SCANIA

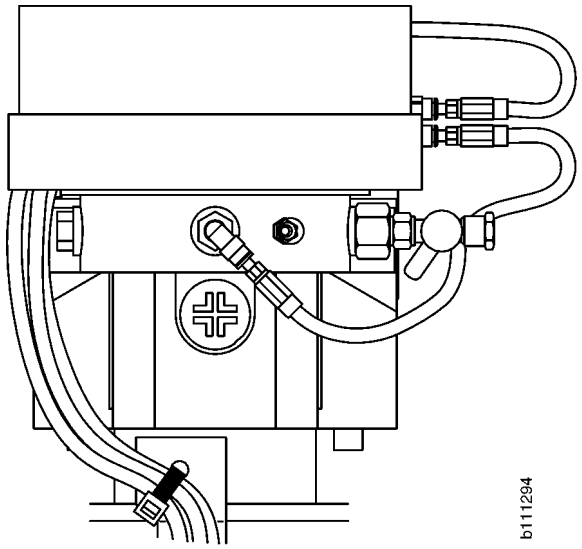
19:03-08

Issue 2 **en**

Automatic chassis lubrication

ACL

Function and work description



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Contents

Function description

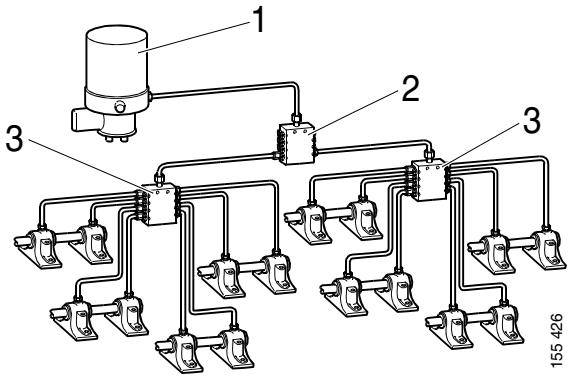
General

A truck has a number of moving parts that need regular lubrication. This inspection operation can be much simplified by using Automatic Chassis Lubrication ACL.

Design of system

The ACL system is designed to require a minimum of service. The system is made up of as few components as possible. The only manual labour required is to fill the lubricant reservoir.

The lubricant pump, lubricant reservoir and control unit are integrated into one unit. A main distributor block and distributor blocks are positioned out on the frame.



Outline diagram

1 *Pump with integrated reservoir and control unit*

2 *Main distributor block*

3 *Distributor block*

Pump unit

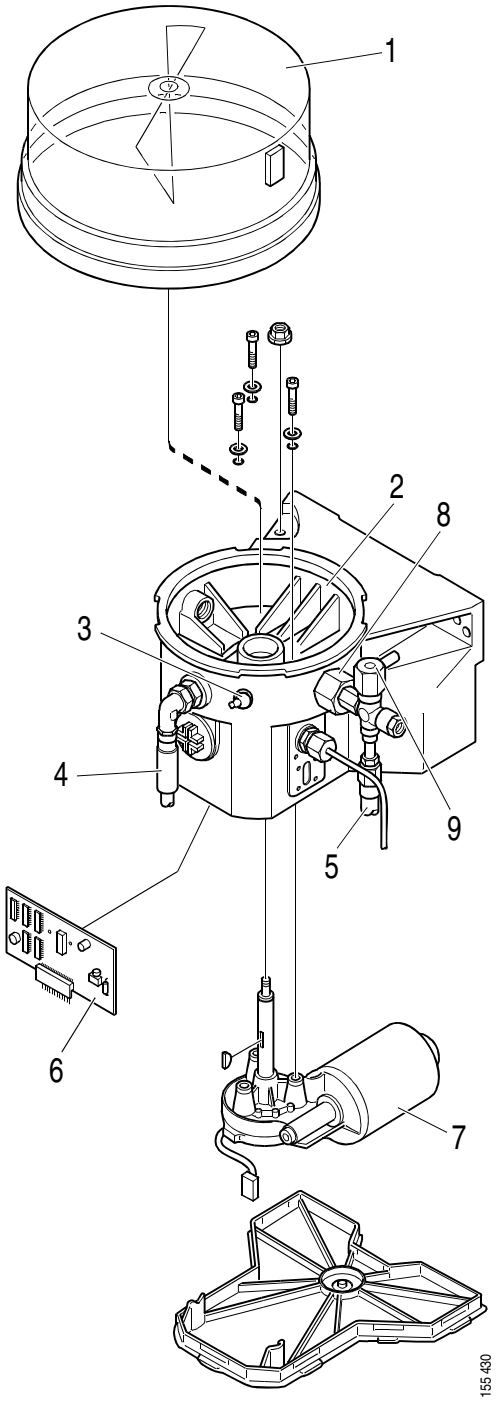
The lubricant pump is a piston type pump, driven by an electric motor positioned in a waterproof housing under the pump housing. A pressure connection and a return connection are fitted on the pump housing.

To ensure that the correct quantity of grease is distributed to the distributor blocks, outlet 1 on the main distributor block is connected as a return line.

In order for the lubrication system to work properly, it is important to use a lubricant that is stable at varying temperatures and is of a long life type.

Lubricant in the form of grease is filled through a grease nipple on the pump housing using a grease gun. The lubricant reservoir volume is 2 litres. Both liquid grease and normal chassis grease can be used.

Use only recommended lubricants, otherwise the lubricant pump will have difficulty pumping the lubricant at low temperatures. Refer to workshop manual, group 0.



1 Lubricant reservoir
2 Pump housing
3 Grease filling union
4 Return connection
5 Pressure connection
6 Control unit
7 Electric motor
8 Lubricant pump
9 Safety valve

Control unit

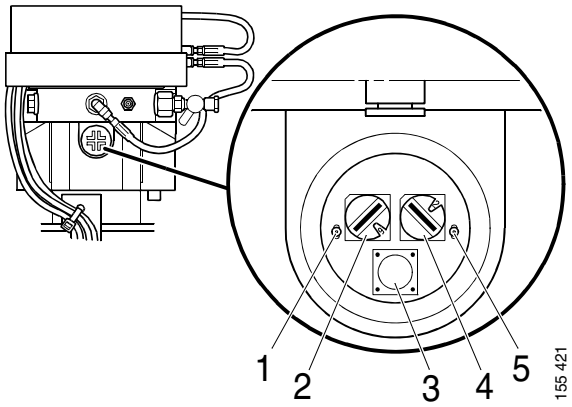
When the vehicle’s alternator charges, the control unit senses that the vehicle is in operation and then calculates the vehicle's operating time. The control unit has a defined pause time and a defined lubrication time. When the pause time is over, the lubrication time starts and the system supplies all connected lubrication points in the vehicle with lubricant.

