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**⚠ WARNING**

The measuring valve assembly is charged to 2000 PSI with hydraulic fluid and must not be disassembled. Do not open the hydraulic dump valve or remove the charge check valve (see Illus.). Doing so may result in serious injury and make the spray unit inoperable.

**SAFETY**

Read and carefully observe these operating instructions before unpacking and operating this Airless Spray System. The Airless Spray System must be operated, maintained and repaired exclusively by persons familiar with the operating instructions. Local safety regulations regarding installation, operation and maintenance must be followed.

Operate this Airless Spray System only after safety instructions and this service manual are fully understood.

**⚠ WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**⚠ CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**Safety Instructions**

This equipment generates very high grease pressure. Extreme caution should be used when operating this equipment as material leaks from loose or ruptured components can inject fluid through the skin and into the body causing serious bodily injury. Stay clear of the spray nozzle as material discharged from the nozzle tip can also inject fluid through the skin and into the body causing serious bodily injury. Adequate protection is recommended to prevent splashing of material onto the skin or into the eyes.

**DESCRIPTION**

**General Description**

This Hydraulic Spray Lubrication System consists of a measuring block with spray nozzle, accumulator (50), heating element (35) with thermostat (49) and pressure switch (48). The unit is installed into an NEMA 4 enclosure with waterproof connector for connection to controller.

**Appropriate Use**

The unit is exclusively designed to eject lubricant in a wide pattern onto an open gear, cam face or thread using appropriate lubricant. It should be charged with appropriate pumping equipment, not to exceed the maximum pressure rating per product specification.

The unit should be operated by a control which will stop the pump when the preset pressure is reached, as signaled by the pressure switch (48). The control must keep the solenoid valve (44) closed while pump is operating and stop the pump while the solenoid valve is open in order for a measured volume of the lubricant to be discharged. The controller must also provide a timing device to control the time the solenoid valve is open. This will limit the spray cycle to a period where the pressure is optimal to develop a full spray pattern, eliminating dribbling of the material as pressure decays to a point where there is insufficient pressure to develop an acceptable spray pattern.

The controller may also be used to synchronize timing of the spray with the movement of the part to be lubricated.

**⚠ WARNING**

Never mount the Spray Head in a position where the material spray can be directed at any person in the area of operation. Mounting above the work surface will keep any residual spray material on the work surface, after the spray cycle is completed.

**Product Specifications**

- Output per Cycle** - 1-2 in<sup>3</sup> (dependant on spray "ON" time)
- Inlet Pressure** - 3500 psi max. (recommended)
- Output Pressure** - 3500 psi max.
- Operating Temperature** - -10° to +150° F (-25° C to +65° C)
- Operating Voltage** - See Chart Below
- Initial Current** - See Chart Below
- Material Inlet (measuring valve)** - 1/2" 37 1/2° Flare Tube Connection
- Material Outlet (spray head)** - 11/16 - 16 Male
- Pressure Switch Setup** - 3,500 PSIG
- Pressure Switch Contacts** - 5 Amps @ 125/250 VAC
- Accumulator precharge** - 2,000 psig
- Weight**

**Model Specification**

Model	Operating Voltage	Solenoid Valve Initial Current	Heater Current
85418	115 VAC	.18 Amps	1.80 Amps

**OPERATION**

The pump charges the Measuring valve with lubricant to the preset pressure of 3,500 psig (240 bar). The Piston (30) of the measuring valve moves to the opposite end of the valve chamber displacing the hydraulic fluid inside the hydraulic accumulator. The volume of the nitrogen gas inside the accumulator compresses to the inlet pressure. The Internal Check (39) and the normally closed Solenoid Valve (44) hold the lubricant under pressure, ready to be ejected. A manual or automated signal opens the Solenoid Valve (44), the Piston (30) moves, pushing the lubricant out of the metering chamber. The pressurized lubricant is ejected

through the Spray Nozzle to the point of application. The pressure inside of the measuring valve drops and valve is ready to be charged with lubricant for the next cycle.

The Spray Nozzle is attached to the measuring valve. To maintain the best spray pattern, Lincoln Industrial does not recommend separating the Spray Nozzle from the valve.

**Temperature Control**

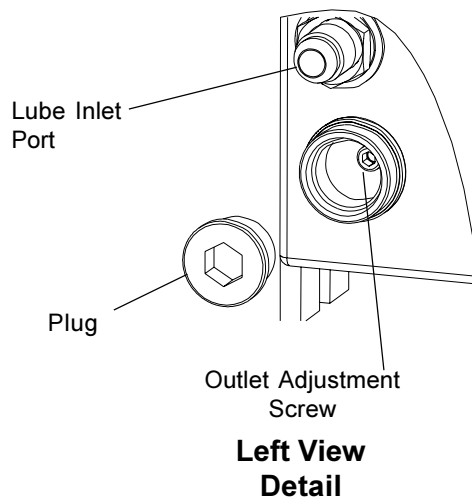
To maintain a consistent spray pattern, the Measuring Valve includes a Heating Element (35) and Thermostat (49). The Thermostat (49) is set at 120° to 150° F (+/-5° F) (49° - 66° C) and will maintain the temperature of the lubricant automatically.

