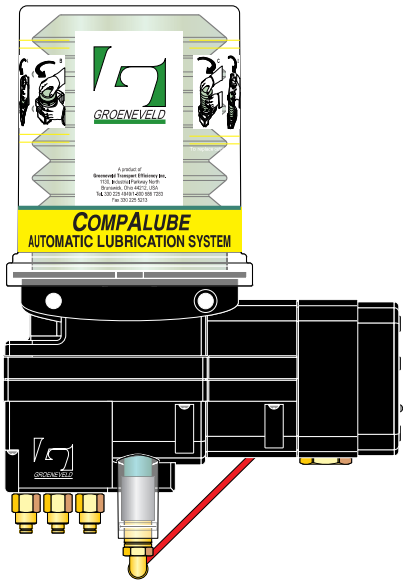
General Manual



CompAlube

Automatic greasing system

EG0105P02

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General information

Type of manual	General Manual
System	CompAlube Automatic greasing system
Manual number	EG0105P02
Publication date	September 2005
Revision	02

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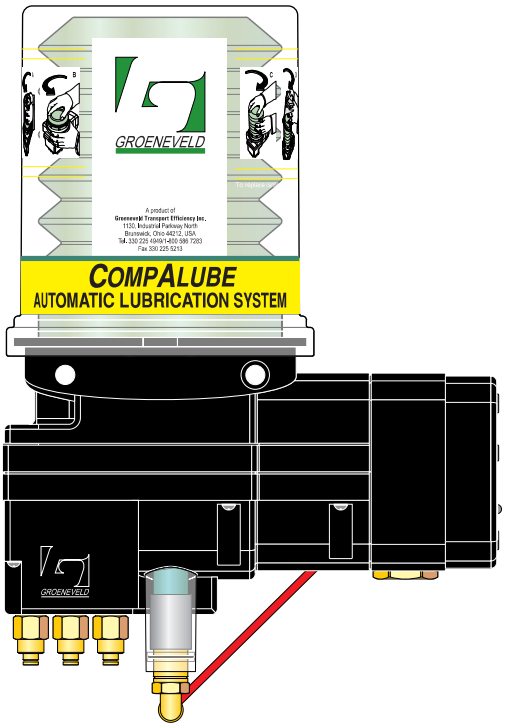
FOREWORD



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Publication date: September 2005

This system manual contains a description of the CompAlube automatic greasing system. The intention is to give potential customers an insight into how the system works, what the possibilities are and, in brief, the maintenance aspects. In addition, this manual contains the technical data of the different parts of the greasing system. The system manual can also be used as user manual.

The manual comprises different sections, indicated with a chapter number. The numbering of the illustrations starts anew at the beginning of each chapter.

Chapter 1, the introduction gives a description of Groeneveld and greasing systems in general.
Chapter 2 describes the complete CompAlube greasing system.
Chapter 3 gives an insight into the operation of the system components.
In chapter 4, the operation of the greasing system is treated.
In chapter 5, the installation of the system is treated.
Maintenance is treated in chapter 6.
The manual concludes with chapter 7, which contains the technical specifications of the CompAlube greasing system.

The folllowing pictograms are used in this manual to notify or warn the user:

Caution:

Notifies the user about important supplementary information, with the purpose of avoiding problems.

WARNING

Warns the user if there is a danger of bodily injury or serious damage to the equipment through incorrect actions/operation.

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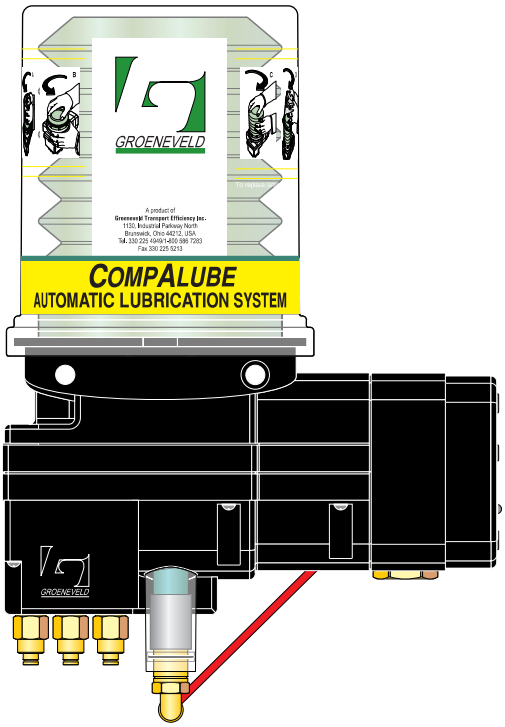
1.

INTRODUCTION



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1.1 Introduction

This chapter contains a brief presentation of the Groeneveld Transport Efficiency company and the products that we supply. In addition, a description of the CompAlube Automatic greasing system is given.

1.2 *GROENEVELD* Transport Efficiency B.V.

Investing in reliability. *Groeneveld* was established in 1971 with just that in mind. In the meantime, this has resulted in an international network of companies, governed from the head office in Gorinchem, The Netherlands. *Groeneveld* strives continuously to strengthen its already predominant position, which has been obtained through a solid image and customer-oriented approach.

The people at *Groeneveld* form a team that works with great enthousiasm to please its customers. A high level of automation allows rapid reactions. The ISO 9001 standard forms the basis for the guaranteed qualitiy of *Groeneveld's* products. Frequent contact with all business relations and an elaborate dealer network are the warranty for the good name of *Groeneveld*. We know what today's entrepreneurs need: not an off-the-shelf product, but a customised solution for the automation of the daily maintenance.

New technologies create new applications. This is why *Groeneveld* has an ample budget for research and development to create new cost-effective products. Groeneveld's Research and Development organisation co-operates closely with leading R&D organisations and manufacturers of vehicles and machines.

Besides the CompAlube Automatic greasing system, *Groeneveld* supplies products such as:

- temperature recording sytems
- on-board computer systems
- speed limiters
- automatic oil-level controllers
- reversing protection systems

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

Figure 1.1 The head office of Groeneveld

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1.3 Groeneveld greasing systems

Groeneveld's automatic greasing systems takes care of the daily maintenance of everything that has moving parts. They prevent unnecessary wear and down-time and thus costs and annoyance. Groeneveld greasing systems are applied, for example, in: manufacturing, machines for civil engineering, agriculture, ships, the off-shore industry and the transport industry.

The most important advantages:

- longer maintenance intervals; less unnecessary down-time.
- reduced wear of the greased parts, as a result of accurate and constant greasing.
- lower repair and replacement costs.
- less unexpected down-time; less loss of production.

1.4 Operation

With CompAlube automatic greasing system from *Groeneveld*, all lubrication points of a vehicle or machine are automatically lubricated at the right moment and with the right amount of grease. Moreover, an optimum grease distribution is obtained over the whole surface to be greased, because the machine or vehicle is greased while it is operational. All actions are automatically performed by the system. The user only needs to make sure that the reservoir is periodically refilled and that the system is inspected.

Groeneveld's automatic greasing systems are carefully designed and thoroughly tested to guarantee a long and trouble-free service life, even under the heaviest operating conditions.

Besides correct installation and the use of the prescribed type of grease, a periodic check of the operation is a condition for the continued good functioning of the system. This periodic check is easy to carry out and can be done together with the usual maintenance. Partly through a careful choice of materials, the greasing system itself is almost maintenance-free.

