

High Speed Spindl-Gard™ Lubrication System with Electric Pump

313444C

EN

For applying a constant quantity of oil directly to rotating bearing elements that operate at speeds greater than 250,000 DN

Models: Page 2

320 psi (2.2 MPa, 22 bar) Maximum Working Pressure

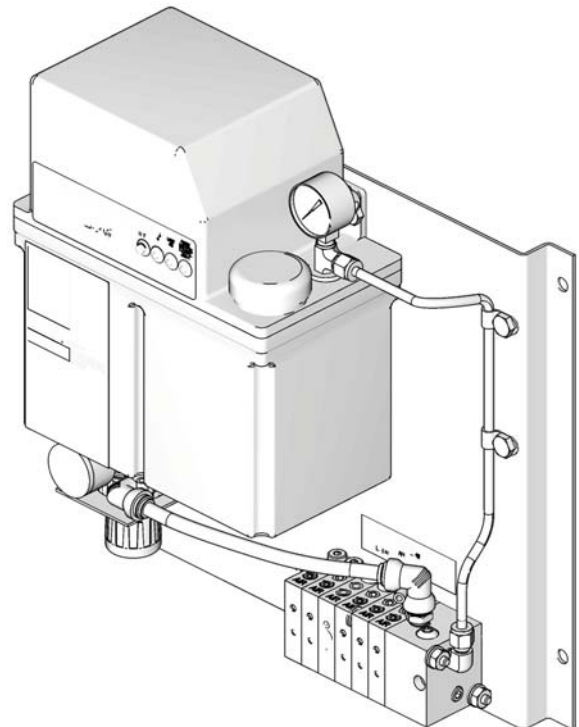


Important Safety Instructions

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

Components:

- Electric motor driven pump
- 0.8 gallon (3 liter) plastic reservoir
- Air/oil dispensing module
- Optional programmable timer/controller








