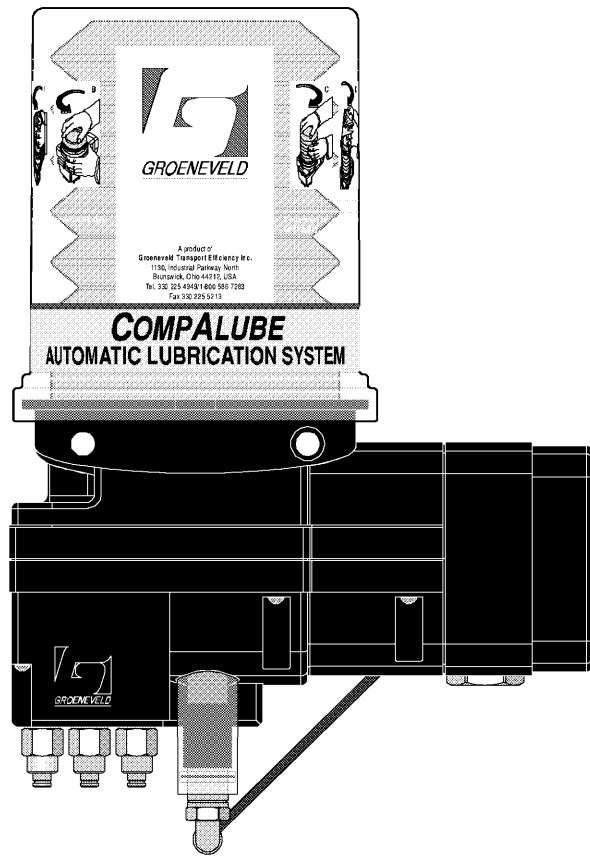


AUTOMATIC LUBRICATION SYSTEM - COMPALUBE



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SYSTEM MANUAL



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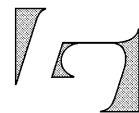
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COMPALUBE

SYSTEM MANUAL

UG 0105 17 february 1999

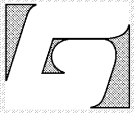
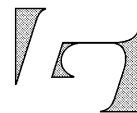


TABLE OF CONTENTS

Foreword	5
Groeneveld Transport Efficiency B.V.	6
Groeneveld lubrication systems	5
A - General information	6
Introduction	6
How to use this manual	7
Safety precautions	8
The CompAlube lubrication system	9
B - Operation	10
1 Main components	10
2 Operating principle	11
2.1 The control unit (brake-counter)	11
2.2 The piston pump	11
2.3 System monitoring device (grease-pressure indicator)	12
2.4 The test screw	12
3 Operations	13
3.1 Performing a test cycle	13
3.2 Replacing the grease cartridge	13
3.3 Setting the lubrication interval	15
3.4 Venting the system	15
4 The metering units	16
4.1 Introduction	16
4.2 Operating principle	16
C - Maintenance	18
1 Introduction	18
2 Periodic checks	18
3 trouble shooting	19
D - Installation	20
1 Overview	20
2 General installation instructions	20
3 Specific installation instructions	21
3.1 The CompAlube pump unit	21
3.2 Grease lines and couplings	22
3.3 The air lines	24
4 Venting and placing in service	25
4.1 Venting	25
E - Technical data	27
1 Pump	29
2 Metering units	29
3 Brake-counter	29
F - PARTS AND ACCESSORIES	31
1 Compalube system	31
2 Brake-counter	33



FOREWORD

Groeneveld Transport Efficiency B.V.

Investing in reliability. Groeneveld was established in 1971 with just that in mind. By now, that ideal has resulted in an international network of companies, governed from a head office in Gorinchem, The Netherlands. Groeneveld strives continuously to strengthen her already predominant position in the market by cultivating a solid image and a client-orientated approach.

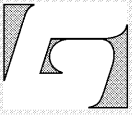
The people at Groeneveld are a team, which works with great enthusiasm to please its customers, every day. A high level of automation allows rapid reactions. The ISO 9000 standard forms the basis for the guaranteed quality of Groeneveld's products.

Frequent contact with all business relations, an elaborate dealer organisation and knowing what an enterprise needs these days - not an off-the-shelf product, but solutions for its daily maintenance problems - are paramount to uphold the good name of Groeneveld.

New technologies create new applications. That is why Groeneveld has an ample budget for research and development to create newer and better cost-effective products. Groeneveld's offices for research and development cooperate closely with leading R&D organisations and manufacturers of vehicles and machines.

The head office in Gorinchem





GROENEVELD LUBRICATION SYSTEMS

Groeneveld's automatic lubrication systems take care of the daily maintenance of anything that has moving parts. These systems prevent unnecessary wear and down-time and thus reduce operating costs and guard against annoying, costly, unexpected problems.

Groeneveld's automatic lubrication systems are used in, manufacturing, off-the-road vehicles, agriculture, the off-shore and transport industries.

The most important advantages:

- longer maintenance intervals.
- reduced wear of the greased components due to accurate and constant lubrication.
- less repair and replacement costs.
- less unnecessary down-time; less loss of production.

Besides her automatic lubrication systems Groeneveld designs, manufactures and supplies:

- speed limiters
- boardcomputer systems
- automatic oil-level controllers
- temperature/humidity recording systems
- reversing protection systems
- engine and cabin heaters
- fuel pre-heaters.

Groeneveld supplies a complete range of cost-effective, comfort enhancing products.

INTRODUCTION

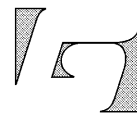
A **CompAlube** automatic lubrication system ensures that all grease points on a trailer are greased with the required amount of grease at the required intervals. Because lubrication takes place while the trailer is in operation, the applied grease is spread optimally over the whole surface to be greased. The lubrication system requires no user intervention to operate, apart from periodically replacing the grease in its reservoir, and inspecting the system.

Groeneveld's automatic lubrication systems are designed with the utmost care and tested rigorously. This guarantees an extended operational life and error-free operation, even under the most extreme operating conditions.

Proper installation, using the correct type of grease, and periodic checks are prerequisites for the continual hassle-free operation of the system. The periodic checks, which take little time and effort, can be performed during the normal maintenance of the vehicle. Careful selection of construction materials, makes the lubrication system itself virtually maintenance-free.

Warning:

The automatic lubrication system reduces the time and effort spent on manual lubrication significantly. However, do not forget that there may be grease points that are not served by the lubrication system and must still be greased by hand (the universal joints, for instance).



HOW TO USE THIS MANUAL

This manual comprises the following sections:

Please note that the page-numbering starts anew at the start of every section, and so do the figure numbers. If one of the sections seems to be missing from this manual, take a look at the table of contents. If the section is not mentioned there, then that section is not relevant for the manual we supplied you.

A - General information

This section provides you with the necessary background information and a description of the lubrication system, its components, and the principles that govern its workings. It also contains the general safety precautions that must be adhered to when installing, maintaining or repairing the lubrication system.

B - Operation

This section describes the principle of operation of every significant component of the lubrication system and the tasks that may have to be performed during normal use of the system.

C - Maintenance

This section contains the guidelines and procedures that must be followed when performing maintenance on the system. It also contains a trouble shooting chart to help you pin-point any malfunctions.

D - Installation

This section deals with the manner in which the components must be installed and interconnected and how the system should be set up.

E - Technical data

This section contains the relevant technical data of the various components of the lubrication system, including the recommended or prescribes types of grease.

F - Parts and Accessories

This section contains the (spare) parts.

Appendices

If any relevant additional information is available, that information will be placed in an appendix. Also, if your lubrication system or one of its components is a 'special' - with properties different from 'standard' - further information may be obtained from an appendix. If you cannot find what you are looking for in the main body of this manual, please look for it in the appendix.

Note:

In this manual, values are always formatted in accordance with the ISO standard: A decimal comma is used, instead of the decimal point.



SAFETY PRECAUTIONS

1. Adhere to all safety regulations applicable at the locality where the tasks are performed.
2. Always take the necessary precautions to prevent potentially dangerous situations from occurring during installation, checking, and maintenance. Always apply or use adequate safety measures to prevent bodily harm and damage, before you start working on the vehicle.
3. The electrical system of the vehicle must be disconnected before you start working.
4. The air system of the trailer must be drained of all air and pressure.
5. Ensure the vehicle is immobilised before you start work. Remove the ignition key and store it in a safe place. Engage the parking brake. Block parts that may move of their own accord. Use the safety devices provided on the vehicle. Pay special attention to tailboards, loading flaps, drop flaps, etc.
6. Never work underneath a vehicle which is raised by a jack only. Always use a jack stand and check that the ground is firm and flat enough.
7. Keep in mind that a vehicle with air-suspension may drop of its own accord.
8. Only work underneath the cab if it is fully tilted (and latched). Otherwise a support must be placed underneath the cab to ensure the cab cannot drop back.
9. Disconnect the ground from the vehicle's battery. This prevents electrical equipment from being inadvertently activated.
10. Avoid working on the cooling system without allowing it to cool down first. The system is pressurised and may cause burns. Direct contact with the (poisonous) cooling fluid must be avoided.
11. A vehicle or machine may only be operated by those who are competent to do so and are aware of all possible dangers. If necessary, an expert should be consulted.
12. Only use tools that fit and are designed for the specific task you want to perform with them.
13. Keep the environment in which you work clean and tidy. This enhances safety.
14. Adhere to all regulations, specifications, and limitations as specified by the manufacturer of the machine, vehicle or engine.