The quantity of lubricant to be distributed is controlled by the vehicle’s operating conditions. When the system is installed, the pause time and lubrication time are set for the relevant operating conditions. These times are predefined by Scania and should not be altered.

If the engine stops during the pause time or lubrication time, the elapsed time is stored and the calculation continues when the engine restarts. If lubrication is interrupted in this way, lubrication therefore continues when the engine restarts.

If separate additional lubrication intervals are required, the pump can be started manually. This is done by pressing a switch on the control unit circuit board. The ongoing pause time is not affected by additional lubrication of this type.

There are two LEDs on the control unit circuit board. The left LED lights up when the control unit is powered up. The right LED lights up when lubrication is taking place and flashes if there is a fault in the control unit.



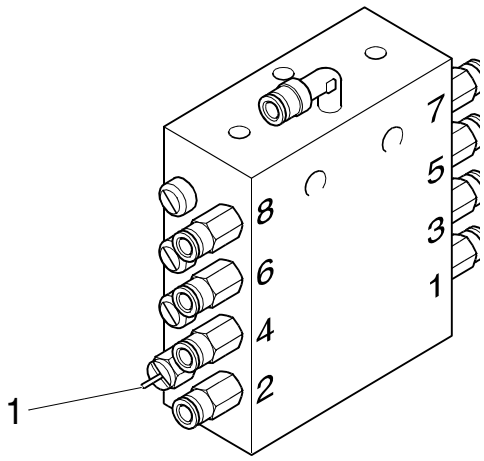
1 *Left LED, voltage to control unit*
2 *Rotary control for setting pause time (blue)*
3 *Switch for starting lubrication cycle*
4 *Rotary control for setting lubrication time (red)*
5 *Right LED, lubrication in progress*

Distributor block

The lubricant pump pumps the lubricant to the main distributor block, which then distributes the lubricant to the various distributor blocks.

Both types of distributor block use the same working principle: a number of pistons distribute the lubricant to a number of outlets. The distributor block works sequentially which means that each individual piston in the block has to end its movement before the next piston movement can be started.

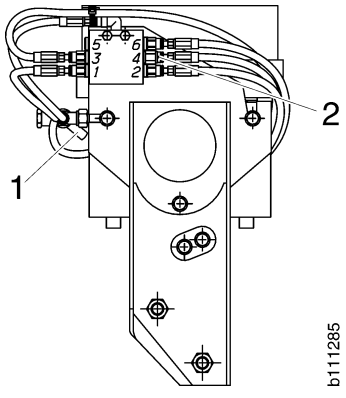
There is an indicator pin for checking the lubrication. This pin is located directly on one of the main distributor block pistons and indicates by its movement that lubrication is in progress.



1 Indicator pin

If the distribution of lubricant to any lubrication point is blocked, the whole system stops. A fault is detected when the amount of lubricant that should have been distributed leaks through a safety valve on the pump instead. The safety valve opens when the pressure in the system exceeds 350 bar.

The stoppage is also indicated by the indicator pin stopping. These fault indications allow the fault to be rectified before any damage occurs.

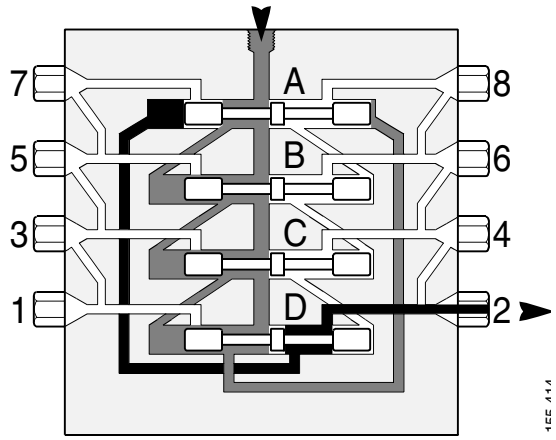


1 Safety valve
2 Indicator pin

The distributor block works in different stages. This example shows how a distributor block with 8 outlets works.

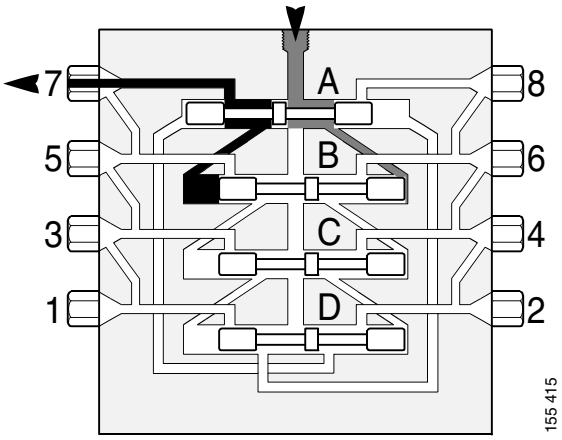
Stage 1:

Lubricant is pumped to the distributor block inlet. The lubricant reaches the right side of piston A via the block ducts. The pressure also forces the lubricant from the left side of the piston to outlet 2.



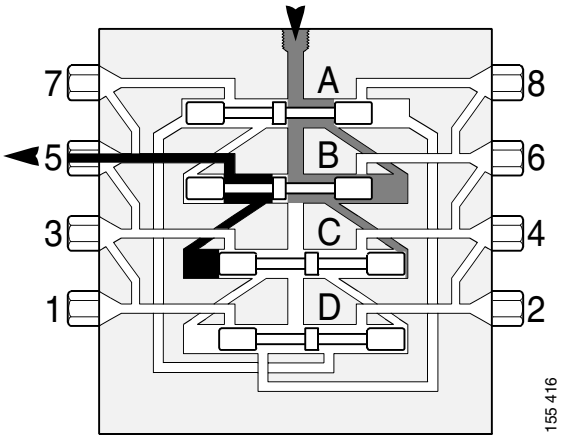
Stage 2:

When piston A has reached its maximum left position, the connection to the right side of piston B is opened. Lubricant flows there and pushes piston B to the left. The lubricant from the left side of piston B is pressed to outlet 7.



Stage 3:

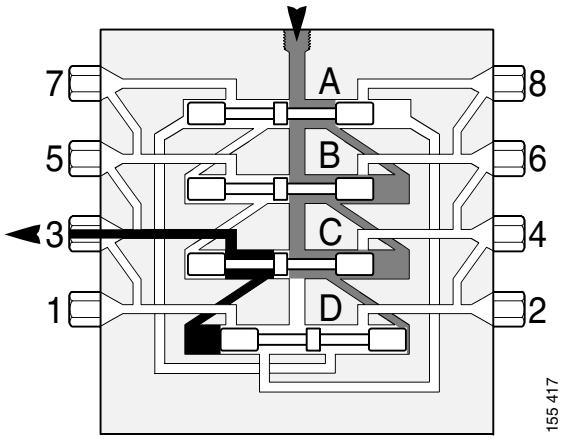
When piston B has reached its maximum left position, the connection to the right side of piston C is opened. Lubricant flows there and pushes piston C to the left. The lubricant from the left side of piston C is pressed to outlet 5.