Spindl-Gard with Electric Pump Models

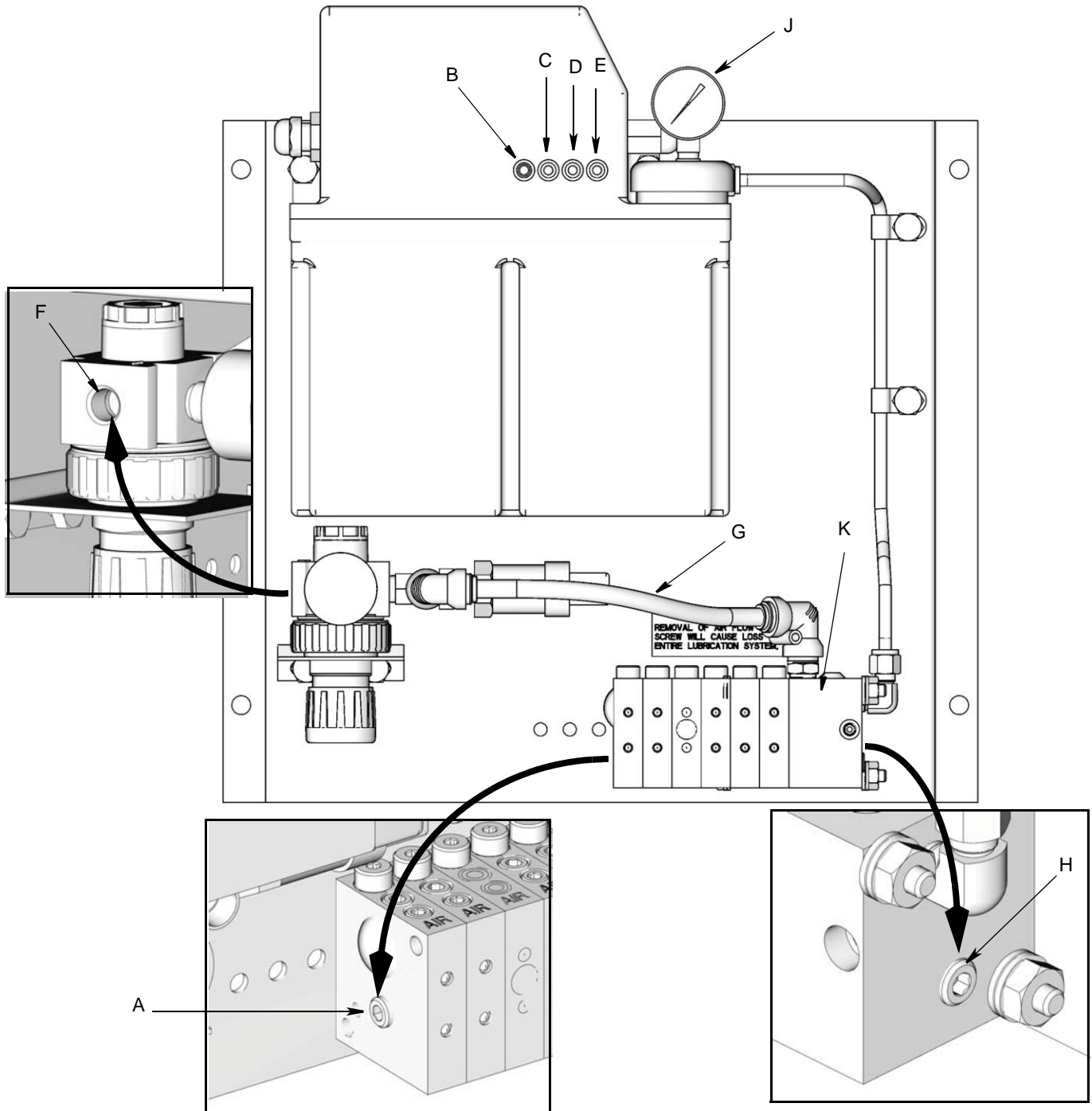
Model No.	Controller Option		Voltage			Number of Outlets								Outputs from Inlet to End CC/Stroke (cu in./stroke)			
	Remote (no timer)	Timer Included (AC Models Only)	24 VDC	115 VAC	230 VAC	1	2	3	4	5	6	7	8	Plugged	0.025 (0.0015)	0.049 (0.0030)	0.082 (0.0050)
248219		X		X			X								X		
24H681		X			X								X				X
24L010	X			X						X					X		
24R127		X		X			X									X	
24V204		X		X			X										X
24V531		X			X					X							X
258295	X		X				X			X							X
258301		X		X						X						X	
258347		X		X						X					X	X	
25A202	X				X				X							X	
25A209		X			X				X							X	
564445	X		X					X								X	

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, 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	
	<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 forms from distributor or retailer. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. • 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>ELECTRIC SHOCK HAZARD</p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Fluid from the gun/dispense valve, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none"> • Follow Pressure Relief Procedure in this manual, when you stop spraying 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.

Component Identification



NOTE: Reference letters are used throughout the instructions on the following pages. Refer back to this page as needed.

- | | | | |
|---|-------------------------|---|----------------------------------|
| A | Purge Plug | F | 1/4-18 Air Regulator Inlet, NSPF |
| B | Manual Run Reset Button | G | Air/Oil Delivery Line |
| C | Pump ON LED | H | Air Flow Adjustment Screw |
| D | Power ON LED | J | Oil Pressure Gauge |
| E | Alarm LED | K | Air/Oil Mixing Block |

Installation

NOTE: Reference letters used throughout these instructions refer to the reference letter provided on the Component Identification page 4.

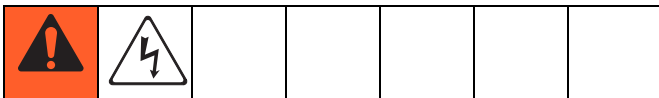
- Mount panel in a dry location near the bearing that is being serviced.
- Line length from the air/oil mixing blocks (K) to the spindle ranges from 2 to 50 feet (0.61 m to 15.24 m).
- Mount panel using 3/8 inch (0.375 mm) diameter bolts. Panel mounting dimensions are provided in the Technical Data section of this manual, page 12.