THE COMPALUBE LUBRICATION SYSTEM

Groeneveld's **CompAlube** lubrication system was specifically designed to serve vehicles with a limited number of grease points. It is easy to install, virtually maintenance free, and extremely reliable.

A **CompAlube** lubrication system is comprised of the following components (fig. 1):

1. The pump unit, which consists of:
 - The pneumatic grease pump (a piston pump).
 - The grease reservoir (a grease cartridge).
 - The control unit (a pneumatic brake-counter).
 - The metering units.
 - The grease-pressure indicator.
2. The grease lines between the metering units and the various grease points.
3. The compressed-air lines to the pump and brake-counter.
4. The Pump mounting bracket.

The compressed air which is used to drive the piston pump is drawn from the vehicle's air tank. The brake-counter counts the number of times the vehicle's brakes are activated - through a coupling with the vehicle's brake-service line. After the brake-counter has registered a certain number of brake applications, it starts the pump and the lubrication system activates its lubrication cycle (with a pump phase).

The grease pressure built-up by the pump allows the metering units to pass an exact amount of grease to the grease points - through the grease lines. The amount of grease that is passed to each grease point during each cycle, depends on the type of metering units installed.

The grease-pressure indicator provides an instantaneous check whether the lubrication system operated properly during the most recent lubrication cycle. If the required grease pressure was reached during that cycle, the indicator will show a green window. If the grease pressure was not reached, a red window will appear. The most probable reason for a failure of the system to reach the proper grease pressure is an empty grease cartridge.

The lubrication cycle ends when the brake-counter has counted a second, smaller number of brake-applications. The brake-counter then stops the pump.

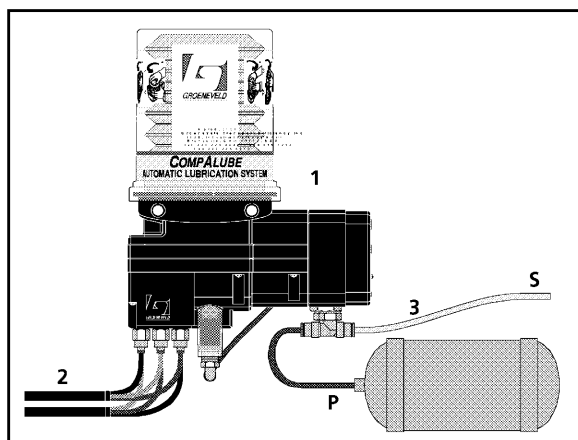
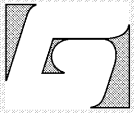


Fig. A1 **CompAlube** lubrication system



THE COMPALUBE PUMP UNIT

The pump unit is the heart of the **CompAlube** lubrication system and even though it contains all major components of the system, it is a very compact unit. The pump unit requires virtually no maintenance and is easy to install and place in service.

Warning:

The automatic lubrication system significantly reduces the time and effort spent on manual lubrication. However, do not forget that there may be grease points that are not served by the lubrication system and must still be greased by hand (the universal joints, for instance).

1 MAIN COMPONENTS

The **CompAlube** pump unit is comprised of the following components (fig. 2a/b):

1. Transparent protection cover
2. Grease cartridge
3. Grease piston
4. Check valve
5. Metering units
6. Spring
7. Main air piston
8. Set screw
9. Control unit (pneumatic brake-counter)
10. Brake command air piston
11. Test-screw (on brake-counter)
12. Compressed-air connection (P)
13. Grease-pressure indicator
14. Brake-command air connection (S)

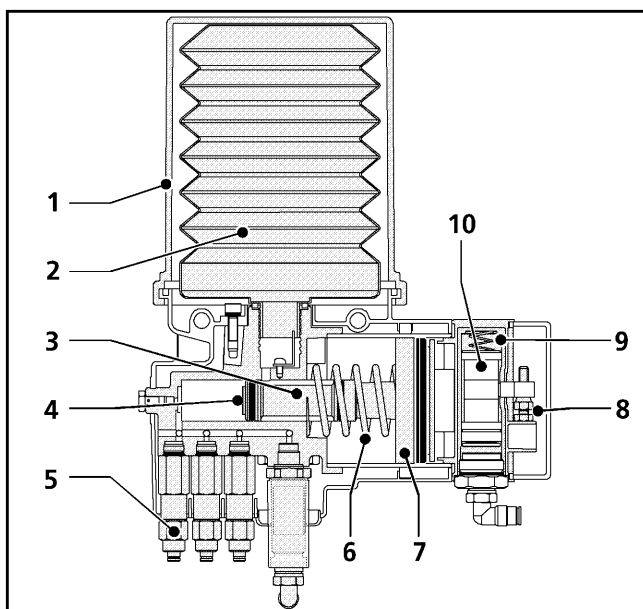


Fig. B1.1 *CompAlube* main components

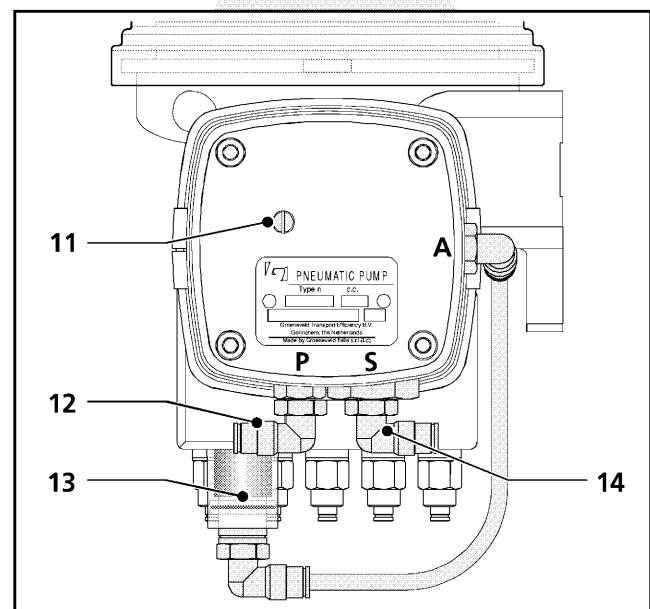
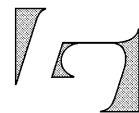


Fig. B1.2 *CompAlube* main components



2 OPERATING PRINCIPLE

2.1 The control unit (brake-counter)

The brake-counter controls the actions of the **CompAlube** lubrication system. Since this is a pneumatically operated device, the **CompAlube** system is particularly suited for vehicles like (semi-) trailers, which lack a permanent electrical power supply.

The brake-counter draws the compressed air it needs from the protected air tank of the vehicle. The counter is connected to the brake-service air line of the vehicle's braking system.

Each time the brake-counter has registered a certain number of brake-application (the number can be set and is called the lubrication interval), it starts the piston pump and thereby a lubrication cycle.

When the vehicle brakes, the service-air activates a piston in the brake-counter, which in turn rotates a control cam, just a few degrees. If the control cam has rotated far enough – after the set number of brake-application has been received – the cam opens an integrated 3/2 valve and allows compressed air to flow to the piston pump. The lubrication cycle begins.

The brake-counter continues to register braking actions. After a second, smaller number of brake-applications has been received, the control cam will close the 3/2 valve again, stop the pump and end the lubrication cycle. The actual number of brake-applications required to stop the pump – the length of the lubrication cycle - depends on the set value for the lubrication interval (the values are proportional).

2.2 The piston pump

When the brake-counter allows air to flow from the vehicle's air tank to the space behind the air/grease piston (fig. B2), that piston (1) will be pressed sideways. The grease pressure in chamber (2) pushes valve (3) against its seating to close the way back to the grease cartridge (the check valve). Grease is pressed from chamber (2), via duct (4), to the grease channel (5) above the metering units. The metering units then simultaneously pass – at full system pressure - their respective amounts of grease through the grease lines to the grease points on the vehicle. At the end of the lubrication cycle the compressed air supply is cut-off and the pressure behind the air/grease piston (1) starts to drop. Spring (6) returns the piston to its starting position. This creates an vacuum in chamber (2), which causes the check valve (3) to open and new grease from the cartridge to fill chamber (2).

