

KEEP FOR FUTURE REFERENCE

SERVICE MANUAL



**INTENDED FOR USE BY SKILLED
TECHNICAL PROFESSIONALS • READ
AND UNDERSTAND BEFORE SERVICING**



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**AC-VOLTAGE
POWER SYSTEM,
WITH HIGH-DUTY
POWERED MOTION**

Stock number: 35277



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BEFORE SERVICING LIFTER



**Disconnect power source
before servicing lifter.**

Disconnect the electrical connectors (figs. 1A-B).

1A



1B



Service personnel must read and understand the lifter's *OPERATING INSTRUCTIONS* – especially “INSPECTIONS AND TESTS” and “MAINTENANCE” sections – before servicing the vacuum lifter. Many of the following discussions assume knowledge of the *OPERATING INSTRUCTIONS*.

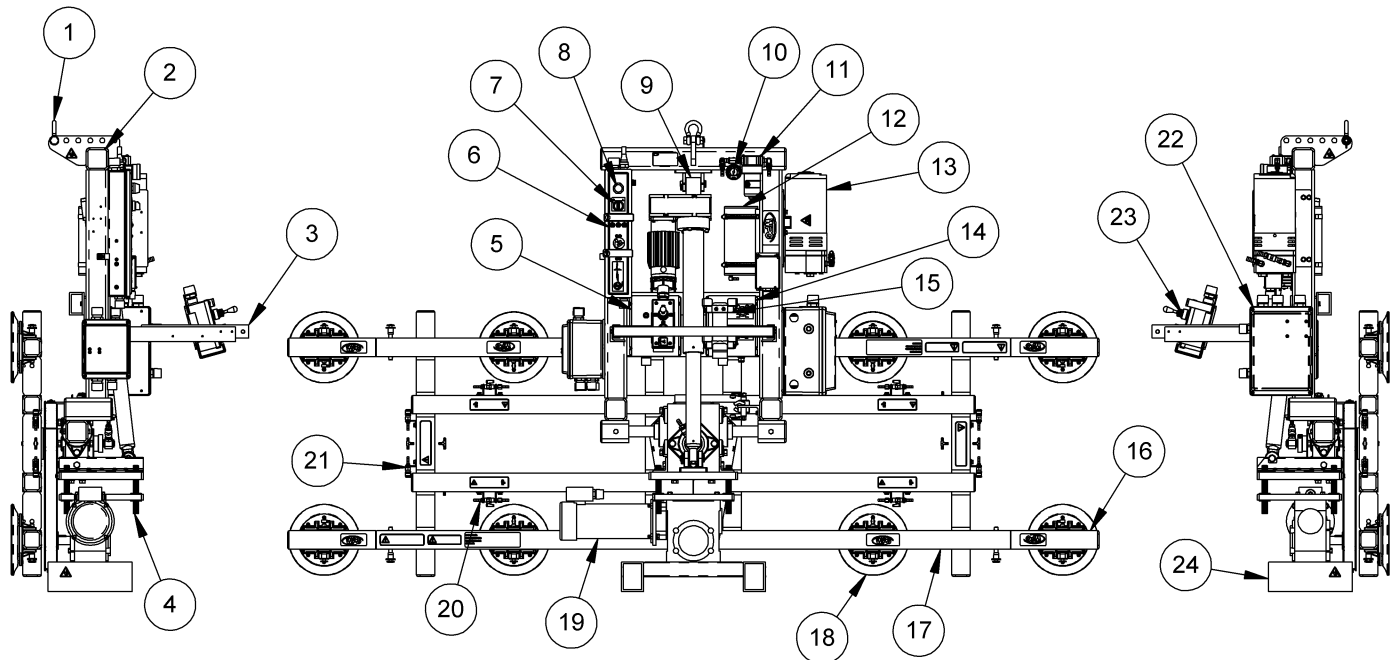
Note: The relevant wiring diagrams are shown in the lifter's OPERATING INSTRUCTIONS, for reference when servicing or troubleshooting the lifter.

SERVICE SCHEDULE

Service must be performed whenever a deficiency is indicated by routine inspections or tests. Follow the “INSPECTIONS AND TESTS” section of the *OPERATING INSTRUCTIONS*. Any service warranted must be performed before resuming normal operation of the lifter.

OPERATING FEATURES

Features shown here are underlined> on their first appearance in each section following.