**Output Adjustment**

The Output Adjustment should not be attempted on a unit which is charged with lubricant and ready to spray. To prepare unit for adjustment, disable the Pump, (preventing it from refilling the measuring valve). Electrically open the solenoid valve (46) to discharge the lubricant from the measuring valve assembly or turn system off after a spray cycle, before pump recharges system.

The output adjustment screw is accessible through a plugged opening below the lube inlet connection. The enclosure cover does not need to be removed to make adjustments. A deep well socket can be inserted through the access hole to loosen the output lock nut (23)

To adjust the lubricant output, loosen the Nut (23) and turn the Screw (22) using the 3/16" hex wrench. Each full turn of the output adjustment screw will change the output by .062 in<sup>3</sup>. Turning the Screw (22) into the valve will reduce the lubricant output. Lock the Nut (23) after adjustment has been made.



# Hydraulic Spray Lubrication System® Model 85418



## Spray Nozzle

The Spray Nozzle is not included with these models and must be selected depending on the lubricant to be applied and the desired spray pattern. Tungston carbide tips are recommended with all lubricants for best tip life.

Some lubricants will frequently clog the spray tips due to particulates in the lubricant. For these applications, Lincoln recommends that a Roto-Clean nozzle be used. The Roto-Clean Nozzle will allow the operator to clean the spray tip without the use of tools.

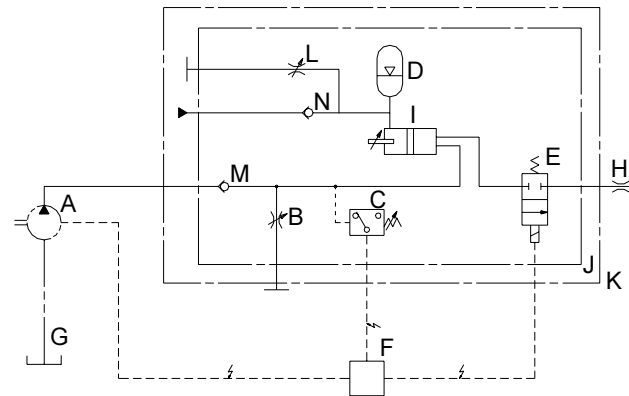
Well filtered lubricants and lubricants requiring large orifice sizes may be used with plain carbide tips.

Nozzle tip selection is dependant upon the material to be applied. Contact Lincoln Industrial for spray tip recommendations. In some cases, sample lubricants will have to be submitted to Lincoln for testing, along with specific application information.

## Spray System Configurations:

Single Spray System is used where the target surface can be covered with one spray tip.

Double Spray Systems are used when a single spray tip can not cover the target surface.



**Hydraulic Schematic**

## Legend

- |  |  |
|--|--|
| A. Lubricant Pump<br>(provided by customer). | G. Lubricant Reservoir<br>(Provided by customer) |
| B. Material Dump Valve                       | H. Spray Nozzle                                  |
| C. Pressure Switch                           | I. Adjustable Measuring Valve Body               |
| D. Accumulator                               | J. Heated Measuring Valve Body                   |
| E. 2-way Spray Solenoid                      | K. Enclosure                                     |
| F. Controller (Provided by Customer)         | L. Hydraulic Dump Valve                          |

## MOUNTING OF THE AIRLESS GEAR SPRAY

The unit may be mounted in any position. Use wiring diagram to connect measuring valve to the controller.

Select the mounting position of the unit that will maintain the specified distance from the tip of the nozzle to the point of lubrication to obtain the full spray pattern.

All tubing and supply hoses should be clean and free of rust, dirt and debris prior to connecting to the Hydraulic Spray System. Flushing the supply lines is recommended.

Lincoln Industrial recommends the use of filters in line with the supply line to keep dirt and large particles out of the Hydraulic Spray System.

## Electrical Connections and Controls

This hydraulic spray lubrication system uses Deutsch waterproof electrical connectors. Lincoln Model 256241 wiring harness is recommended for connection to spray control systems. One harness is required for each airless spray valve. Lincoln has 3 spray control systems available: Model 254120 for use on single or dual spray systems. Time between spray events is controlled by a timer in the controller. Model 254815 is for dual system control, only. Model 256228 is for single system control only. Both 254815 and 256228 require input from an external contact closure to initiate a lube cycle. There is no internal timer for initiating a lube event. All controllers have an alarm light and the ability to signal an external alarm.

**⚠ WARNING**

Make sure the area around the Spray Nozzle and work surface is clear. Keep hands or any other body part out of the Spray Nozzle path. Ensure that Spray Nozzle is securely mounted.

**⚠ WARNING**

Dirt or debris in spray nozzle can cause spray pattern to discharge in an unpredictable pattern even outside of the projected spray area. Keep clear of Spray Nozzle and keep distance between anyone and spray when operating.

