

SaniForce® Piston Pump

Elevator Packages

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EN

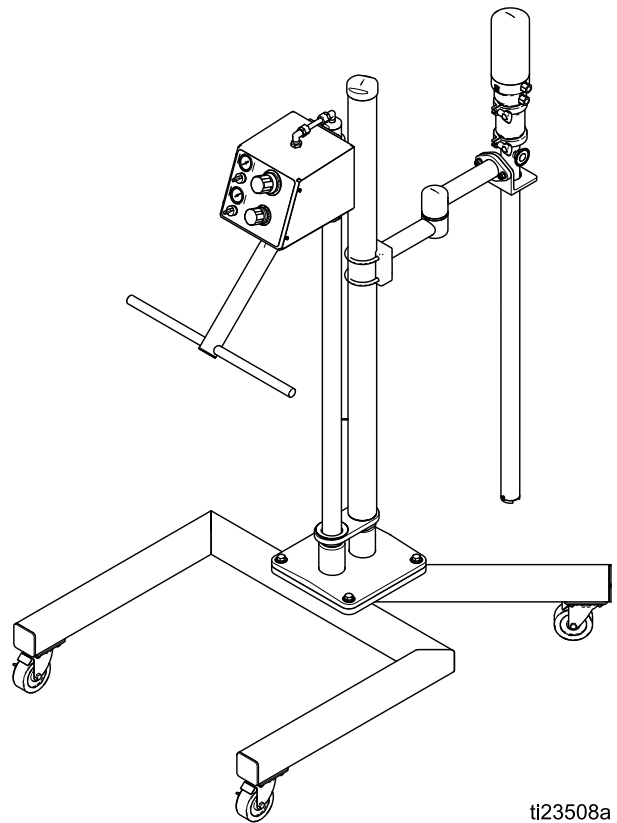
For use in sanitary applications to transfer low to medium viscosity fluids. For professional use only. Not approved for use in European explosive atmosphere locations.



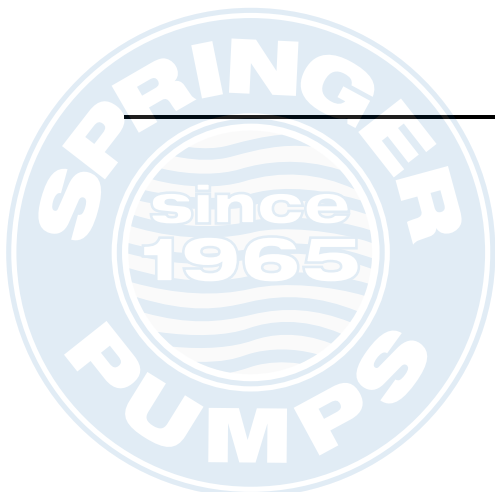
Important Safety Instructions

Read all warnings and instructions in this manual.
Save these instructions.

*Maximum Air Inlet Pressure: 100 psi
(0.7 MPa, 7.0 bar)*



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PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

Models.....	3	Clean the Elevator and Pump	17
Warnings	5	Shutdown	17
System Components.....	8	Troubleshooting.....	18
Installation.....	9	Repair.....	19
Choose a Location	9	Replace Elevator Seal.....	19
Unpack the Equipment	9	Service the Pump.....	20
Move Equipment to Location.....	9	Lubricate the Packing.....	20
Assembly	9	Remove Water from Air Cylinder.....	20
Ground the Equipment	11	Repair or Replace Air Control Parts.....	20
Setup	12	Notes.....	21
Operation.....	14	Parts.....	22
Pressure Relief Procedure.....	14	Dimensions	33
Flush Before First Use.....	14	Appendix A: Air Connections	35
Set Height of Articulating Arm	14	Technical Data	37
Start and Adjust the Elevator	15	Graco Standard Warranty.....	38
Start and Adjust the Pump.....	16		
Change Drums	16		





Material Certification

SaniForce Product Family

Issue Date: April 1, 2014

All fluid contact materials in the SaniForce product family are FDA-Compliant and meet the United States Code of Federal Regulations (CFR) Title 21, Section 177 or are of a corrosion resistant grade Stainless Steel. This includes the below product groups:

- ◆ SaniForce 515, 1040, 1590, and 2150 Air-Operated Double Diaphragm Pumps
- ◆ SaniForce 1590, 3150 HS Air-Operated Double Diaphragm Pumps
- ◆ SaniForce 1590, 3150 HS 3-A Certified Air-Operated Double Diaphragm Pumps
- ◆ SaniForce 2:1, 5:1, 6:1, and 12:1 Air-Operated Piston Pumps
- ◆ SaniForce Diaphragm Pump and Piston Pump Drum Unloaders
- ◆ SaniForce Piston Pump Elevators
- ◆ SaniForce Diaphragm Pump and Piston Pump Bin Evacuation Systems

A handwritten signature in cursive script that reads 'Bradley A. Byron'.


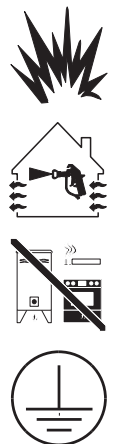


Bradley A. Byron
Quality Manager
Graco Inc.



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Warnings

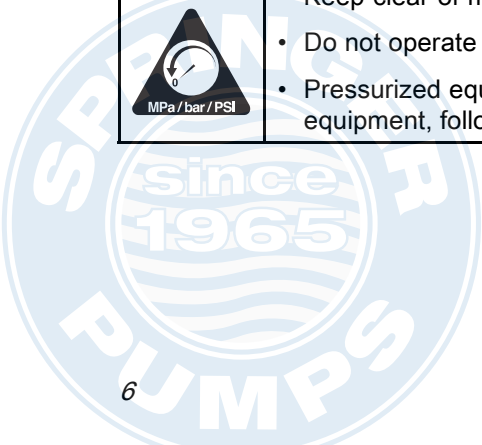
The following warnings are for the setup, use, grounding, maintenance and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risks. When these symbols appear in the body of this manual or on labels refer back to these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




 <h2 style="margin: 0;">WARNING</h2>	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • 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. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive. • Stop operation immediately if static sparking occurs or you feel a shock, Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.
	<p>Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Clean plastic parts only in well ventilated area. • Do not clean with a dry cloth. • Do not operate electrostatic guns in equipment work area.
	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none"> • 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.

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 <h1 style="margin: 0;">WARNING</h1>	
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical 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. • Do not leave the work area while equipment is energized or under pressure. (If applicable.) • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
 	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD</p> <p>Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.</p> <ul style="list-style-type: none"> • Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. • See Technical Data in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's MSDSs and recommendations.
 	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.



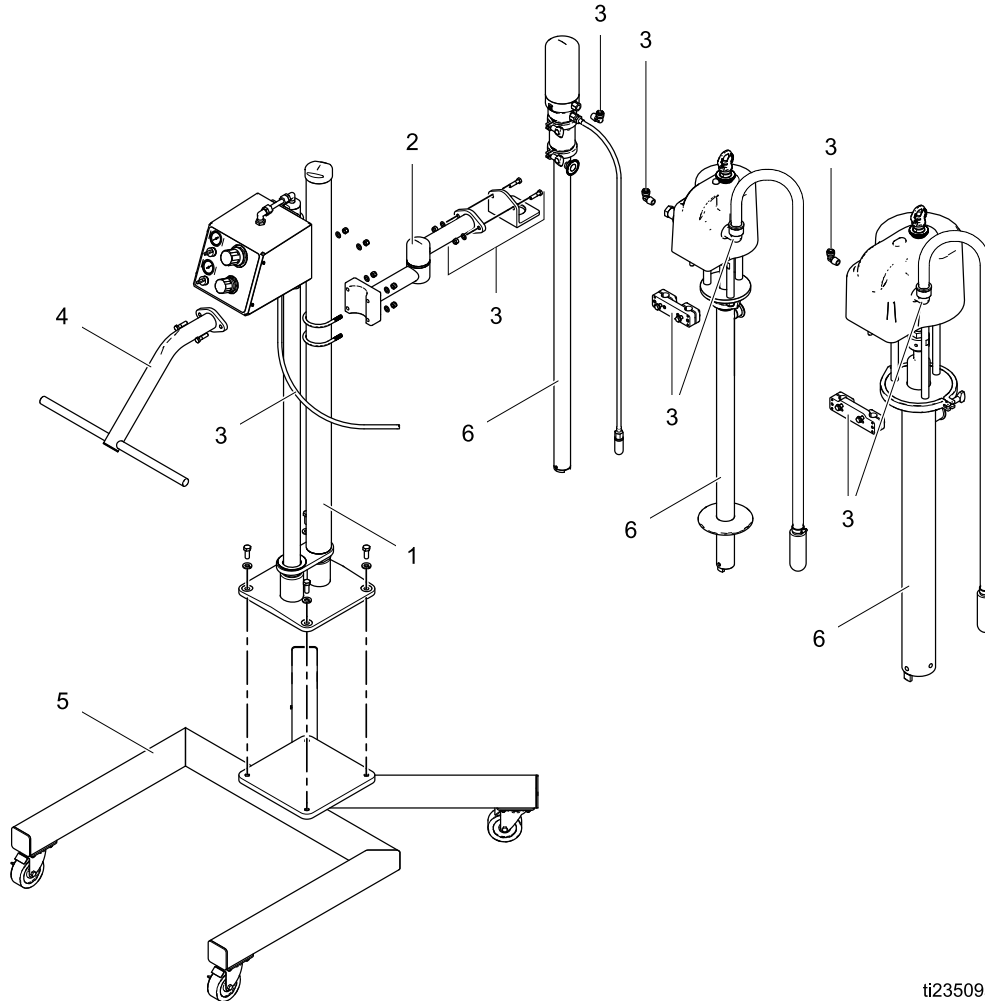
 WARNING	
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer



System Components

All models include the elevator (1), the articulating arm (2), and a mounting kit (3). Mobile models also

include the handle (4) and the cart (5). Some models also include a pump (6).



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1 Elevator Frame — includes pneumatic controls to regulate air to the pump air motor and to the air cylinder that raises and lowers the pump in and out of the material container.