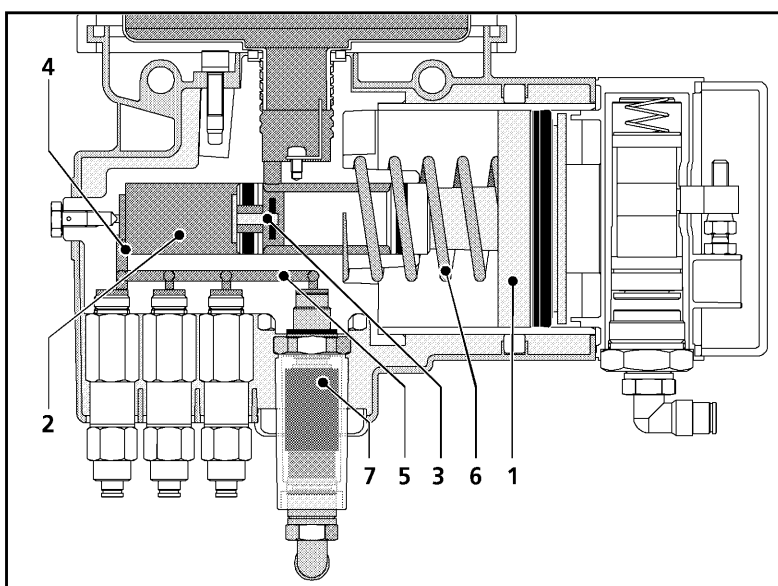


Fig. B2 The plunger pump



2.3 System monitoring device (grease-pressure indicator)

The grease-pressure indicator (1) shows the driver or maintenance personnel whether the system operates properly.

The moment the piston pump is started by the brake-counter, compressed air pushes the piston in the indicator upwards. This causes the indicator to show 'red' (fig. B3.1). The chamber on the other side of the piston is connected to the grease chamber above the metering units. As pressure is built-up in that chamber, the piston is pushed back – against the air pressure. The indicator will show 'green' (fig. B3.2), provided the grease pressure gets high enough to press the piston back fully.

So, if the required grease pressure is not reached during the current or last lubrication cycle, the indicator remains 'red'. This means, most probably, that the grease cartridge is empty and needs to be replaced.

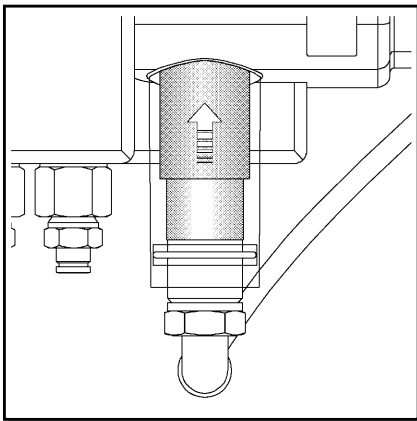


Fig. B3.1 Red indication

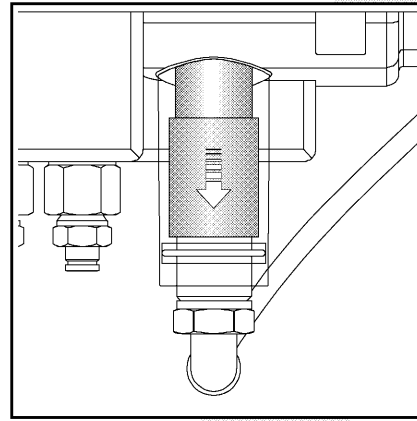


Fig. B3.2 Green indication

2.4 The test screw

With the test-screw on the brake-counter (on the right-hand side of the pump unit (fig. B4)) the system can be tested, an extra lubrication cycle can be initiated by hand to supply extra grease to the grease points, and the system can be vented after maintenance or repairs.

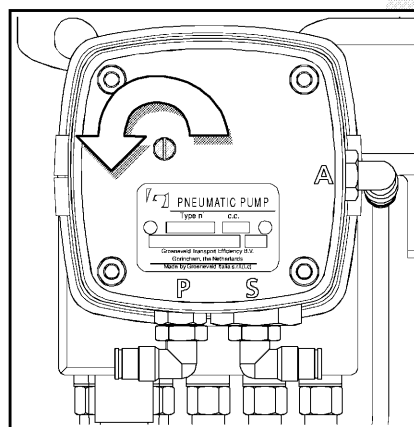


Fig.B4 Turn the test-screw counter-clockwise

3 OPERATIONS

3.1 Performing a test cycle

Remark:

Sufficient air must be available in the air tank of the vehicle, otherwise the test cannot be completed or the system cannot work at all.

Place a flat screwdriver in the slot of the test-screw. Push the test-screw inward and slowly turn the test-screw counter-clockwise (fig. B5.1) until you hear compressed air starting to flow to the pump (fig. B5.2). The grease-pressure indicator will initially be red, and almost immediately turn green. The system is now in operation and grease will be metered-out to the grease points. Allow the system to operate for at least 30 seconds.

To have the system perform multiple test cycles in quick succession, turn the test-screw slowly counter-clockwise until you hear the pump venting air (the pump stops). Wait 15 seconds, then start the lubrication cycle again, as described above. It is important that you wait about 15 seconds each time you start or stop the pump in this way. This time is needed for the metering units to recharge.

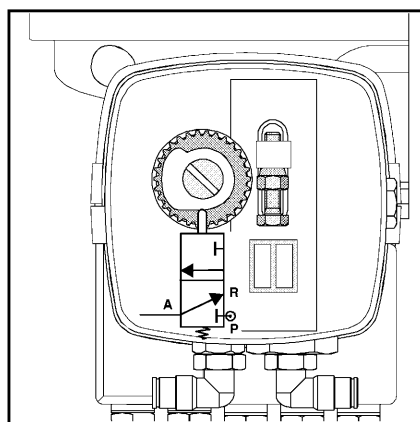


Fig. B5.1

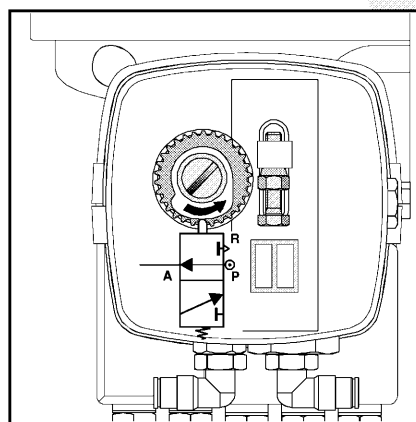


Fig. B5.2

3.2 Replacing the grease cartridge

The **CompAlube** pump unit is fitted with an exchangeable grease cartridge (fig. B6). The cartridge is protected by a transparent cover and can be exchanged easily and quickly.

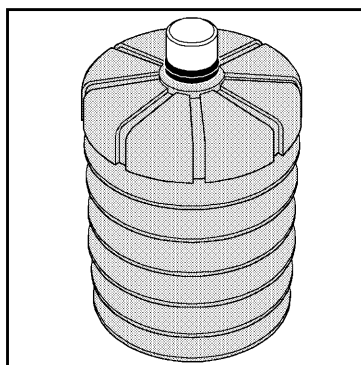
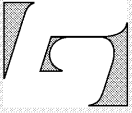


Fig. B6



Attention:

Prevent dirt from entering the pump while you exchange the cartridge. Always clean the pump unit and its immediate surroundings before you even remove the transparent cover.

If you remove a cartridge that is not completely empty, be aware that grease may drip out. Conserve the environment, and prevent grease spills.

Empty cartridges and left-over quantities of grease must be disposed of in accordance with the local regulations.

1. The transparent protective cover (fig. B7) has a bayonet catch. To remove it: turn it counter-clockwise and lift it straight up.
2. The cartridge is screwed onto the pump. Turn it counterclockwise to remove it (fig. B8).

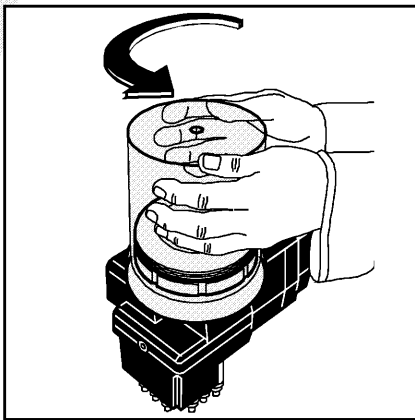


Fig. B7

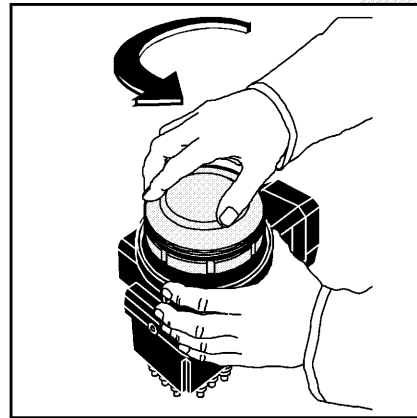


Fig. B8

3. Remove the rubber gasket (fig. B11.C) and the cardboard disc (fig. B11.B), and replace them with new ones (supplied with the new cartridge).