Stage 4:

When piston C has reached its maximum left position, the connection to the right side of piston D is opened. Lubricant flows there and pushes piston D to the left. The lubricant from the left side of piston D is pressed to outlet 3.

Half a lubricant cycle has now been completed. All pistons have now been pressed to the left side.



Stage 5:

When piston D has reached its maximum left position, the connection to the left side of piston A is opened. Lubricant flows there and pushes piston A to the right. The lubricant from the right side of piston A is pressed to outlet 1.

Stage 6:

The cycle continues with pistons B, C and D in turn being pressed to the right and forcing lubricant to outlets 8, 6 and 4.

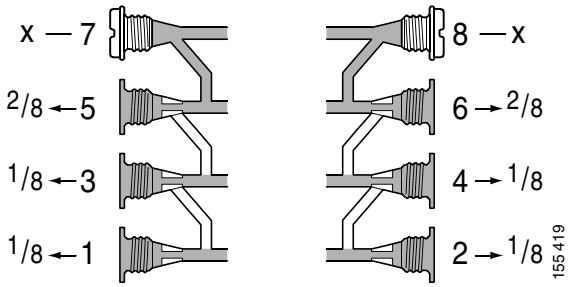
Lubricant volume control

The lubricant requirements of the different bearings on the chassis vary depending on size and position. Large bearings in a dirty environment require more lubricant than small bearings in a relatively clean environment. For this reason, there may be a need to regulate the quantity of lubricant to the respective lubrication points.

One method of doing this is to move a connection on the distributor block and plug the preceding outlet. If one outlet is blocked, the distributor blocks are designed to double the amount of lubricant to the next outlet. If two outlets in a row are plugged on the same side of the block, this trebles the amount of lubricant to the next outlet.

This method can be applied to both main blocks and normal blocks.

Note: Outlets 1 and 2 must never be plugged.

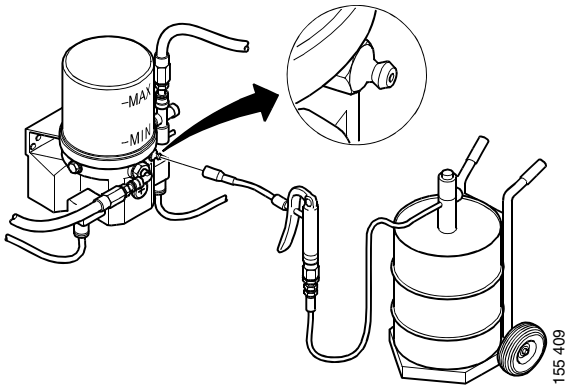


Example. If outlets 7 and 8 are plugged, outlets 5 and 6 receive double the amount of grease.

Work description

Filling with grease

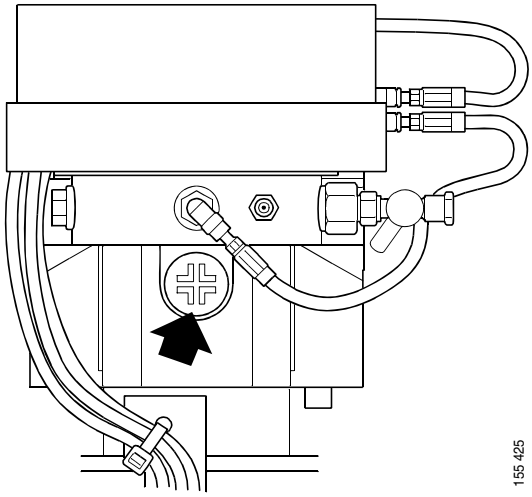
Fill grease through the union on the pump housing.



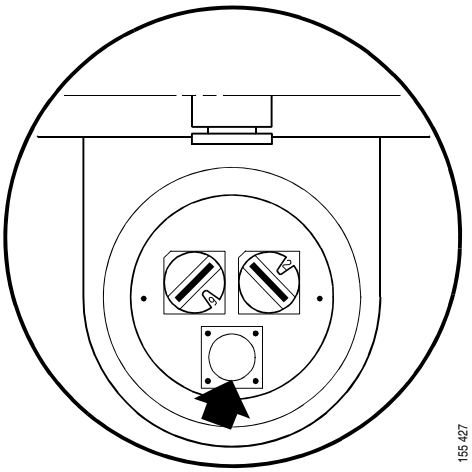
Extra lubrication and functional inspection

1 Unscrew the small cover on the pump housing.

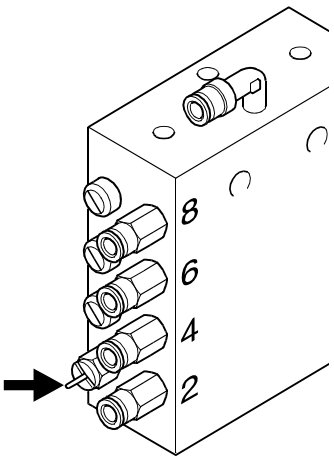
2 Start the engine.



3 Press the button on the circuit board. Lubrication is carried out at the same time as the right LED is lit.



4 Check that the indicator pin on the main distributor block is moving.



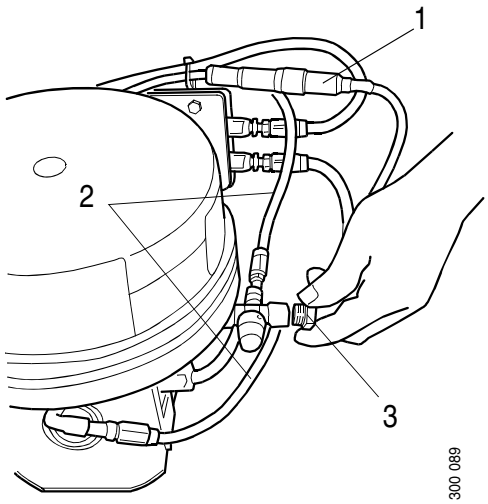
Pump unit

Removal

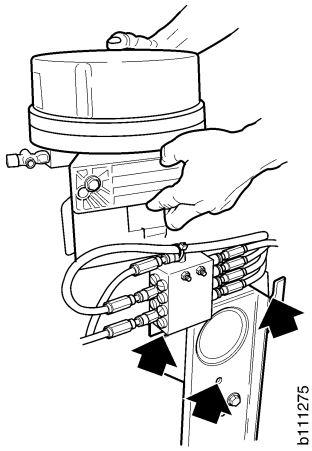
1 Remove the plug 3 on the pump element to facilitate removal of the grease lines.

