



MULTI-LINE INSTALLATION RECORD - XGS

Vehicle Type
 Customer
 Pump No

Voltage
 Timer Settings

PUMP CALIBRATION SYSTEM

Unit No.	Bearing Lubricated	Col. Code	Cal cc.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

Unit No.	Bearing Lubricated	Col. Code	Cal cc.
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
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Installed by Date

XGS

SERVICE & MAINTENANCE MANUAL

for

INTERLUBE

CHASSIS LUBRICATION SYSTEM

MANUAL

SAFETY

As with all equipment, all due care must be used when servicing the XGS chassis lubrication system.

Throughout this manual there will be information provided which requires special attention. This information will be displayed under the headings of **WARNING**, **CAUTION**, or **NOTE**.

WARNING

Information given about a situation that can cause significant damage to the machine or injury to personnel.

CAUTION

Information given about a situation that can cause damage to the machine.

NOTE

Information special interest

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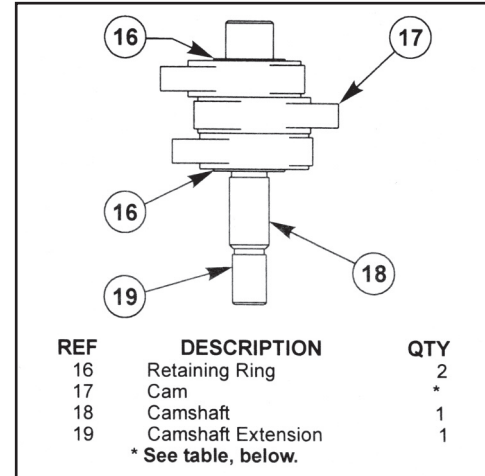
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Camshaft Assembly



Part No.	Description
XGS/SP14/1	12 port pump camshaft
XGS/SP14/2	24 port pump camshaft
XGS/SP14/3	36 port pump camshaft
XGS/SP14/4	48 port pump camshaft
XGS/SP14/5	60 port pump camshaft
XGS/SP14/6	72 port pump camshaft
XGS/SP14/7	84 port pump camshaft

Controller

Part No.	Description
AF17472/12V	12 VDC
AF17472/24V	24 VDC

Controller Spare Parts

Part No.	Description
AF1747/SP1	Controller Lid Assembly
23781-071	Solenoid Valve – 12 VDC
23781-072	Solenoid Valve – 24 VDC
25487-020	Air Fitting

Injectors

Part No.	Description
XGS/SP9	Paddle assembly
XGS/SP12/P	Top cap assembly
XGS/SP19	Roller clutch for 9.6mm shaft (XGS/SP1 cover)
XGS/SP20	Roller clutch for 9.52mm shaft (XGS/SP15 cover)

Fittings

ELBOW CONNECTORS

Elbows	
Part Number	Thread Size
PM90412	1/8 PTF SAE
PM90484	1/4-28UNF
PM90485	5/16-24UNF
PM90487	1/8 BSPT
PM90489	M6X1P
PM90490	M8X1P
PM90491	M8X1,25P
PM90492	M10X1P
PM90493	M10X1,5P



STRAIGHT CONNECTORS

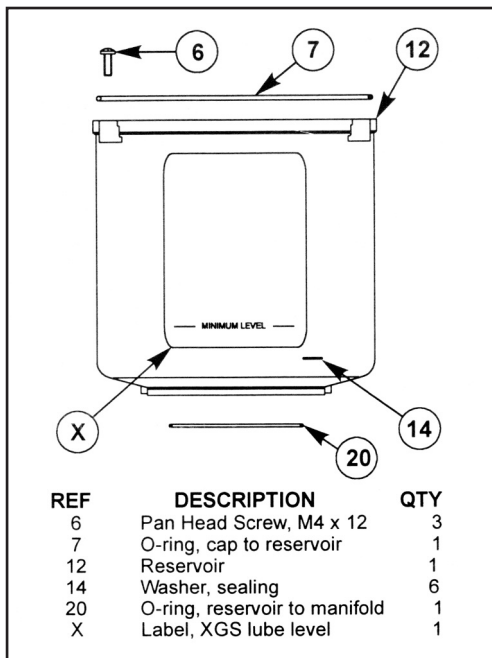
Straight Connectors	
Part Number	Thread Size
PM80412	1/8 PTF SAE
PM80484	1/4-28UNF
PM80485	5/16-24UNF
PM80487	1/8 BSPT
PM80489	M6X1P
PM80490	M8X1P
PM80491	M8X1,25P
PM80492	M10X1P
PM80493	M10X1,5P
25478-056	4mm to 4mm

ACCESSORIES

152823/254mm OD soft grease filled tube x 25M
 152823/504mm OD soft grease filled tube x 50M
 152821/254mm OD Heavy grease filled tube x 25M
 27233-507Cable ties