Grounding



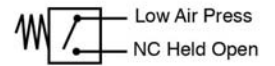
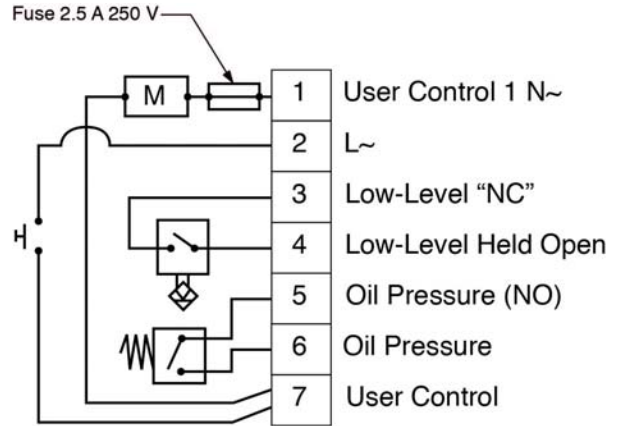
The equipment must be grounded. Grounding reduces the risk of static and electric shock by providing an escape wire for the electrical current due to static build up or in the event of a short circuit.

Electrical Connections - All Models



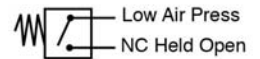
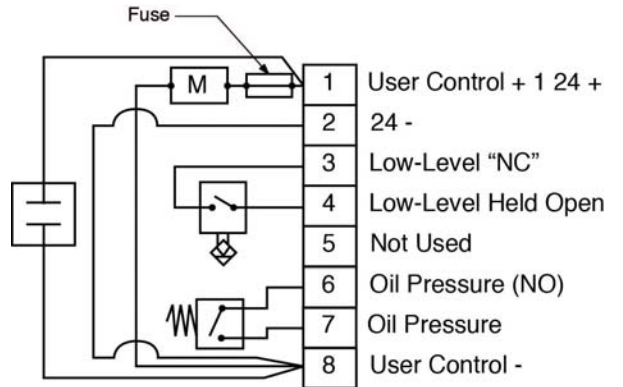
1. Verify all power to the system is disconnected.
2. Remove enclosure cover from top of pump.
3. Install electrical cable through connector located on right side of electrical enclosure.
4. Referring to the wiring diagram for your model (115 and 230 VAC or 24 VDC) in FIG. 1, connect Pump Power leads to their respective terminals within the enclosure.

Wiring Diagram: 115 VAC & 230 VAC Units



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Wiring Diagram: 24 VDC Units