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Notes

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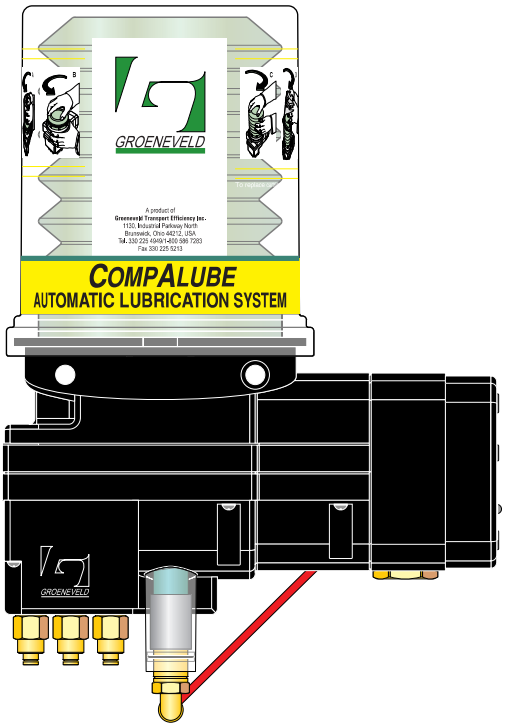
2.

SYSTEM DESCRIPTION



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2.1 Introduction

The *Groeneveld* CompAlube greasing system is specially developed for use on vehicles with a maximum of 19 lubrication points that must be greased. It is easy to install, requires almost no maintenance and is extemely reliable.

2.2 Main components

There are two versions of the CompAlube available: a pneumatic plunger pump and an electrical gear pump.

A pneumatic CompAlube greasing system has the following components (Figure 2.1):

1. Pump unit with integrated:
   - pneumatic grease pump (plunger pump)
   - grease reservoir (grease cartridge)
   - control unit (pneumatic brake-counter or electronic timer)
   - metering units
   - grease-pressure indicator
   - filling connection (optional)
2. Grease lines from the metering units to the individual grease points.
3. Air lines to the pump.
4. Brake-counter, if installed.
5. Installation bracket for the pump (not shown).

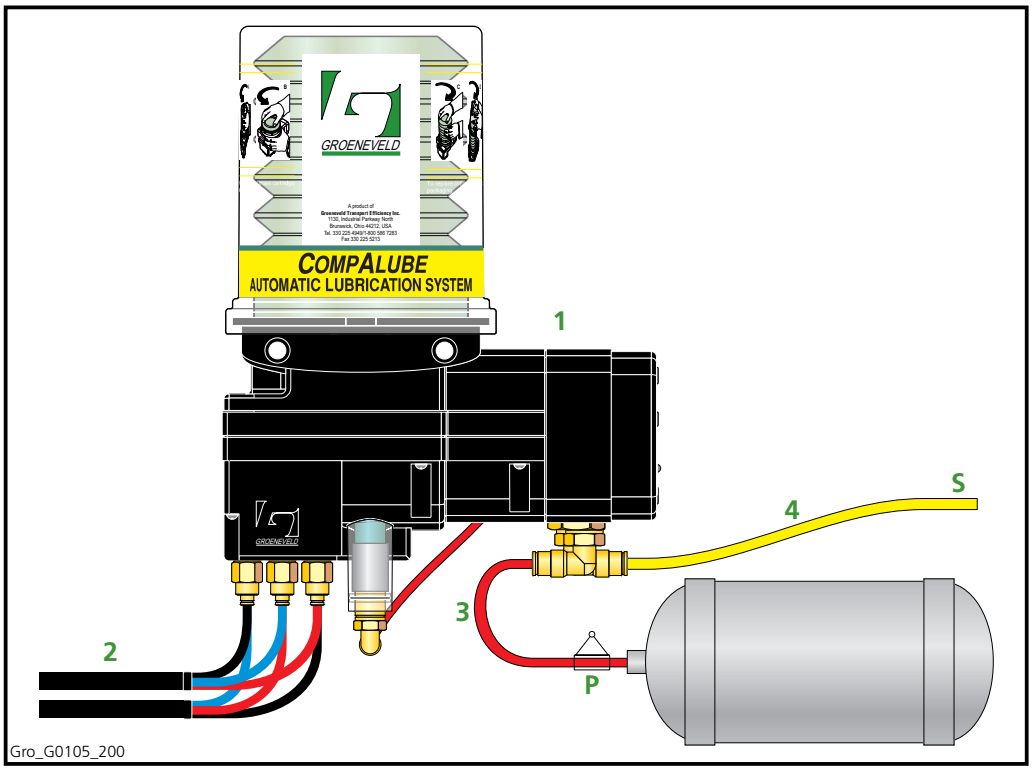

Figure 2.1 Pneumatic CompAlube greasing system

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An electrical CompAlube greasing system has the following components (Figure 2.2):

1. Pump unit with integrated:
   - electrical grease pump (gear pump)
   - grease reservoir (grease cartridge)
   - control unit (electronic timer)
   - metering units
   - grease-pressure sensor
   - filling connection (optional)
2. Grease lines from the metering units to the individual grease points.
3. Electrical cable to the pump.
4. Installation bracket for the pump (not shown).

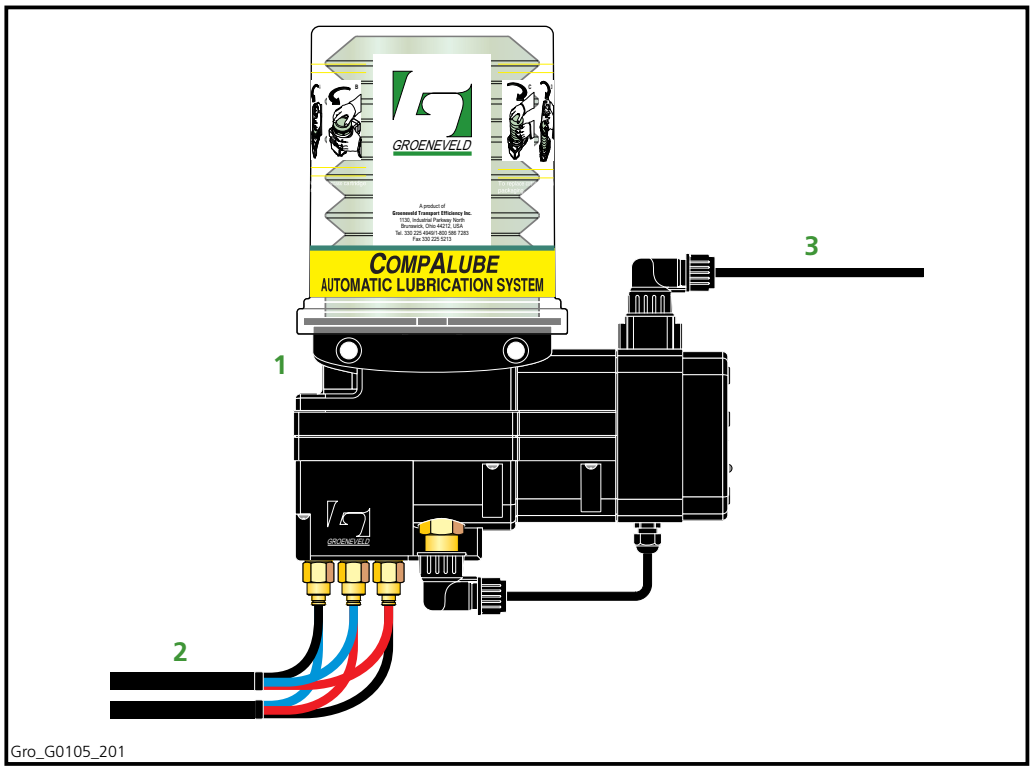

Figure 2.2 Electrical CompAlube greasing system

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2.3 The CompAlube pump unit

The pump unit is the heart of the CompAlube greasing system. It is a very compact unit in which the most important components are integrated. The pump unit requires virtually no maintenance and is easy to install and put into service.