Be sure to mount the cartridge with only a *single* rubber gasket!

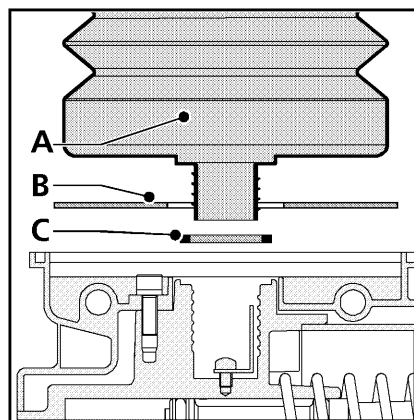


Fig. B11

4. Remove the cap of the new cartridge. The opening of the cartridge is covered by a piece of foil.
Do not remove the foil.

5. Screw the cartridge clockwise onto the pump (fig. B9). The foil will be removed automatically.

6. **Clean the transparent cover**, place it over the cartridge (fig. B10) and turn it clockwise to lock it.

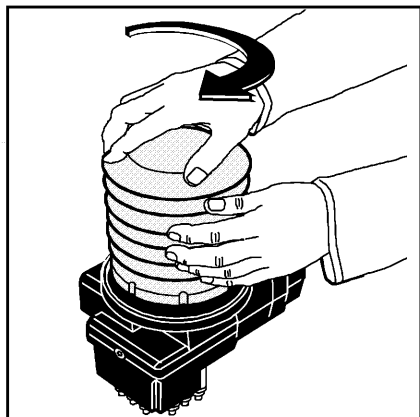


Fig. B9

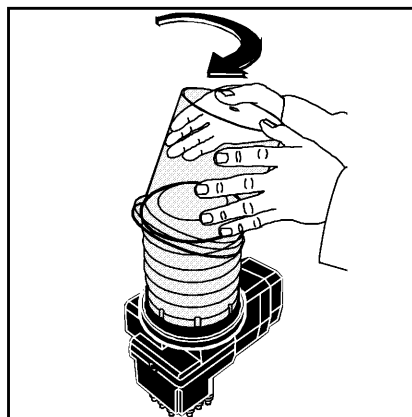


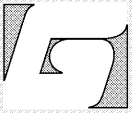
Fig. B10

3.3 Setting the lubrication interval

The lubrication interval is set on the brake-counter which is integrated in the pump unit. To set the lubrication interval – number of brake-commands – a gauge is needed. This gauge is mounted on the inside of the cover of the brake-counter. Always replace it after use. For information on the method employed to set the lubrication interval see section D – Installation – 4.2 Placing in service.

3.4 Venting the system

During normal operation, the lubrication system never needs to be vented. Only if the grease cartridge was allowed to become completely empty, the pump unit may have to be vented (see: section D – Installation – 4.1 Venting).



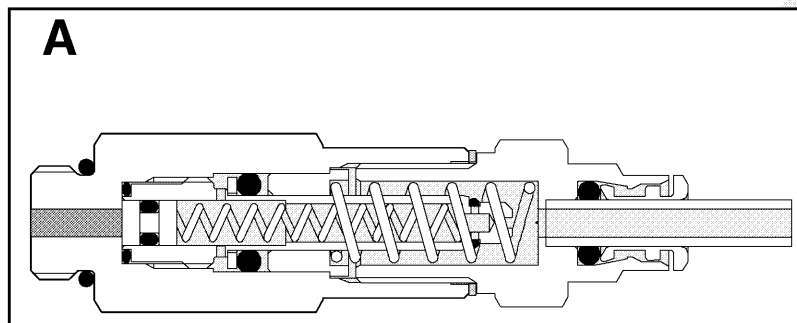
4 THE METERING UNITS

4.1 Introduction

Twelve identical metering units are supplied in the **CompAlube** lubrication system. Each one delivers the same amount of grease to the grease points (0,05 cc per grease cycle). By carefully selecting the metering unit, each grease point will receive the exact amount of grease it needs when it needs it. The metering units are made of yellow brass. Their closed-construction makes them utterly reliable and very suited for use on semi-trailers.

4.2 Operating principle

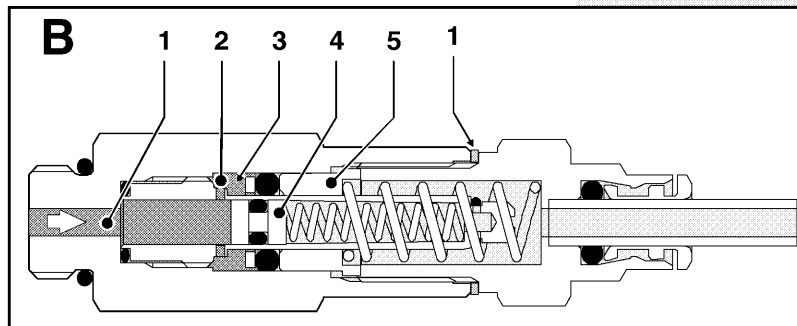
To explain the principle of operation of a metering unit, we assume that we have a device not yet filled with grease, as shown in fig.B12.



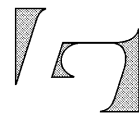
phase A (fig. B12)

phase B (fig. B13)

The pump presses the grease into channel (1) of the metering unit. The pressure pushes plunger (4) past channel (2). The grease now fills chamber (3) and pushes plunger (5) to the right. The stroke-length of plunger (5) determines the amount of grease that will be stored. The delivery of the metering unit, therefore, depends on the number and thickness of the spacers (6) that have been fitted (at the factory).

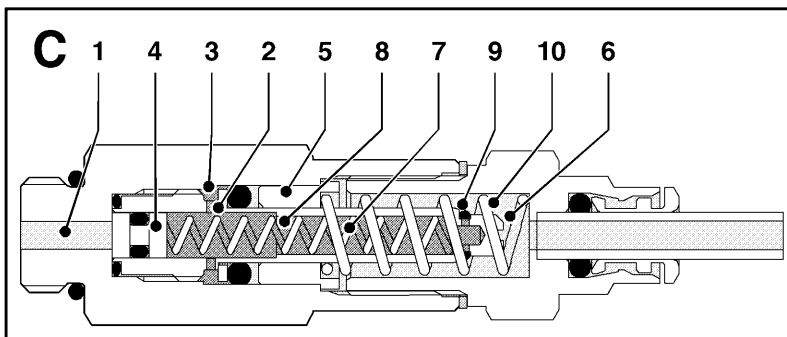


phase B (fig. B13)



Phase C (fig. B14)

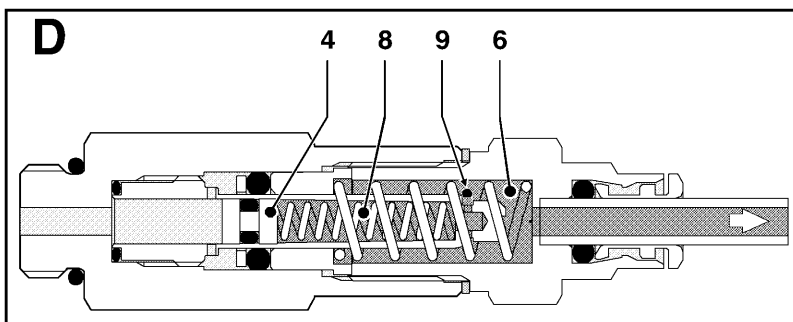
When the pump stops and the grease pressure disappears, plunger (4) is pushed back by spring (7) to block channel (1). O-ring (9) prevents the grease in chamber (6) from being sucked back into chamber (8). Plunger (5) is pushed back by spring (10), so that the stored grease is transferred from chamber (3) – via channel (2) – to chamber (8).



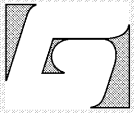
phase C (fig. B15)

Phase D (fig. B15)

During the next lubrication cycle the same things happen as during phase A. Chamber (8), however, now contains grease. When plunger (4) is depressed, grease goes from chamber (8) - past O-ring (9) through chamber (6) and the grease line - to the grease point on the vehicle. O-ring (9) is pressed outward to allow the passage of the grease.



phase D (fig. B15)



1 INTRODUCTION

The periodic checks, which take little time and effort, can be performed during the normal maintenance of the vehicle (during oil-replacement, for instance). Careful selection of construction materials, makes the lubrication system itself virtually maintenance-free.