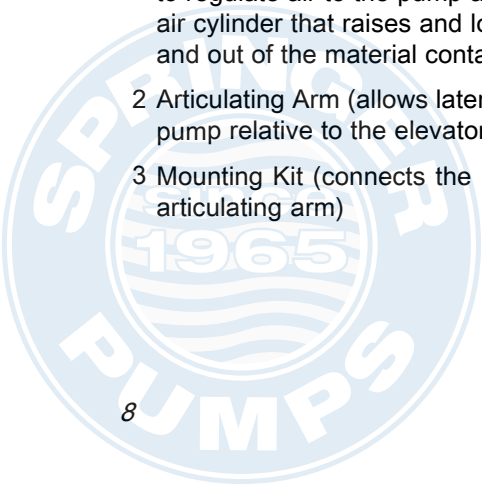
2 Articulating Arm (allows lateral movement of the pump relative to the elevator)

3 Mounting Kit (connects the pump to the articulating arm)

4 Drive handle (used on mobile models to steer the cart)

5 Cart (for mobile models)

6 Pump to move material from the drum to the target application



Installation

Choose a Location

Choose a location that meets the following requirements:

- Is close to where the fluid is being delivered to minimize back pressure and maximize flow rate.
- Provides enough room around the equipment for maintenance.
- Provides enough room for access to the air supply shutoff valves and the pneumatic controls.
- Provides enough room to load and unload fluid drums, possibly four on a pallet, with a forklift or hand truck.
- Has sufficient overhead clearance — 10 feet for stationary models, 11 feet for mobile models.
- Has a flat, level floor.

Unpack the Equipment

NOTICE
Moving or installing the elevator components without following these instructions may damage the equipment.

1. Inspect the crate and boxes for shipping damage. Contact the carrier if damaged.
2. Open all boxes. **Mobile Models:** Remove the sides and top of the crate containing the cart.
3. Check the contents for loose or damaged parts.
4. Compare the packing slip against items inside the boxes. Immediately call your Graco distributor about any shortages or damage.
5. Remove the components from the boxes. **Mobile Models:** Do not remove the cart from the pallet at this time.

Move Equipment to Location

To avoid crushing injuries or muscle strains, never have one person move or lift the elevator, the cart, or the 6:1 or 12:1 pump.					

Use a forklift or hand truck and support devices, such as a hoist, and have an adequate number of personnel to move the elevator, the cart, and the larger pumps. Avoid jarring the equipment while moving it.

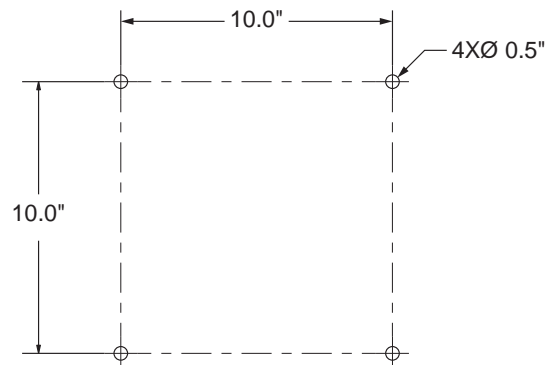
NOTE:

- Ensure there is an adequate compressed air supply. Refer to your pump manual for your air consumption.
- Have the pump manual available.
- Ensure that all hoses are properly sized and pressure rated for the system.

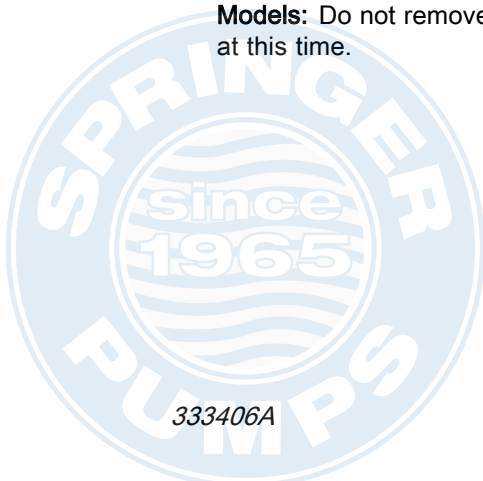
Assembly

1. Anchor the elevator.

Stationary Models: Use four 1/2-inch anchor bolts (not supplied) to anchor the base plate of the elevator to the floor. Follow hole pattern shown.



Mobile Models: Lock the wheels on the cart. Use four 1/2–13 x 1.25 in. bolts (9) to anchor the base plate of the elevator to the cart.



Installation

2. Attach the articulating arm.

All models: Remove 4 nuts (308), washers (307) and the u-bolt (306) from the arm. Place the arm on the elevator riser tube at the desired mounting level for your pump. Reattach the u-bolt and hand-tighten the nuts to secure the arm to the tube.

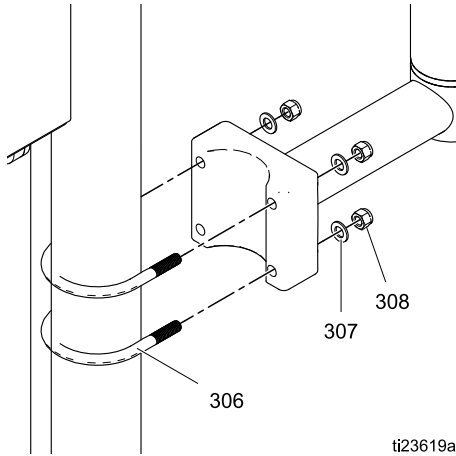


Figure 1

3. Attach the pump bracket (401) and pump to the articulating arm.

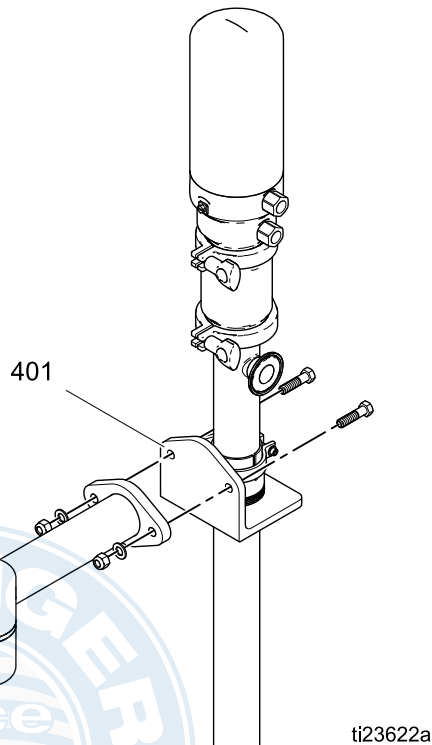


Figure 2 2:1 Pump Models:

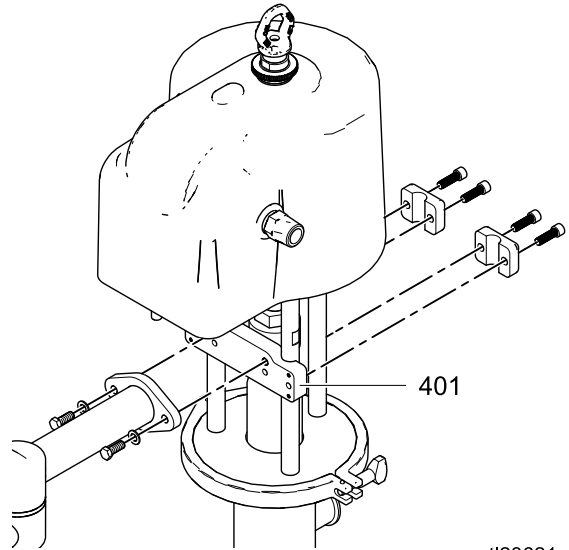


Figure 3 5:1 Pump Models:

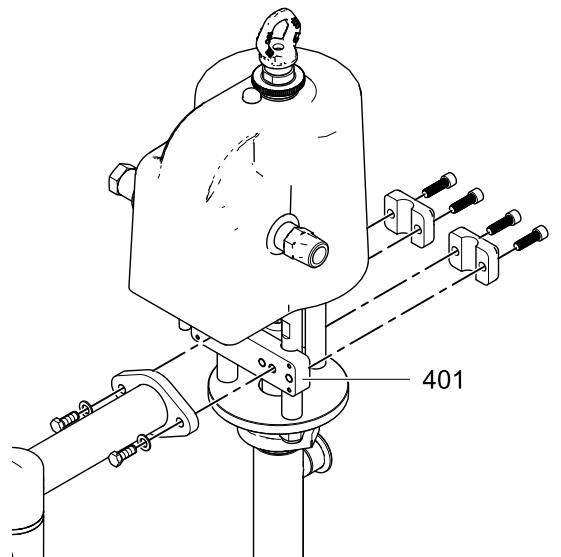
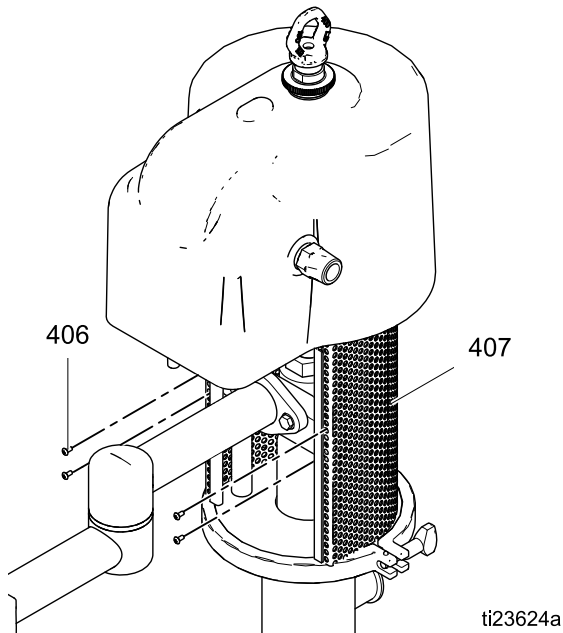
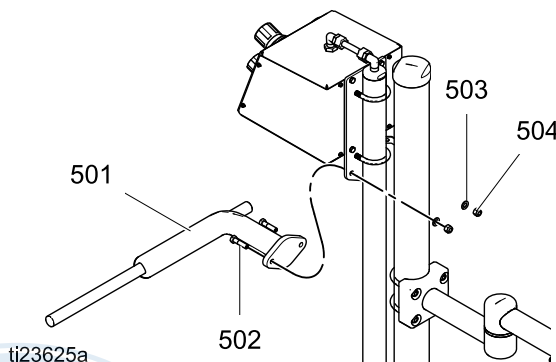


Figure 4 6:1 Pump Models:

- 5:1 and 6:1 Models:** Use screws (406) to attach the tie rod guard (407) to the mounting bracket (401). Cut trim (410) to fit and place on the sharp edges of the guard. **Do not operate the 5:1 or 6:1 pump without the guard in place.**



- Mobile Models:** Attach the drive handle (501) to the air control mounting plate. Use screws (502), washers (503), and nuts (504). Hand tighten.



Ground the Equipment

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

Pump: Connect a ground wire (Graco PN 238909) to the ground screw on the air motor base. Connect the other end of the ground wire to a true earth ground.

Air and fluid hoses: Use only electrically conductive hoses with a maximum of 500 ft. (150 m) combined hose length to ensure grounding continuity. Check electrical resistance of hoses. If total resistance to ground exceeds 25 megohms, replace hose immediately.