ti13158b

FIG. 1

Timer Models Only

5. Connect input power leads to the input terminal block (Terminals 4 and 6) (FIG. 2).

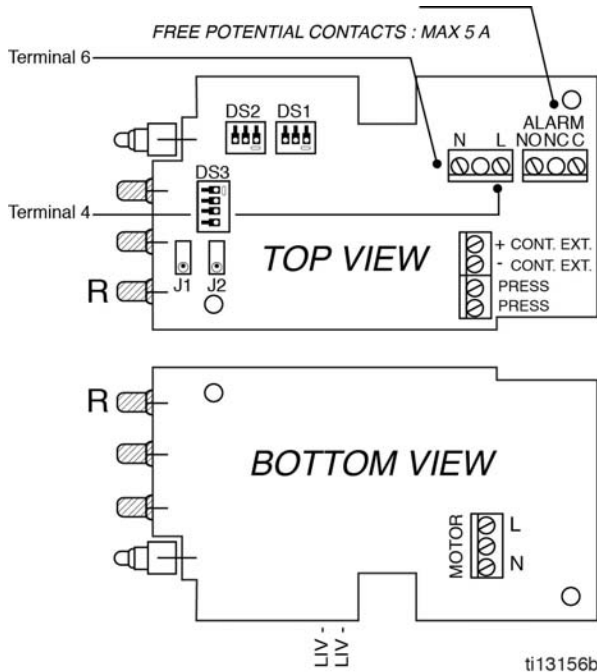


FIG. 2

All Models

6. Replace electrical enclosure cover.

Air Flow Data Chart

The tube size from the air/oil mixing block (K) to the bearing is critical for proper air and oil delivery to the bearings. Refer to the Air Flow Chart (below) for orifice and corresponding delivery tube sizes and the resulting airflow.

Orifice Size Inches (mm)	Delivery Tube O.D. Inches (mm)	Delivery Tube I.D. Inches (mm)	Air Flow @30 psi SCFM (LPM)	Air Flow @ 60 psi SCFM (LMP)
0.030 (0.76)	3/16 (5)	1/8 (3)	16.1 (0.570)	25.2 (0.890)
0.040 (1.00)	1/4 (6)	3/16 (5)	27.7 (0.980)	45.2 (1.600)
0.050 (1.27)	5/16 (7)	1/4 (6)	48.4 (1.710)	81.5 (2.880)
0.060 (1.52)	5/16 (7)	1/4 (6)	103.7 (2.180)	103.9 (3.670)

Pneumatic Connections

Pressure Relief Procedure



1. Loosen the purge plug (A) on the air/oil mixing block assembly (K).
2. Press the manual run button (B) until oil flows out of the port.

Connecting Pneumatic Fittings - All models



NOTE:

- Incoming air should be dry (40°F, 4.4°C) and be filtered to 5 micron.
 - Minimum inside diameter of incoming air line should be 0.25 inch (0.63 cm).
1. Connect incoming air line to the 1/4-18 NPSF inlet (F).
 2. Connect air/oil delivery line from the air/oil mixing block (K) to the bearing point.

Setup

1. Set the desired Pause (off) and Work (on) Times for your model using the 3 banks of dip switches (DS-1, DS-2, DS-3) located under the electrical enclosure cover on the top of the pump. (See Dip Switch Settings, page 8.)

The possible time choices for both the Pause and Work Times are shown on page 8.

NOTE:

- Pause (off) Time cannot exceed 20 **minutes**.
- Work (on) Time cannot exceed 20 **seconds**.

2. Adjust the air flow using the air flow adjustment screw (H) located on the air/oil mixing blocks (K) by turning the set screw counter-clockwise. When the screw is flush with the surface of the block, the blocks are full open.

To restrict the air flow, turn the adjustment screw clockwise.

NOTE: Entirely removing the air flow adjustment screw (H) will cause a loss of air pressure to the entire lubrication system.

3. Set the pressure regulator for the air/oil mixing blocks between 30 and 60 psi (0.20 MPa, 2.06 bar and 0.41 MPa, 4.13 bar). Refer to Air Flow Chart, page 6 for setting guidelines.

4. Air flow is supplied on a constant basis to the air-oil mixing block. Adjust the air regulator to achieve the required air pressure as follows.
 - a. Fill the reservoir with spindle oil.
 - b. Press the manual run button (B).
 - c. Loosen the purge plug (A) on the air/oil mixing block assembly (K).
 - d. Press the manual run button (B) until oil flows out of the port. As oil begins flowing out of the purge port, quickly tighten the purge plug (A).
 - e. Press the manual run button (B) 10 additional times (allowing approximately 5 seconds OFF time). The pressure should build on the oil pressure gauge (J) to 320 psi (2.21 MPa, 22.1 bar) and drop to 0.0 psi (0 MPa, 0 bar).
 - f. If pressure is not established, repeat steps b - e.