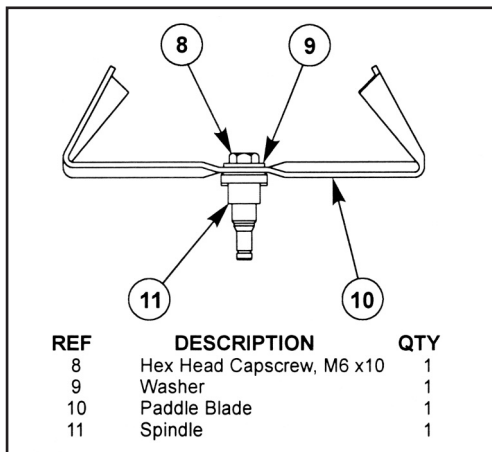
OA50397/1 2 off Numbered sleeves 1 – 12
 OA50397/2 2 off Numbered sleeves 1 – 24
 OA50397/3 2 off Numbered sleeves 1 – 36
 OA50397/4 2 off Numbered sleeves 1 – 48
 OA50397/5 2 off Numbered sleeves 1 – 60

Reservoir Assembly



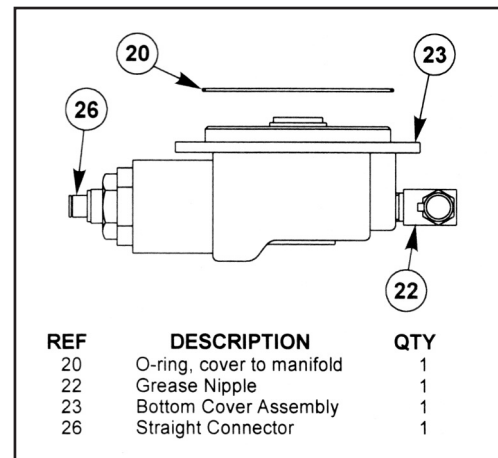
Part No.	Description
XGS/SP5/P	Reservoir Assembly
XGS/SP21/P	Reservoir & Lid Assembly for old CAB reservoirs

Reservoir Paddle Assembly



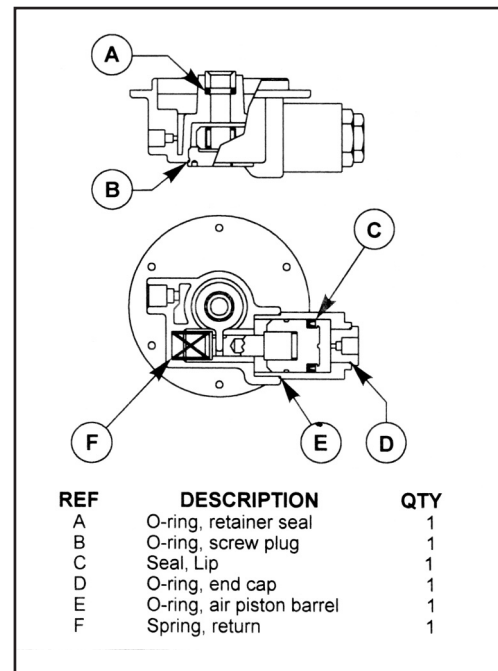
Part No.	Description
XGS/SP9	Reservoir Paddle Assembly

Bottom Cover Assembly - Pneumatic



Part No.	Description
XGS/SP15	Bottom Cover Assembly

Bottom Cover Repair Kit



Part No.	Description
XGS/SP15/RK	Reservoir Cover Repair Kit

1. INTRODUCTION

This manual gives instructions for operating, maintaining, and servicing the Interlube XGS chassis lubrication system. Because of the importance of providing the correct lubricant amount to the moving parts of the equipment, read this manual to become familiar with your XGS lubrication system.

Review and follow the procedures given before attempting maintenance or service. Illustrations are provided to aid in disassembly and reassembly.

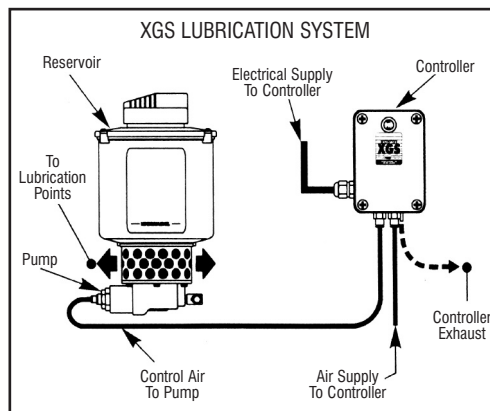
If there are questions not answered by this manual, contact your Interlube distributor, dealer, or Interlube Systems Ltd direct.

2. GENERAL DESCRIPTION

A typical XGS lubrication system includes the following components:

- Pump with integral reservoir
- Lubricant injectors
- Tubing to the lubrication points
- Fittings at the lubrication points
- Programmable controller

FIG 1 - XGS System Components



The XGS pump has a radial manifold ranging from 12 to 84 ports, depending on the model. Each port can be fitted with a positive displacement lubricant injector. Each lubricant injector is dedicated to a single lubrication point.

The lubricant injector is connected to the lube point with tubing and a tube connector. Numbered sleeves are placed on the tubing at both the lubricant injector and lube point to ensure accurate installation and identification.

NOTE

Throughout this manual, whenever part names are used, there will be a number following it in parenthesis, i.e., reservoir paddle (10). The number is the reference used in section 7, Figure 8.