Air compressors: Follow manufacturer's recommendations.

Dispense valve: Ground through connection to a properly grounded fluid hose and pump.

Material supply container: Follow local code.




Container(s) that receive material: Follow local code.

Solvent pails used when flushing: Follow local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

To maintain grounding continuity when flushing or relieving pressure: Hold metal part of the dispense valve firmly to the side of a grounded metal pail, then trigger the valve.



Setup

					
<p>To avoid contaminating the fluid, pipe the exhaust air to vent outside of the fluid product area, away from people, animals, or food handling areas.</p>					

Note

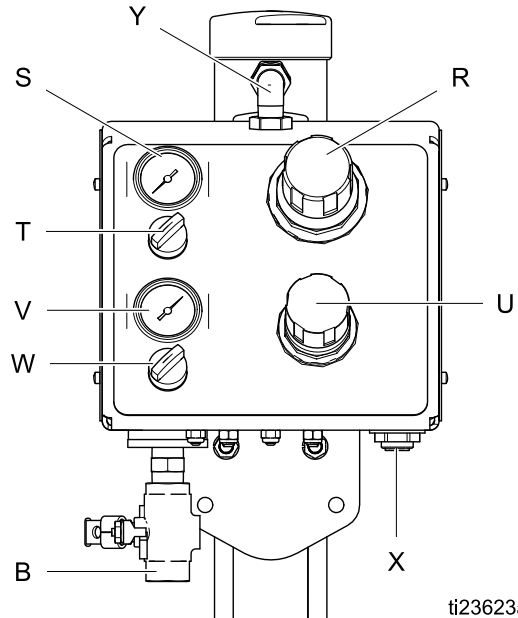
Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawings.

Accessories are available from Graco. Make certain all accessories are sized and pressure rated to meet your system requirements.

Figure 6 is only a guide for selecting and installing system components and accessories. Contact your Graco distributor for assistance in designing a system to suit your particular needs.

1. Connect the master air supply to the 1/2 npt(f) main air inlet valve (B). The incoming air pressure maximum is 100 psi (0.7 MPa, 7 bar).
2. Verify that the elevator air supply connections (Y) did not loosen during shipping.
3. Connect air tubing from the 1/2 npt(f) push-to-connect fitting (X) to the pump air inlet (D).

Air Controls

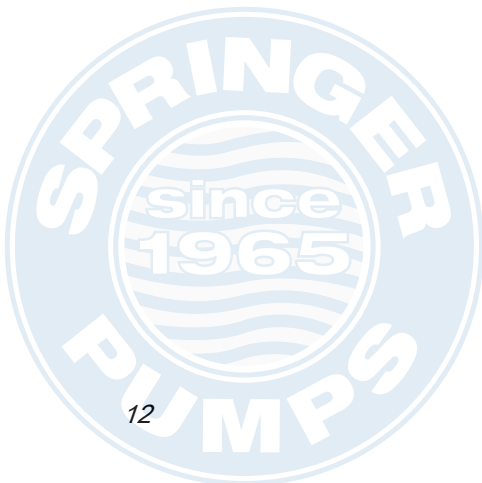


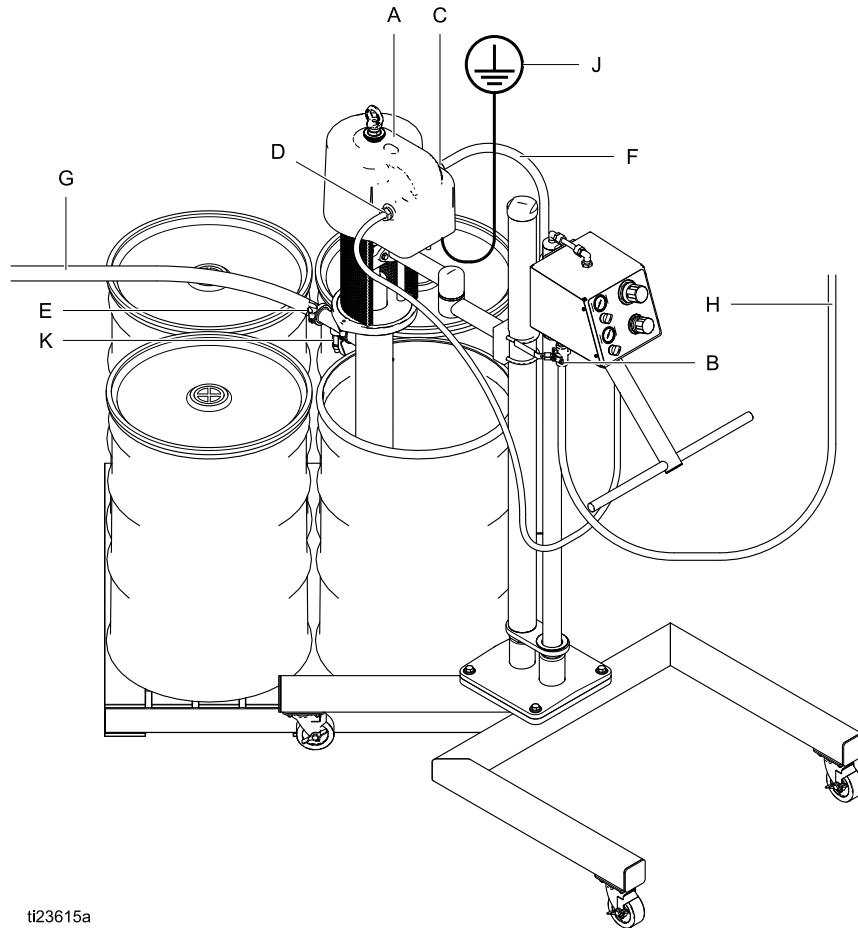
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Figure 5

Key

- B Main air inlet valve
- R Pump air pressure regulator
- S Pump air pressure gauge
- T Pump air switch, 2 position
- U Elevator air pressure regulator
- V Elevator air pressure gauge
- W Elevator director switch, 3 position
- X Air outlet to pump
- Y Air outlet to elevator





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Figure 6 Typical Installation, mobile model shown

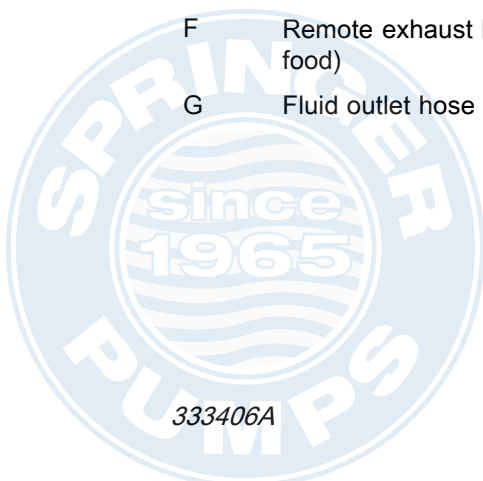
Key

System Components (included)

- A Pump; 5:1 model shown
- B Main air inlet valve
- C Pump air exhaust
- D Pump air inlet
- E Pump fluid outlet
- F Remote exhaust hose (route away from food)
- G Fluid outlet hose




System Accessories (sold separately)

- H Main air line, 100 psi (0.7 MPA, 7.0 bar) maximum, regulated and filtered air
- J Pump ground wire (required)
- K Fluid drain valve



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Operation






				
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Moving parts can pinch or crush your fingers or hands. When raising or lowering the elevator, keep fingers and hands away from the elevator, articulating arm, drum cover, and the lip of the drum. Do not operate the 5:1 or 6:1 pump without tie rod guard in place. To quickly stop the lowering of the ram, turn the director switch to UP.

Pressure Relief Procedure








Follow the Pressure Relief Procedure whenever you see this symbol.

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

NOTE: Do not close the main air valve until Step 5. The air controls will not operate when the main air supply is in the off position.

1. Turn the pump air switch to OFF. 
2. Open the fluid ball valve and/or dispensing valve to relieve pump fluid pressure. 
3. Set the elevator director switch to UP  to lift the pump out of the drum, then remove drum. 
4. Set the elevator director switch to DOWN. The elevator will slowly lower all the way down. Leave the director switch in the down position. Do not put it into neutral.

5. Close the main air valve. 

Flush Before First Use

The sanitary pump was assembled using sanitary lubricant on moving parts and was tested in water. Flush the pump thoroughly with an appropriate cleaning solution or disassemble and sanitize the parts before using the pump. See your separate pump manual for complete flushing and cleaning procedures for a sanitary pump. Check national, state, and local codes for specific limitations.

Set Height of Articulating Arm




Adjust the height of the articulating arm and the pump mounting bracket to meet the needs of your setup.

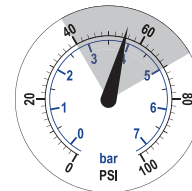
1. Close all air regulators and air valves.



2. Open the main air valve.

3. Set the elevator director switch to UP.  Slowly increase regulator pressure until the elevator rises to its full height.

NOTE: Generally, 40 to 70 psi (0.3 to 0.48 MPa, 3 to 4.8 bar) is sufficient to raise the elevator.



4. **Stationary Models:** Set an empty drum against the elevator base, under the pump.
Mobile Models: Move the cart into place by an empty drum.

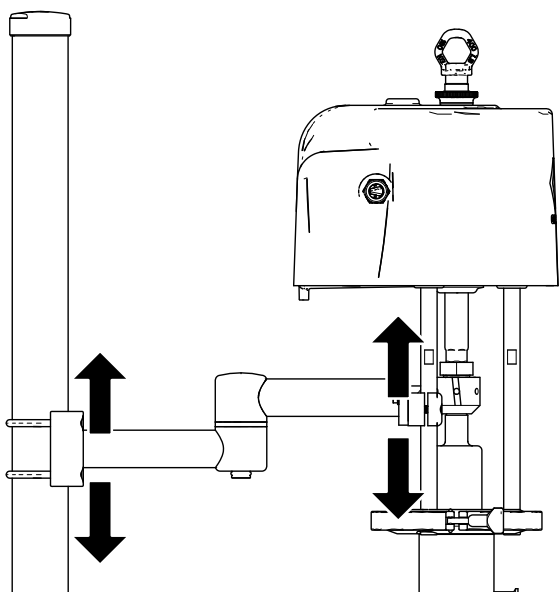
- With your hands away from the drum, set the



elevator director switch to DOWN. Fully lower the pump into the drum. **Mobile models:** Lock the cart wheels.

- Loosen the u-bolt on the articulating arm. Raise the arm until the pump is just off the bottom of the drum. Block the pump to hold it in place, then tighten the u-bolt on the articulating arm.

NOTE: The pump mounting bracket can connect anywhere on the tie rods. Start with it connected in the center, and adjust as needed for proper travel.



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Start and Adjust the Elevator



- Close all air regulators and air valves.