Caution:

The automatic greasing system significantly reduces the time and effort spent on manual greasing. However, do not forget that universal joints, for instance, must still be greased by hand.

2.3.1 Pneumatic CompAlube with brake-counter

The pneumatic CompAlube pump unit with brake-counter has the following components (Figure 2.3):

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. Filling connection (optional)
12. Test screw (on brake-counter)
13. Compressed air connection (P)
14. Grease-pressure indicator
15. Brake command air connection (S)

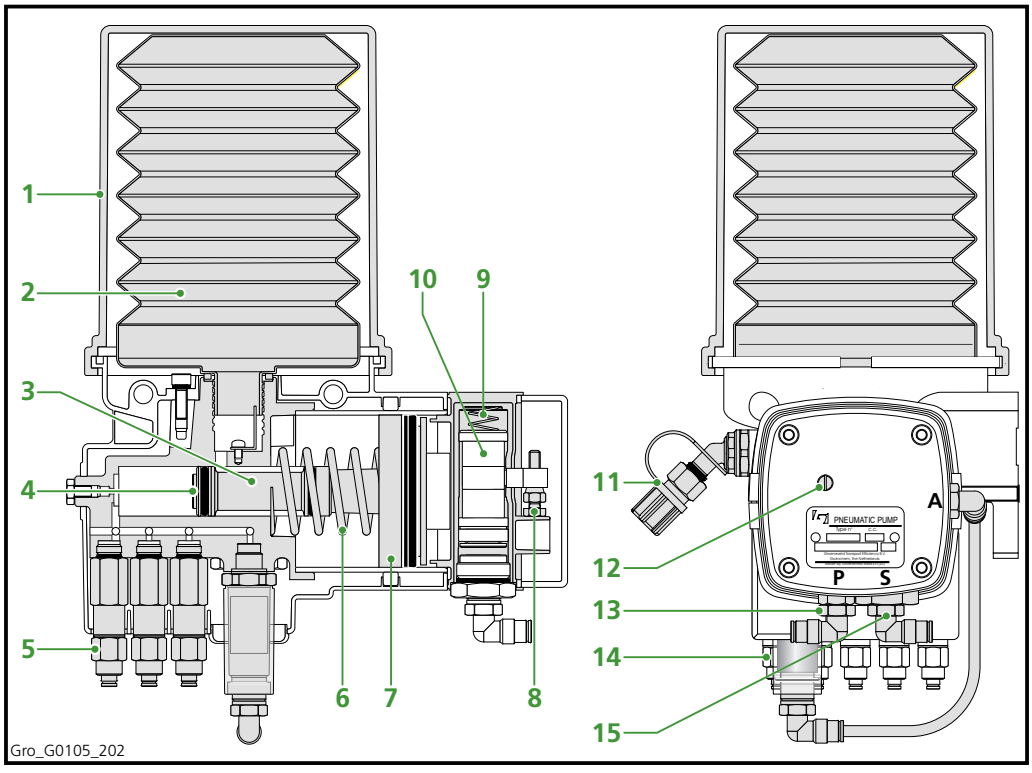

Figure 2.3 Pneumatic CompAlube with brake-counter

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2.3.2 Pneumatic CompAlube with integrated electronic timer

The pneumatic CompAlube pump unit with integrated electronic timer has the following components (Figure 2.4):

1. Transparent protection cover
2. Grease cartridge
3. Grease piston
4. Check valve
5. Metering units
6. Spring
7. Main air piston
8. Magnetic valve
9. Printed circuit board
10. Electrical connection
11. Filling connection (optional)
12. Test button
13. Compressed air connection (P)
14. Grease-pressure indicator

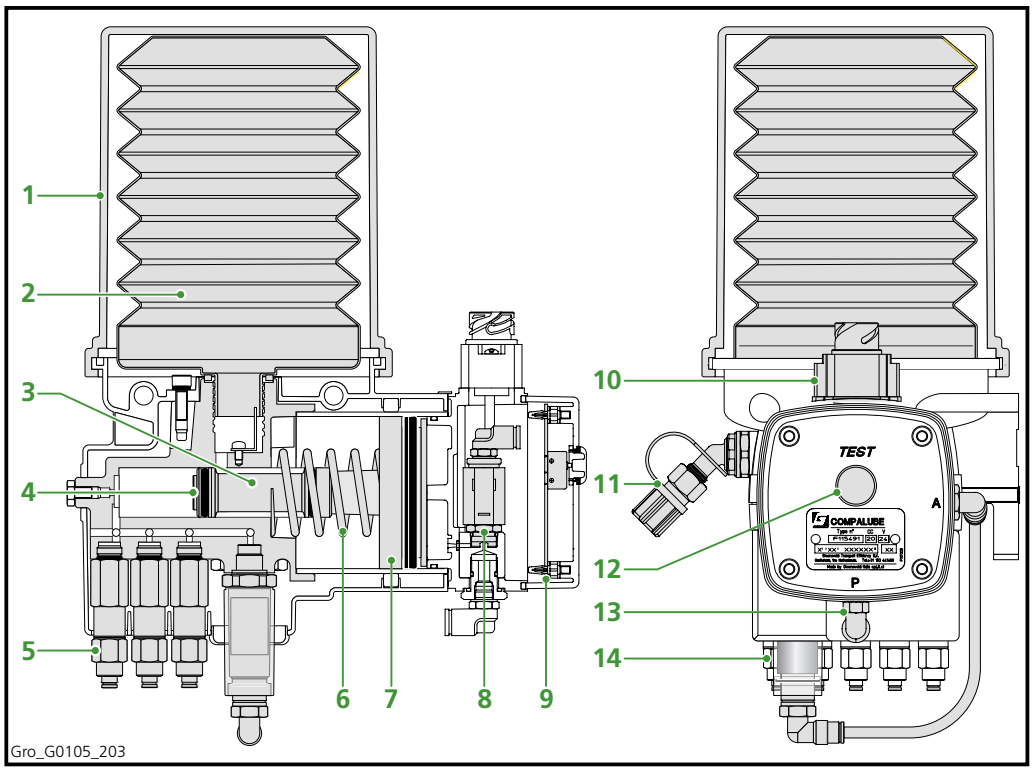

Figure 2.4 Pneumatic CompAlube with integrated electronic timer

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2.3.3 Pneumatic CompAlube with integrated electronic timer

The electrical CompAlube pump unit with integrated electronic timer has the following components (Figure 2.5):

1. Transparent protection cover
2. Grease cartridge
3. Gear pump
4. Pressure regulating valve
5. Metering units
6. Motor
7. Printed circuit board
8. Electrical connection
9. Filling connection (optional)
10. Test button
11. Grease-pressure switch