2 Remove the connector 1.

3 Remove the two grease lines 2.



4 Remove the three bolts which hold the pump unit in place. Then remove the pump unit.



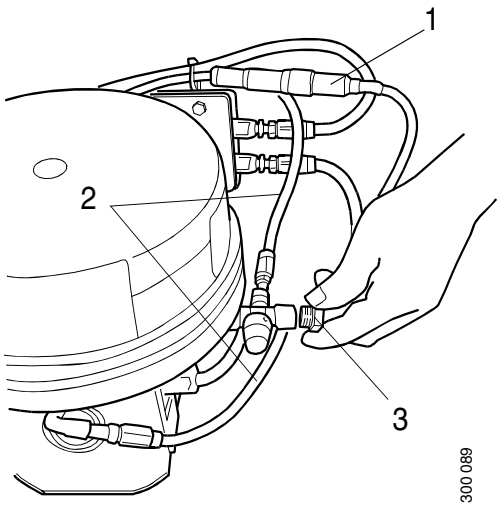
Fitting

1 Fit the pump unit and secure it in place using the three bolts.

2 Fit the two grease lines 2.

3 Fit the connector 1.

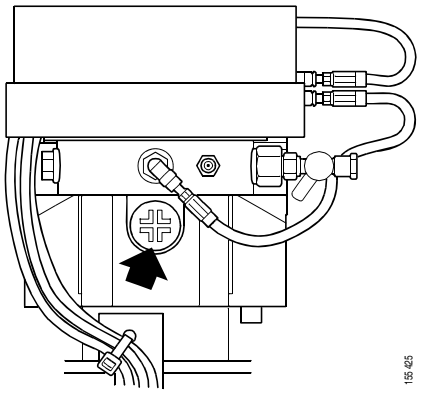
4 Fit the plug 3 on the pump element.



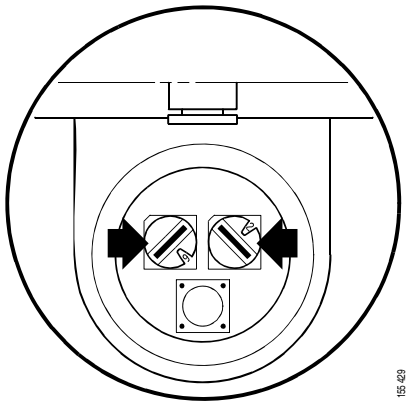
Checking the pause time and lubricating time

Scania's default setting for pause time and lubricating time for each vehicle should not be altered. A normal default setting is a pause time of 6 hours and a lubricating time of 4 minutes.

1 Remove the cover on the pump housing.



2 Check that the two rotary controls are set to the correct pause time and lubricating time according to the table below. If not, adjust the rotary controls to the correct position.



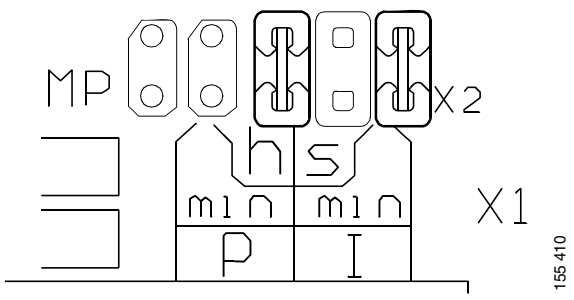
The left rotary control, blue, adjusts the pause time in hours

Rotary control position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
Pause time (h)	4	4	4	4	5	6	7	8	9	10	11	12	12	12	12

The right rotary control, red, adjusts the lubricating time in minutes

Rotary control position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
Lubricating time (min.)	2	4	6	8	8	8	8	8	8	8	8	8	8	8	8

3 Check that the time unit jumpers on the circuit board are positioned on the correct pins. The time units must be set to h for pause time (P) and min. for lubricating time (I).

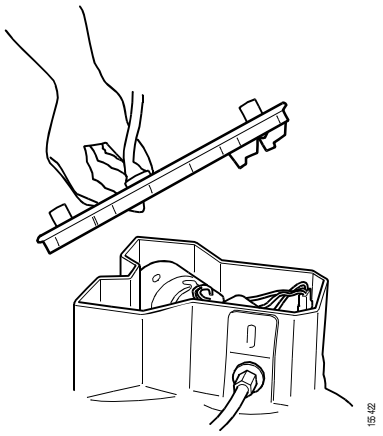


Control unit

Removal

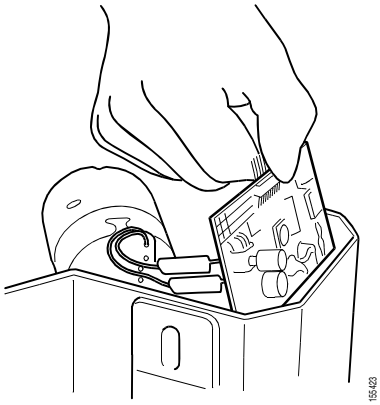
1 Remove the pump unit from the bracket and invert it.

2 Remove the cover.



3 Disconnect the connectors from the circuit board.

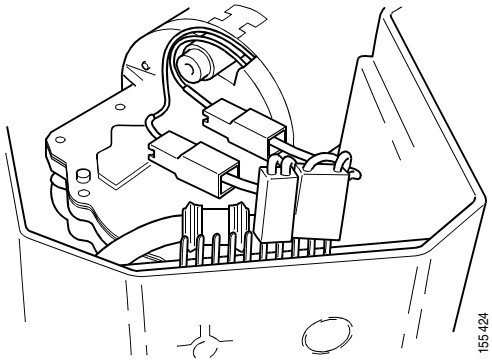
4 Carefully remove the circuit board.



Fitting

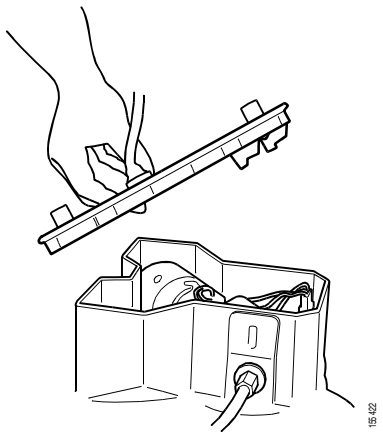
1 Fit the circuit board.

2 Attach the connectors to the correct pins on the circuit board.



3 Fit the cover.

4 Turn the pump unit the right way up and fit it on its bracket.



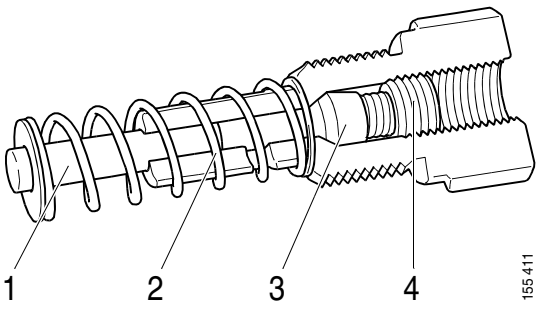
Distributor block

The distributor blocks can be disassembled.