- Open the main air valve.



- Set the elevator director switch to UP. Slowly increase regulator pressure until the elevator rises to its full height.

NOTE: Generally, 40 to 70 psi (0.3 to 0.48 MPa, 3 to 4.8 bar) is sufficient to raise the elevator.



- Stationary Models:** Set a full 200 liter (55 gallon) drum against the elevator base.
Mobile Models: Move the cart into place by a full 200 liter (55 gallon) drum.
- With your hands away from the drum, set the




elevator director switch to DOWN. Fully lower the pump into the drum. **Mobile Models:** Lock the cart wheels.

NOTE: When the elevator is fully lowered, the pump should be just off the bottom of the drum. See [Set Height of Articulating Arm, page 14](#).

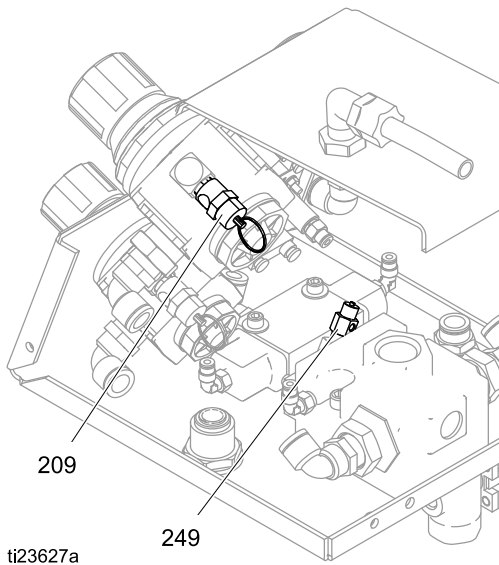
- To increase or decrease the speed of downward travel on the elevator, remove the side panel of the air controls. Adjust the bleed valve (249) as needed, clockwise for faster, counter-clockwise for slower. Put the side panel back on. **Do not operate the elevator with the side panels off.**
- The speed of upward travel on the elevator is controlled by the regulator pressure.




Start and Adjust the Pump

1. Set the pump air switch to ON.  Slowly increase pump air regulator pressure until desired flow is achieved.

NOTE: The pump regulator is set at the factory to relieve pressure at 80 psi, the maximum inlet pressure of the SaniForce 5:1 pump. SaniForce 2:1 and 6:1 pumps can use up to 100 psi. If more supply pressure is needed for a 2:1 or 6:1 pump, adjust the relief valve (209) on the back of the pump regulator to relieve at higher pressures.



NOTICE
To avoid equipment damage, do not exceed the maximum pressure rating of your pump.

2. Turn the pump air switch to OFF  when the drum is empty, or any time the pump begins to run too fast.





NOTICE


To avoid equipment damage, do not let the pump runaway.

Change Drums

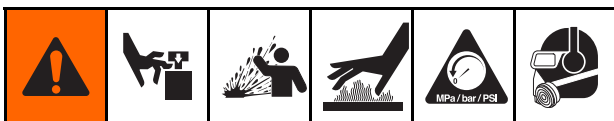


1. Set the pump air switch to OFF. 
2. Open the fluid ball valve and/or dispensing valve to relieve fluid pressure.
3. **Mobile Models:** Unlock the cart wheels.
4. Set the elevator director switch to UP  to lift the pump out of the drum.
5. **Stationary Models:** Remove the empty drum and place the full drum against the elevator base.

Mobile Models: With air connected and the main air valve in the open position, the cart can be moved short distances while the elevator is raised. If you are going to turn off or disconnect the air to move the cart, lower the elevator all the way. Move the cart into position by a full drum.

6. With your hands away from the drum, set the elevator director switch to DOWN.  Fully lower the pump into the drum. **Mobile Models:** Lock the cart wheels.

Clean the Elevator and Pump



NOTE: The following instructions are a basic procedure for cleaning a sanitary elevator.

- **Be sure** to follow your national and state sanitary standard codes and local regulations.
 - Use appropriate cleaning and disinfecting agents, at intervals appropriate for product processed.
 - Follow cleaning product manufacturer's instructions.
1. Use the elevator to remove the pump from the fluid container and place it in an empty drum. Operate the pump to remove as much fluid as possible.
 2. Flush the system thoroughly with an appropriate cleaning solution.
 3. Remove the pump.
 - a. Disconnect the fluid hose.
 - b. Use the elevator to remove the pump from the drum.
 - c. **Stationary models:** Remove the drum.

Mobile models: Move the elevator to cleaning location. Lower the elevator so the pump rests on a clean, slightly raised surface.

- d. Remove the clamp
- e. Raise the elevator. The motor, tie rods, and displacement rod will separate from the rest of the pump.
- f. Remove all pump parts for cleaning, then lower the elevator again.

Note: The pump **must be disassembled** to clean it thoroughly. See your separate pump manual for complete flushing and cleaning procedures for a sanitary pump. Any damaged rubber parts must be replaced as they could harbor microorganisms that can contaminate the fluid.

4. Clean external surfaces of the elevator and air motor before reassembly.

Shutdown

1. Follow the [Pressure Relief Procedure, page 14](#).
2. Follow the pump shutdown instructions in your separate pump manual.



Troubleshooting



1. Follow [Pressure Relief Procedure, page 14](#).
2. Check all possible remedies in the Troubleshooting Chart and in your pump manual Troubleshooting Chart before disassembling the elevator riser or the pump.

Problem	Cause	Solution
Elevator will not raise or lower.	Closed air valve or clogged air line.	Open, clear
	Not enough elevator regulator pressure.	Increase.
	Worn or damaged piston.	Replace.
Elevator lowers too fast or too slow.	Travel rate is not properly adjusted.	Reset. See Start and Adjust the Elevator, page 15 .
Elevator raises too fast or too slow.	Too much or not enough elevator regulator pressure.	Adjust as needed.
Elevator slowly lowers when in neutral.	Worn or damaged leather cup packing.	Replace.
	Air leak in control box.	Check all tube connections.
Pump air regulator automatically relieves pressure below desired target for a 2:1 or 6:1 pump	The relief valve is set to 80 psi to accommodate the 5:1 pump.	For 2:1 or 6:1 pumps, adjust the relief valve on the back of the pump air regulator. Do not exceed the pump's maximum pressure.
Elevator movement is not smooth.	Leather cup packing needs lubrication.	Lubricate. See Lubricate the Packing, page 20 .








Repair

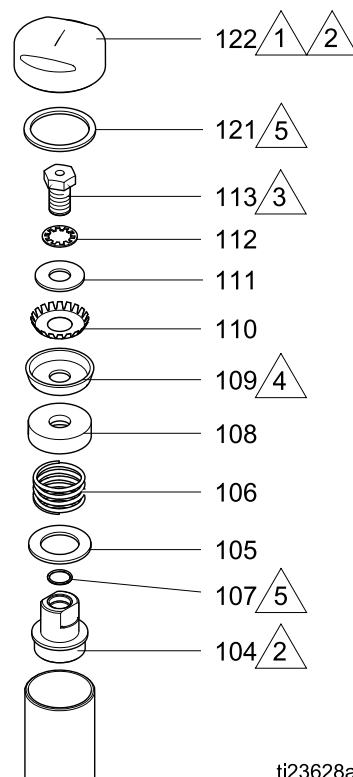
Replace Elevator Seal

1. Remove the cap (122).
2. Screw the piston retainer capscrew (113) out of the piston and remove the parts. Inspect parts for wear and damage. Replace as necessary.

NOTE: When replacing packing (109), install a new spreader (110) to increase the life of the packing.

3. Apply appropriate waterproof sanitary lubricant to the inside surface of the tube. Reassemble in reverse order.
4. Apply medium-strength thread sealant to the internal threads of the piston housing (104) and the threads of the capscrew (113). Torque the capscrew to 15 to 20 ft-lb (20 27 N•m).

-  Apply medium-strength thread sealant to the threads.
-  Torque to 20 to 40 ft-lb (27 to 54 N•m).
-  Torque to 15 to 20 ft-lb (20 to 27 N•m).
-  Apply appropriate waterproof sanitary lubricant to the **outside** of the leather packing.
-  Apply appropriate waterproof sanitary lubricant.



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Service the Pump



1. Follow the [Pressure Relief Procedure, page 14](#).
2. Follow all directions and warnings in your pump manual to repair or service the pump.

Lubricate the Packing

As needed, remove the packing (109) and apply appropriate waterproof sanitary lubricant to the external surface. Replace the cap and torque to 20 to 40 ft-lb (37–54 N•m).

Remove Water from Air Cylinder

Occasionally water may accumulate in the cylinder from condensation.

1. Follow the [Pressure Relief Procedure, page 14](#).
2. Remove the plug (134).
3. Allow all water to drain.
4. Apply thread sealant or PTFE tape to the plug and reinstall.