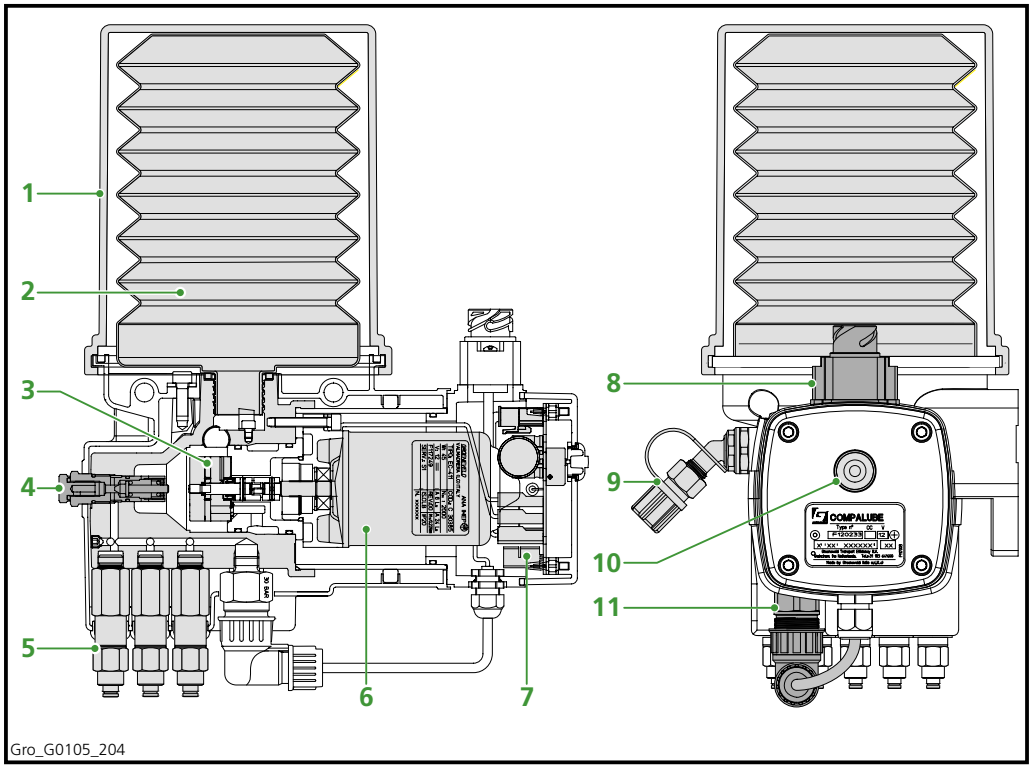

Figure 2.5 Electrical CompAlube with integrated electronic timer

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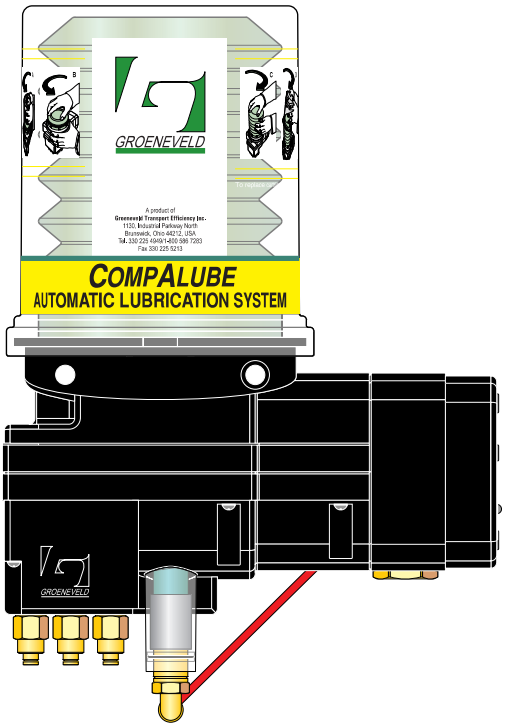
3.

OPERATION



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3.1 Introduction

This chapter contains a description of the operation of various components of the *Groeneveld* CompAlube automatic greasing system. These are the control unit, grease pump, metering units, grease-pressure indicator, grease-pressure switch and the test screw or test button**.**

3.2 Control unit

3.2.1 CompAlube with brake-counter

The *Groeneveld* CompAlube greasing system is controlled by a pneumatic brake-counter. This makes it particularly suited for vehicles that do not have a permanent electrical power supply, such as (semi-)trailers.

The brake-counter draws the compressed air it needs from a protected air tank. The counter is connected to the brake command air connection of the vehicle's braking system through the fast-braking valve. This connection has a restriction, so that the vehicle can always stop in the event of a fractured or broken line.

Each time that the brake-counter has registered a certain number of brake applications (this number can be set), it starts the plunger pump and the greasing system starts its greasing cycle.
The brake-counter contains a cam that rotates a few degrees if the brake command air operates a piston in the brake-counter when the vehicle brakes. After the set number of brake applications has been 'counted', the cam opens the integrated 3/2 valve and the plunger pump is activated. (The pump phase starts.)
After a second series of brake applications (depending on the counter setting), the cam closes the 3/2 valve again and the plunger pump stops. This is the end of the pump phase and the greasing cycle.

3.2.2 CompAlube with electronic timer

When the CompAlube has an integrated electronic timer, the timer controls the actions of the CompAlube greasing system. The timer is an electronically operated device that is suited for vehicles that do not have a permanent electrical power supply. With the electronic timer, you can set the duration (in minutes) of the greasing interval.

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3.3 Pump

3.3.1 Plunger pump

When the brake-counter allows compressed air to flow from the air tank behind the air/grease piston (Figure 3.1) of the plunger pump, this piston is pushed sideways. The grease in chamber (2) is now placed under pressure, so that valve (3) is pressed against the seat and the path to the grease reservoir is closed off (the check valve). The grease now goes from chamber (2) through duct (4) to the grease chamber (5) above the metering units. The metering units now apply the grease at full pump pressure through the grease lines to the grease points. At the end of the pump phase, the air pressure behind the air/grease piston (1) drops away and spring (6) returns the piston to its starting position. At the same time, valve (3) comes away from the seat and, as a result of the underpressure in chamber (2), grease is sucked out of the grease cartridge.