Adding a Lubrication Point

To add a point, the air/oil mixing assembly must be removed from the panel. An additional mixing module and new tie rod combination can then be added.

Plugging a Lubrication Point

To plug an air/oil outlet, Graco Plug Part No. 555456 must be installed in the piston distributor port on top of the air/oil mixing block.

Dip Switch Settings: Models With Timers

Pause (off) Time (FIG. 2 and FIG. 3)

The Pause (off) Time is set using dip switches DS3 and DS1 to select the time to deliver the required lube volume per hour. **For example:** If 12 cycles per hour are required $60 \div 12 = 5$; set the pause time to 5 minutes.

NOTE: Do not exceed 20 minutes Pause (off) time.

Work (on) Time (FIG. 2 and FIG. 3)

The Work (on) Time is set using the DS2 dipswitches.

NOTE: A Work (on) Time of 20 seconds will normally be sufficient.

Prelube (FIG. 2 and FIG. 3)

J1 is used to Yes or No. When set to Yes, the lube cycle will immediately power up.

Pressure Switch (FIG. 2 and FIG. 3)

For timer models, J2 must be set to the monitored position.

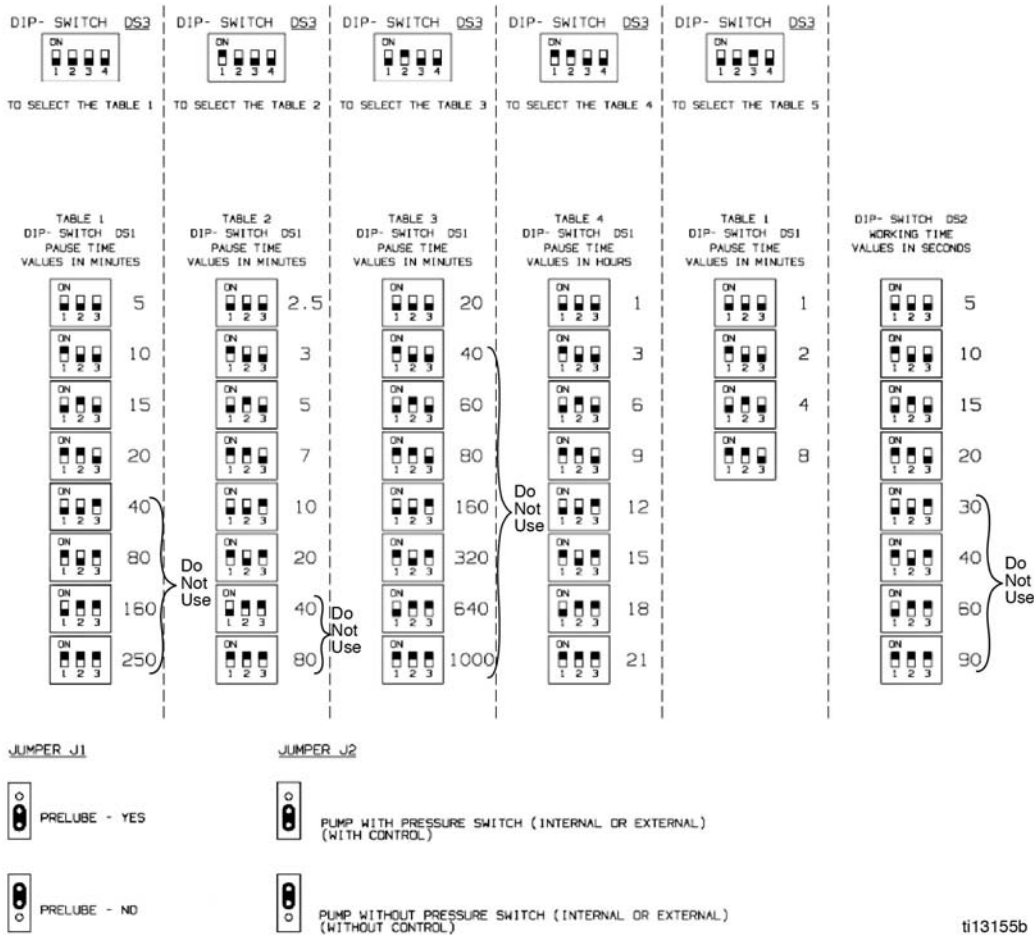


FIG. 3

Controller Settings: Models With Timers

Pause (off) Time (FIG. 3)

Set the Pause (off) Time to between 2 minutes and 20 minutes to deliver the required lube volume per hour.