Repair or Replace Air Control Parts

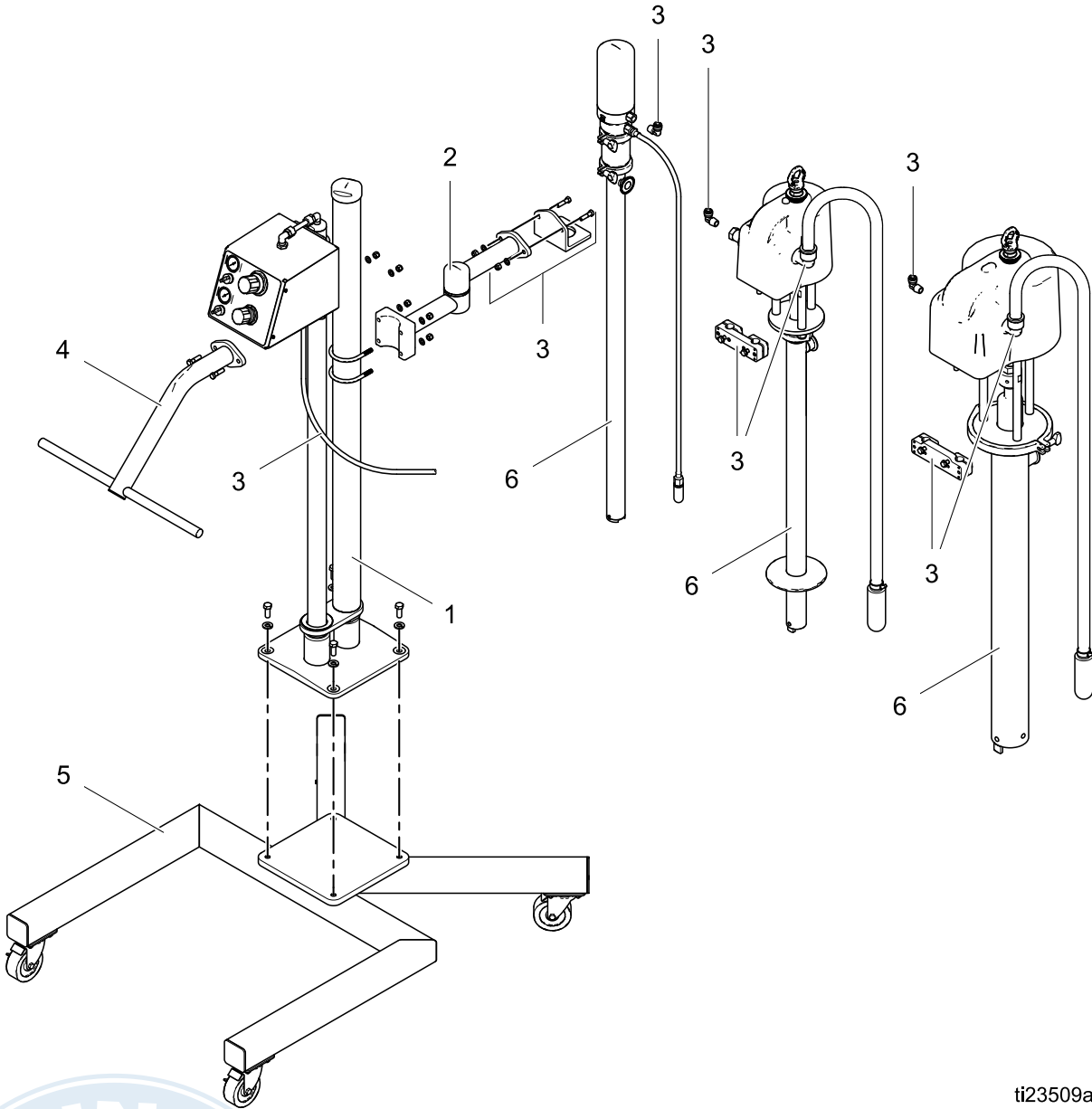
If you remove any parts in the Air Controls (127), see Appendix A for information on properly reconnecting any affected air lines.



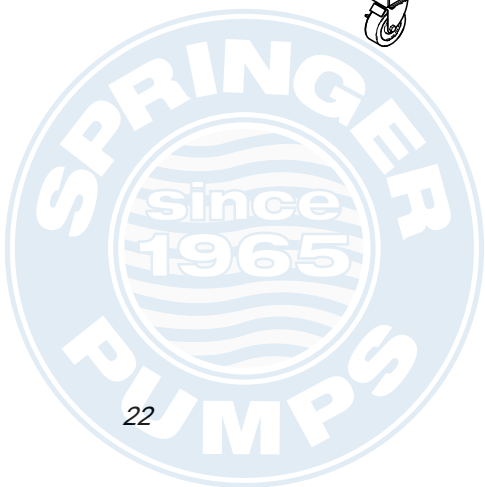
Parts

Parts

Parts



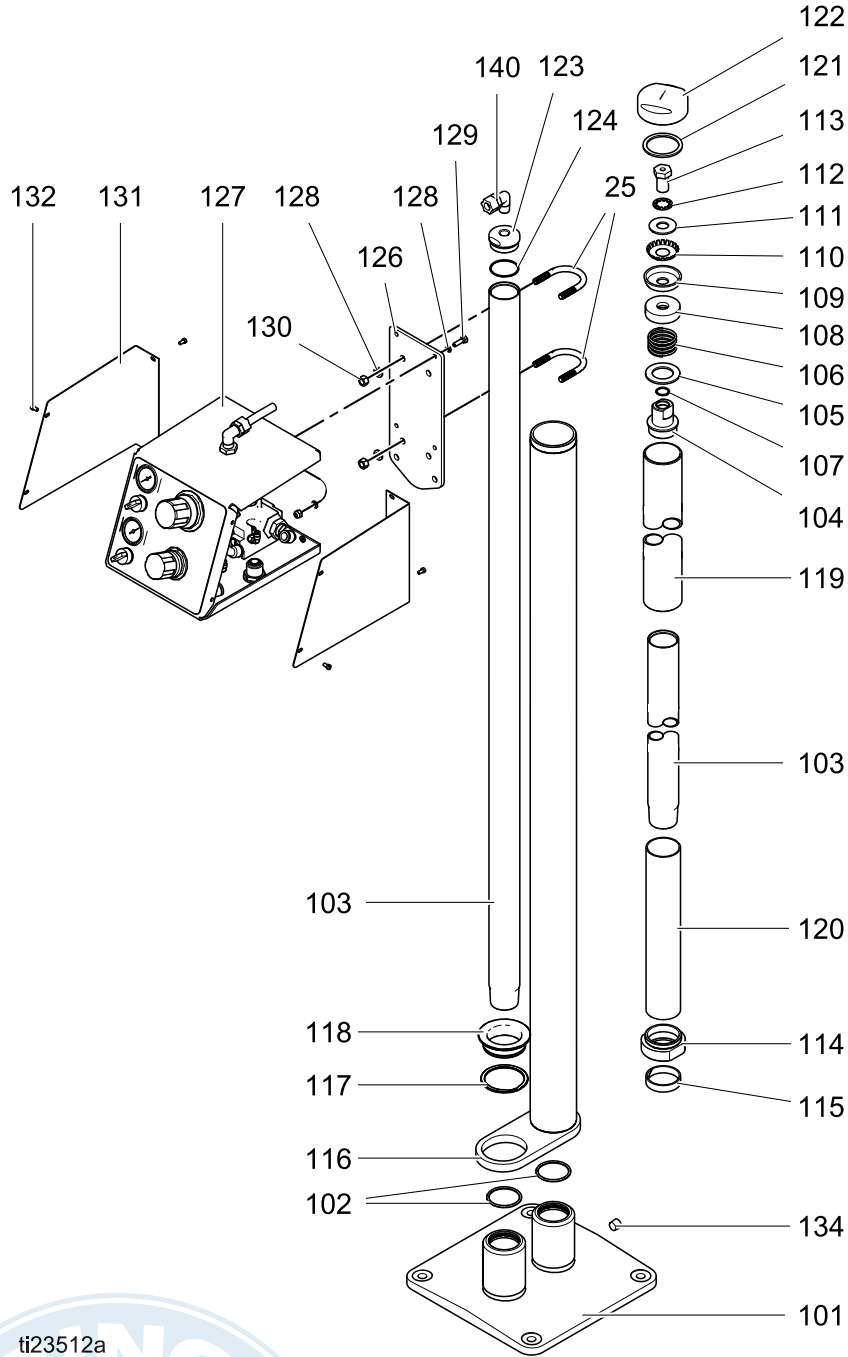
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Ref	Part	Description	Qty	Ref	Part	Description	Qty
1	24V299	ELEVATOR, sanitary, see	1	5	24V305	CART, for mobile models	1
2		ARM, articulating, see	1	6		PUMP, double ball, piston, sanitary	1
	24V301	for mobile models			24N300	2:1, UHMWPE	
	24V302	for stationary models			24N344	2:1, PTFE	
3		KIT, mounting, pump, see	1		24F195	5:1	
	24V303	for 2:1 pump			24E839	6:1, Buna-n	
	24V304	for 5:1 pump			24E840	6:1, PTFE	
	24V307	for 6:1 pump					
4	24V306	KIT, drive handle, for mobile models, see	1				



Sanitary Elevator Kit 24V299



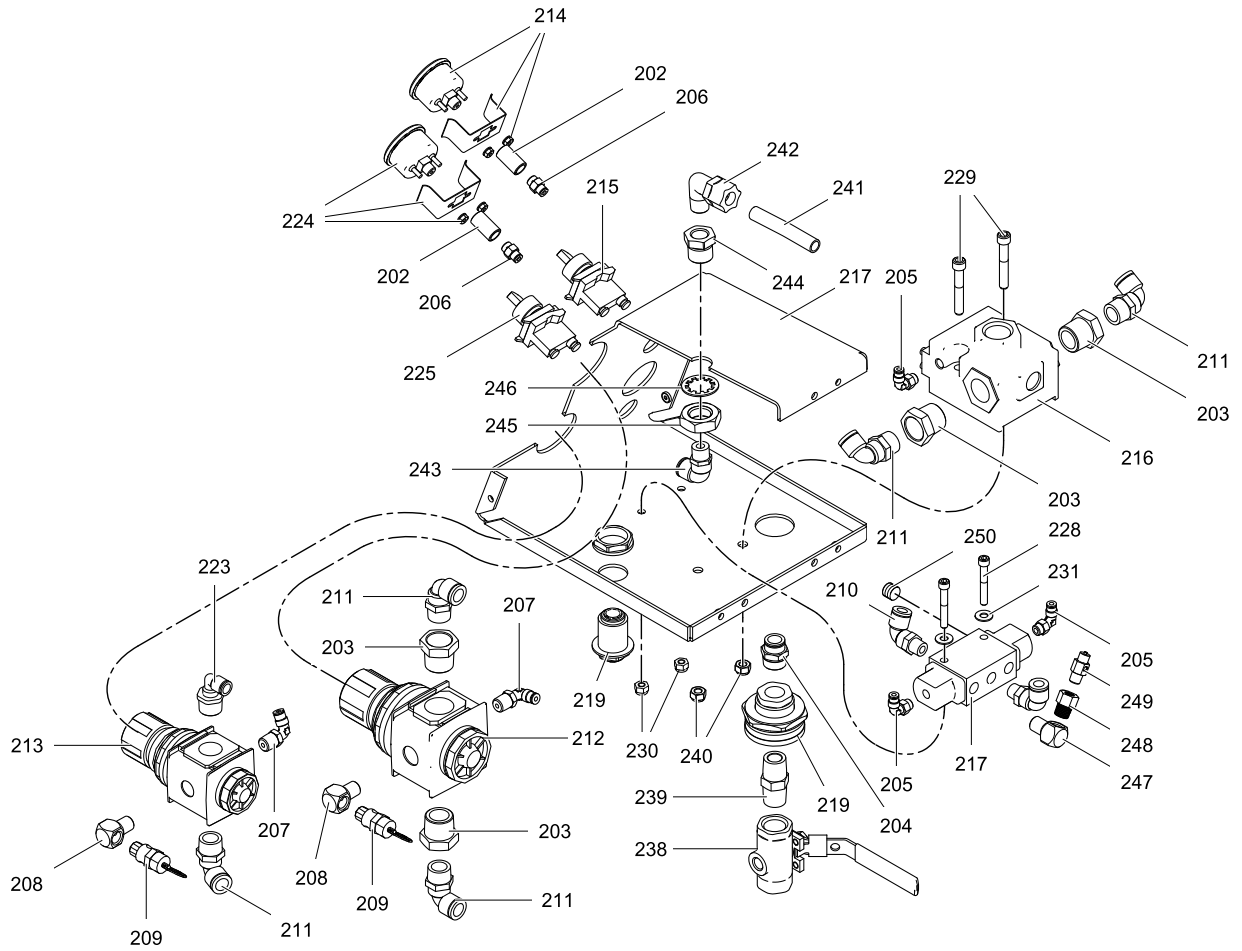
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Elevator Kit 24V299