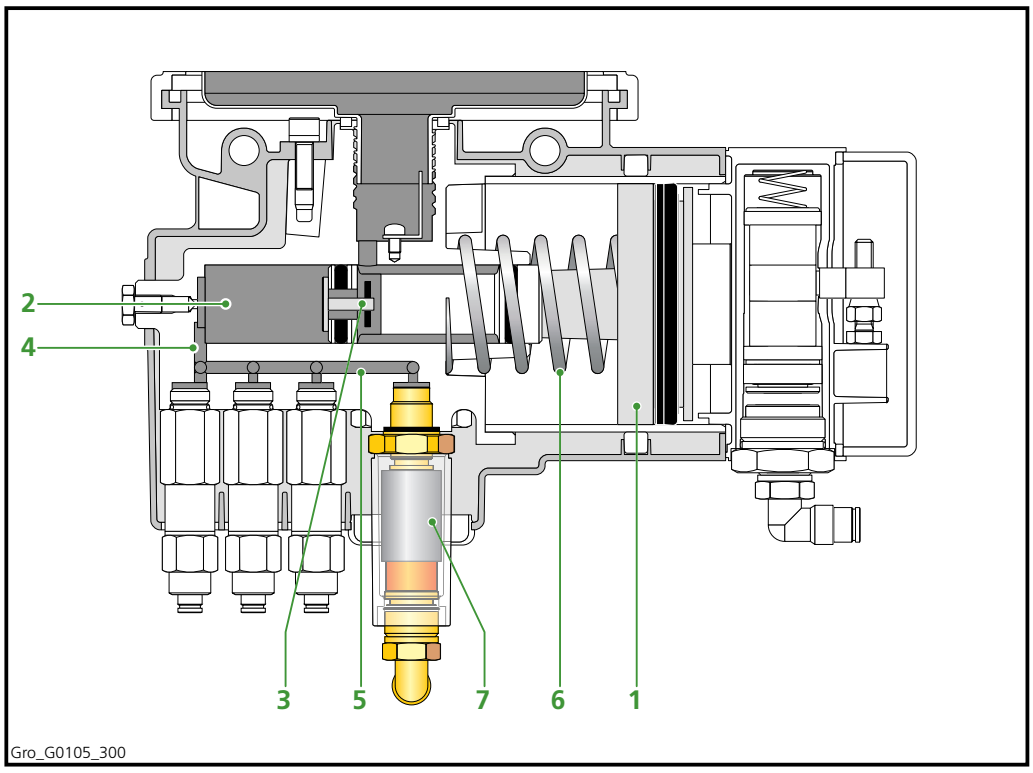

Figure 3.1 Plunger pump

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3.3.2 Gear pump

The gear pump (1) is switched on by the electronic time switch (2) (Figure 3.2). The grease is now pumped from the reservoir (3) to the metering units. The pump continues to run during the total cycle time. This cycle or pulse time is 2 minutes. During the cycle, the pump builds the grease pressure up further all the time. At a pressure of 55 bar, the pressure regulating valve (4) opens, and the grease returns to the reservoir. The grease pressure is therefore limited to 55 bar.
After the greasing cycle of 2 minutes, the pump's direction of rotation is reversed for 90 seconds, to release the pressure in the pump and metering units.

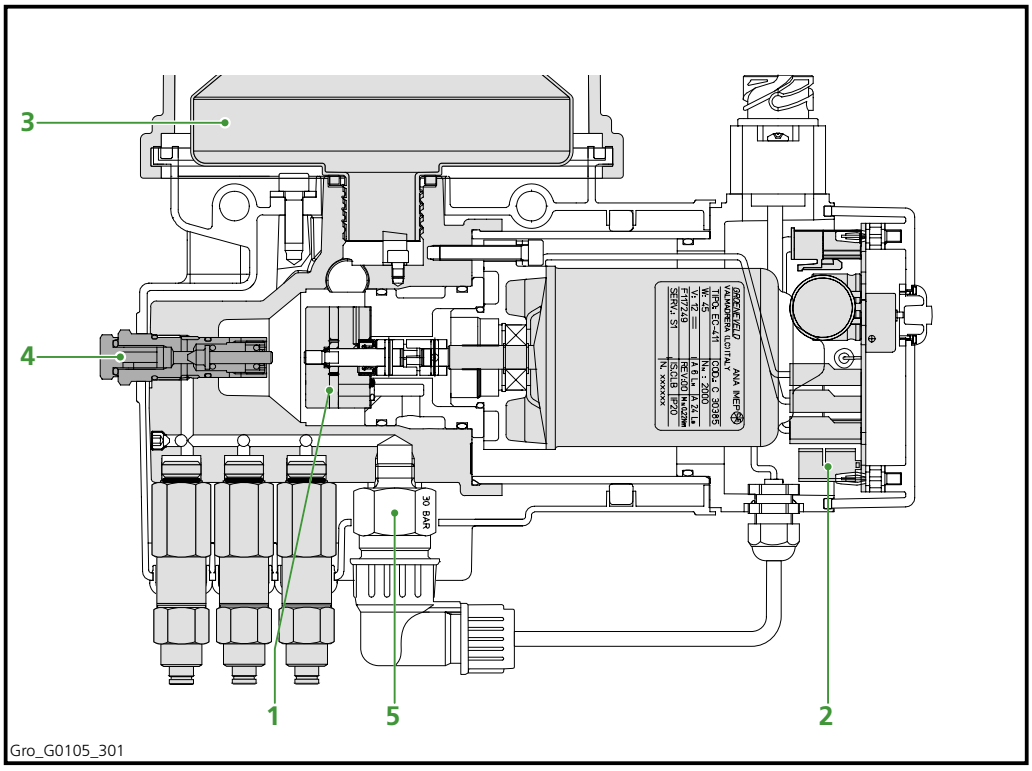

Figure 3.2 Gear pump

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3.4 Metering units

3.4.1 Introduction

Nine different metering units can be supplied for the CompAlube pump; each with a different grease output, varying from 0.025 cc to 1.0 cc per greasing cycle. By carefully selecting the type of metering unit, each grease point will receive the right amount of grease. The metering units are made of brass and, with their closed construction, are extremely reliable.

3.4.2 Operation

Phase A

For this explanation, we assume that we have a metering unit that is not yet filled with grease at the beginning of the greasing cycle pump phase (Figure 3.3).

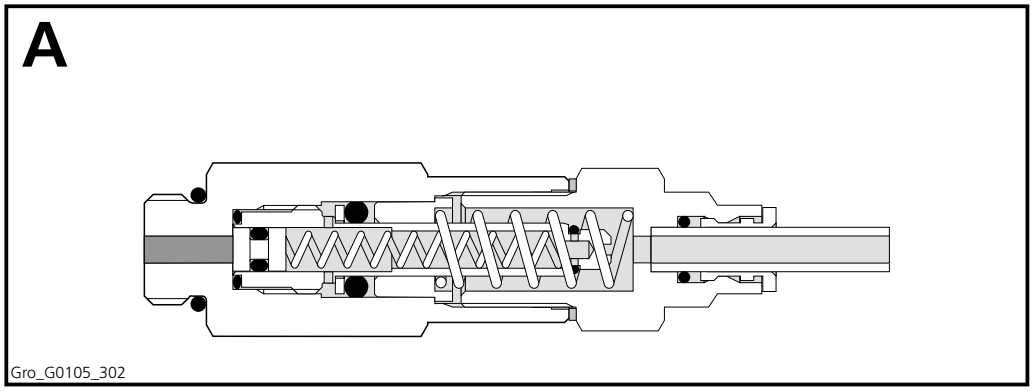

Figure 3.3 Phase A, metering unit in the starting position

Phase B

The pump presses the grease into channel (1) of the metering unit (Figure 3.4). 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 is pushed through the grease line to the grease point. This stroke length - and thus the contents of chamber (3) - is determined by the total thickness of the spacer(s) (6).

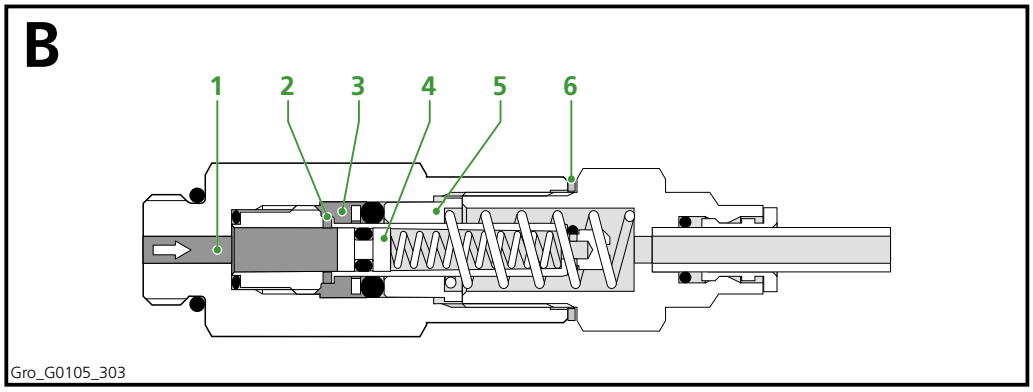

Figure 3.4 Phase B, metering unit during phase B

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Phase C

When the pump stops and the grease pressure disappears, spring (8) pushes plunger (4) back, to block channel (1) (Figure 3.5). O-ring (10) prevents the grease in chamber (7) from being sucked back into the chamber. Spring (11) pushes plunger (5) back, so that the grease in chamber (3) is transferred to chamber (9), through channel (2).