- | | | |
|-------------------------------------|--|----------------------------------|
| 1 LIFT POINT | 2 LIFT BAR | 3 CONTROL HANDLE |
| 4 CHAIN TENSION ADJUSTMENT BOLT | 5 TILT SPEED CONTROLLER | 6 CIRCUIT BREAKERS |
| 7 POWER SWITCH | 8 VACUUM LIFT LIGHT | 9 TILT ACTUATOR |
| 10 VACUUM GAUGE | 11 AIR FILTER | 12 VACUUM RESERVE TANK |
| 13 VACUUM PUMP | 14 ROTATION SPEED CONTROLLER | 15 HOIST PENDANT HOLDER |
| 16 TELESCOPING PAD ARM | 17 PAD FRAME | 18 VACUUM PAD with MOVABLE MOUNT |
| 19 ROTATION MOTOR with GEAR REDUCER | 20 PAD SHUTOFF VALVE | 21 QUICK CONNECTOR |
| 22 Enclosure with VACUUM SWITCH | 23 MOVABLE CONTROL PENDANT with ROTATION/TILT SWITCH and VACUUM RELEASE BUTTON | 24 PARKING STAND |

Note: A model PRTHD89ACS is shown.¹

1..... Some components may not be relevant or they may have a different location, depending on the lifter in question.

SERVICE PROCEDURES

AIR FILTER MAINTENANCE – 4.4 OZ BOWL SIZE

! *Inspect each air filter regularly, and service when necessary.*

Immediately remove liquid found in the filter bowl, to prevent contact with the filter element.

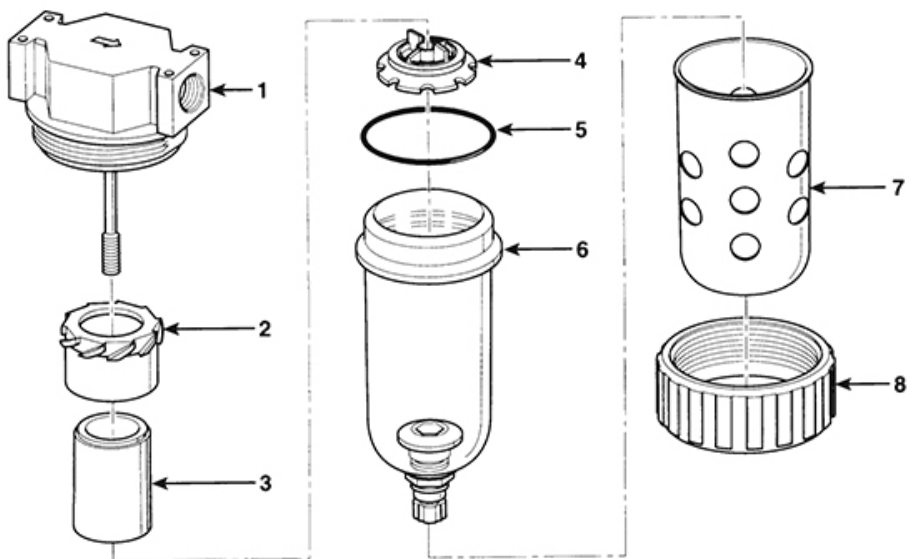
⊘ *Never use bowl drain to remove liquid, because this could cause air leak.*

Replace the element whenever:

- It has an overall dirty appearance.
- There is a noticeable increase in the time required to attain full vacuum.

Note: The Filter Element Kit (#16132) includes an element (item 3 in fig. 1A), a bowl seal (item 5) and lubricant (not shown).

1A



Filter Service Procedure

- 1) Unscrew the threaded collar (item 8 in fig. 1A) from the body (item 1) of the air filter.

Note: To protect air-line fittings from damage, hold the body while turning the collar.

- 2) Remove the bowl guard (item 7) and the bowl (item 6).
- 3) Determine whether the filter element (item 3) needs to be replaced (see above).
 - *If so, proceed to step 4.*
 - *If not, remove any liquid or contaminants from the bowl; clean the old bowl seal (item 5) with mild soap and water; and skip to step 8.*
- 4) Unscrew the baffle (item 4), and remove the element and deflector (item 2).
- 5) Discard the old element and bowl seal (item 5).
- 6) Clean the bowl and all remaining internal parts, using mild soap and water only.

Caution: *Do not use any other cleaning agents.*

SERVICE PROCEDURES

- 7) Install the deflector and a new filter element. Then screw the baffle back on to hold the element in place.

Note: Tighten gently – finger-tight.