NOTE: Do not exceed 20 minutes Pause (off) time.

Monitor Time (FIG. 3)

Set the Monitor Time to 20 seconds. This will allow sufficient time for the system pressure to rise, piston distributors to fire and the oil pressure switch to close.

Cycle Switch (FIG. 3)

Set Cycle Switch (oil pressure switch) transition to 1.

Pressure Switch (FIG. 3)

For timer models, J2 must be set to the monitored position.

If the oil pressure switch closes before the expiration of set Work Time, the pump and “Pump ON” LED (C) turns off and the timer begins its count down to the next lube occurrence.

If the oil pressure switch does NOT close before the expiration of the set Work Time, a fault is registered, causing a red “Alarm” LED (E) to light. The Fault Alarm contacts to transfer. The “Pump ON” LED (C) and pump turn off.

Other System Faults

Fault	Red Alarm LED Lights	Pump Shuts Down	How to Confirm Fault
Reservoir Level Low	X	YES	Visually examine the oil level within the translucent reservoir.
Air Pressure Low (<25 psi, 1.7 bar, 0.17 MPa)	X	YES	Visually examine the air pressure gauge

NOTE: If a fault occurs, press the Manual Run/Rest button to clear the fault and restart the pump. The pump will not start until the fault is cleared.

Operation

Theory of Operation

Air is constantly being applied to the air/oil blocks. After a preset Pause (off) Time, the controller activates the pump. The green “Power ON” LED (D) lights. System pressure builds causing the piston distributors within the air/oil mixing module to fire. The “No OIL” pressure switch closes.

The output from the piston distributor is discharged to the air/oil mixing chamber where the constant flow of air causes a thin film of oil to flow along the delivery tube in a constant, wave-like motion. This film is then applied in the form of a very fine spray from a drilled orifice or nozzle tube to the bearing elements on a constant basis.