Ref	Part	Description	Qty	Ref	Part	Description	Qty
101	24V123	BASE, elevator, sanitary	1	122	17A172	CAP, cylinder	1
102	107306	O-RING, FKM	2	123	16Y935	CAP, post	1
103	16Y925	POST, elevator	1	124	111178	O-RING, FKM	1
104	192198	HOUSING, piston	1	125	127626	U-BOLT, stainless steel, 3/8-16 x 1.5 in, pipe	2
105	158265	WASHER, flat	1	126	16Y917	PLATE, air controls	1
106	158388	SPRING, compression	1	127	24V172	CONTROLS, air	1
107	722834	O-RING, FKM	1	128	111750	WASHER, plain	8
108	167870	GUIDE, tube	1	129	104119	SCREW, cap, 1/4-20, stainless steel	4
109	158260	CUP, leather	1	130	102021	NUT, lock, stainless steel	4
110	150230	SPREADER, cup	1	131	16Y984	PANEL, air controls, left side	1
111	156306	WASHER, flat	1	132	104021	SCREW	8
112	100422	WASHER, lock	1	133	16Y985	PANEL, air control, right side	1
113	192199	SCREW, cap	1	134	101748	PLUG, pipe, stainless steel	1
114	17A160	COUPLER, riser	1	140	116315	ELBOW	1
115	167872	BEARING	1	141	15J074	LABEL, warning	1
116	24V453	POST, riser	1	▲			
117	127604	RING, retaining	1	142	15F744	LABEL, warning	1
118	17A168	BUSHING, anti-rotation	1	▲			
119	167873	TUBE, straight	1	▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.			
120	17A165	TUBE, riser, inside	1				
121	155899	GASKET, non-metallic	1				



Air Controls, Kit 24V172



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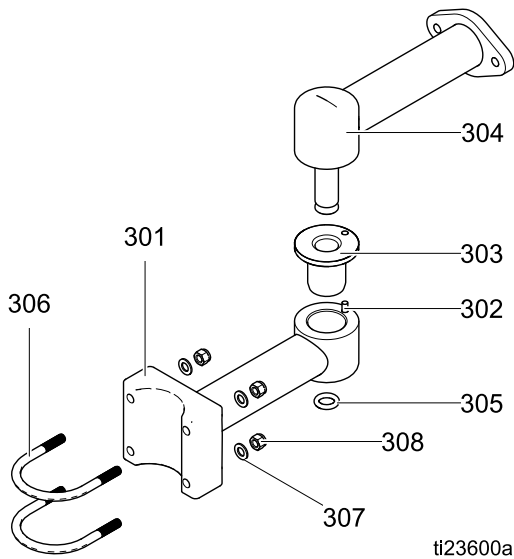
Air Control 24V172

Ref	Part	Description	Qty	Ref	Part	Description	Qty
201	054760	TUBE, polyurethane, round, black	4.25	228	500171	SCREW, socket head cap	2
202	100451	COUPLING	2	229	17A237	NUT, 5/16 nyloc, SST	2
203	100896	BUSHING, pipe	4	230	109478	NUT, lock, hex, SST	2
204	114111	CONNECTOR, male	1	231	115814	WASHER, flat, SST	2
205	114151	ELBOW, swivel, male	3	232	17A244	FITTING, push-to-connect, 1/2 to 1/4 reducing	1
206	114263	CONNECTOR, male	2	233	17A251	FITTING, push-to-connect, 1/4 to 5/32 reducing	2
207	114469	ELBOW, swivel, male	2	235	17A243	FITTING, Y, 1/4 push to connect	1
208	115335	ELBOW, street, 1/4 npt	2	236	17A252	UNION, T, 5/32 acetal	1
209	120306	VALVE, air, safety relief	2	237	17A240	ELBOW, 5/32 push to connect	4
210	121141	ELBOW, swivel, 3/8T x 1/4 npt(m)	2	238	16Y861	VALVE, ball, SST, 1/2 in. vented	1
211	15V204	ELBOW, 1/2 npt x 1/2 T	5	239	114373	FITTING, nipple, 1/2 npt, SST	1
212	16T409	REGULATOR, air, 3/4 npt	1	240	17A264	SCREW, sockethead, SST, 5/16-18x2	2
213	16T410	REGULATOR, air, 1/2 npt	1	241	17B319	TUBE, 6.75 ft (2.1 m)	1
214	16V727	GAUGE, pressure, air motor, 160 psi	1	242	116315	ELBOW 3/8 npt(m) x 1/2 T	1
215	16V728	SWITCH, pressure	1	243	16F151	SWIVEL, 3/8 T x 3/8 npt	1
216	C59752	VALVE, air, 3 way, 2 position	1	244	191586	FITTING, bulkhead, 3/8 npt	1
217	16Y964	PANEL, control	1	245	111014	NUT, jam, hex	1
218	16Y978	VALVE, air, 5 way, 2 position	1	246	113348	WASHER, lock, internal	1
219	16Y981	UNION, bulkhead, 1/2 npt	1	247	100840	ELBOW, street	1
220	16Y995	UNION, bulkhead, 1/2 T	1	248	556402	FITTING, 1/4 x 1/8 npt(f)	1
221	16Y998	UNION, Y, 1/2 T,	2	249	17A530	VALVE, bleed, 1/8 npt, mini	1
223	C38211	FITTING, tube	1	250	100721	PLUG	1
224	16V726	GAUGE, pressure, ram director, 100 psi	1				
225	16V729	SWITCH, pressure	1				
226	C12509	TUBE, nylon, round	0.75				

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



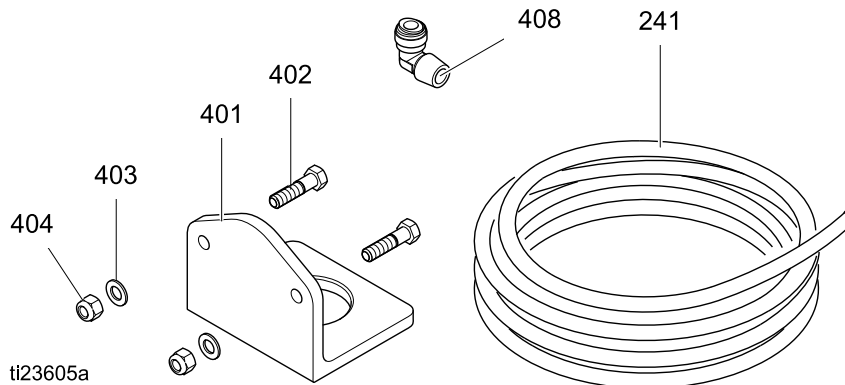
Articulating Arm 24V301 (Refs 301–309) and 24V302 (Refs 301, 303–309)



Ref	Part	Description	Qty
301	24V130	ARM, inside	1
302	16E096	PIN, dowel, for model 24V301	1
303	16Y932	BUSHING, pin	1
304	24V131	ARM, outside	1
305	121846	O-RING, 313, Buna-n	1
306	127547	U-BOLT, stainless steel, 3/8–16	2
307	112914	WASHER, plain	4
308	102021	NUT, hex, 3/8	4
309	070303	LUBRICANT	1

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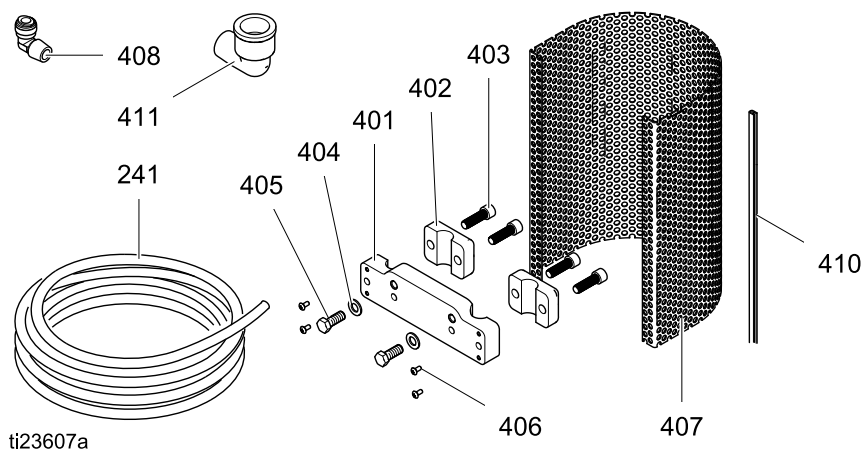
Mounting Kit 24V303, for 2:1 Pumps



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Ref	Part	Description	Qty
401	16Y933	BRACKET; threaded to a 2-inch bung	1
402	113976	SCREW, cap, 3/8–16 x 1.5	2
403	112914	WASHER, plain	2
404	102021	NUT, hex, 3/8	2
405	16R954	HOSE, exhaust, not shown	1
408	116315	ELBOW 3/8 npt(m) x 1/2 T	1
241	17B319	TUBE, 6.75 ft (2.1 m); from air controls to pump air inlet	1

Mounting Kit 24V304, for 5:1 Pumps

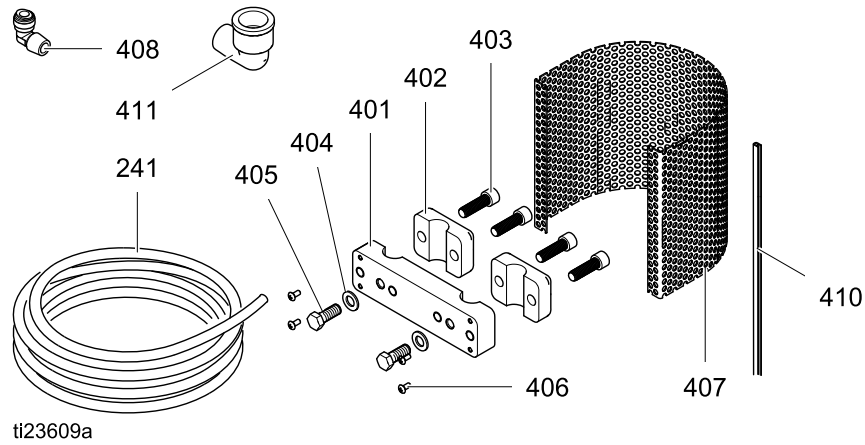


Ref	Part	Description	Qty
401	17A121	BRACKET, mounting	1
402	17A120	CLAMP, tie rod	2
403	127586	SCREW, socket head, 3/8-16 x 1.25	4
404	112914	WASHER, plain	2
405	102471	SCREW, cap, hex, 3/8-16 x 1	2
406	127624	SCREW, pan, phillip's head, 8-32 x 3/8	4
407	17A125	GUARD, tie rod	1
408	16F384	FITTING; 1/2 npt x 1/2 ptc	1
410	17B414	TRIM, tie rod guard, 2 ft. (0.6 m)	1
411	16A942	ELBOW, exhaust, 1 in. npt	1
241	17B319	TUBE, 6.75 ft (2.1 m); from air controls to pump air inlet	1