- 8) Lubricate the new or cleaned bowl seal, using a mineral-based oil or grease, such as that provided in the filter element kit.

Caution: Do not use synthetic oils, such as esters, and do not use silicones.

Then place the bowl seal around the rim of the bowl.

- 9) Install the bowl back onto the body.

Caution: Do not contaminate the filter element with lubricant from the bowl seal.

- 10) Install the bowl guard and the collar.

Note: Tighten the collar with 28-32 in-lbs [316-362 N-cm] of torque.

- 11) Perform the “[Vacuum Test](#)” to be certain the air filter does not leak (see “INSPECTIONS AND TESTS: TESTING” in the lifter's *OPERATING INSTRUCTIONS*).

Note: Repeat this procedure for any other filter of the same type.

SERVICE PROCEDURES

VACUUM PUMP MAINTENANCE – MODEL 0523



Before proceeding with any maintenance, disconnect power source and allow pump to cool.

Disassembly/Reassembly Procedure

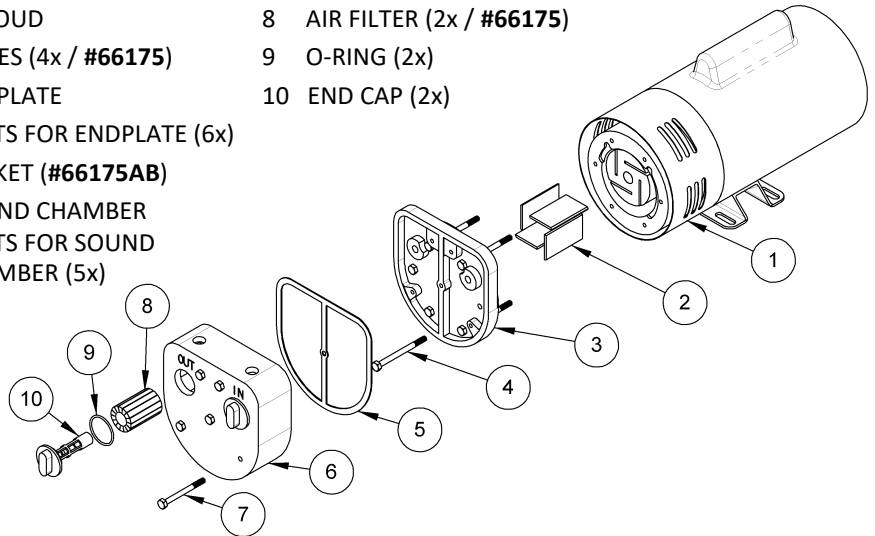
(includes replacing air filters, vanes and gasket; see [“REPLACEMENT PARTS”](#) on page 16)

- 1) Remove the end caps, O-rings and air filters from the sound chamber of the vacuum pump.

- | | | | |
|---|------------------------------|----|--------------------------|
| 1 | SHROUD | 8 | AIR FILTER (2x / #66175) |
| 2 | VANES (4x / #66175) | 9 | O-RING (2x) |
| 3 | ENDPLATE | 10 | END CAP (2x) |
| 4 | BOLTS FOR ENDPLATE (6x) | | |
| 5 | GASKET (#66175AB) | | |
| 6 | SOUND CHAMBER | | |
| 7 | BOLTS FOR SOUND CHAMBER (5x) | | |

- 2) Remove the five bolts and remove the sound chamber.

Note: If any liquid is discovered in the sound chamber, thoroughly dry all interior surfaces of the pump prior to reassembly.



- 3) Remove the six bolts from the endplate, and separate the endplate from the rotor housing. The shroud surrounding the rotor housing will loosen as well.
- 4) Note the orientation of the bevel on the vanes for step 5. Then remove the vanes by sliding them out the end of the rotor. If needed, rotate the rotor by hand to position the vanes for easier access.
- 5) Make sure that the rotor and housing are clean and free of debris. Orient the new vanes like the old ones by matching the bevel. Then insert the new vanes by sliding them into the empty slots in the rotor.
- 6) Reinstall the endplate and secure it with the six bolts previously removed.
- 7) Remove the gasket, and make sure that the contact surfaces between the endplate and sound chamber are clean. Install a new gasket and reinstall the sound chamber. Then secure the sound chamber with the five bolts previously removed.
- 8) Replace the air filters. Then reinstall the O-rings and end caps.