Always observe cleanliness when disassembling and cleaning parts.

Lubricant pump element

Remove and clean the loose parts of the pump element.

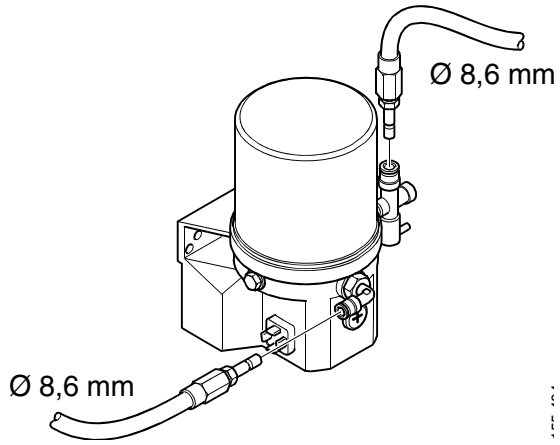


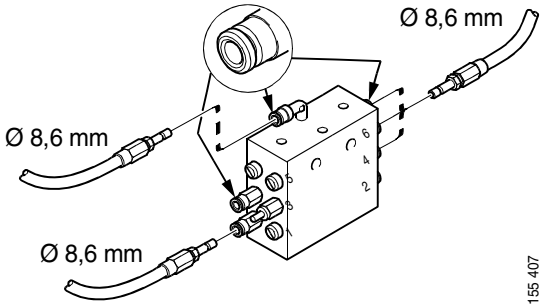
1 *Piston*
2 *Spring*
3 *Check valve*
4 *Lock nut*

Hoses and connections

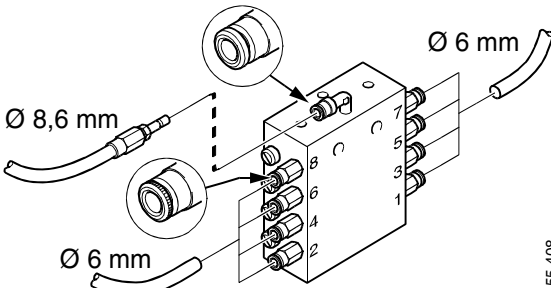
Hose types

Hoses between the lubricant pump, main distributor block and distributor blocks are 8.6 x 2.3 mm and have metal unions.





Hoses between distributor blocks and lubrication points are 6 x 1.5 mm and have no unions.



Cutting a hose

Always use a sharp knife when cutting a hose. The cut must be straight and even.

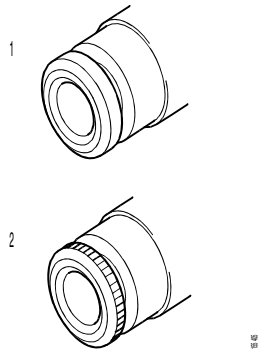
Note: Never use cutting pliers. These will damage the hose.

Couplings and unions

Couplings

Use an ungrooved coupling sleeve 1 for a hose with a metal union.

Use a grooved coupling sleeve 2 for a hose with no union.

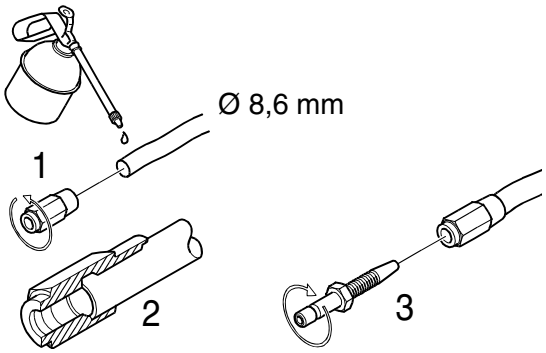


Fitting the metal union on a hose

1 Lubricate the hose with oil.

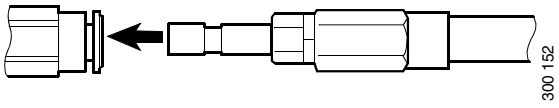
2 Screw the sleeve fully home.

3 Screw in the metal union completely.

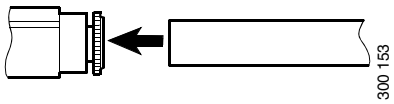


Assembly

Assemble the coupling and hose by pushing the hose and any union into the coupling sleeve.



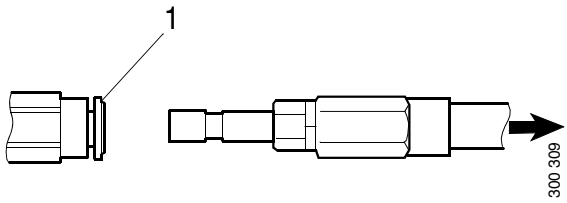
Ungrooved coupling sleeve



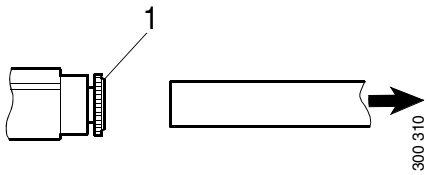
Grooved coupling sleeve

Dismantling

Dismantle the coupling and hose by pushing in the coupling sleeve snap ring 1 and at the same time pulling out the hose and any union 2.



Ungrooved coupling sleeve



Grooved coupling sleeve

Electrical diagrams

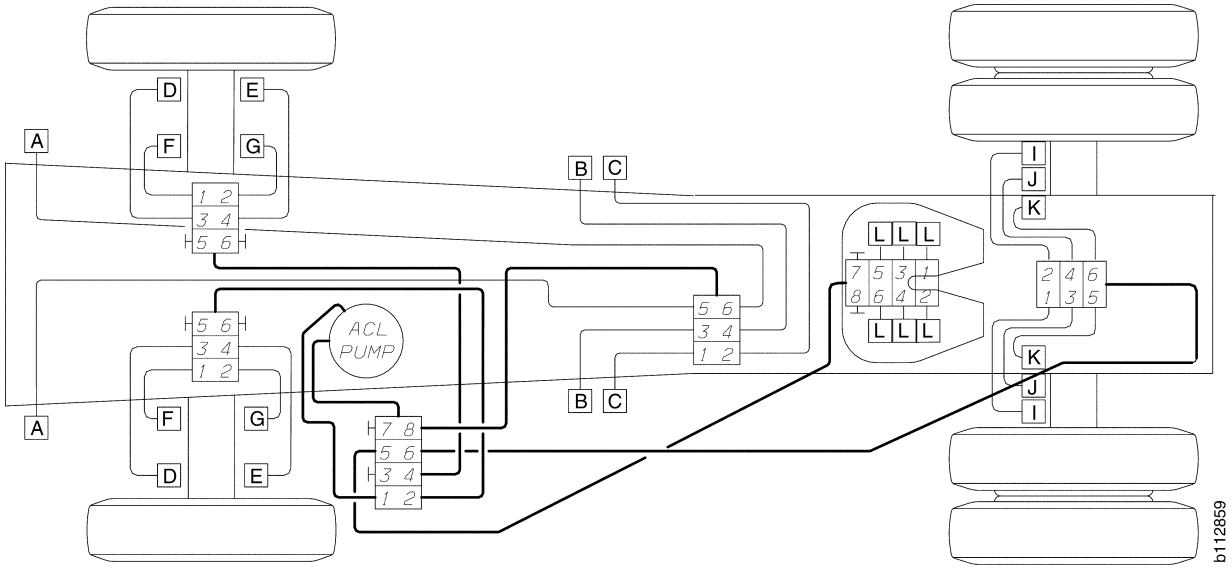
See Wiring Diagram 16:04-41.