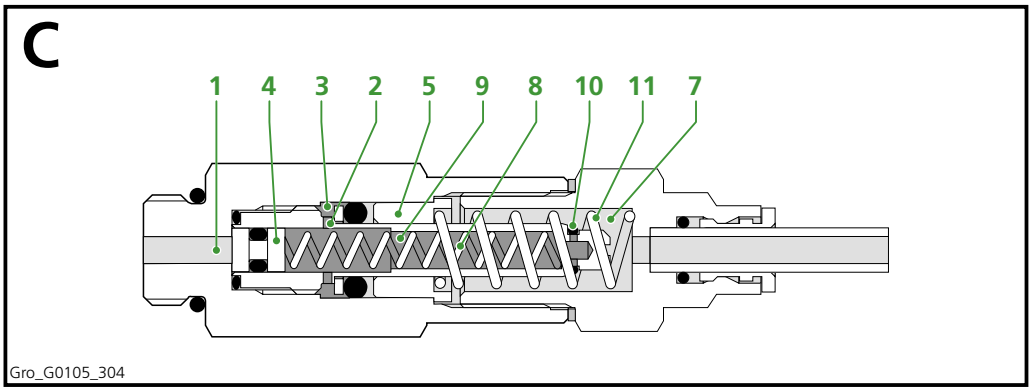

Figure 3.5 Phase C, metering unit during phase C

Phase D

During the next greasing cycle, the same things happen as during phase B. Chamber (9), however, is now filled with grease (Figure 3.6). When plunger (4) is depressed, grease goes from chamber (9), through chamber (7) and the grease line, to the grease point. O-ring (10) is pushed outwards, so that the grease can leave chamber (9).

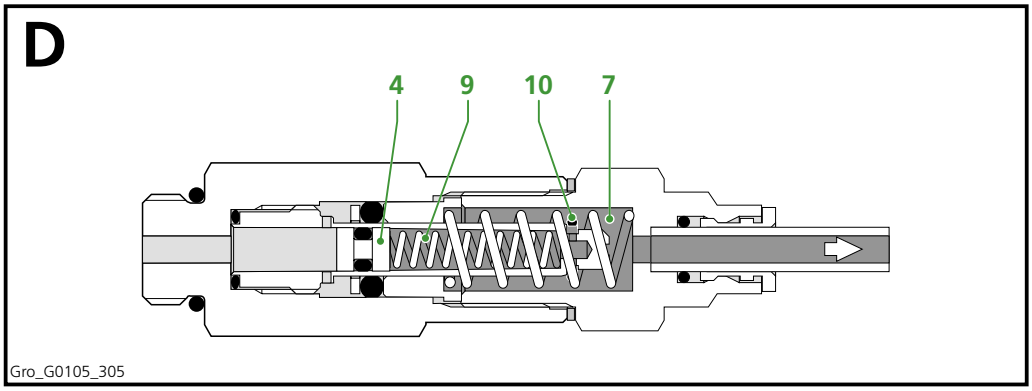

Figure 3.6 Phase D, metering unit during phase D

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3.5 Monitoring

3.5.1 Grease-pressure indicator

The indicator warns the driver or maintenance personnel in the event of an empty grease cartridge and incorrect functioning of the greasing system.

The moment that the brake-counter starts the plunger pump, compressed air also flows under the piston in the grease-pressure indicator. The piston moves upwards and a red indicator (Figure 3.7 left) can be seen behind the window. The chamber on the other side of the piston is connected to the grease chamber above the metering units. When grease pressure builds up in this chamber, the grease pressure returns the grease-pressure indicator piston to its starting position. A green indicator (Figure 3.7 right) appears in the window.

A green indicator therefore indicates that sufficient grease pressure was built up during the last greasing cycle. A red indicator indicates that the necessary grease pressure is not attained, which usually means that a grease cartridge is empty and needs to be replaced.

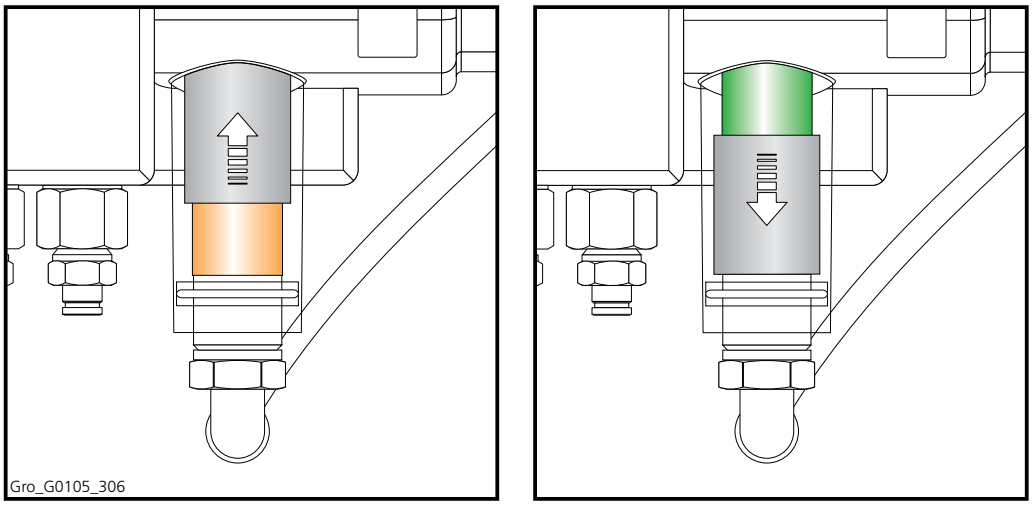

Figure 3.7 Grease-pressure indicator

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3.5.2 Grease-pressure switch

The pump has a grease-pressure switch to signal a too low pressure in the pump during the greasing cycle (Figure 3.8).
This grease-pressure switch is depressed so far at 30 bar that an earth connection is obtained. If this is not the case during the greasing cycle, because there is no or insufficient grease pressure, the control lamp will light. The control lamp only goes out at the next good greasing cycle or the contact on/off. When the contact is switched on, the control lamp will light for 1 second.

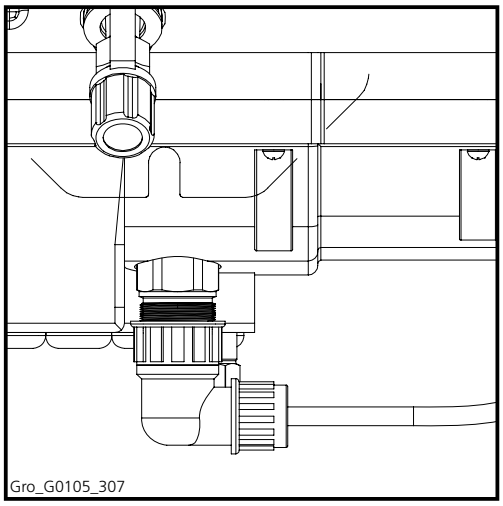

Figure 3.8 Grease-pressure switch

3.6 Test cycle

By using the test screw (see paragraph 4.2.1) - which is on the brake-counter or on the pushbutton (see paragraphs 4.2.2 and 4.2.3) of the electronic timer (on the right-hand side of the pump unit) - the system can be tested and it is possible to start an extra greasing cycle manually, to supply extra grease to the grease points. This can also be used to vent the system after maintenance or repair work.