Six different lubricant injector output capacities are available to match the lube point volume requirements. Lubricant injectors are colour coded for easy identification. Unused pump manifold ports are plugged.

The XGS pump is equipped with one or more cams (17) that operate the lubricant injectors as the cams(s) are indexed. The camshaft (18) is indexed by the rotary clutch located in the bottom cover assembly (23).

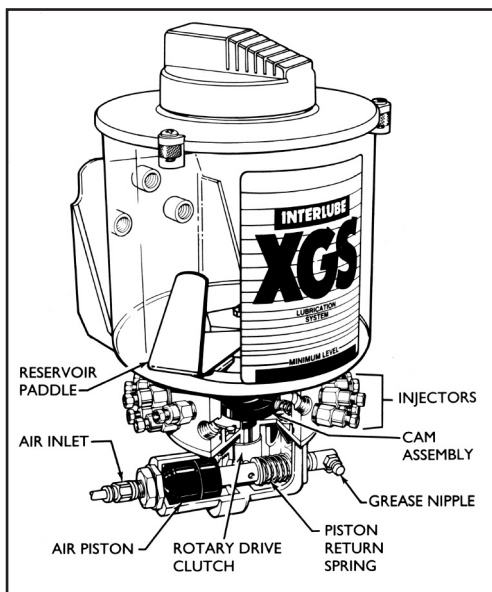
3. COMPONENT OPERATION

3.1 XGS Pump Operation

The XGS reservoir (12) is filled through the grease nipple (22) on the bottom cover (23). During the controller ON interval, air from the controller flows through the air inlet and shuttles the air piston forward. When the air piston moves forward, the rotary drive clutch assembly is engaged and it indexes the cam assembly.

The cam assembly consists of one or more cams (17) in an offset configuration, with each cam (17) dedicated to a row of lubricant injectors. As the cam assembly is indexed, the cam lobe actuates the injectors and lubricant is dispensed.

FIG 2 - XGS Pump Assembly



The reservoir paddle (10) is also indexed by the cam assembly. Paddle (10) rotation ensures positive lubricant flow to the lubricant injectors.

When the controller ON time expires, air to the pump is shut off and exhausted thru the controller exhaust port. The return spring shuttles the air piston back, the rotary clutch is disengaged, and the controller OFF interval begins.

When the controller OFF time expires, the above sequence is repeated. It takes 15 ON-OFF pulses to complete one revolution of the cam shaft (18). Each lubricant injector is actuated by its cam (17) only once per 360° revolution.

3.1.1. Filling The Reservoir

Depending on the application, consult with your lubricant vendor or the authorised Interlube distributor for a lubricant suitable for the application. Refer to TECHNICAL DATA for a guide to lubricant selection.

The initial reservoir fill must be through the grease nipple (22) on the pump body (23). This is to ensure against any air pockets in the reservoir.

NOTE

Be certain to wipe the nipple (22) clean before filling. Place the dirt cap back on the lubricant nipple (22) after any service procedures.

Subsequent refilling of the reservoir (12) should be done through the grease nipple (22) to minimise any contaminates from entering the reservoir.

CAUTION

Do not overfill the reservoir (12). Fill only to within 13mm of the top of the reservoir (12).

CAUTION

If the reservoir (12) must be filled through the reservoir cap moulding (5) with Fluid Grease, be certain the cap (1) is secured to the reservoir cap moulding (5) when finished. Take care to prevent air pockets in the reservoir.

CAUTION

Stored lubricants must be sealed and properly kept to remain free of contaminates.

3.2 Controller Operation

The controller primarily consists of a solid state circuit board for timing and a 2-position, 3-way, normally closed solenoid valve. These are mounted in a durable, weatherproof enclosure.

During automatic operation, the timing sequence consists of **ON** and **OFF** durations that are programmed through the circuit board. The controller initiates an **ON** duration when either the **OFF** duration has elapsed; or when power is initially supplied; or when the **Manual Override** button will cycle the solenoid valve **ON** and **OFF** twenty times.

During the **ON** duration, the solenoid valve is opened, allowing compressed air to flow to the pump. At the end of the **ON** duration, the solenoid valve shuts off air to the pump and the air line is exhausted thru the controller exhaust port.

7.5.4 Loosen each injector to allow the cams (17) enough clearance to easily remove the cam assembly.

CAUTION

If the injectors must be removed from the manifold (21), be certain to mark the location for each one. Place the injectors in a clean container to prevent contamination.

7.5.5 Remove the cam assembly from the manifold (21). Wipe all components clean.

7.5.6 Insert the new cam assembly through the manifold (21) and onto the bottom of the reservoir (12).

CAUTION

Be certain the new cam assembly has the same number of cams (17) as the old one.

7.5.7 Refer to 7.3, above, and install the reservoir paddle assembly.

NOTE

After the reservoir paddle assembly is installed, and any loosened injectors have been tightened, you should be able to turn the reservoir paddle (10) in a CCW rotation without excessive force. If the paddle will not rotate, check the cams (17) and injectors for any misalignment.