Warning:

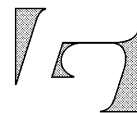
The automatic lubrication system reduces the time and effort spent on manual lubrication significantly. However, do not forget that there may be grease points that are not served by the lubrication system and must still be greased by hand (the universal joints, for instance).

2 PERIODIC CHECKS

1. Check the grease-pressure indicator (it should be green).
2. Check the grease level in the grease cartridge (replace the cartridge on time).
3. Check the pump for damage and leakage.
4. Check the grease and the pneumatic lines for damage and leakage.
5. Check, the condition of the grease points the system serves. Sufficient fresh grease should be present.
6. Check the operation of the system. Perform a test-cycle. Note that every time you perform a test-cycle a small amount of grease is supplied to the grease points.

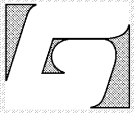
Warning:

If you use a high-pressure air or water gun to clean the vehicle, please do not spray directly onto the pump unit. Water or dirt might enter the pump unit through the venting openings.



3 TROUBLE SHOOTING

Problem	Cause	Solution
Grease-pressure indicator shows 'red'	<p>Grease cartridge empty</p> <p>Leakage in a metering unit</p> <p>Defective grease-pressure indicator</p> <p>Air in the system</p> <p>Pump malfunction</p>	<p>Replace the cartridge</p> <p>Check whether a grease point received an excess of grease. Replace the metering unit that serves that grease point.</p> <p>Repair or replace the grease-pressure indicator</p> <p>Vent the system</p> <p>Repair or replace the pump</p>
All grease points are too dry, while the system seems to operate properly (the grease pressure indicator shows 'green')	<p>Brake-counter not set correctly (Number of set brake-commands too high, i.e. lubrication interval too long)</p> <p>The grease used is not suitable for the current working environment (temperature too low)</p> <p>The pump receives no compressed air from the air tank</p> <p>The pump receives no signals via the brake-command air line</p>	<p>Set the brake-counter correctly</p> <p>Replace the cartridge with a cartridge containing the correct grease</p> <p>Check the air-supply and pressure in the air tank</p> <p>Check the air-line between pump and air tank</p> <p>Check the air-line between the pump and vehicle's-brake service line</p> <p>Check the restriction in the coupling which connects the air line to the vehicle's-brake service line</p>
All grease points receive too much grease	Brake-counter not set correctly (Number of set brake-commands too low, i.e. lubrication interval too short)	Set the brake-counter correctly
Some grease points are too dry, while others receive the correct amount of grease	<p>Grease line(s) damaged</p> <p>Metering unit(s) defective</p>	<p>Repair or replace the grease line(s) Prefill this line(s) before installation</p> <p>Replace the metering unit(s)</p>
A single grease point receives too much grease	Metering unit leaks internally	Replace the metering unit



1 OVERVIEW

To install a Groeneveld **CompAlube** lubrication system, the following components must be mounted and the following tasks carried out:

1. Mounting the **CompAlube** pump unit (includes grease cartridge, control unit, metering units, grease lines and grease-pressure indicator).
2. Mounting the grease lines to the grease points.
3. Mounting the air lines between the vehicle's pneumatic system and the pump unit.
4. Venting the system.
5. Setting and preparing the system into service.

2 GENERAL INSTALLATION INSTRUCTIONS

1. Check, before you start installing the lubrication system, whether all grease points on the vehicle are sufficiently greased. If not, grease them. This ensures that the greased points are open and properly greased during the period immediately following the installation of the lubrication system (before the lubrication system becomes effective) and prevents the damage that might be caused by (temporary) insufficient lubrication.
2. Prevent contaminations from entering the lubrication system. Use clean tools and clean the surroundings of the location of the pump unit before you start installing it. Even minor contaminations may cause the lubrication system to malfunction!
3. When mounting the air and grease lines, take care that:
 - you do not mount the lines onto or near parts that become hot, like the exhaust, retarder, compressor, turbo or air-conditioning;
 - the lines are mounted neat and straight, and are fixed in place with large or small tie wraps or clamps.
 - the lines are not mounted too near or onto moving parts in ways that may – over time - damage the lines;
 - the lines that serve moving parts have sufficient room to follow the movements of those parts;
 - feed-through grommet are used wherever there is a chance of a line becoming damaged.

3 SPECIFIC INSTALLATION INSTRUCTIONS

3.1 The *CompAlube* pump unit

Each *CompAlube* pump unit is the same.
However, before you mount it on the vehicle:

- Check whether the unit has the correct number of metering units.
- Check whether the correct grease and air lines are available and long enough.

If the pump unit is delivered as part of an installation kit, the grease lines will – usually – already have been fitted to the pump unit. If the grease lines were supplied separately, we recommend that you fill the grease lines before you mount them. Use only NLGI-0 grease.

3.1.1 Mounting the pump unit onto the vehicle

1. The location for the pump unit must be chosen so, that:
 - all the grease lines can reach the grease points.
 - the unit will be easily accessible (to be able to replace the grease cartridge, fig. D1);
 - the grease-level in the cartridge can be seen;
 - the unit is protected from being inadvertently damaged.
2. Always check whether you can use existing mounting holes on the vehicle to mount the mounting plate of the pump unit with or without mounting bracket.
 - Only drill new holes when you cannot use any of the existing mounting holes and always check with the manufacturer of the vehicle whether they allow holes to be drilled where you want to drill them.
 - Do not drill holes in the chassis profile-flange to create new mounting holes. Before you drill a hole, please make sure you will not damage some essential component of the vehicle, like ducts, wiring or air tanks. Clear the area of debris with an air gun or a brush after you drilled the holes.

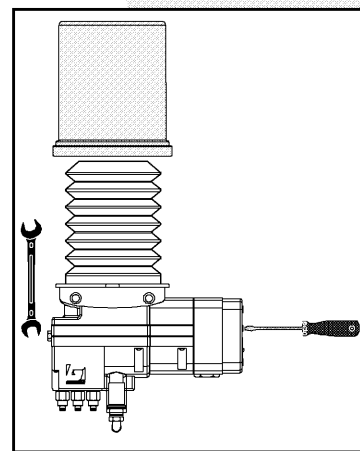
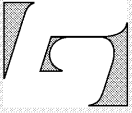


Fig. D1

Warning:

If the mounting bracket is to be welded onto the vehicle, the instructions and regulations, as issued by the manufacturer of the vehicle with respect to such an action, should also be strictly adhered to.

3. Mount the pump unit – with its mounting bracket - onto the chassis of the vehicle.
4. Remove the blind plugs from the air-connections of the pump unit.



3.2 Grease lines and couplings

The grease lines, which are connected to the metering units at one end, are connected at the other end – at the grease points - with special couplings. The couplings can be supplied in a wide variety types. Which type of coupling(s) should be used at each grease point, depends on:

- the screwthread at the lubrication point
- the location of the lubrication point
- the type of grease line employed
- the operating conditions

Always make sure the screwthread of the coupling matches that of the grease point. Elbow couplings with metric thread are marked with a letter 'M'. Straight couplings with metric thread are marked with a groove on the hexagonal of the coupling.

Usually, the polyamide (o.d. 3/16") grease lines are used in the **CompAlube** lubrication system. The metering units are – as standard – fitted with push-in couplings. Therefore, the grease lines can be connected easily and quickly. If polyamide grease lines cannot be used for some grease points, the metering units that serve those grease points must be fitted with pipe (nut and cutting-ring) couplings.

The polyamide lines can be supplied as composite lines (2 of 3 polyamide lines within a common, plastic outer jacket). To make them easily distinguishable at both ends of the jacket, each grease line has a different colour (red, blue or black, fig.D2).

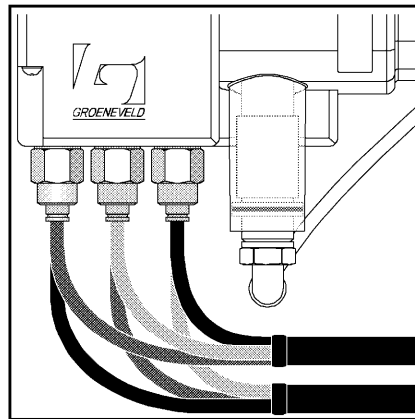
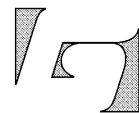


Fig. D2



3.2.1 Mounting the grease lines and couplings

Warning:

Do not add or modify existing grease points at your own initiative. Drilling holes may be detrimental to the structural integrity of some parts of the construction. Always follow the instructions of the manufacturer of the vehicle.