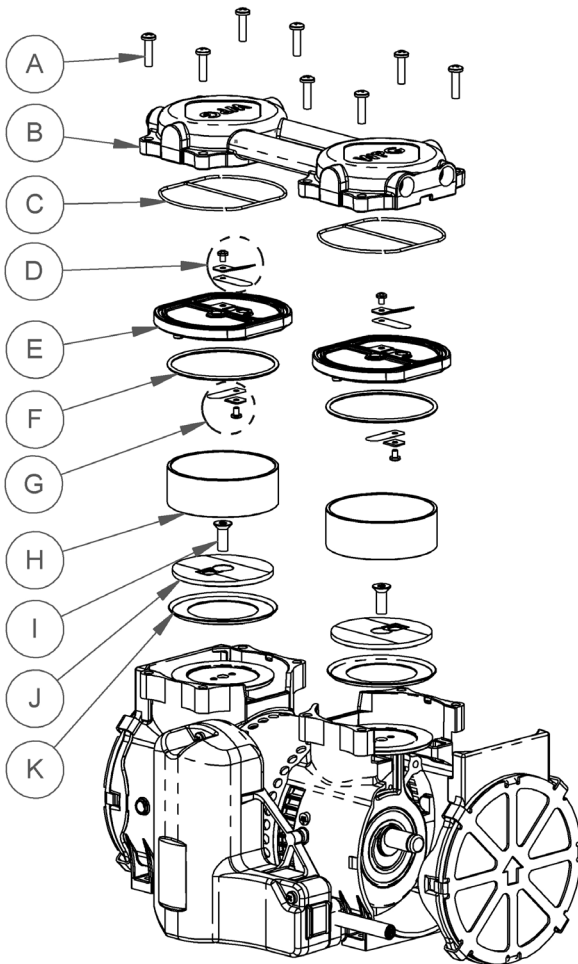
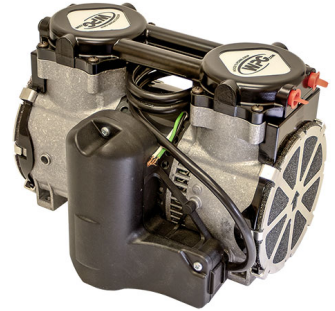
SERVICE PROCEDURES

VACUUM PUMP MAINTENANCE – MODEL MP27



Before proceeding with any maintenance, disconnect power source and allow pump to cool.

If the vacuum pump takes too long to attain full vacuum, clean the exterior of the pump and replace worn parts as necessary to obtain acceptable pump performance (see “[REPLACEMENT PARTS](#)” on page 16).



Reference	Availability	Quantity	Description
A	☐	8	Head Screw
B	☐	2	Head
C	☒	2	Head O-ring
D	☒	2	Exhaust Valve Kit (valve flapper, restraint and screw)
E	☐	2	Valve Plate
F	☒	2	Sleeve O-Ring
G	☒	2	Intake Valve Kit (valve flapper, keeper and screw)
H	☒	2	Cylinder Sleeve
I	☒	2	Retainer Screw
J	☐	2	Retainer Plate
K	☒	2	Piston Cup

☐ Nonstocked Item

☒ Included in service kit #66179AM

Removing the Heads and Valve Plates

- 1) Remove the head screws (A) and the pump heads (B). Note the orientation of the heads for reassembly.
- 2) Carefully separate the valve plates (E) from the bottom of the pump heads (B) and the top of the cylinder sleeves (H). Note the orientation of the plate tabs for reassembly.
- 3) Remove the head O-rings (C) and sleeve O-rings (F), and discard them.

SERVICE PROCEDURES

Replacing the Intake Valves and Sleeve O-Rings

- 4) Remove the old valve screws, keepers and flappers (G) and discard them.
- 5) Clean the lower surfaces of the valve plates (E) with a soft cloth.
- 6) Install the new valve flappers, keepers (so “X” is visible) and screws (G) as shown. Tighten the screws with 18 in-lbs [2 N-m] of torque.
- 7) Install new sleeve O-rings (F) in the valve plates (E). Make sure to seat them firmly in the grooves.

Replacing the Exhaust Valves and Head O-Rings

- 8) Remove the old valve screws, restraints and flappers (D) and discard them.
- 9) Clean the upper surfaces of the valve plates (E) with a soft cloth.
- 10) Install the new valve flappers, restraints and screws (D) as shown. Tighten the screws with 18 in-lbs [2 N-m] of torque.
- 11) Install new head O-rings (C) in the valve plates (E). Make sure to seat them firmly in the grooves, without any twists.

