Gearbox | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AC | | NEMA | | IEC | | BLDC+ NEMA | |
| Fluid Section | Center Section | lb | kg | lb | kg | lb | kg | lb | kg |
| Stainless Steel | Aluminum | 136 | 62 | 99 | 45 | 104 | 47 | 120 | 54 |
| Stainless Steel | Stainless Steel | 166 | 75 | 129 | 58 | 134 | 61 | 150 | 68 |

| | US | Metric |
|---|---|---|
| **Weight** | | |
| Compressor | 28 lb | 13 kg |
| Graco VFD | 6 lb | 3 kg |
| Graco Motor Control | 10.5 lb | 4.8 kg |
| Cart | 33 lb | 15 kg |
| **Wetted Parts** | | |
| Wetted parts include stainless steel, plus material(s) chosen for seat, ball, and diaphragm options | | |
| Non-wetted parts | | |
| Aluminum | aluminum, coated carbon steel, bronze | |
| Stainless Steel | stainless steel, aluminum, coated carbon steel, bronze | |

### 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.

| | Fluid Temperature Range | |
|---|---|---|
| **Diaphragm/Ball/Seat Material** | **Fahrenheit** | **Celsius** |
| Polychloroprene check balls (CW) | 40° to 200°F | 4° to 90°C |
| PTFE overmolded diaphragm (PO) | 40° to 220°F | 4° to 104°C |
| PTFE check balls or two-piece PTFE/EPDM diaphragm (PT) | 40° to 220°F | 4° to 104°C |
| Santoprene® check balls or 2–piece PTFE/Santoprene diaphragm (SP) | -40° to 180°F | -40° to 82°C |

**Technical Specifications for the Graco Motor Control**

| | | |
|---|---|---|
| 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 | 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 | |
| **Output Specifications** | | |
| Output Line Voltage | 0–264 VAC | |
| Output Line Phasing | Three Phase | |
| Output Current | 0–12A | |
| Output Power | 1.92 KW / 2.6 HP | |
| Output Overload | 200% for 0.2 seconds | |

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 in order to provide the motor overload protection.

Current limit, set via the software, is provided as a secondary protection from motor overload.

All installations and wiring must comply with NEC and local electrical codes.

# 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.

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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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