## Purge the system of air:

With relatively short lubricant supply lines the Hydraulic Spray System can be purged by a repeated cycling of the system. With long supply lines it may be desirable to purge the supply lines before connecting them to the Hydraulic Spray System.

**⚠ WARNING**

In normal operation, the Spray Tip may become clogged with dirt or foreign matter and it will be necessary to clear the clog. If this happens, turn off the electrical power to the Spray System and disable or lockout the Spray System while servicing.

## MAINTENANCE AND REPAIR

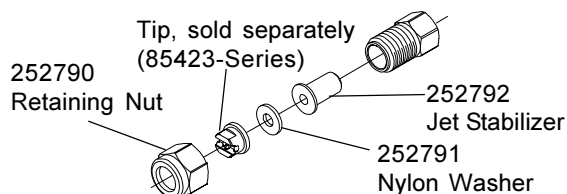
**⚠ WARNING**

Disable and lockout the Spray System while any adjustments are made.

## Clearing a Clogged Spray Tip and Tip Replacement

### 1. Standard Spray Tips

- Wear eye protection.
- Disable and lockout the spray system.
- Loosen the spray tip-retaining nut. Keep hands and fingers away from the spray tip. Residual pressure can remain behind a clogged spray tip.
- Remove the retaining nut, spray tip, nylon gasket and jet stabilizer (if present) and retain.
- Clean all components in a suitable solvent.
- Spray tip orifices maybe cleaned with a jet of compressed air. Stubborn particles can be dislodged with a stiff card or fine wire.
- Reinstall the cleaned or new tip and align the tip for the



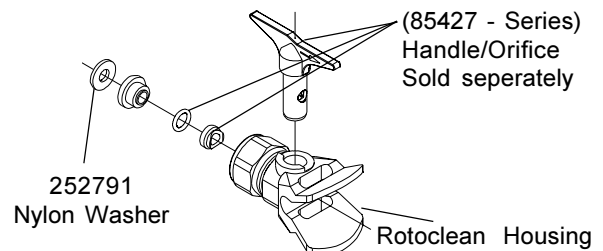
desired spray pattern before tightening the retaining nut.

### Standard Spray Tip

### 2. Rotoclean tips:

- Wear eye protection
- Disable and lockout the spray system.

- Rotate the Rotoclean handle/orifice so that the arrow points 180° from the desired direction of the spray.
- Activate the spray system and initiate one or two spray cycles. This action should force any dirt or foreign matter free of the orifice tip.
- Disable and lockout the spray system again.
- Rotate the handle/orifice so the arrow points in the desired direction of spray.



### Model 252831 Rotoclean Tip Assembly

- Reactivate the spray system.

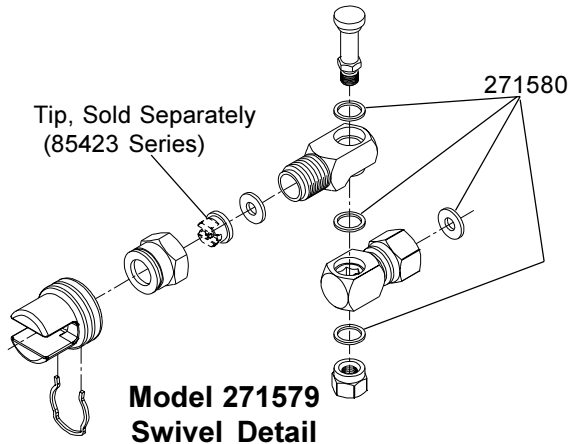
### Rotoclean tip replacement:

- Wear eye protection.
- Disable and lockout the spray system.
- Rotate the rotoclean handle/orifice so that the arrow points 180° from the desired direction of spray.
- Carefully pull the handle/orifice from the rotoclean housing. Some twisting may be required to aid in careful removal of the handle/orifice.
- Insert the new handle/orifice into the “Danger” message side of the Rotoclean housing. The handle arrow should be pointing away from the spray surface when inserting into the housing.
- Rotate the handle/orifice pointing the arrow towards the spray surface.
- Reactivate the spray system and check for proper operation and leaks.
- Should seals in the rotoclean require replacement, follow the detailed instructions packaged with the handle/orifice kits.

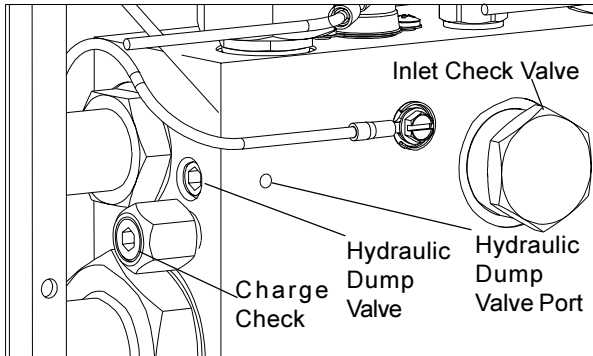
**Note:** Some lubricants may dryout on the spray tip after a day or more of dis-use. Lincoln Industrial recommends that the tips be removed and cleaned in a suitable solvent before placing the airless spray system back in service.