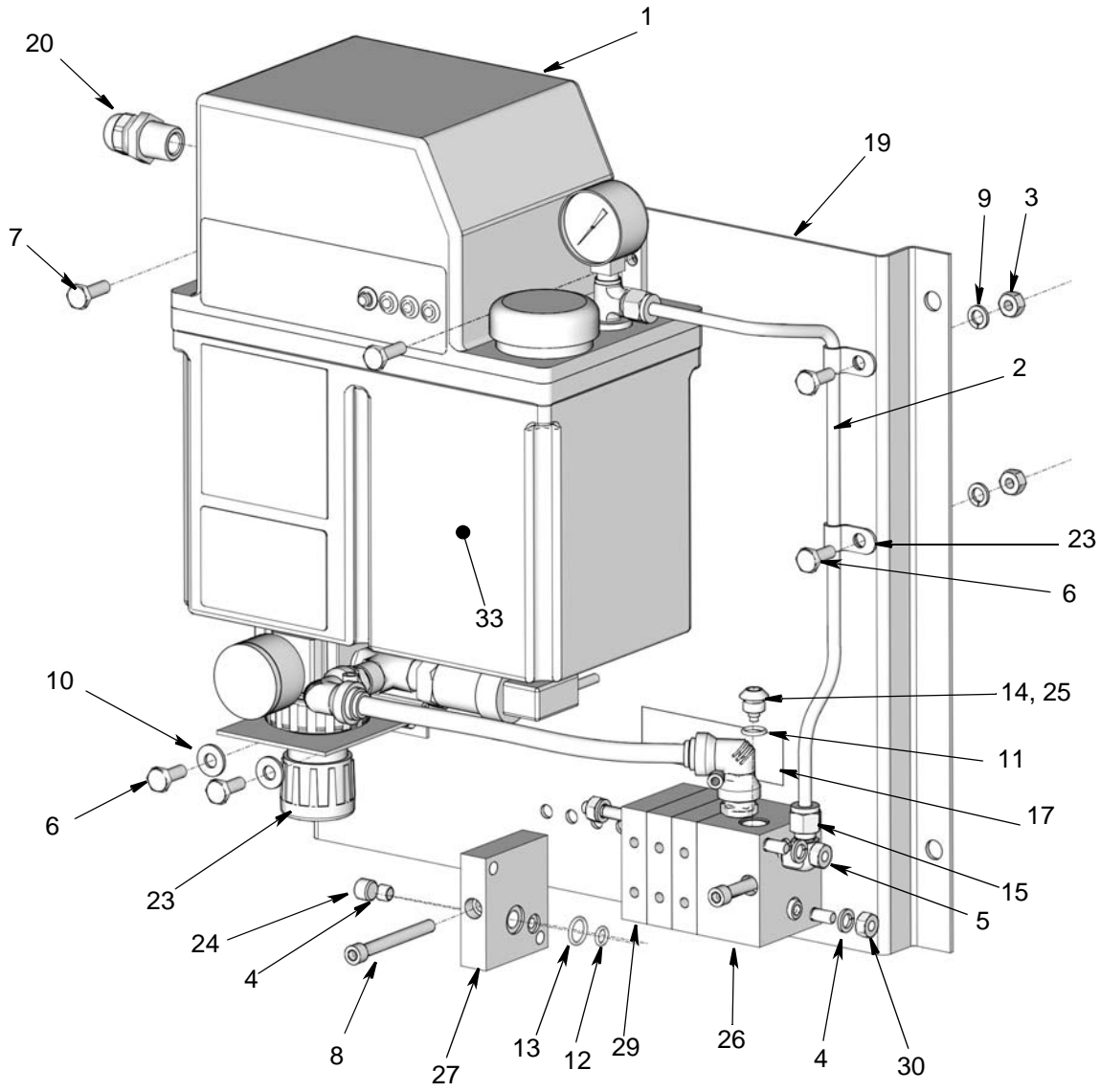
Startup Procedure

1. Verify the pressure regulator set point for the air/oil mixing blocks; the bearing should be receiving air.
2. Repeatedly press the manual run button (B) (allowing approximately 5 seconds of OFF time between cycles).
3. Verify oil output from each of the air/oil mixing blocks.

NOTE: This step also ensures that the inside of the air/oil delivery lines are coated with oil.

4. If a Timer is used, verify the cycle time.
5. Allow the system to stabilize for 15 minutes; then check the air/oil lines to ensure that oil has reached the bearing.
6. Start the spindle.