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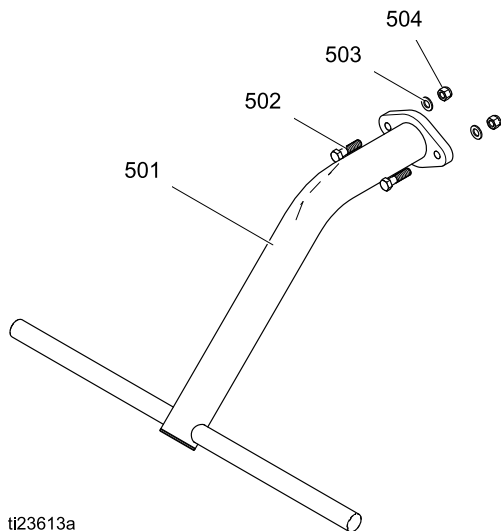
Mounting Kit 24V307, for 6:1 Pumps



Ref	Part	Description	Qty
401	17A123	BRACKET, mounting	1
402	17A120	CLAMP, tie rod	2
403	127586	SCREW, socket head, 3/8-16 x 1.25	4
404	112914	WASHER, plain	2
405	102471	SCREW, cap, hex, 3/8-16 x 1	2
406	127624	SCREW, pan, phillip's head, 8-32 x 3/8	4
407	17A124	GUARD, tie rod	1
408	16F384	FITTING; 1/2 npt x 1/2 ptc	1
410	17B414	TRIM, tie rod guard, 2 ft. (0.6 m)	1
411	16A942	ELBOW, exhaust, 1 in. npt	1
241	17B319	TUBE, 6.75 ft (2.1 m); from air controls to pump air inlet	1



Drive Handle Kit 24V306



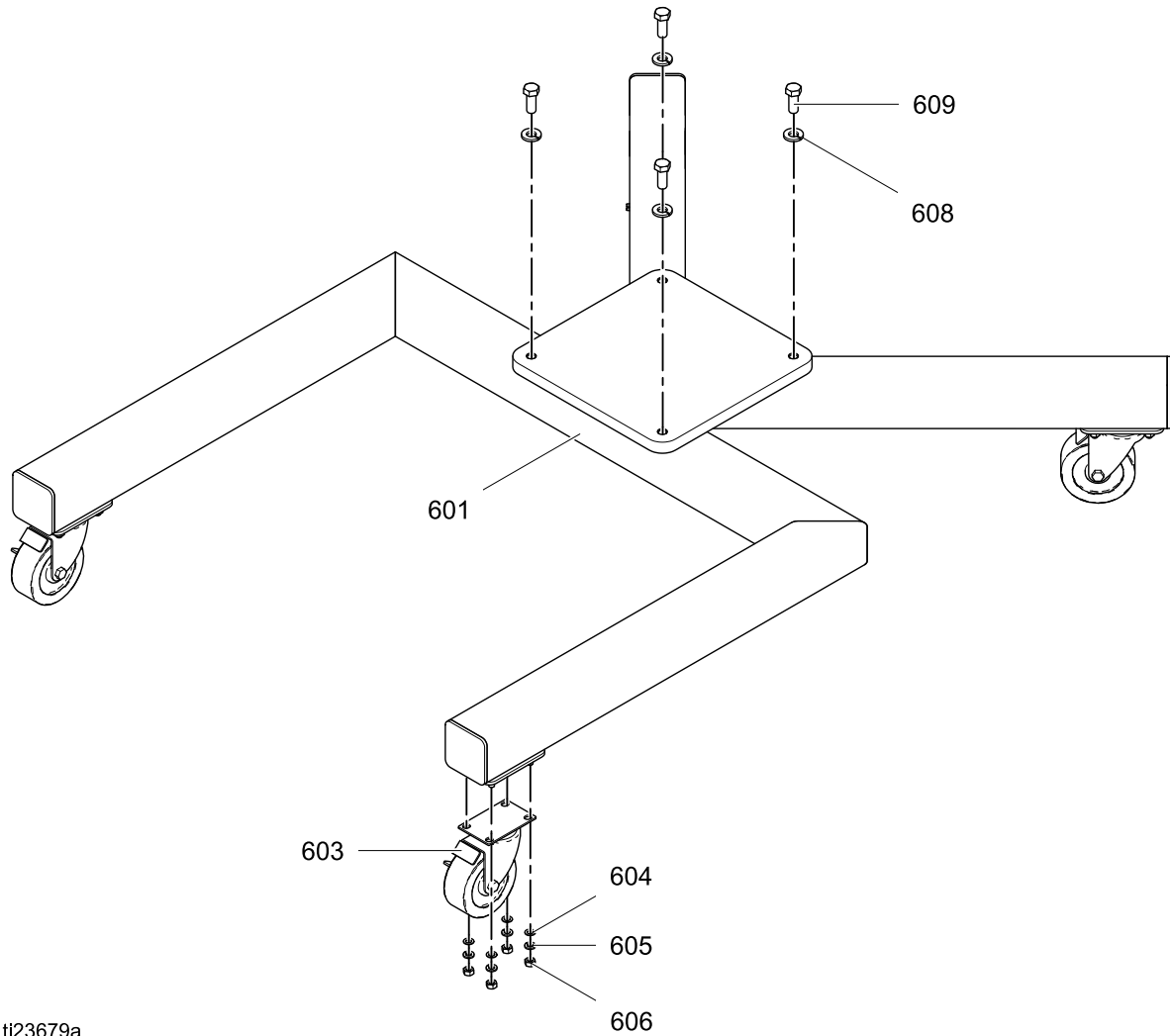
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Ref	Part	Description	Qty
501	24V148	BAR, handle	1
502	113976	SCREW, cap, hex, 3/8-16 x 1/5	2
503	112914	WASHER, plain	2
504	102021	NUT, hex 3/8	2



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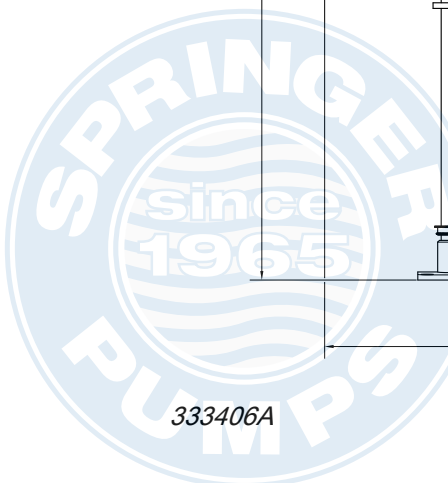
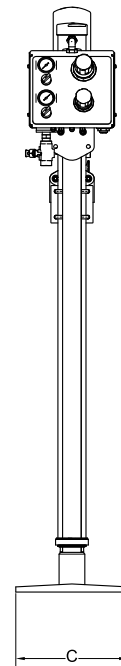
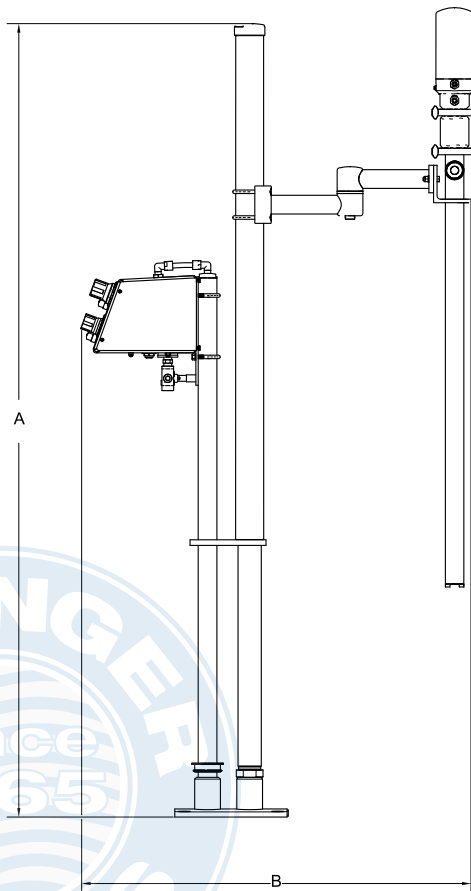
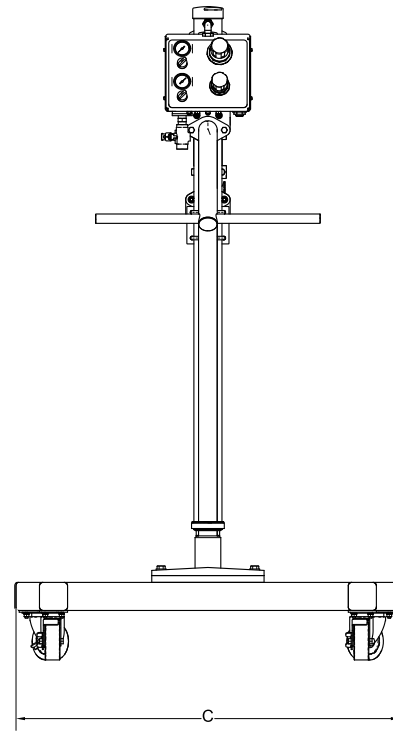
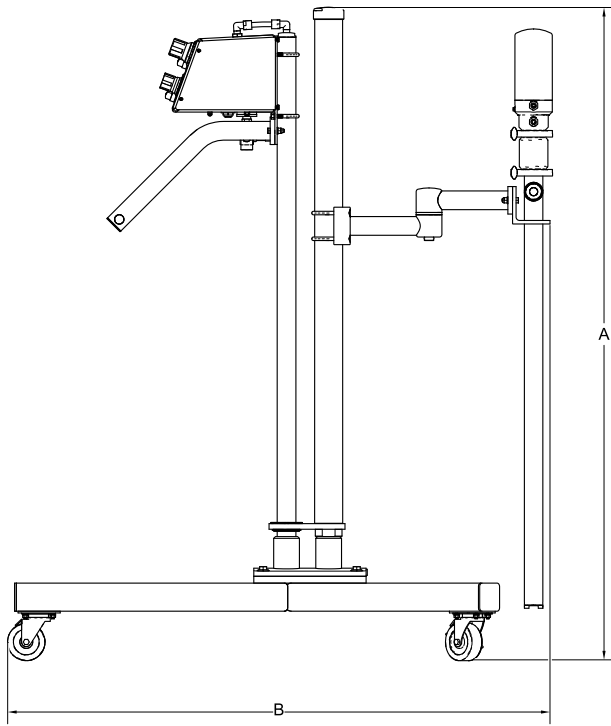
Cart Kit 24V305