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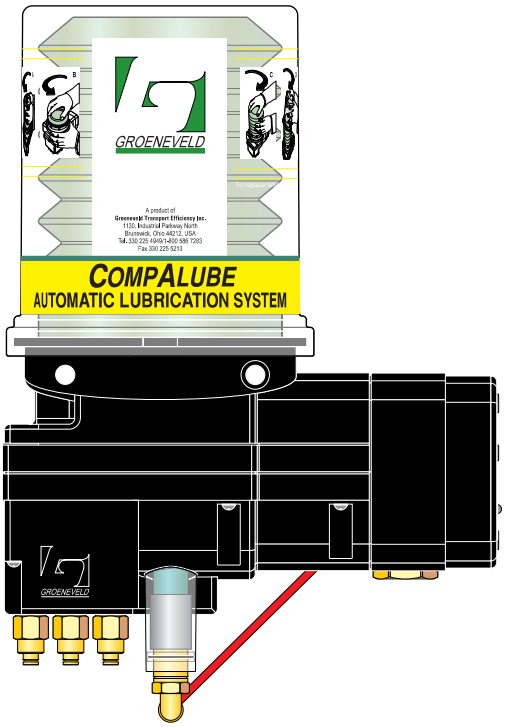
4.

OPERATION



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4.1 Introduction

This chapter contains a description of how several components of the CompAlube greasing system must be operated These are in turn performing a test cycle, replacing the grease cartridge, refilling through the filling connection, setting the greasing interval and venting.

4.2 Performing a test cycle

4.2.1 Pneumatic CompAlube with brake-counter

Place a flat screwdriver in the slot of the test screw. Push the test screw inward and slowly turn the test screw anti-clockwise (Figure 4.1) until a greasing cycle is started (when the greasing cycle starts, air will flow from the air tank into the pump, which can be clearly heard).
The grease-pressure indicator will initially be red and almost immediately turn green. Grease is now metered out to the grease points. Allow the greasing system to operate for at least 30 seconds.

Caution!

There must be sufficient compressed air in the air tank to be able to perform this test.

With the test screw, it is possible to quickly perform several greasing cycles in succession. To do this, turn the test screw anti-clockwise for about 15 seconds after starting the greasing cycle until the greasing cycle is finished (now, compressed air will escape from the pump). Wait 15 seconds and start the procedure again. It is important that you wait about 15 seconds between switching the pump on and off. This time is needed for the metering units to recharge.

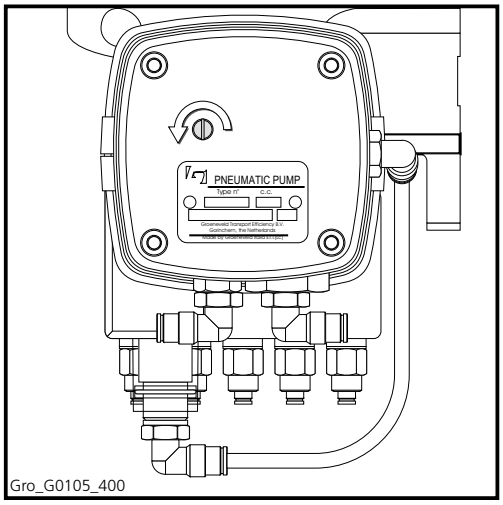

Figure 4.1 Test screw

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4.2.2 Pneumatic CompAlube with electronic timer

Press the test button on the right-hand side of the pump unit (Figure 4.2) for a minimum of three seconds but not longer than five seconds, until you hear compressed air starting to flow to the pump. (If you press the test button for longer than 5 seconds, you will start a multiple test cycle of 25 successive cycles that can be used for greasing after repairs on the vehicle). This starts the pump procedure. This lasts for 3 minutes. Wait 15 seconds before you start the next procedure.

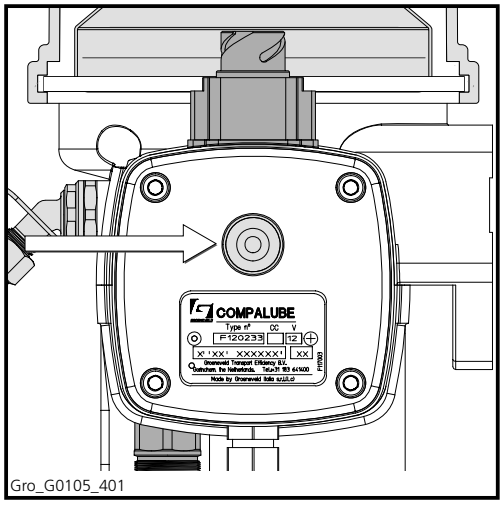

Figure 4.2 Test button

4.2.3 Electrical CompAlube with electronic timer

Press the test button on the right-hand side of the pump unit (Figure 4.2) for a minimum of three seconds but not longer than six seconds, until you hear that the pump motor is switched on. (If you press the test button for longer than 6 seconds, you will start a multiple test cycle of 10 successive cycles that can be used for greasing after repairs on the vehicle). This starts the pump procedure. This lasts for 2 minutes. After these 2 minutes, the pump's direction of rotation is reversed for 90 seconds to release the grease pressure in the pump. Wait 15 seconds before you start the next procedure.

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4.3 Replacing the grease cartridge

The CompAlube pump unit is fitted with a grease cartridge (Figure 4.3). The cartridge is placed under a transparent protection cover and is easily and quickly replaced:

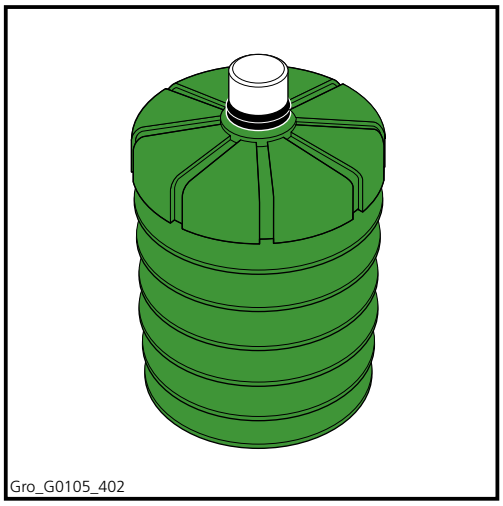

Figure 4.3 Grease cartridge

Caution:

When replacing the grease cartridge, prevent dirt from entering the pump. Before removing the protection cover and the cartridge, first clean the pump and its immediate surroundings.
When removing a cartridge that is not completely empty, be aware that grease can drip out of the cartridge. Protect the environment and prevent grease spills.
Empty cartridges and grease residues must be disposed of in accordance with local regulations.

1. The transparent protection cover (Figure 4.4) has a bayonet catch. Turn the cover anti-clockwise and lift it off the pump unit.