Disassembling the Piston Assemblies

- 12) Remove the retainer screws (I) and discard them. Note the position of the recesses in the retainer plates (J) for reassembly.
- 13) Remove the cylinder sleeves (H), retainer plates (J) and piston cups (K). Discard the sleeves and cups.
- 14) Clean the retainer plates (J) and tops of the piston rods.

Replacing the Sleeves and Cups

- 15) Place a new cylinder sleeve (H) over one piston rod.
- 16) Insert a new piston cup (K) into the sleeve (H) and push the cup down to the piston rod.
- 17) Reinstall a retainer plate (J) on the piston rod, making sure to position it correctly.
- 18) Install a new retainer screw (I) and tighten the screw with 55 in-lbs [6.2 N-m] of torque.
- 19) Repeat steps 15–18 with the other piston assembly.

SERVICE PROCEDURES

Installing the Valve Plates and Heads

- 20) Make sure the cylinder sleeves (H) are seated firmly against the pump housing. Then place the assembled valve plates (E) in the correct orientation on the sleeves, making sure they fit into the corresponding O-ring grooves.
- 21) Place the heads (B) in the correct orientation on the valve plates (E), making sure the plate tabs fit in corresponding head notches.
- 22) Install the head screws (A) and tighten them with 55 in-lbs [6.2 N-m] of torque in a crisscross pattern.

SERVICE PROCEDURES

VACUUM SWITCH ADJUSTMENT

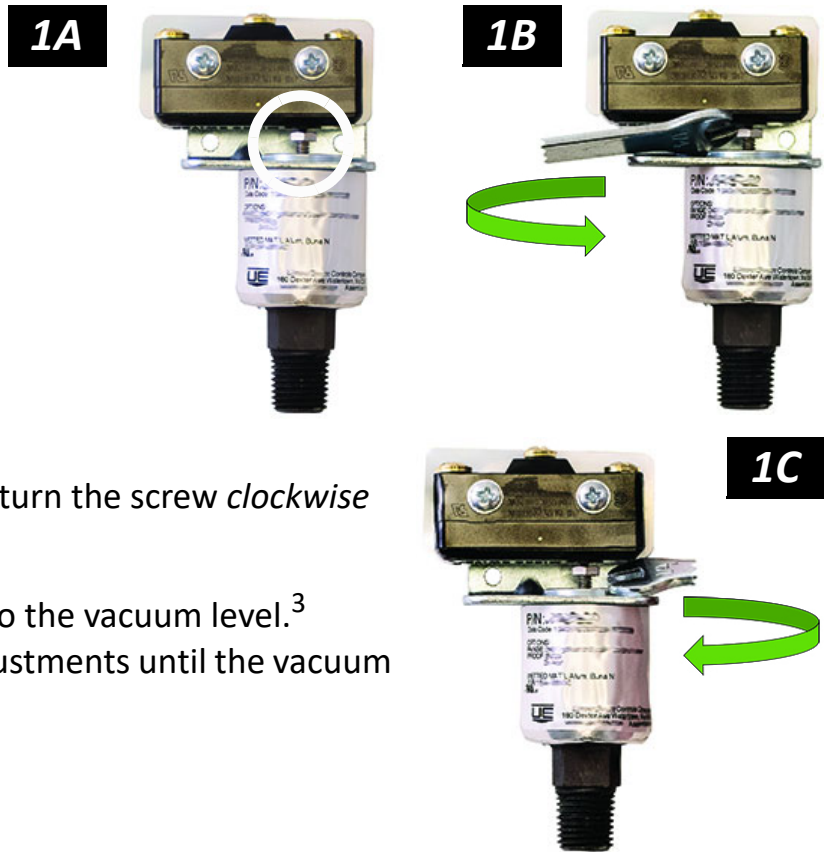
The vacuum switch turns the vacuum lift light on and off as needed to indicate whether the lifter has attained sufficient vacuum for lifting the maximum load weight, as shown on the vacuum gauge (see “OPERATION: TO ATTACH THE PADS TO A LOAD: Reading the Vacuum Gauge” in lifter’s *OPERATING INSTRUCTIONS*).