**⚠ WARNING**

Any service other than what is outlined above should be referred to qualified service personnel. The Hydraulic Circuit in the Measuring Valve utilizes an Accumulator which is under pressure at all times unless properly discharged as outlined below.



### System Discharge Procedure



Any maintenance or repairs to the Hydraulic Spray System, other than a change of spray tips or cleaning of the tips, will require that the system be discharged of any pressure before any components are removed. This procedure is done in two steps.

**⚠ WARNING**

The Hydraulic Spray System is always under pressure. Disconnecting all supply lines from the unit will not relieve the internal pressure within the measuring valve in the Hydraulic Spray System. Follow the discharge procedure exactly before any disassembly or service is attempted. Failure to heed this warning may result in severe personal injury or death. If these procedures are not followed, permanent damage to the spray system may result in rendering it inoperable.

### Discharge Procedure

#### 1. Discharging the lubricant pressure from the system:

- Disconnect or otherwise disable the pump to prevent it from starting.
- Remove the spray nozzle.
- Initiate a spray cycle and discharge the lubricant in the measuring valve. (If the Hydraulic Spray System is inoperable, the supply line pressure may be dissipated by carefully loosening the supply line at the bulkhead connection on the system enclosure no more than a turn or two, while rocking the supply line at the fitting. Continue rocking the supply line until all supply line pressure has been dissipated.)
- Proceed to System Discharge step 2.

#### 2. Discharging the Hydraulic Circuit

The hydraulic circuit within the Hydraulic Spray System must be discharged before any disassembly of the system is started. Do not remove any components from the Hydraulic Spray System until after this procedure has been completed and you are confident that all pressure has been removed, and then proceed with caution.

- Protect the eyes, and keep hands and fingers from the discharge path. A rag may be used to prevent splashing of oil within the enclosure.
- Open the hydraulic dump valve with a 3/16" Allen wrench, by slowly turning counterclockwise, no more than a few turns. Oil should begin to flow from the dump valve port.
- If oil does not flow from this port, consult Lincoln Industrial Technical Service for assistance.
- Do not attempt any disassembly until you are sure that all pressure has been dissipated from the hydraulic circuit.

### Removal of the Measuring Valve Assembly

1. Disconnect and lockout the electrical power to the Hydraulic Spray System.
2. Discharge the system following procedures 1 and 2.
3. Disconnect the lubricant supply line from the bulkhead fitting (8).
4. Disconnect electrical connections to the unit at connector (7).
5. Remove the spray nozzle from adapter (42).
6. Remove relief valve (55) from adapter (42).
7. Remove two lock nuts (14 & 15) from adapters (42 & 41).
8. Disconnect ground wire from connection point on inside wall of the enclosure (57).
9. Remove outside lock nut (14), washer (8), and sealing washer (13) from bulkhead adapter (4). Move inside locknut (14) towards measuring valve body.
10. Loosen two mounting bolts (5) and support the measuring valve with one hand, while removing both bolts with the other. The measuring valve may now be removed from the enclosure. Retain the two spacers (19) between the measuring valve body (53) and the enclosure wall (12).





## Measuring Valve Disassembly and Repair

Do not attempt any disassembly until you are sure that all pressure has been dissipated from the hydraulic circuit.

1. Disconnect and lockout power to the Hydraulic Spray System.
2. Discharge the Hydraulic Spray System per Discharge Procedures 1 & 2.
3. Remove the measuring valve assembly per the removal procedure above.
4. Remove set screw (33) and ball (34) from valve body.
5. Remove pipe plug (31) and check valve (32).
6. Remove accumulator (50) and adapter (52) from valve body.
7. Remove thermostat (49) by removing two screws(56).
8. Remove solenoid coil (46) by removing nut from stem of solenoid valve.
9. Remove pressure switch (48) by turning counterclockwise from valve body.
10. Loosen 6-32 set screw (36) and remove heating element from valve body. (A hole is provided to aid in the removal of the heating element, in the valve body opposite the heater.)
11. All electrical components may be set aside.
12. Remove set screw (22) and locknut (23) from adjustment housing (24).
13. Remove adjustment housing (24) from valve body (53).
14. Remove adjustment plunger (28) from adjustment housing (24).
15. Remove the piston (30) from the valve body (53). Blowing air from a blow gun into adapter (41) may assist piston removal.
16. Remove adapters (42) and (41).
17. Remove check valve (39).
18. Remove solenoid valve (44).


Clean all components, except for electrical components, in a suitable solvent. Check all components for damage or wear. The accumulator (50) has no serviceable components in side of it and no further disassembly should be attempted. Replacement accumulators are supplied pre-charged with nitrogen gas by Lincoln Industrial. Lincoln Industrial recommends that all seals be replaced prior to

reassembly. Seals should be properly lubricated at assembly. The measuring valve may be reassembled in the reverse order of disassembly. The heating element (35) should be evenly coated with Chromalox heat transfer and release coating #014293 or equivalent before inserting into valve body. Old heat release compound can be removed with a water dampened rag. All pipe threads should have Loctite 242 or equivalent applied at assembly. Proceed to Hydraulic Charging Procedure below.