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Ref	Part	Description	Qty
601	--	FRAME, cart, 304 stainless steel	1
603	17A126	CASTER, swivel	4
604	105473	WASHER, plain	16
605	112904	WASHER, lock	16
606	108946	NUT, hex head, SST	16
608	556538	WASHER, lock, SST, 1/2	4
609	127602	BOLT, hex head, 1/2-13 x 1.25	4
610	070303	LUBRICANT	1

Dimensions



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Dimensions

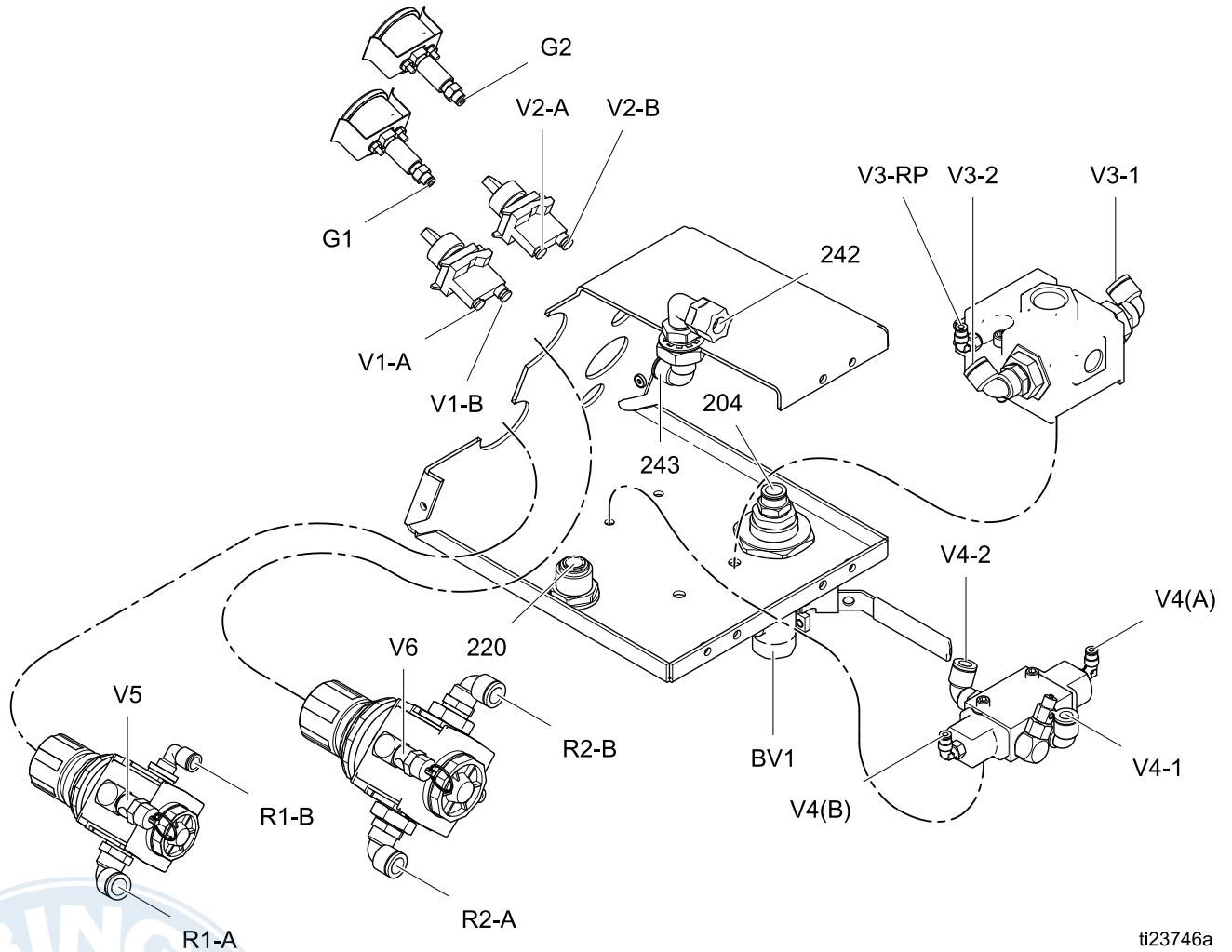
Reference	Mobile Models		Stationary Models	
	in.	cm	in.	cm
A — Raised	109	277	100	254.0
A — Lowered	70	178	61	155
B	57.25	145.4	40.375	102.6
C	41.25	104.8	12	30.5



Appendix A: Air Connections

The air controls are shipped completely assembled. Should a connection loosen, or a part need to be replaced, this page shows air connection points. The next page shows tube lengths and the correct connection for each end of the tube.

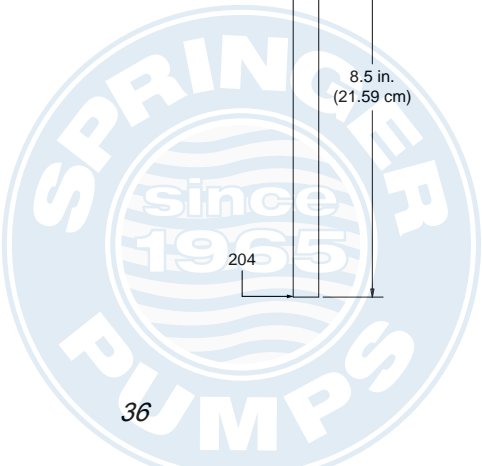
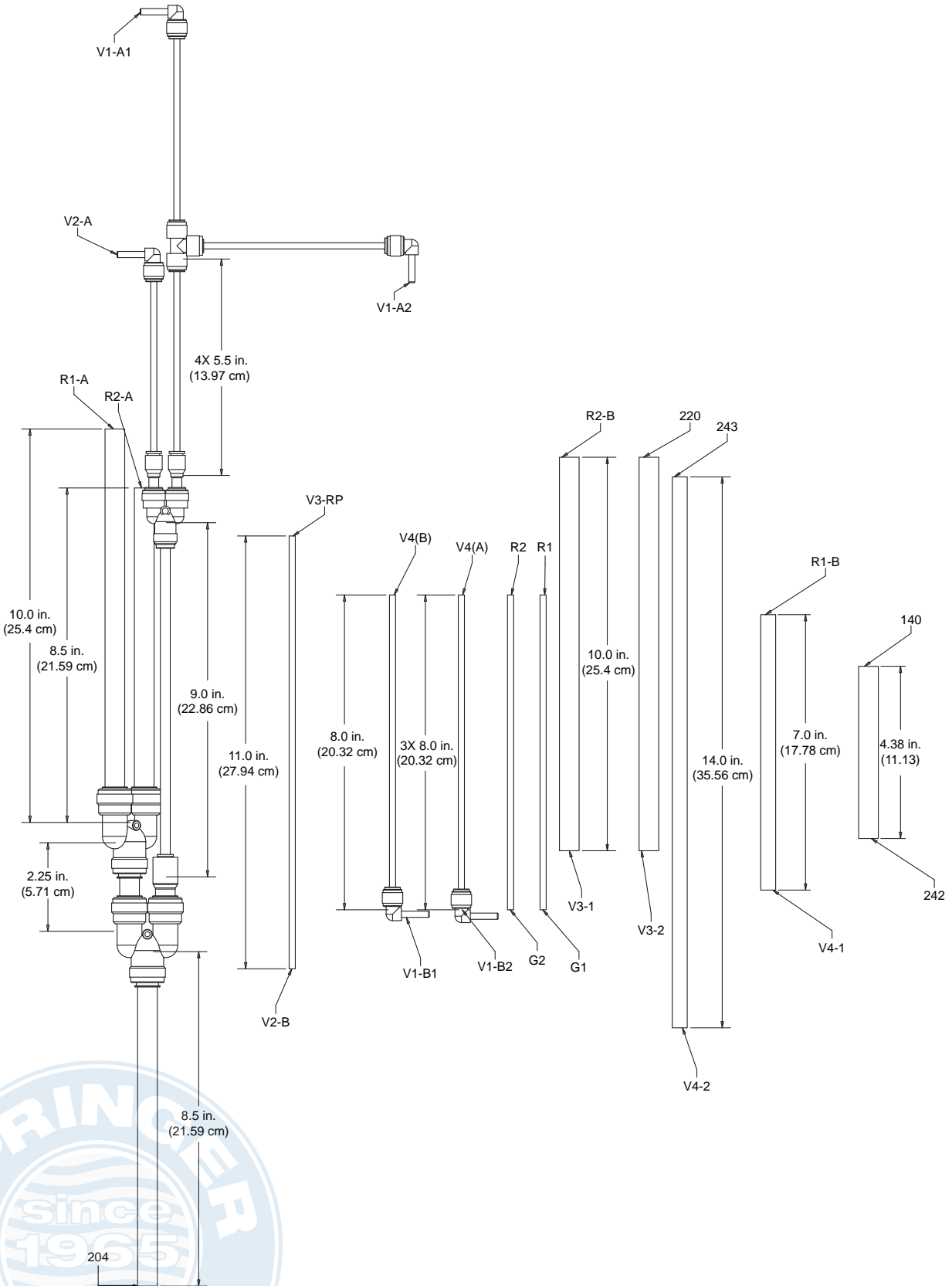
A	Inlet
B	Outlet



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Appendix A: Air Connections



Technical Data

SaniForce Piston Pump Elevator		
	U.S.	Metric
Maximum Air Inlet Pressure	100 psi	7.0 bar, 0.7 MPa
Maximum Fluid Working Pressure		
2:1 Pumps	250 psi	17 bar, 1.7 MPa
5:1 Pumps	400 psi	28 bar, 2.8 MPa
6:1 Pumps	600 psi	41 bar, 4.1 MPa
Maximum Ambient Temperature (Air Motor)	120°F	49°C
Maximum Weight Capacity for Elevator	200 lb	91 kg
Air Inlet	1/2 npt (f)	12.7 mm npt (f)
Sound Data	See your pump manual.	
Wetted Parts	See your pump manual.	

Package Weights

Model	Weight	
	lb	kg
24V310	305	138
24V311	170	77
24V312	305	138
24V313	170	77
24V314	305	138
24V315	170	77
24V316	330	150
24V317	330	150

Model	Weight	
	lb	kg
24V318	195	88
24V319	195	88
24V320	342	155
24V321	342	155
24V322	207	94
24V323	207	94
24V324	425	193
24V325	290	132



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