If the switch is adjusted correctly, the lift light turns on only *after* vacuum becomes sufficient for lifting; and turns off again *before* vacuum becomes insufficient for lifting.^{1,2} Adjust the vacuum switch when necessary:

- 1) Use the 1/4" open-end wrench provided to turn the adjustment screw (circled in fig. 1A) about 1/6th turn at a time:

- To make the lift light turn *off* at a *greater* vacuum level, turn the screw *counterclockwise* (fig. 1B).
- To make the lift light turn *on* at a *lesser* vacuum level, turn the screw *clockwise* (fig. 1C).

- 2) Check lift light activity in relation to the vacuum level.³ Continue to make incremental adjustments until the vacuum switch is functioning correctly.



1..... If the lift light turns on *before* vacuum is sufficient for lifting, replace the air filter’s element (see “[AIR FILTER MAINTENANCE – 4.4 OZ BOWL SIZE](#)” on page 4). If the lift light does *not* turn on *after* vacuum is sufficient for lifting, replace the light bulb (see “[REPLACEMENT PARTS](#)” on page 16).

2..... In order to observe lifter functions while vacuum is decreasing, it may be necessary to create a controlled leak in the vacuum system.

3..... In order to test the adjustment accurately, release the vacuum pads completely before reattaching them to a test surface.

TILT COMPONENTS MAINTENANCE

High-Duty Tilt Actuator

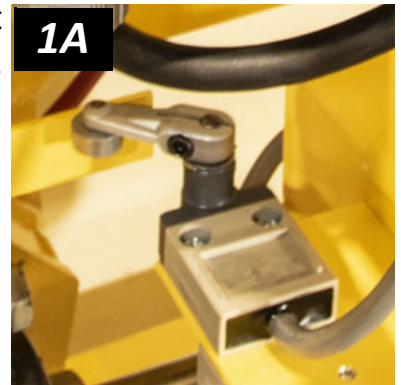
Powered tilt motion is performed by a 90-volt DC, ball screw linear actuator, or "tilt actuator".

The only customer-replaceable parts of the actuator motor are the brushes. Check the brushes initially after 42,000 tilt cycles and every 20,000 tilt cycles thereafter.¹ Replace the brushes if their square section is worn to 5/16" [8 mm] in length or less.

The ball screw and guide bearings are prelubricated and should not require additional lubrication. Although the tapered load bearings also are prelubricated, use the grease zerk on the side of the bearing housing to apply a small amount of light, general-purpose grease to them after every 20,000 tilt cycles. **Do not over-lubricate.**

The brake is preset and should provide consistent braking for the tilt function. However, if the brake friction surfaces become worn (indicated by excessive drift), contact WPG for rebuilding.

The limit switches (fig. 1A) which control stroke length also are preset and should not need adjustment. However, if adjustment is required, proceed as follows:



Caution: Exercise special care when adjusting limit switches because excessive actuator motion can damage lifter components.

- 1) Determine which end of the stroke needs to be adjusted, and identify the corresponding limit switch.
- 2) Determine which way to move the limit switch in order to produce the desired adjustment. Rotating the limit switch's arm on the splined shaft changes the position of the roller in relation to the corresponding contact surface on the lifter's rotation hub:
 - To *reduce* stroke length, move the roller of the limit switch *towards* the contact surface.
 - To *increase* stroke length, move the roller of the limit switch *away from* the contact surface.
- 3) Note the current position of the limit switch's arm on the shaft. Then loosen the socket-head screw on the arm, rotate the arm in the appropriate direction on the shaft, and tighten the socket-head screw to secure the arm.
- 4) Check the stroke length and repeat steps 1-3 as necessary to obtain the desired adjustment.

1..... "Tilt cycle" indicates full 90° travel in *both* directions.

SERVICE PROCEDURES

Tilt Speed Controller

Tilt speed and power are governed by the tilt speed controller, which operates on 120 volts AC to produce an adjustable 0 to 90 volts DC for the actuator motor, and a constant 90 volts DC for the actuator brake.

The controller (fig. 2A) has 2 speed control dials. The *upper* dial controls the speed of actuator *extension*. The *lower* dial controls the speed of actuator *retraction*.

The controller's internal settings for minimum and maximum motor speeds, acceleration and deceleration rates, and motor torque are preset and should not need adjustment. If any setting needs adjustment, contact WPG for directions.



SERVICE PROCEDURES

ROTATION COMPONENTS MAINTENANCE

Rotation Gear Reducer

See the manufacturer's documentation about gear reducer maintenance.

Rotation Speed Controller

Rotation speed and power are governed by the rotation speed controller (fig. 1A), which operates on 120 volts AC to produce an adjustable 0 to 90 volts DC for the rotation motor.