Parts



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REF	Part No.	Description	Qty	REF	Part No.	Description	Qty
1	562850	PUMP, EO-3 motor/timer 115V (models 24B219, 258301, and 258347)	1	29	563130	BLOCK, Spindl-Gard, 0.0015 model 24L010	6
	564254	PUMP, EO-3 24V, with timer (models 258295 and 564445)	1			model 248219	2
	258294	PUMP, EO-3 230V, without timer, PS/LL (models 24H681, 24V531 and 25A209)	1	563131	BLOCK, Spindl-Gard, 0.0030 model 256445	model 24R127	2
2		TUBE, nylon 6mm OD	1			model 258347	3
3		NUT, hex	8			model 25A202	4
4	555456	PLUG, 1/16 NPT	2			model 24R127	2
5	558801	FITTING, elbow 1/8 NPT X 6mm tube	1			model 258347	4
6		SCREW, 1/4-20 X.625 hex hd cap	4			model 258301	6
7		SCREW, 1/4-20 X.750	2	563132	BLOCK, Spindl-Gard, 0.0050 model 258295	model 24V531	2
8		SCREW, 1/4-20 X 2.25 soc hd cap	2			model 24H681	8
9		WASHER, lock	8	30	563940	KIT, repair, tie rod, SG-2 (models 24B219, 258295, 24R127, 24V204)	1
10		WASHER, plain	2			model 24V204	2
11		O-RING, -008 BUNA-N 70 DURO	1	563941	KIT, repair, tie rod, SG-6 (model 258301 and 258347)		1
12		O-RING, -010 BUNA-N 70 DURO	1	564444	KIT, repair, tie rod, SG-3 (model 564445)		1
13		O-RING, -013 BUNA-N 70 DURO	1	15U854	KIT, repair, tie rod, SG4, model 25A202 and 25A209)		1
14		O-RING, ARP-4 BUNA-N 90 DURO	1	15U855	KIT, repair, tie rod, SG-5		1
15		INSERT, brass, 6mm tube	2	15U856	KIT, repair, tie rod, SG-8, model 24V531, 24H681		1
17▲	558707	LABEL, warning air adj scr	1	33	555991	LABEL, serial number	1
19	16D893	BASE, Spindl-Gard	1				
20		CLAMP, strain relief	1				
21		CONNECTOR, tap, splice wire 22-16 AWG (not shown)	2				
22	558900	REGULATOR, assy psi switch spindl	1				
23	557324	CLIP, half 1/4 tube stl	2				
24		PLUG, dryseal 1/8 NPTF	2				
25	563489	ELEMENT, filter integral 10 MIC	1				
26	561031	BLOCK, inlet Spindl-Gard	1				
27	561032	BLOCK, outlet Spindl-Gard	1				

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

Technical Data

High Speed Spindl-Gard™ Lubrication System with Electric Pump		
	US	Metric
Pump Output	8.5 in ³ / min.	140 cm ³ /min
Motor Power		1/18 hp
Pressure Relief Setting	350 psi	3.4 MPa, 34 bar
Output Block Regulator	30 - 60 psi	0.207 - 0.414 MPa, 2.07 - 4.14 bar
Lubricant	Oils up to 2500 SUS (ISO 460)	
Seals Used	Buna-N	
Plastic Reservoir	0.8 gal. (3 Liter)	
Low Level	NC (held open) 115/230 VAC, 10 watt load	
Controls Option		
Remote (External Control or Customer PLC)	115 VAC, 230 VAC, 1 Ph, 50/60 Hz, 24 VDC	
*AC Timer	115 VAC, 230 VAC, 1 Ph 50/60 Hz	
Work (On) Time	5 - 20 seconds	
Pause (Off) Time	2.5 - 20 minutes	
Air Cleanliness Requirements	5 micron 40°F Dew point	5 micron 4°C Dew point
Operating Temperature	40°F - 120°F	4°C - 49°C
Lube Output	0.0015, 0.0030, and 0.005 inch ³ per cycle	0.025, 0.049, and 0.082 cm ³ per cycle
Pressure Switch Set Points		
Air (N.C.)	25 psi nonadjustable	0.17 MPa, 1.7 bar nonadjustable
Oil (N.O)	320 psi nonadjustable	2.2 MPa, 22 bar nonadjustable
Nozzles		
Tube ID/Orifice Ratio		
Delivery Tube Length Required		
Minimum	24 inches	0.6 mm
Maximum	50 feet	15.24 m
Lubrication Filtration Requirements	Filter to a minimum level recommended by the Society of Automotive Engineers (SAE) which corresponds to the ISO Standard 4406 ratings/specifications of ISO 18/14.	

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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Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

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Phone: 612-623-6928 **or Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

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For patent information, see www.graco.com/patents

Original instructions. This manual contains English. MM 313444

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