7.5.8 Refer to 7.1, above, and install the reservoir lid assembly.

7.5.9 Refer to 7.2, above, and install the bottom cover (23).

7.5.10 Use the three XGS mounting bracket bolts to mount the XGS pump assembly. Torque to 22Nm. Do not over tighten the bolts.

7.5.11 Reconnect the control air line to the fitting (26) in the bottom cover (23).

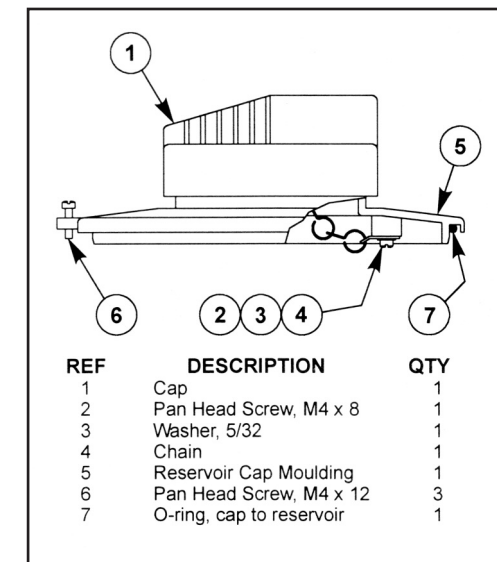
8.0 REPLACEMENT PUMPS AND SERVICE PARTS

Contact your local Interlube XGS distributor for parts and accessories for your XGS lubrication system. Be certain to have all installation record information available to ensure ordering the correct replacement parts.

Replacement Pump with Reservoir

Part No.	Description
XGS4012	12 outlet pump
XGS4024	24 outlet pump
XGS4036	36 outlet pump
XGS4048	48 outlet pump
XGS4060	60 outlet pump
XGS4072	72 outlet pump
XGS4084	84 outlet pump

Reservoir Cap Assembly



Part No.	Description
XGS/SP12/P	Reservoir Cap Assembly

7.2.7 Install the five head screws (25) and lockwashers (24). Torque to 1.4Nm. Do not over-tighten the screws (25).

7.2.8 Reconnect the control air line to the fitting (26) in the bottom cover (23).

7.3 Reservoir Paddle Assembly Replacement

7.3.1 Refer to 7.1, above, and remove the reservoir lid assembly. Remove the lubricant from the reservoir (12).

7.3.2 Turn the paddle (10) in a CCW rotation. The paddle assembly-bolt (8), washer (9), paddle (10), and spindle (11) – will come out as a unit.

NOTE

The camshaft (18) must be secured to prevent rotation.

CAUTION

Be careful not to move the camshaft (18) when removing the paddle assembly.

7.3.3 Carefully wipe the reservoir (12) and reservoir lid moulding (5) clean.

7.3.4 Install the new paddle assembly – bolt (8), washer (9), paddle (10), and spindle (11) – into the reservoir (12), turning in a CW rotation. Torque the bolt (8) to 7Nm. Do not over-tighten the bolt.

7.3.5 Refer to 7.1, above, and install the reservoir lid assembly.

7.3.6 Reconnect the control air line to the fitting (26) in the bottom cover (23).

7.4 Reservoir Replacement

7.4.1 Refer to 7.1, above, and remove the reservoir lid assembly. Remove the lubricant from the reservoir (12).

7.4.2 Refer to 7.3, above, and remove the reservoir paddle assembly.

7.4.3 Remove the six screws (13) and washers (14) from the bottom of the reservoir (12). Discard the old washers (14).

7.4.4 Carefully remove the reservoir (12) from the manifold (21). The mounting bracket (15) and O-ring (20) must be separated from the reservoir (12) and manifold (21). Discard the reservoir (12) and O-ring (20).

7.4.5 Carefully remove any old lubricant from the lid moulding (5). Wipe the manifold (21) and XGS mounting bracket (15) clean.

7.4.6 Set the reservoir (12) on the mounting bracket (15). Install the O-ring (20) onto the flange of the reservoir (12). Align the mounting holes.

7.4.7 Carefully install the reservoir / bracket / O-ring (12, 15, 20) onto the manifold (21). Align the mounting holes of all three pieces.