The controller has 1 speed control dial, which controls the speed of rotation both clockwise and counter-clockwise.

The controller's internal settings for minimum and maximum motor speeds, acceleration and deceleration rates, and motor torque are preset and should not need adjustment. If any setting needs adjustment, contact WPG for directions.

The speed controller's hot and neutral lines have 15-amp, normal blow fuses that are user-replaceable.



To prevent contact with dangerous voltages, disconnect power supply wire from controller before replacing fuses.

Rotation Motor

The rotation motor (fig. 1B) has externally replaceable brushes. Periodically inspect both brushes to determine whether they need to be replaced. Replace any brushes worn to 9/16" [15 mm] in length or less (measured on long side).

Rotation Bearings

Using the zerk fittings provided, lubricate the bearings with a lithium-based grease after every 6 months of use.



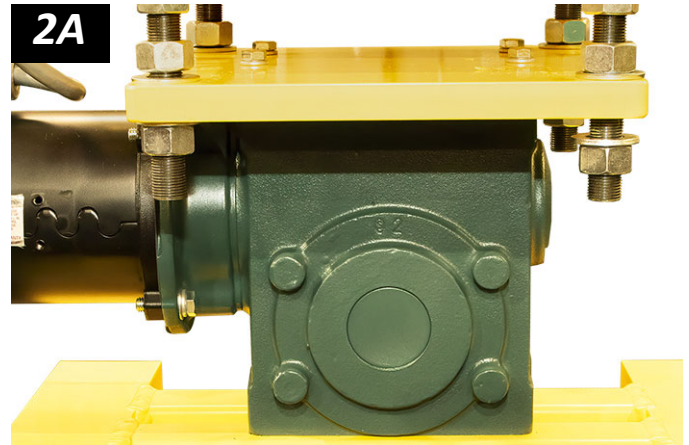
SERVICE PROCEDURES

Rotation Chain Drive

Regularly inspect the rotation chain and sprockets for correct lubrication, tension and alignment. Oil the chain periodically to keep it from running dry, and adjust the chain when needed (see directions to follow). Unusual vibrations or noises may indicate an alignment problem. Correct any deficiency prior to resuming normal use of the lifter.

To Adjust Chain Tension:

- 1) Loosen the four bottom lock nuts on the chain tension adjustment bolts that hold the gear reducer mounting plate on the lifter (fig. 2A). Be careful not to remove the bottom nuts, since this would allow the gear reducer to drop off the lifter.
- 2) Move the adjustment nuts *down* to *tighten* the chain or *up* to *loosen* the chain, as necessary to produce chain slack that measures between $\frac{1}{4}$ " and $\frac{1}{2}$ " [7-13 mm].
Avoid over-tightening the chain, as this will cause excessive bearing wear on the gear reducer.
- 3) The planes of the two sprockets should be aligned when the nuts are positioned at equal distances along the four adjustment bolts. If not, move the nuts as necessary to align the sprockets. Then recheck chain tension.
- 4) Taking care to maintain correct chain tension, tighten the nuts securely against the mount.



To Lubricate Chain:

- 1) Remove one half of the chain guard (fig. 2B) by removing the fasteners holding it together and/or to the lifter.
- 2) Turn the lifter's power switch on, as well as the power switch for the rotation speed controller (green light illuminated). Then set the controller to the minimum setting that allows the pad frame to rotate.
- 3) Rotate the pad frame and apply oil to the chain while the pad frame makes two complete revolutions, to ensure that the entire chain has been lubricated. Be careful to avoid using anything that could get caught in the chain.
- 4) Reinstall the chain guard and securely tighten its fasteners.



Suspend lifter high enough for pad frame to rotate fully without contacting anyone or anything.

Rotation Function Troubleshooting

If the rotation function experiences one of the following problems, investigate the possible causes indicated. Correct any deficiency before resuming normal use of the lifter.

If line fuse blows repeatedly:

- Rotation motor may be overloaded.
- Rotation motor's armature or power supply wire may be shorted or grounded:
Disconnect the power supply wire from the armature. An ohmmeter reading on the armature connections should read from 1.25 to 4.00 ohms. A reading from either side of the armature connections to the motor frame should read "open" (use high ohm scale).
- Rotation motor's brushes may be worn.

If rotation motor does not function and line fuse has not blown:

- Power switch for rotation speed controller may not be activated.
- Torque trim pot (inside controller enclosure) may need to be adjusted clockwise.
- Speed selected on controller dial may be too low for load resistance.
- Rotation motor's connections may be loose or motor's brushes worn.