1. If the grease point to be connected is a so-called "added grease point", a hole must be drilled (at the location shown on the grease plan) and the right thread tapped. Make sure that all drill and tap cuttings are removed before pumping grease into the grease point. The new channel must be checked and the void filled with grease. Only after these steps can the added grease point be connected to the system. Make sure that the couplings point in the direction of the grease line (prevent unnecessary (sharp) corners in the grease line).
2. Determine the most suitable route for the (composite) grease line to the grease points. (consider routing along break hoses)
3. Cut the grease line at roughly the required length.
4. Determine, approximately, the required length of the individual grease lines in a composite (polyamide) line, and strip the outer jacket along that length (fig. D3/D4). Make absolutely sure that you do not damage the individual grease lines!

The stripped part of the composite grease line should look as shown in fig. D5.

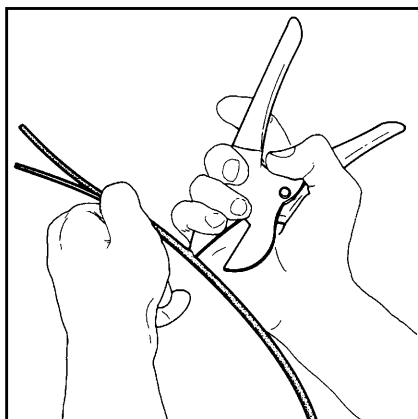


Fig. D3

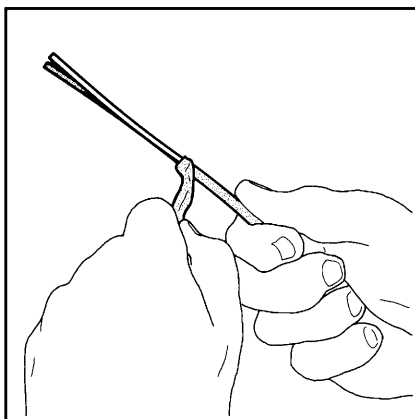


Fig. D4

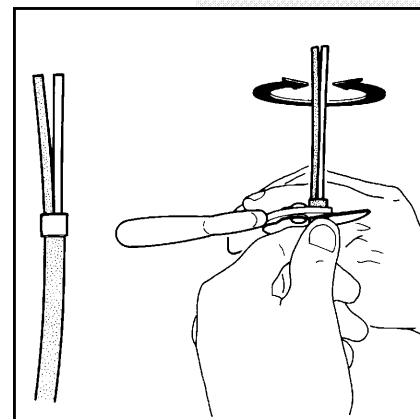


Fig. D5

5. Route the (composite) grease line to the grease point(s) and fasten it with tie-wraps or clamps.
6. Cut the (individual) grease line to its correct length and connect it with the coupling at the grease point.
7. Fix the last few inches of the grease line into place.



3.3 The air lines

Warning:

Before you install the pneumatic lines, you should check whether there are (local) regulations concerning the kind of pneumatic system you are about to modify. Always follow those regulations to the letter. Failure to do so, might have dire consequences (accidents, damages and liability).

Two air lines need to be connected to the **CompAlube** pump unit:

- The air-supply line – the line between the air tank of the vehicle and port 'P' of the brake-counter. This air line is red.
- The brake-service line connected to port 'S' of the brakecounter. Use the yellow line.
- Be sure to install the air restriction fitting (the straight fitting with the small hole in it) into the street T at the Brake service valve when installing the yellow air line.

Both pneumatic lines are made from high-grade polyamide and have a diameter of 8 mm (5/16") fig. D6.

Warning:

Depressurise the air tank before you install the air-supply line.

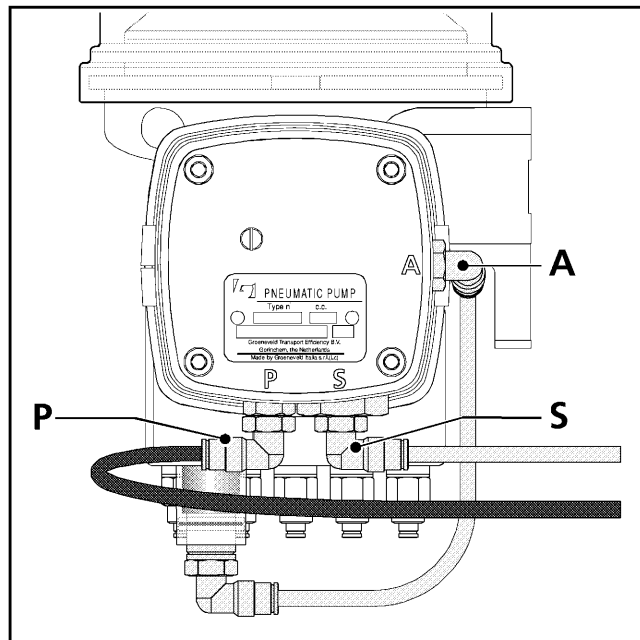


Fig. D6

4 VENTING AND PLACING IN SERVICE

After installation the system may need to be vented and put in service.

4.1 Venting

4.1.1 *CompAlube* pump-unit

Normally, the pump never needs to be vented, because it will have been vented and tested prior to delivery. Only in the event that the grease cartridge was allowed to become completely empty, the pump-unit may need to be vented (fig. D7):

1. Depress the test screw and slowly turn it counter-clockwise until the – possibly active- current lubrication cycle ends (air will escape from the pump) (fig. D8).
2. Open the venting screw (fig. D9) one turn of the winding.
3. Turn the test screw slowly counter-clockwise until a new lubrication cycle is started (air will start flowing to the pump).
4. Close the vent screw (fig. D9).
5. Repeat this procedure until only grease exits the vent opening (and no more air inclusions).

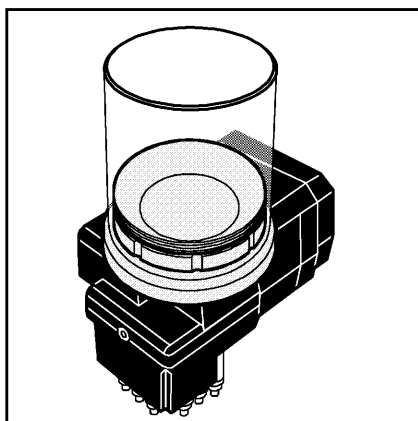


Fig. D7

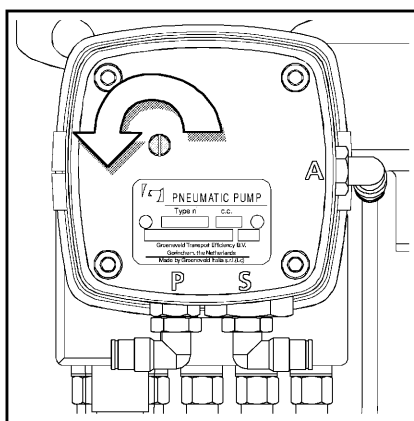


Fig. D8

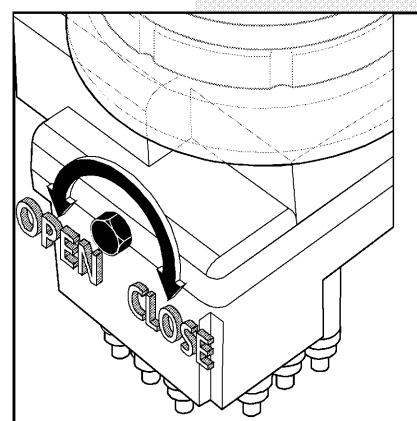


Fig. D9

4.1.2 Grease lines

If prefilled grease lines were not used during installation, a number of lubrication cycles must be performed (see steps 1 and 3 in the previous paragraph), until grease exits at the ends of the grease lines.

Attention:

Make sure - during the venting procedure - that the grease lines are not connected to grease points that serve bearings. Otherwise air would be pumped into the bearings, which must be avoided.



4.2 Placing in service

The main thing that must be done is setting the brake-counter. The number of brake-commands (the lubrication interval) that must be set, depends on:

- the grease demand of the grease points
- the operating conditions (highway, city-traffic, building site, etc.)

A gauge is supplied with the brake-counter, which must be used to set the lubrication interval. The lubrication interval can be set between 10 and 80 brake-commands.

The setting procedure:

1. Remove the 4 mounting screws from the cover of the brake-counter (fig. D10). Use an 5 mm. Allen key.
2. Remove the cover (mind the gasket) and take the gauge (fig. D11) from the cover.