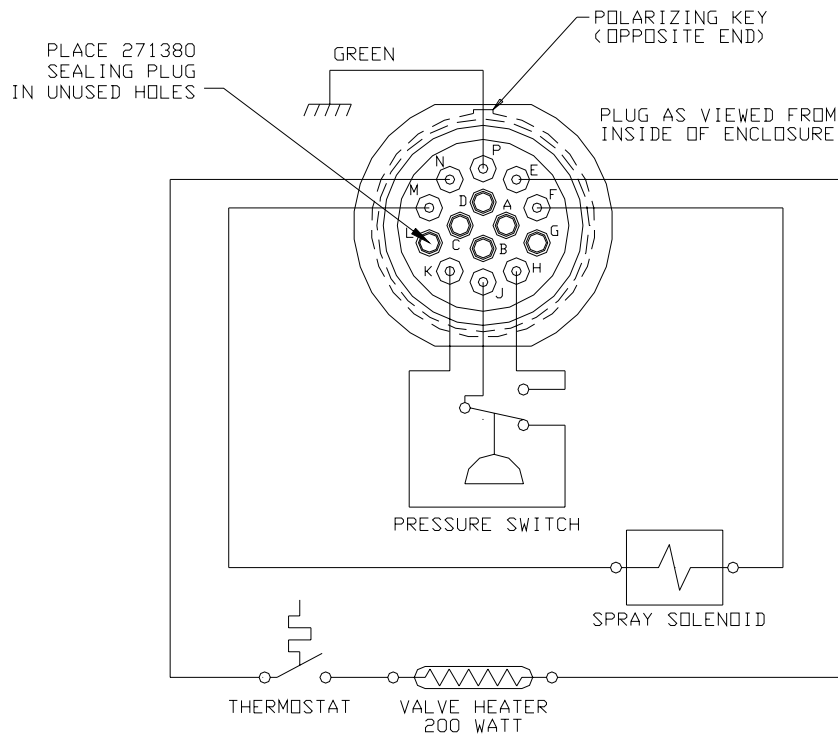
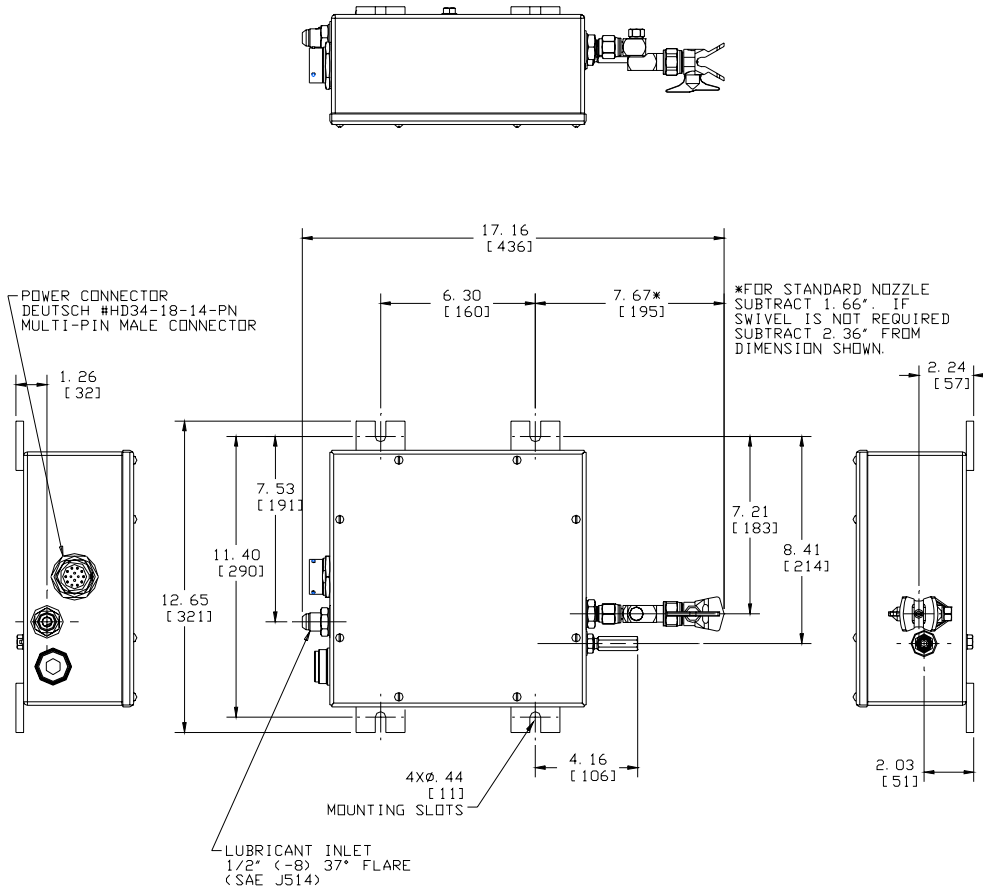
## Hydraulic Charging Procedure

A suitable hand operated pump, capable of developing 2000 PSI, with a pressure gage to monitor charging pressure is required for properly charging the hydraulic circuit of the measuring valve assembly. The Hydraulic Spray System will not operate properly unless properly charged prior to being placed in service.