If rotation motor runs at full speed regardless of speed controller setting:

- Speed controller may be shorted or defective.
- Speed controller's potentiometer may be defective.

REPLACEMENT PARTS

Stock No.	Description	Qty.
96220	Tilt Actuator – 2000 lbs – 24" Stroke – 90 V DC (for MRPTHD-AC)	1
96212AM	Tilt Actuator – 850 lbs – 12" Stroke – 90 V DC (for PRTHD89AC)	1
95500AM	Vacuum Pump – Rotary Vane – 4 SCFM – 100/120/240 V AC	1
67075	Potentiometer – 20 kOhm (for MRPTHD-AC, PRTHD89AC, PR4-AC)	*
67050	Resistor – 15 Ohm – 100 W (for MRPTHD-AC)	1
66432	Actuator Belt (for tilt actuators 96212AM, 96220)	1
66262	Roller Chain – #40 (for PR4-AC)	*
66252	Connecting Link – #40 (for PR4-AC)	1
66179AM	Pump Service Kit (for pumps 66126, 66126AM)	1
66175AB	Pump Gasket (for pump 95500AM)	1
66175	Pump Vanes/Filters Kit (for pump 95500AM)	1
66126AM	Vacuum Pump – Wobble Piston – 5 SCFM – 240 V AC	1
66126	Vacuum Pump – Wobble Piston – 5 SCFM – 120 V AC	1
65232	Solenoid Valve – 24 V AC – 6 W (for PR4-AC)	1
65231	Solenoid Valve – 24 V AC – 11 W (for PR4-AC)	2
65212AM	Check Valve – 1/4 NPT – 0.15 PSI Cracking Pressure (for MRPTHD-AC)	1
65212	Check Valve – 1/4 NPT – 1.0 PSI Cracking Pressure (for PR4-AC, PRTHD89AC)	1
65211AM	Check Valve – 1/8 NPT – 0.15 PSI Cracking Pressure (for MRPTHD-AC, PR4-AC)	1
65211	Check Valve – 1/8 NPT – 0.5 PSI Cracking Pressure (for PRTHD89AC)	1
64461	Circuit Breaker – 10 A (for MRPTHD-AC, PR4-AC, PRTHD89AC)	*
64459MZ	Circuit Breaker – 8 A (for MRPTHD-AC, PRTHD89AC, PR4-AC)	1
64459	Circuit Breaker – 5 A (for MRPTHD-AC, PRTHD89AC, PR4-AC)	1
64639	Rotation Motor – 90 volts DC – 1/3 HP – 1735 RPM (for PR4-AC)	1
64381	Actuator Motor Brushes (for MRPTHD-AC, PRTHD89AC)	2
64289	Bulb – 24 V – Bayonet (for vacuum lift light)	1
64262	Green Lens (for vacuum lift light)	1
64236	Vacuum Switch – 1/4 NPT	1
64227	Circuit Board (for speed controller)	*
64214	Roller Lever Limit Switch – 5 A (for tilt actuator)	2
64212	Contact Block – Rotation Switch (for PR4-AC)	1
64202	Contact Block – Power Switch (for PR4-AC)	1
64191	Contact Block – Power Switch (for MRPTHD-AC, PRTHD89AC)	1
56209	Actuator Brake – 90 V DC (for tilt actuators 96212AM, 96220)	1
56208	Actuator Motor – 1/3 HP – 90 V DC (for tilt actuators 96212AM, 96220)	1
55952	Solenoid Valve Manifold Assembly – High Flow – 24 V AC (for MRPTHD-AC)	1
20270	1/4" Open-End Wrench (for adjusting vacuum switch)	1
16132	Filter Element Kit (for 4.4 oz bowl size air filter)	1
15910	Vacuum Gauge – 1/8 NPT – CBM Type (for MRPTHD-AC, PR4-AC, PRTHD89AC)	1
15650AM	360° Rotating Union – 3/8 NPT (for MRPTHD-AC, PRTHD89AC)	1
15650	360° Rotating Union – 1/4 NPT (for PR4-AC)	1

* Quantity as required.

See **OPERATING INSTRUCTIONS** for additional parts.

**SERVICE ONLY WITH IDENTICAL REPLACEMENT PARTS,
AVAILABLE AT WPG.COM OR THROUGH AN AUTHORIZED WPG DEALER**