Connection diagrams

The following diagrams are available:

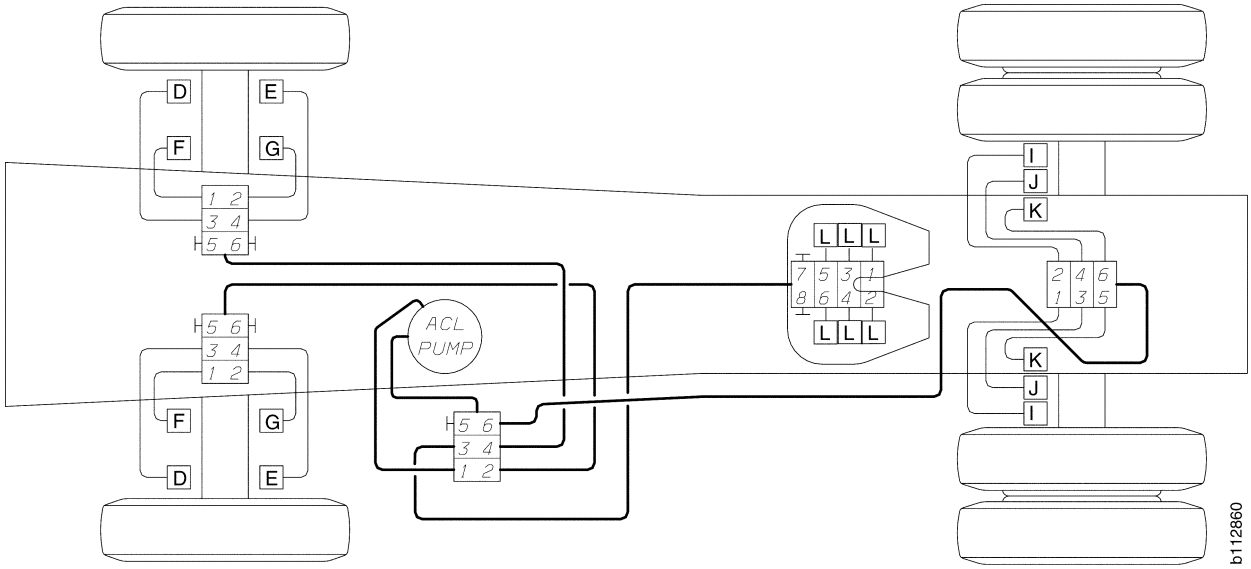
- 4x2 A with drum brake and fifth wheel, see page 19.
- 4x2 B with drum brake and fifth wheel, see page 20.
- 4x2 Z with drum brake and fifth wheel, see page 21.
- 4x2 A and 6x2 A with disc brake, support bearings and fifth wheel, see page 22.
- 4x2 B and 6x2 B with disc brake, support bearings and fifth wheel, see page 23.
- 6x2 A with drum brake, support bearings and fifth wheel, see page 24.
- 6x2 B with drum brake, support bearings and fifth wheel, see page 25.
- 6x4 Z with fifth wheel lubrication, see page 26.

4x2 A with drum brake and fifth wheel



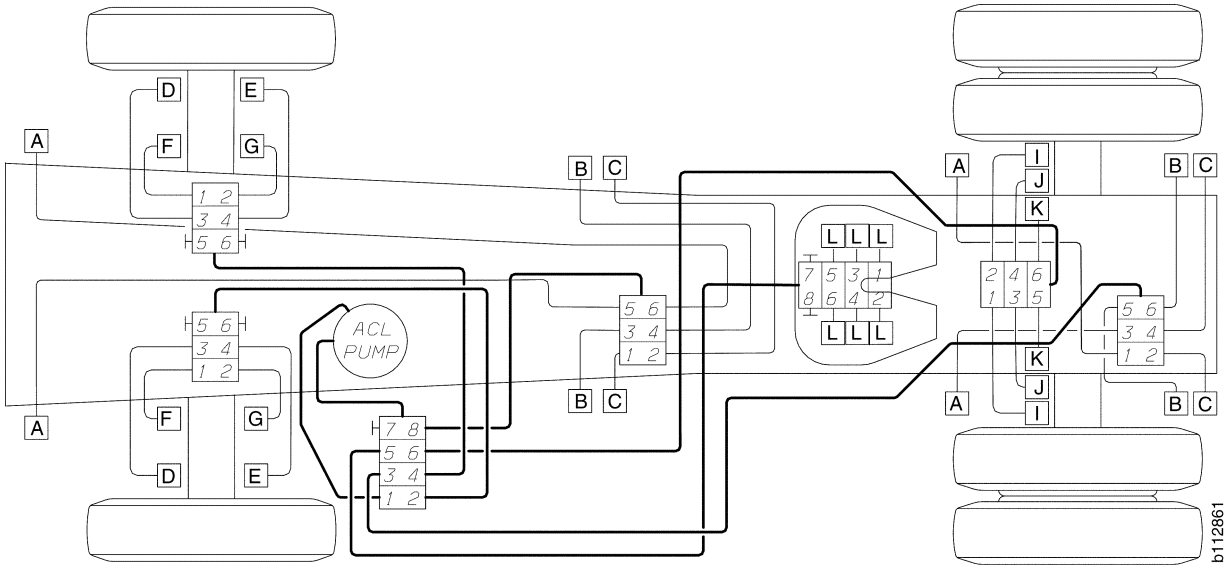
Lubrication points	
A-C	Spring bolt
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