1. Connect hand pump outlet with pressure gage to inlet (1/8 NPT) of check valve (32).
2. Hand pump reservoir must be filled with Dexron II automatic transmission fluid.
3. Be sure that the hydraulic dump valve (33) is open on the measuring valve body.
4. Operate the hand pump until oil, free of air, flows from the dump valve port on the side of the measuring valve body (53).
5. Close the dump valve by turning the setscrew (33) with a 3/16" Allen wrench clockwise and tighten by hand.
6. Continue to operate the hand pump, slowly, until a steady pressure of 2000 PSI is reached on the pressure gage.
7. Check for leaks around the hydraulic dump valve port.
8. Disconnect the hand pump from the check valve (33) and plug the check valve inlet with pipe plug (31). The pipe plug should have loctite 242 or equivalent applied to the threads prior to insertion.
9. Install the measuring valve assembly into the enclosure in the reverse order of disassembly.

 <b>WARNING</b>
The accumulator is charged with Nitrogen gas to 1,500 PSI. Any attempt to discharge without proper equipment can be hazardous. Do not remove protective plastic cap.
Do not attempt to open service valve on top of accumulator.

# Hydraulic Spray Lubrication System® Model 85418





Hydraulic Spray Lubrication System®  
Model 85418

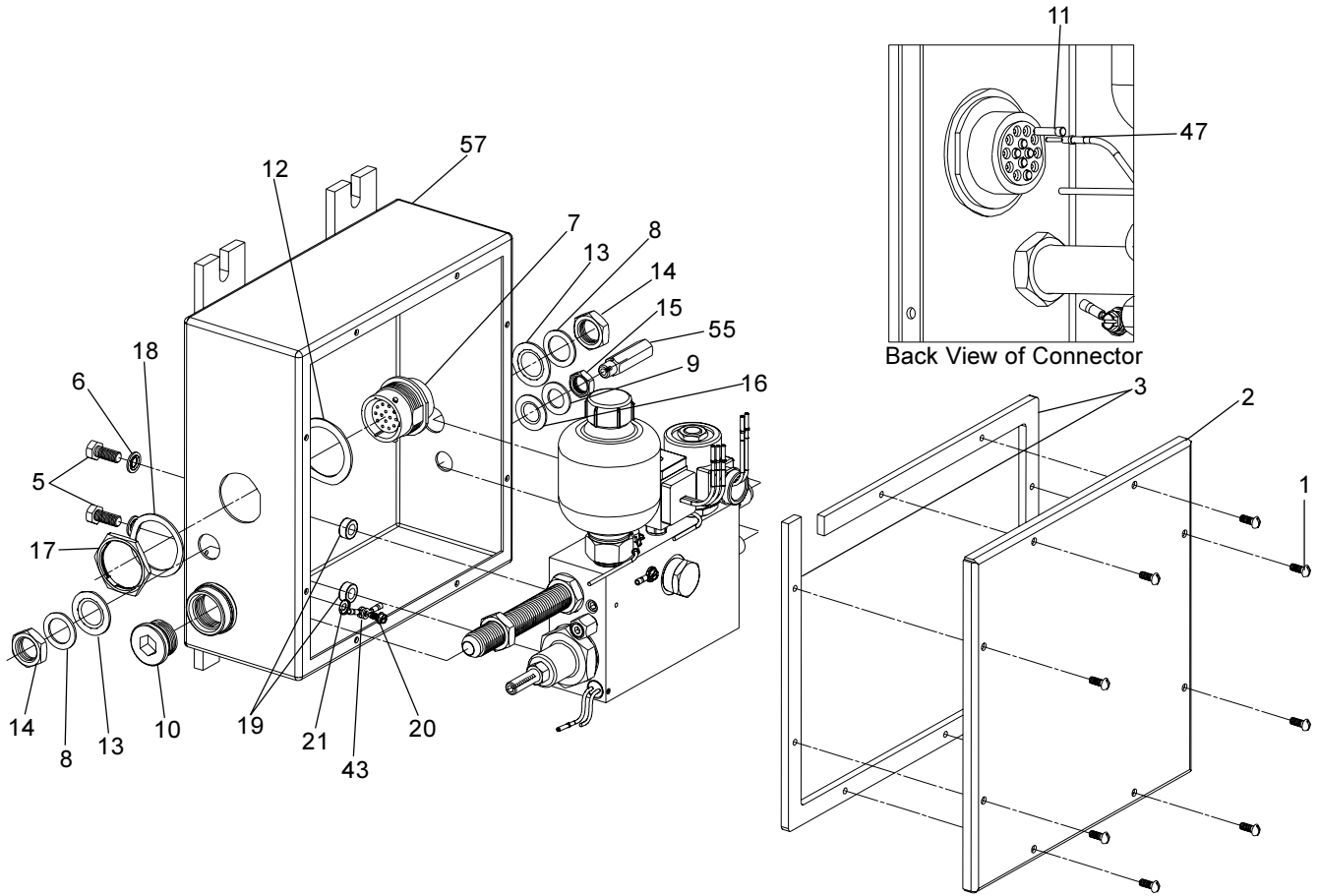


Illustration #2

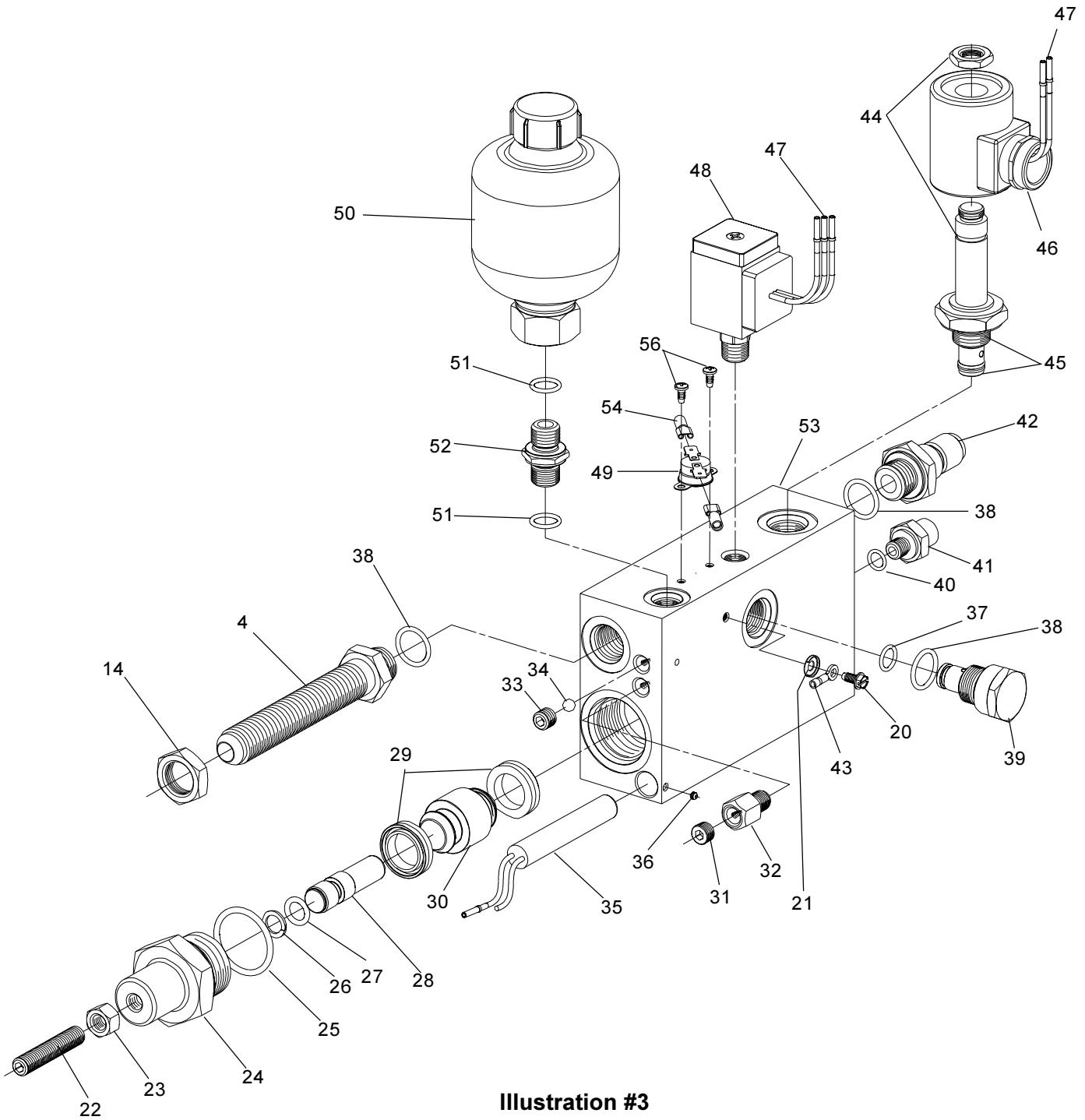


Illustration #3

**Hydraulic Spray Lubrication System®  
Model 85418**



**Service Parts**

Item No.	Qty.	Description	Part No.	Item No.	Qty.	Description	Part No.
1	8	10-32 x 1/2 Tapping Screw	270871	30	1	Piston	252764
2	1	Enclosure Cover Ass'y (Includes Item 3)	271387	31	1	Pipe Plug (1/8 NPT)	68645
3	2	Enclosure Gasket	271570	32	1	Check Valve	130021-3
4	1	Bulkhead Adapter	271564	33	1	Set Screw 3/8 - 16 x 3/8"	50506
5	2	Hex Head Cap Screw 5/16 -18 x 3/4"	50016	34	1	Ball	66003
6	2	Washer/Seal (Nitrile)	270874	35	1	Heater (115 VAC)	252812
7	1	Multi-Pin Socket	270875	36	1	Set Screw 6-32 x 1/8"	50535
8	2	Washer	48265	37	1	O-Ring (Nitrile)	Note 1