7.4.8 Install the six new washers (14) and screws (13). Torque to 0.7Nm. Do not over-tighten the screws (13).

7.4.9 Refer to 7.3, above, and install the reservoir paddle assembly.

7.4.10 Refer to 7.1, above, and install the reservoir lid assembly.

7.4.11 Reconnect the control air line to the fitting (26) in the bottom cover (23).

7.5 Cam Assembly Replacement

7.5.1 Refer to 7.1, above, and remove the reservoir lid assembly. Remove the lubricant from the reservoir (12).

7.5.2 Refer to 7.2, above, and remove the bottom cover (23).

7.5.3 Refer to 7.3, above, and remove the reservoir paddle assembly.

FIG 3 - XGS Controller

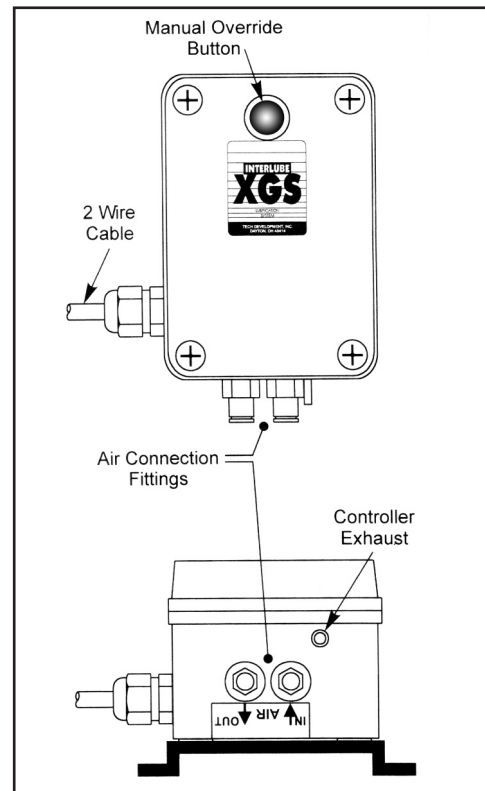
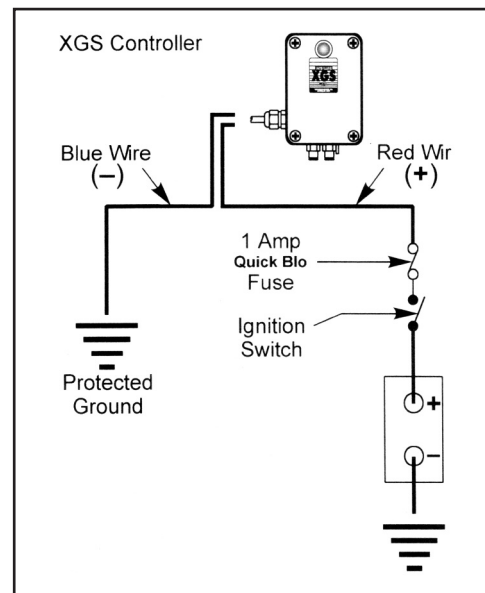


FIG 4 - Controller Wiring Schematic



Lubricant injector capacity and cycle time setting determine the quantity of lubricant fed to individual lubricant points.

To ensure consistent lubrication, the XGS controller must be wired to receive power whenever the vehicle is in operation.

3.3 Programming The XGS Controller

The pump cycle time is the amount of time, in minutes, it takes to make one (1) complete revolution of the cam shaft. This is also the time between one injector cycle. The timer cycle is the amount of time, in seconds, for one ON – OFF cycle.

Cycle settings are selected through the combination of the six dip switches located on the circuit board, inside of the XGS controller enclosure.

3.3.1 Programming Information

To select the pump cycle time, refer to the chart below. This chart is located inside the XGS controller enclosure.

FIG 5 - Cycle Time Settings

TIMER CYCLE SECS.	SWITCH POSITIONS ON						PUMP CYCLE MINS.
	1	2	3	4	5	6	
18	■	■	■	■	■	■	4.5
30	■	■	■	■	■	■	7.5
42	■	■	■	■	■	■	10.5
52	■	■	■	■	■	■	13
62	■	■	■	■	■	■	15.5
72	■	■	■	■	■	■	18
83	■	■	■	■	■	■	21
94	■	■	■	■	■	■	24
105	■	■	■	■	■	■	27
120	■	■	■	■	■	■	30
132	■	■	■	■	■	■	33
144	■	■	■	■	■	■	36

MANUAL OVERRIDE

Press and release the manual override for 20 cycles of 2 seconds.

CAUTION

Lubrication cycle times affect the amount of lubricant metered to the lubrication point. Serious damage to the equipment can result from incorrect cycle settings.

3.3.2 Programming Guidelines

The following table lists guidelines for XGS controller settings. These are suggested settings only. Calculations within individual applications will help to determine cycle time settings.

PUMP CYCLE MINS	APPLICATION
4.5 thru 18	Off-highway equipment
10.5 thru 27	Over-the-road vehicles with start-stop, heavy salt, snow and ice, rough pavement, wet climate, heavy loads, dusty roads.
18 thru 36	Over-the-road vehicles with normal city or highway driving, mild climate, moderate loads.

3.3.3 Setting The Cycle Time

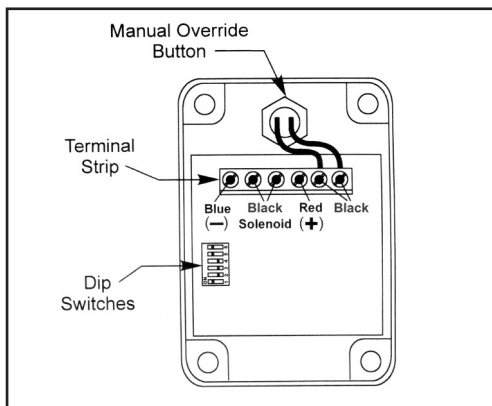
1. Use a Phillips head screwdriver to loosen the four XGS controller lid retainer screws.
2. Carefully lift off the XGS controller lid.