4x2 B with drum brake and fifth wheel



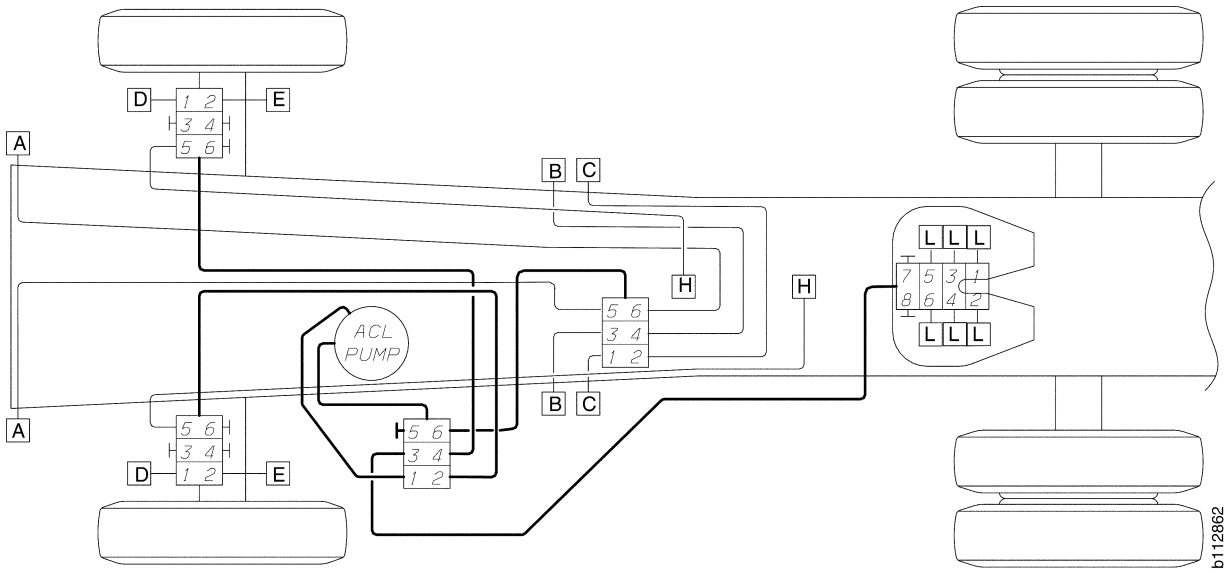
Lubrication points	
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

4x2 Z with drum brake and fifth wheel



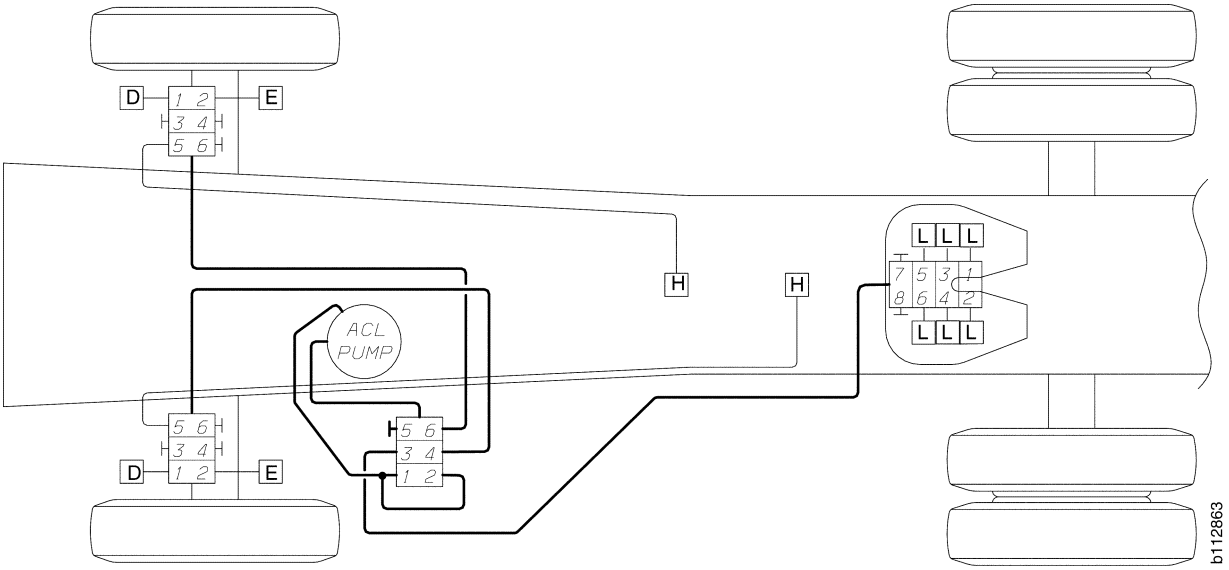
Lubrication points	
A-C	Spring bolt
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

4x2 A and 6x2 A with disc brake, support bearings and fifth wheel



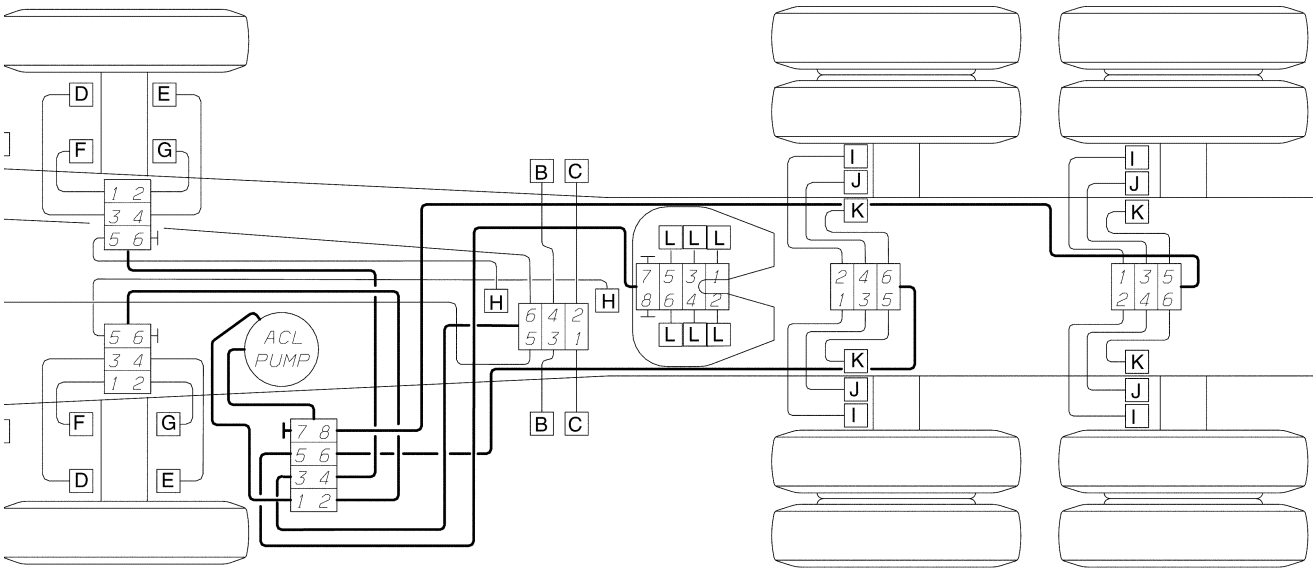
Lubrication points	
A-C	Spring bolt
D	King pin, upper
E	King pin, lower
H	Support bearings
L	Fifth wheel