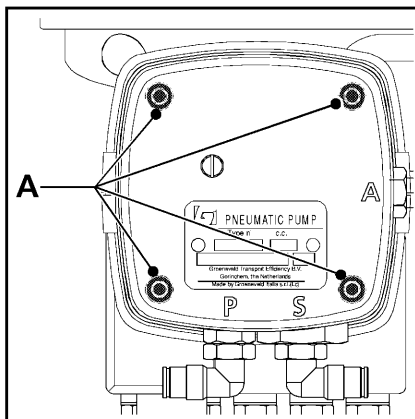


Fig. D10

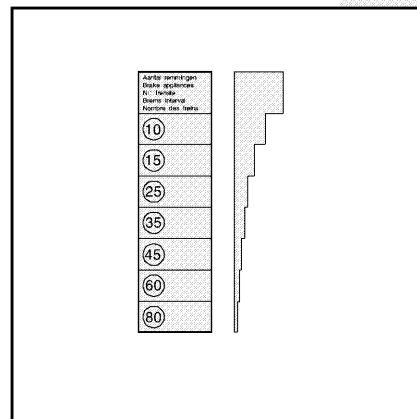


Fig. D11

3. See to it that the set screw attached to the brake-command piston does not rest on the end-stop (fig. D13). Do this by activating the brakes of the vehicle.
4. Set the number of brake-commands using the gauge and two 10 mm open-ended wrenches (fig. D14).
5. Replace the cover, check that the gasket is positioned properly and tighten the 4 allen screws.

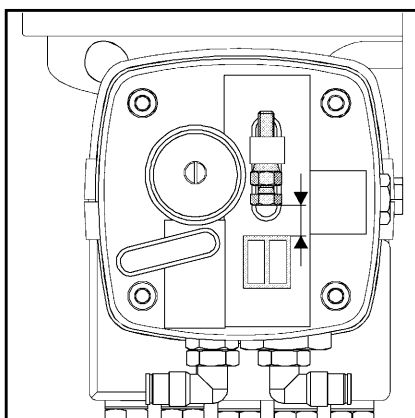


Fig. D12

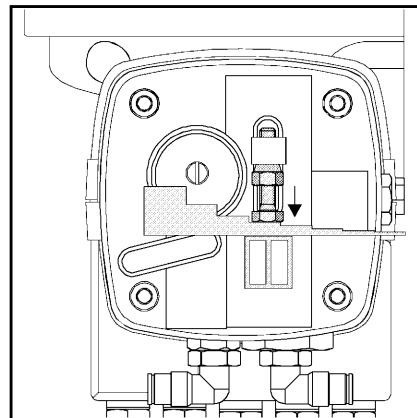
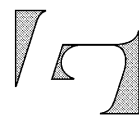


Fig. D14



TECHNICAL DATA

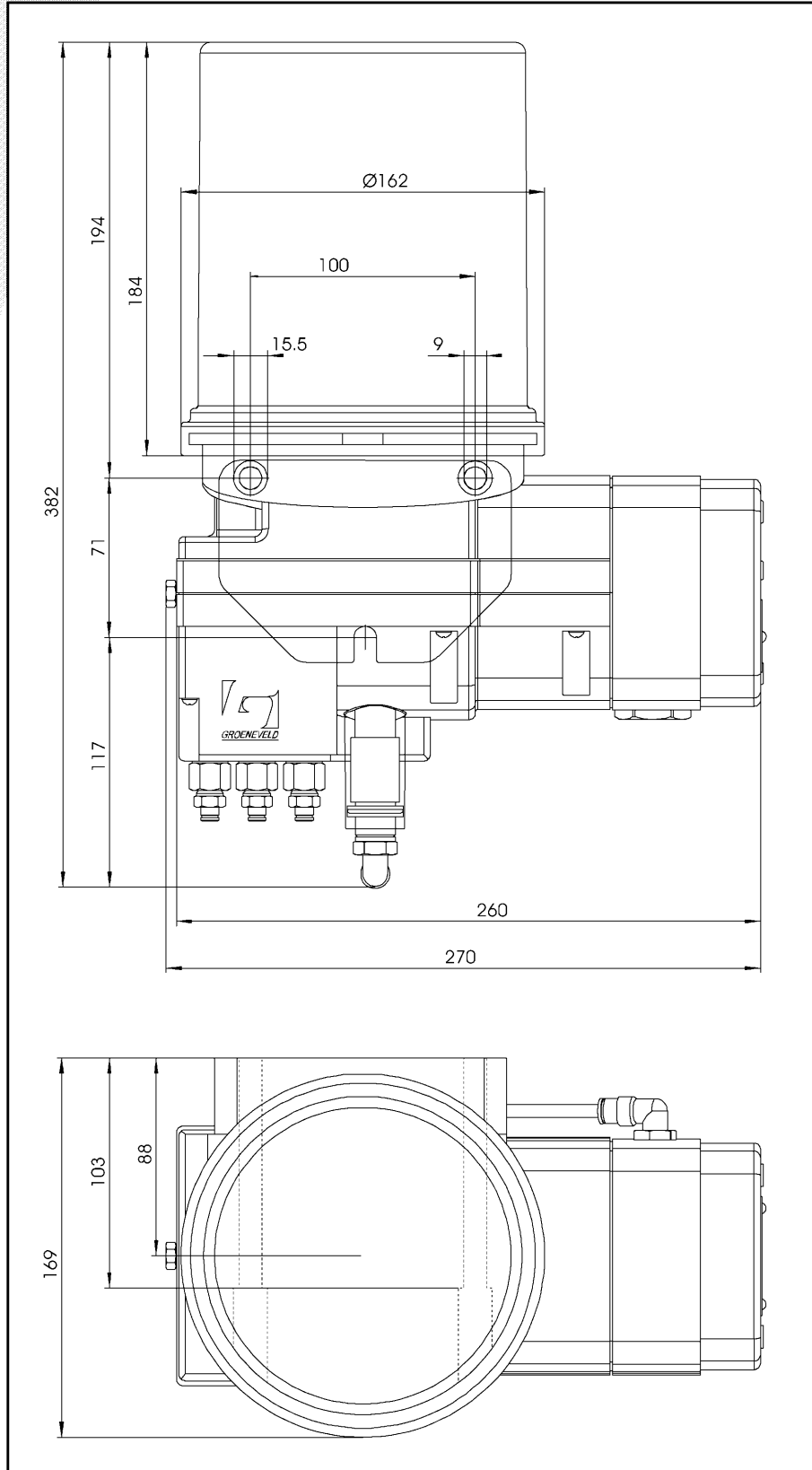
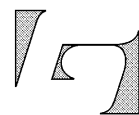


fig. E1 Pump dimensions in millimeters



TECHNICAL DATA

1 PUMP

Cartridge capacity	: 0.5 gallon (1.8 lit.)
Pump output	: 20 cc per stroke
Ratio	: 9:1
Lubricant pressure	: 1080 psi (at 120 psi air pressure)
Maximum lubricant pressure	: 1400 psi
Ambiant temperature	: -13°F to +160°F
Lubricant	: NLGI 0
Weight Pump complete	: 15 Lbs
Cartridge 0.5 gallon	: 4 Lbs

2 METERING UNITS

Maximum number of metering units on pump unit	
- standard	: 12
- special pump unit	: 19
Types of metering unit	Delivery (cm ³ per lubrication cycle)
- Type 1	: 0,050
Secondary tube diameter	: 3\16" (4,8mm)
Maximum length using <i>Greenlube EP.0 grease</i>	: At Tmin > 5°F (-15°C): 25 Ft (7.5m) At Tmin > -4°F (-20°C): 15 Ft (5m) At Tmin > -13°F (-25°C): 10 Ft (3m)

3 BRAKE-COUNTER

Setting range lubrication interval	: 10 ... 80 brake-commands
Duration grease cycle	: 3 ... 25 brake-commands (proportional with set lubrication interval)
Air tube diameter	: Ø 5/16" (8mm)