CAUTION

There is wiring connected from the terminal strip in the lid to the solenoid in the controller housing. Take care not to damage the cover seal.

3. Select the correct cycle time setting as shown in Figure 5.
4. Set the dip switches to the correct positions.

FIG 6 - Dip Switch Location in Controller Lid



5. Replace the XGS controller lid and tighten the four (4) retainer screws.

CAUTION

After setting cycle time, make certain the lid is fastened securely to prevent moisture leakage around the lip.
Take care not to damage the cover seal.

3.4 Lubricant Injector Operation

Each lubricant injector is a positive displacement device to meter lubricant to single lubrication point on the vehicle. The lubricant injector is calibrated to deliver a precise volume of lubricant each time it is actuated.

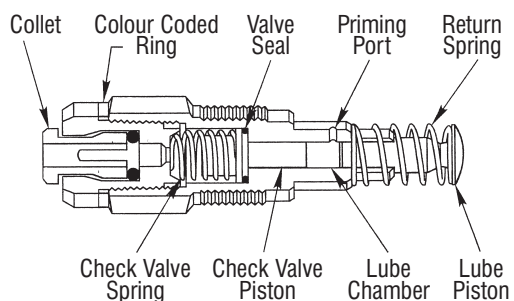
There is a colour-coded ring on the injector for ease of identifying output capacity.

Colour	Stroke output cc	For 4mm tube	For 3/16" tube	For 6mm tube
Red	0.010	78033	78043	78053
Green	0.015	78034	78043	78054
Yellow	0.025	78035	78045	78055
Blue	0.040	78036	78046	78056
Grey	0.060	78037	78047	78057
Black	0.100	78038	78048	78058

Blanking plug for unused outlets 34237-402



FIG 7 - Lubricant Injector Cutaway



Lubricant enters the lubricant injector through the priming port and fills the lube chamber. As the cam lobe (17) is indexed, the lube piston is pushed forward, sealing off the priming port. As the lubricant in the chamber is pressurised, the check valve piston is unseated, allowing the lubricant to flow through the outlet, on to the lubrication point.

6.0. Service Procedures

The rugged design and simple construction of the XGS lubrication system assures the operator of a long and trouble-free service life with the XGS. If service is necessary, use the following procedures to ensure proper disassembly and assembly of components.

Refer to *figure 8 – Exploded View* for the location of the components referenced in the following procedures. Refer to **REPLACEMENT PARTS** for kit ordering information.

Because of the critical nature of supplying clean lubricant to the lubrication points, the XGS must be serviced in a clean area, without potential of contamination.

CAUTION

At any time the XGS is disassembled for service, the exposed components should be cleaned and checked for wear or damage. **DO NOT USE ACETONE-BASED SOLVENTS TO CLEAN.** Use clean towels to wipe the surfaces clean of excess lubricant. Solvents will harm the reservoir.

WARNING

Unless otherwise noted, whenever servicing any XGS lubrication system component, remove compressed air and electrical power from the system at the nearest disconnects before beginning. Observe appropriate safety procedures to prevent any accidents while servicing the XGS system.

7.1. Lid Assembly Replacement

NOTE

If the XGS reservoir (12) is clean / in a clean area, the lid (5) may be replaced without powering down the system.

- 7.1.1 Use a screwdriver to remove the three pan head screws (6) from the reservoir lid (5).
- 7.1.2 Remove the lid assembly from the reservoir (12). Make certain the O-ring (7) is removed and discarded.

Carefully remove any old lubricant from the upper lip of the reservoir (12).

- 7.1.3 Place the new O-ring (7) in the lid (5).

- 7.1.4 Place the lid assembly on the reservoir (12) and align the mounting holes.

- 7.1.5 Install the three pan head screws (6). Torque to 0.7Nm. Do not over-tighten the screws (6).

7.2. Bottom Cover Assembly Replacement

- 7.2.1 Disconnect the air line from the fitting (26) in the bottom cover (23).

- 7.2.2 Place a pan underneath the pump assembly to catch any dripping grease.