9	10	Washer	48575	38	2	O-Ring (Nitrile)	Note 1
10	2	Plug (SAE-12)	271563	39	1	Check Assembly (includes items 37 & 38)	252810
11	1	Plug	271380	40	1	O-Ring (Nitrile)	Note 1
12	1	Gasket	270888	41	1	Relief Adapter	270893
13	2	Washer/Seal (Nitrile)	270883	42	1	Tip Adapter	270802
14	2	Bulk Head Lock Nut	270884	43	3	Ring Terminal	324059
15	1	Nut, Jam	13850	44	1	Solenoid Valve	252822
16	1	Washer/Seal (Nitrile)	270886	45	1	Seal Kit (Solenoid Valve)	270899
17	1	Locknut	270887	46	1	Solenoid Coil (Includes Item 47) (115 VAC)	270904
18	1	Lockwasher	270888	47	8	Receptical Terminal	271378
19	2	Spacer	13275	48	1	Pressure Switch (Includes Item 47)	270905
20	2	Ground Screw	324100	49	1	Thermostat	271384
21	2	Ground Washer	324055	50	1	Accumulator	252811
22	1	3/8 - 16 x 2" Set Screw	270889	51	2	O-Ring (Nitrile)	Note 1
23	1	3/8 - 16 UNC Hex Nut	51005	52	1	Union	252775
24	1	Adjustment Housing	270901	53	1	Measuring Valve Body (Aluminum)	270898
25	1	O-Ring (Nitrile)	Note 1	54	2	Spade Terminal	252826
26	1	Back-up Ring (Teflon)	Note 1	55	1	Safety Unloader	80045
27	1	O-Ring (Polyurethane)	Note 1	56	2	#6-32 x Screw	50632
28	1	Adjustment Plunger	270891	57	1	Enclosure	271569
29	2	U-Cup Piston Seal (Polyurethane)	Note 1		1	Seal Kit	270900

Note 1: Soft Seal Kit 270900 includes all items indicated with Note 1. Solenoid Valve Seals are not included in this kit.

# Hydraulic Spray Lubrication System® Model 85418



## Troubleshooting

Symptom	Possible Cause	Remedy
Airless spray system will not dispense lubricant	No electrical power	Turn on power.
	Clogged spray tip.	Clear clogged tip.
	Pump out of lubricant.	Fill reservoir.
	Pump failure.	Repair pump.
	Defective solenoid spray valve.	Repair or replace solenoid valve.
	Defective pressure switch.	Replace pressure switch.
Continuous lubricant flow out of spray head.	Damaged seals on solenoid spray valve.	Replace seals on solenoid valve.
	Worn or defective spray solenoid valve.	Repair or replace solenoid valve.
	Electrical Defect	Repair electrical problem.