4x2 B and 6x2 B with disc brake, support bearings and fifth wheel



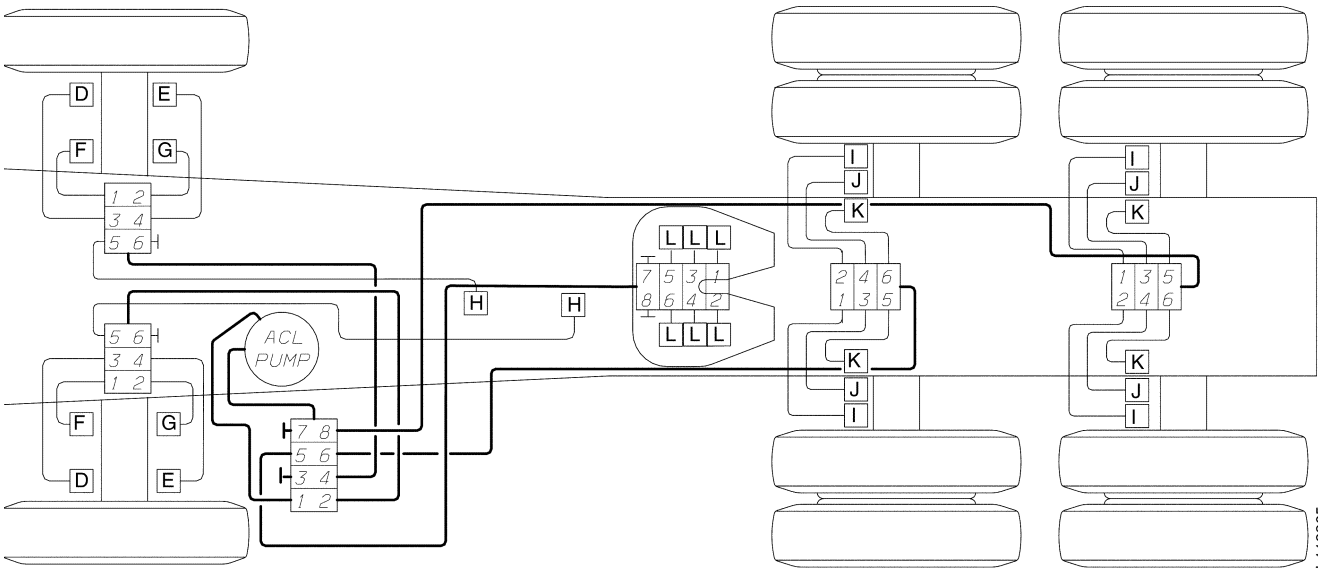
Lubrication points	
D	King pin, upper
E	King pin, lower
H	Support bearings
L	Fifth wheel

6x2 A with drum brake, support bearings and fifth wheel



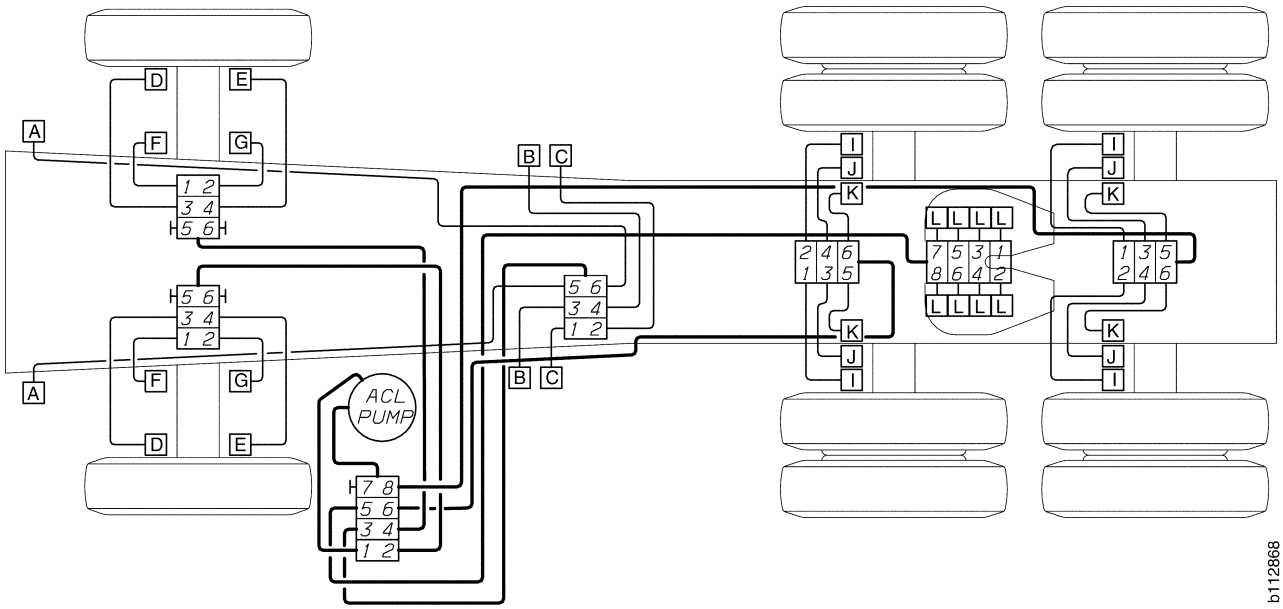
Lubrication points	
A-C	Spring bolt
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
H	Support bearings
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

6x2 B with drum brake, support bearings and fifth wheel



Lubrication points	
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
H	Support bearings
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

6x4 Z with fifth wheel lubrication



Lubrication points	
A-C	Spring bolt
D	King pin, upper
E	King pin, lower
F	Brake slack adjuster
G	Brake camshaft
I	Brake camshaft, outer
J	Brake camshaft, inner
K	Brake slack adjuster
L	Fifth wheel

Troubleshooting

Symptom	Cause	Action
Grease comes out of the safety valve and the indicator pin does not move.	1. A pressure line may be kinked or blocked. 2. Connection 1 or 2 on any distributor block is obstructed 3. The pump element is stuck.	1. Check the pressure lines. 2. Check the distributor blocks. 3. Remove and clean the pump element.
The indicator pin does not move.	1. There is no grease in the reservoir. 2. The grease viscosity is too high. 3. A pressure line may be kinked or blocked.	1. Fill up with grease. 2. Change to a lubricant with a different viscosity. 3. Check the pressure lines.
The pump is malfunctioning.	1. The fuse has blown. 2. Faulty connection in the connectors. 3. The pump circuit board is faulty. 4. The pump motor is malfunctioning.	1. Renew the fuse. 2. Clean the connectors. 3. Renew the circuit board. 4. Renew the pump motor.