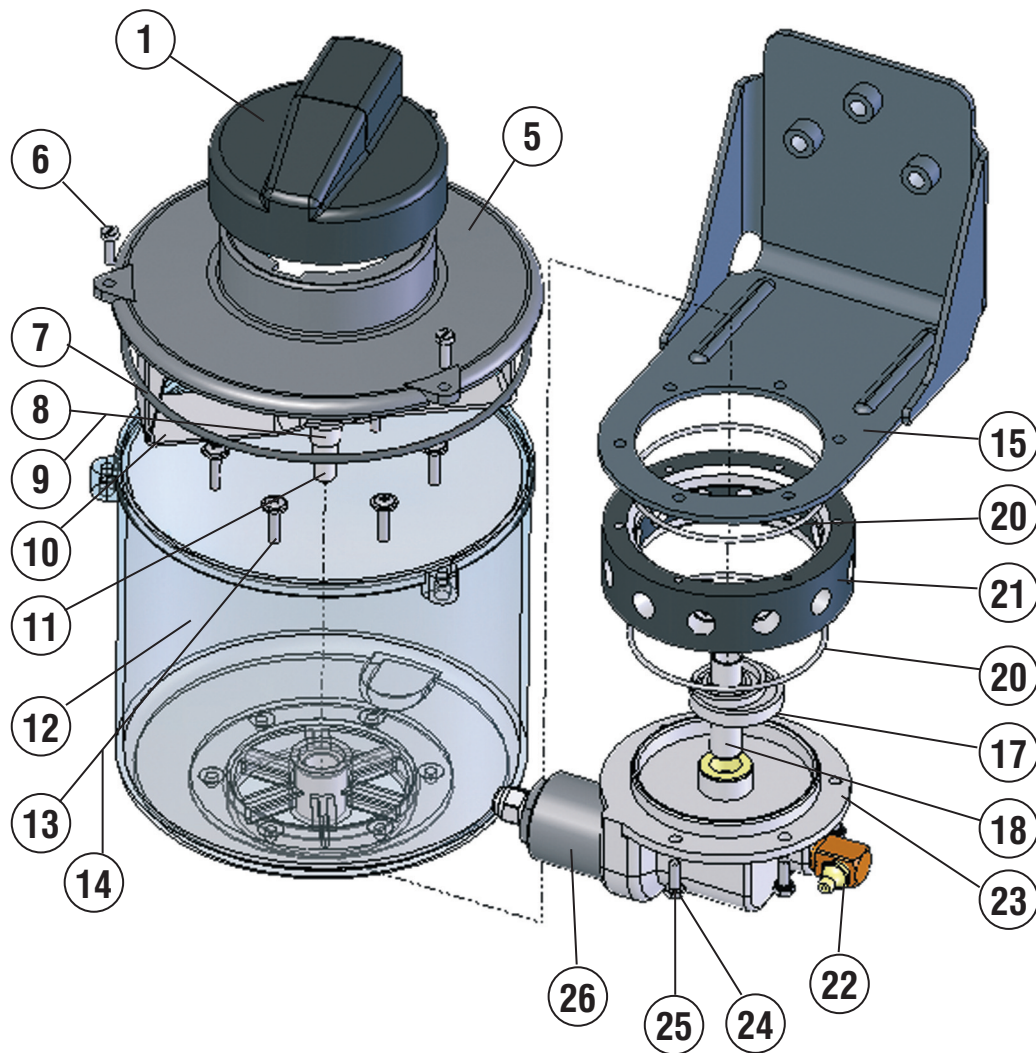
- 7.2.3 Remove the five hex head screws (25) lockwashers (24) from the bottom cover (23).

- 7.2.4 Rotate the bottom cover 1/4 turn CCW and pull down to remove the bottom cover (23) from the pump manifold (21). Make certain the O-ring (20) is removed and discarded.

- 7.2.5 Place the new O-ring (20) on the flange of the bottom cover (23).

- 7.2.6 Align the bottom cover (23) with the camshaft (18). Align the mounting holes in the bottom cover (23) with the holes in the pump manifold (21) and carefully slide the bottom cover (23) into position.

FIG 8 - Exploded View



As the cam lobe (17) is indexed past the lube piston is pushed back, allowing the lubricant injector to prime. At the same time, the check valve spring returns the check valve piston, preventing any back flow.

4.0 Technical Data

LUBRICANT	
NLGI Grade 2	Down to 10°F / -12°C
NLGI Grade 1	Down to 0°F / -18°C
NLGI Grade 0	Down to -10°F / -23°C
NLGI Grade 00	Down to -20°F / -29°C
NLGI Grade 000	Down to -30°F / -35°C

Do not use heavy, tackified greases or Bentone (clay based) high temperature grease.

OILS
Oils 400 SUS - 10,000 SUS. Min SAE 80

SPECIFICATIONS	
Nominal Reservoir Capacity	4.4 lbs / 2 qt
Nominal System Weight (60 outlets, full)	15 lb. 7 kgs
Input Air Pressure Range	80 psi to 150 psi
Max Air Consumption	.06 cu. Ft. / hour
Max Ambient Temperature	160°F / 65°C

INJECTORS	
Max Pressure	1700 psi 120bar

TUBING	
Burst Pressure	
4mm O.D. Nylon Feed	2500 psi 175bar
5mm O.D. Nylon Air Feed	1700 psi 120bar
Operating Temperature Range	
Nylon	-65°F - 180°F -54°C - 82°C
Bundy	-65°F - 400°F -54°C - 205°C

5.0 Recommended Preventative Maintenance

After initial installation, and after any service replacement of lube system components, perform all of the following preventative maintenance checks once a shift for a period of one (1) week to verify that the XGS chassis lubrication system is operating properly.

5.1 Inspection Procedures

The following inspection procedures are recommended to help ensure proper operation of the XGS chassis lubrication system. Once the reservoir refill interval has been determined – every 3 days, once a week, every 3 weeks, etc. – make certain that interval is part of your scheduled maintenance.

- A. Inspect all lubrication points for signs of FRESH grease.
- B. Check the condition of all fittings and connections. Tighten or replace loose or damaged fittings.
- C. Check all lubrication lines; make certain that there are not any breaks. Check for wear or chaffing that may lead to leakage.
- D. Check controller and pump (23) operation.