Spray pattern too narrow or solid stream. (Some variation in pattern is normal, fluxuating within thermostat temperature range.)	Wrong spray tip for lubricant in use.	Select spray tip better suited for lubricant in use.
	Worn or damaged spray tip.	Replace spray tip.
	Tip partially clogged.	Clear clogged tip.
	Low pressure.	Adjust pressure switch for 3500 PSI.
	Lubricant is too cold.	Check heater system or system was not allowed to warm up.
	Wrong lubricant in system.	Replace lubricant in reservoir and purge.
	Distance between spray head and work surface too short.	Reposition spray head.
Spray pattern too wide. (Some variation in pattern is normal, fluxuating within thermostat temperature range.)	Wrong spray tip for lubricant in use.	Select spray tip better suited for lubricant in use.
	Clogged spray tip.	Clear clogged tip.
	Damaged spray tip.	Replace spray tip.
	Wrong lubricant in system.	Replace lubricant in reservoir and purge.
	High pressure.	Adjust pressure switch for 3500 PSI.
Poor spray pattern; lubricant dispenses in solid stream or balls up around spray tip.	Wrong lubricant in system.	Replace lubricant in reservoir and purge.
	Low pressure.	Adjust pressure switch for 3500 PSI.
	Lubricant is too cold.	Check heater system or system was not allowed to warm up.
	Lubricant too tacky to spray.	Replace lubricant in reservoir and purge.
	Measuring valve has lost hydraulic charge or is damaged.	Repair measuring valve assembly.
	Defective accumulator.	Repair measuring valve assembly.
Spray does not deliver full output.	Spray valve "On" time set too short.	Correctly set spray valve "On" time.
	Output volume too low.	Adjust output volume setting for more output.
Spray delivers full output then drips lubricant before stopping.	Spray valve "On" time set too long.	Correctly set spray valve "On" time.
	Worn or damaged spray solenoid valve.	Repair or replace solenoid valve.
Spray valve spits or starts to spray lubricant before lube cycle is initiated.	Worn or damaged spray solenoid valve.	Repair or replace solenoid valve.

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