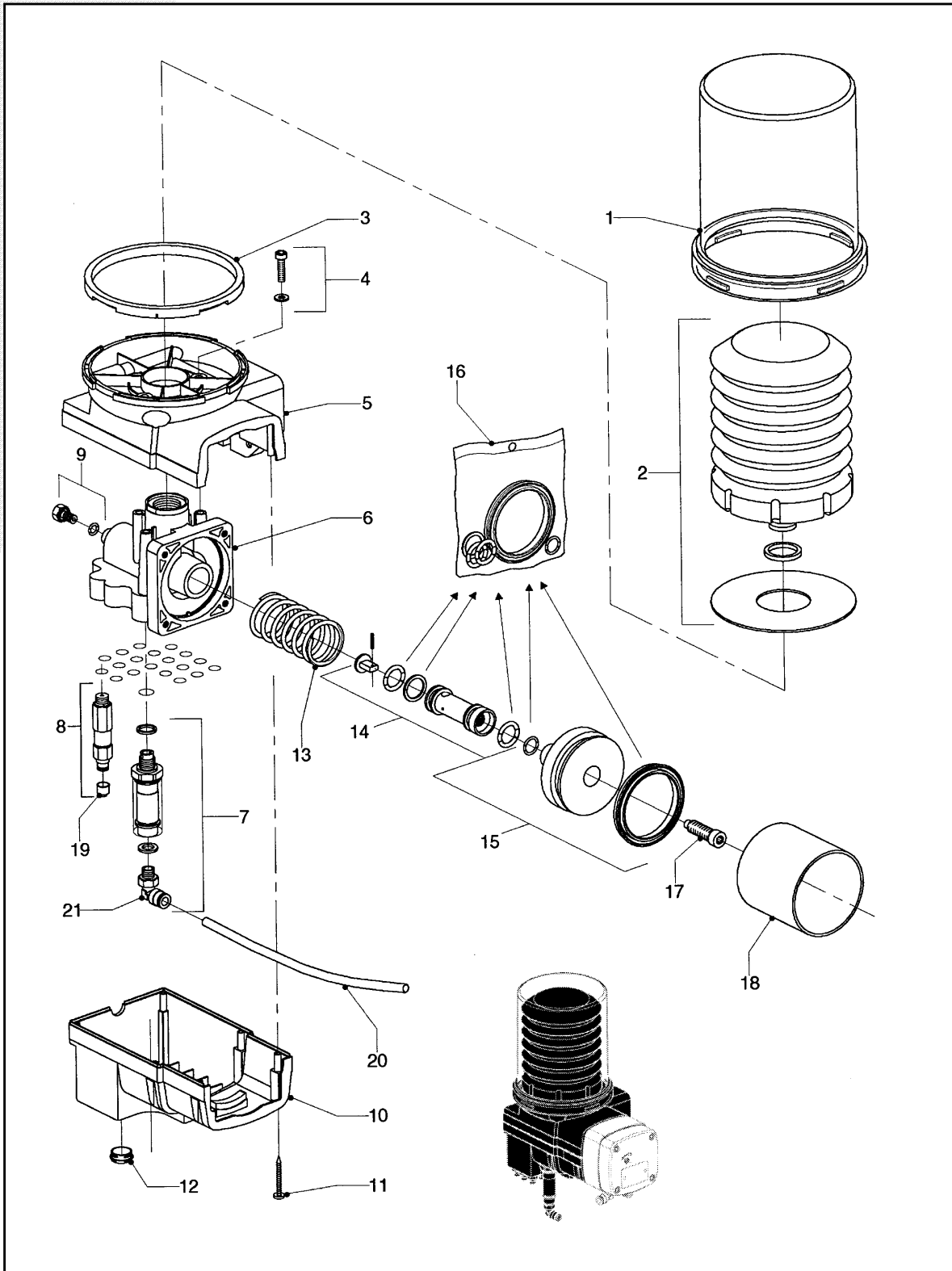
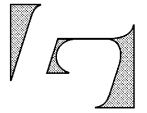


fig. F1 Exploded view Compalube pump



1 EXPLODED VIEW

<i>pos.</i>	<i>kit nr.</i>	<i>part no.</i>	<i>description</i>
1	/	084.11	Reservoircover
2	049.11	/	Cartridge: Greenlube EP-0 / 1,8L
3	/	085.11	Reservoircover gasket
4	115.11	/	Bolt kit pump shell (4 pieces)
5	/	086.11	Plastic pump shell
6	/	087.11	Alu pumphousing (12 metering-units)
	/	088.11	Alu pumphousing (19 metering-units)
7	089.11	/	Pressure indicator kit
8	069.11	/	Metering unit nr. 1 (push-in head 3/16")
9	/	094.11	Vent screw
10	/	095.11	Bottom cover (19 metering-units)
11	098.11	/	Screw kit bottom cover (6 pieces)
12	/	099.11	Plug metering-unit opening bottom-cover
13	/	100.11	Spring 46x85
14	101.11	/	Grease-piston kit
15	102.11	/	Air-piston kit
16	103.11	/	Grease-/ Air- piston O-ring kit
17	/	104.11	Hollow screw: M12x1
18	/	105.11	Bushing air-piston
19	/	104.11	Dustcap
20	/	107.11	Airtube Ø 5/16" x 350 (yellow)

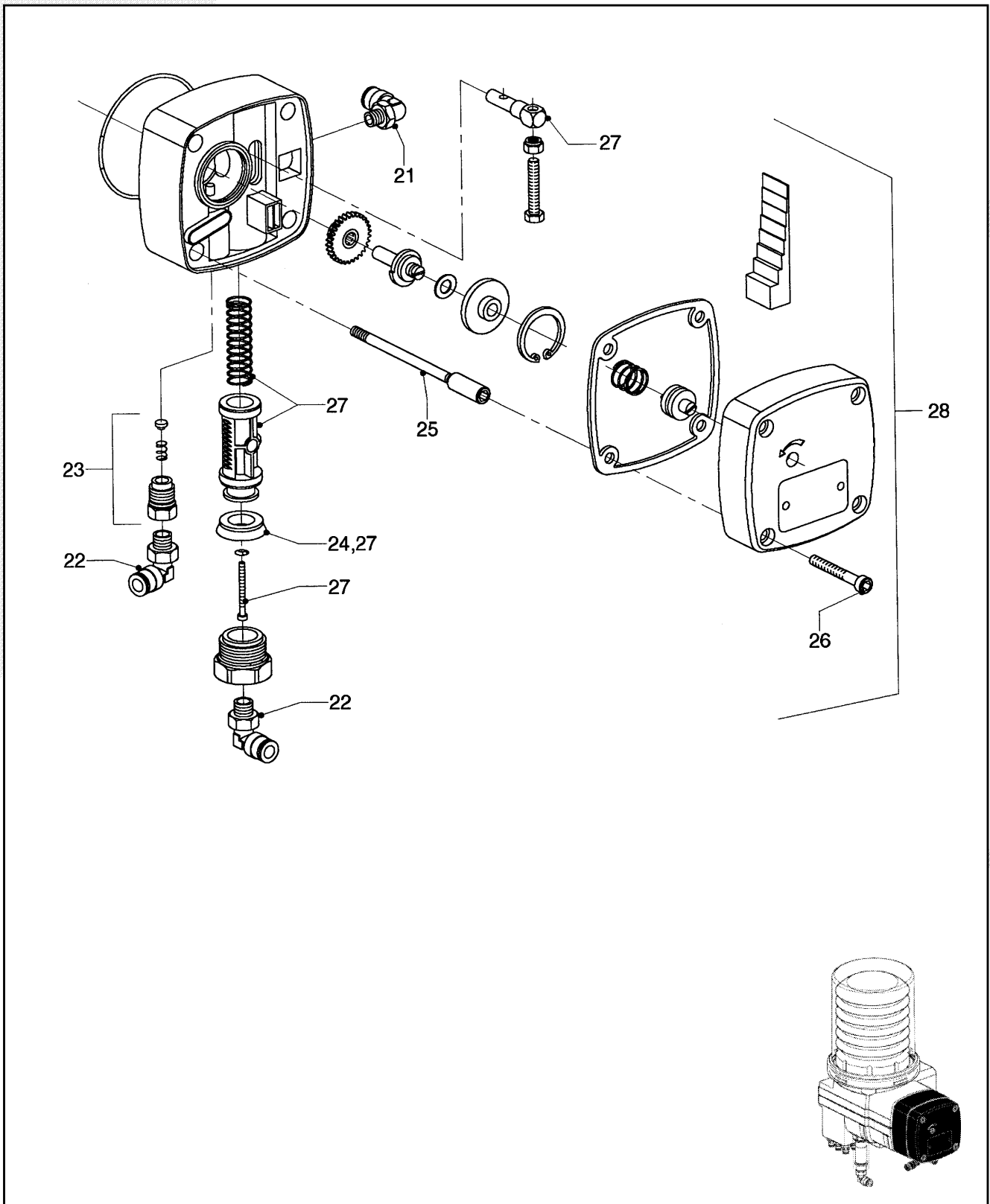
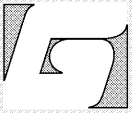
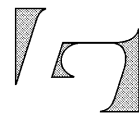


fig. E2 Exploded view Brake counter



2 BRAKE COUNTER

<i>pos.</i>	<i>kit nr.</i>	<i>part no.</i>	<i>description</i>
21	/	108.11	Male stud coupling 90°: 5/16" push-in – G1/4
22	/	109.11	Male stud coupling 90°: 5/16" push-in – G1/8
23	110.11	/	Brake counter valve kit
24	/	111.11	Rubber seal brake-counter piston
25	112.11	/	Bolt kit brake counter
26	113.11	/	Bolt kit brake counter cover
27	/	/	Brake piston revision kit
28	106.11	/	Brake counter kit compAlube (complete)