Build up normal air pressure in the vehicle, minimum 80 psi. Then press the Manual Override button on the bottom of the XGS controller. This will pulse the XGS pump (23) approximately 20 times. While the pump (23) is cycling.

- D.1 Verify controller operation by air being released from the exhaust port.
- D.2 Verify pump operation by observing the paddle (10) indexing in a CCW rotation inside of the reservoir (12).

CAUTION

To ensure proper operation of the lubrication system, fill the reservoir (23) only with clean lubricant. The air supplied to the system must be clean and dry.

6. Troubleshooting

PROBLEM	POSSIBLE CAUSE	REMEDY
A. All lubrication points appear dry.	<ol style="list-style-type: none"> 1. Empty reservoir 2. No air to system. 3. Inoperative controller. 4. Inoperative pump 5. Time between lube cycle is too long. 6. Reservoir has been filled with an unsuitable lubricant. 	<ol style="list-style-type: none"> 1. Refill the reservoir, using the correct lubricant. 2. A. Check for a damaged air line. B. Check to see if air is on and air pressure is between 80 psi and 150 psi 3. Refer to PROBLEM "E". 4. Refer to PROBLEM "F". 5. Adjust controller CYCLE TIME setting. 6. Remove the lubricant and replace with correct grade of lubricant.
B. One or more lubrication point appears dry while others receive sufficient lubrication.	<ol style="list-style-type: none"> 1. Broken or severed lube lines. 2. Inoperative injector. 3. Injector is undersized. 4. Injectors have been switched. 	<ol style="list-style-type: none"> 1. Determined cause, and if necessary, re-route, or protect the lines to avoid a recurrence. Use a connector (25478-056) to reconnect the line. 2. Refer to PROBLEM "J". 3. Replace with a larger capacity injector. 4. Check the lube schematic or installation record, making sure the correct injector is supplying the lube point.
C. All lubrication points are over-lubricated.	<ol style="list-style-type: none"> 1. Time between lube cycles is too short. 	<ol style="list-style-type: none"> 1. Adjust controller CYCLE TIME setting.
D. One or more lubrication points are over-lubricated.	<ol style="list-style-type: none"> 1. Injector(s) is oversized. 	<ol style="list-style-type: none"> 1. Replace the injector(s) with a smaller capacity injector.
E. Inoperative controller.	<ol style="list-style-type: none"> 1. No input power. 2. Fuse is blown. 3. Loose wire connection inside the controller. 4. Defective timer. 	<ol style="list-style-type: none"> 1. Check for power to the controller. 2. Check in-line fuse. Replace if necessary. 3. Check all wires and connections in the controller. 4. Replace timer.
F. Inoperative pump.	<ol style="list-style-type: none"> 1. Air piston is not moving forward or back. 2. Camshaft is worn or broken. 3. Inoperative injector. 	<ol style="list-style-type: none"> 1. Replace the bottom cover assembly. 2. Inspect the camshaft. Replace if necessary. 3. Refer to PROBLEM "I"

PROBLEM	POSSIBLE CAUSE	REMEDY
G. Reservoir paddle is not indexing.	<ol style="list-style-type: none"> 1. Bolt securing the paddle to the camshaft is loose. 2. Inoperative pump. 	<ol style="list-style-type: none"> 1. Tighten the bolt. 2. Refer to PROBLEM "F"
H. Reservoir paddle is not indexing and it rocks forward and back in an arc.	<ol style="list-style-type: none"> 1. Drive clutch is permanently engaged on the camshaft. 	<ol style="list-style-type: none"> 1. Replace the bottom cover assembly. Also, check the camshaft, paddle spindle, and reservoir for damage. Replace as necessary.
I. Inoperative injector causing the pump to stall.	<ol style="list-style-type: none"> 1. Lube piston cannot dispense lubricant. 2. Lube piston is frozen. 	<ol style="list-style-type: none"> 1. Loosen the line fittings individually from the injectors. Actuate the MANUAL OVERRIDE button to identify the stalled injector. Trace the line and check for: <ol style="list-style-type: none"> A. Clogged bearing. B. Crimped line. C. Blocked line. 2. Loosen the injectors individually from the pump body. Actuate the MANUAL OVERRIDE button to identify which injector frees the system. Replace the injector. Check for contaminants in the reservoir. Replace the lubricant if contaminants are found.
J. Inoperative injector but the pump is able to operate.	<ol style="list-style-type: none"> 1. Return spring on the injector is not attached. 2. Lube piston is missing. 3. Outlet check valve is not seating properly. 	<ol style="list-style-type: none"> 1. Secure the return spring to the lube piston and injector body. 2. Replace the injector. 3. Remove and clean the injector. If this does not remedy the problem, replace the injector. Check for contaminants in the reservoir. Replace the lubricant if contaminants are found.
K. Lubricant is coming out of the tape / harness.	<ol style="list-style-type: none"> 1. Broken or severed line. 	<ol style="list-style-type: none"> 1. Refer to PROBLEM "B – 1".