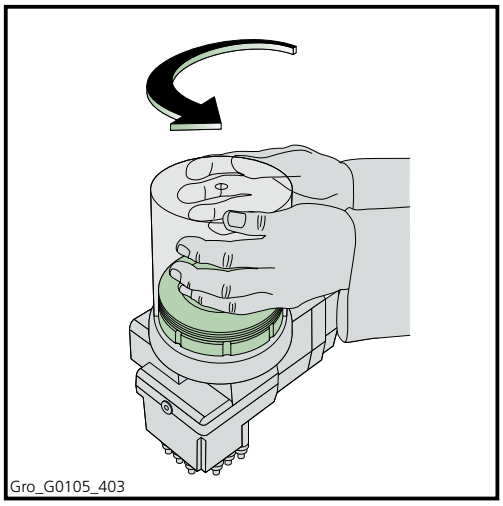

Figure 4.4 Removing the protection cover

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2. Remove the empty cartridge. The cartridge is screwed onto the pump. To remove it, turn it anti-clockwise (Figure 4.5) and lift it straight up.

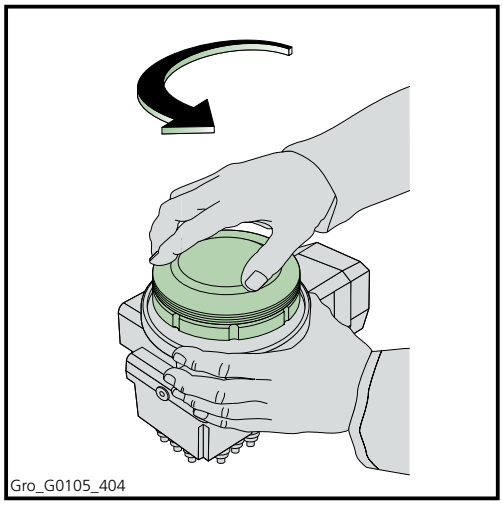

Figure 4.5 Removing the empty cartridge

3. Remove the rubber gasket (Figure 4.6.C) and the cardboard disc (Figure 4.6.B) and replace them with the new parts, supplied with the new cartridge. Fit the cartridge with only one rubber gasket.

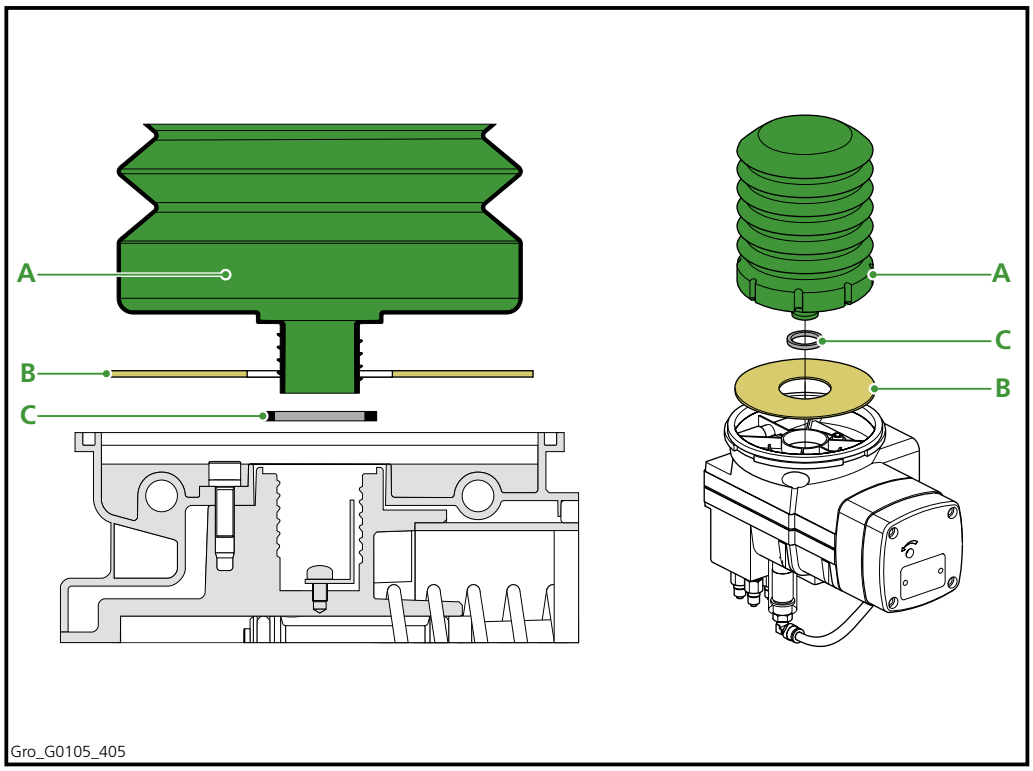

Figure 4.6 Rubber gasket and cardboard disc

Publication date: September 2005

4. Remove the cap from the new grease cartridge, but leave the foil in place. Screw the cartridge clockwise onto the pump (Figure 4.7). The foil is removed automatically.

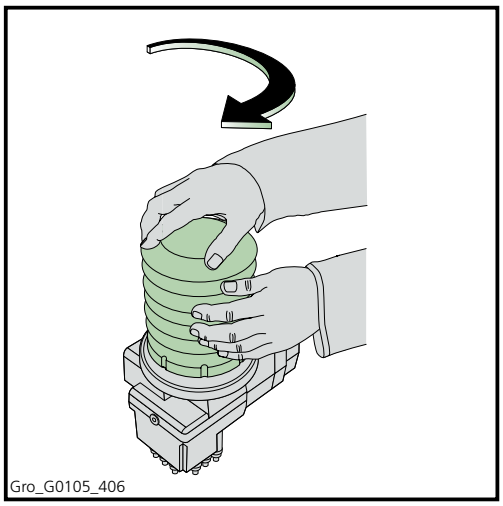

Figure 4.7 Fitting a new grease cartridge

5. Clean the protection cover, place it on the pump (Figure 4.8) and turn it clockwise.

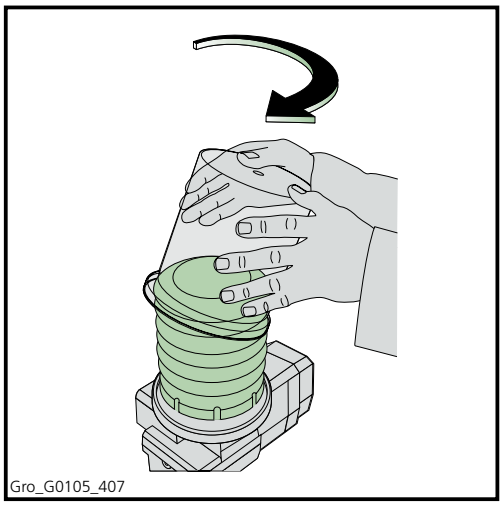

Figure 4.8 Fitting the protection cover

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4.4 Refilling through the filling connection

The grease in the reservoir must be refilled as soon as the minimum level is reached. A filling pump must be used for this. The filling procedure (Figure 4.9) is as follows:

1. With a new filling pump, the filling hose must first be filled with grease. This prevents air from being pumped into the reservoir. Place the quick coupling of the filling hose on the quick coupling of the filling pump cover and pump until the filling hose is filled with grease.
2. Remove the dust cap from the filling connection.
3. Carefully clean the filling connection and the filling hose coupling.
4. Place the filling hose on the filling connection.
5. Fill the reservoir to the maximum level (1 cm below the top of the reservoir).
6. Remove the filling hose from the filling connection and place the filling hose op the quick coupling of the filling pump.
7. Place the dust cap on the filling connection.
8. There is a filter in the filling connection of the pump. If filling is difficult, the filter may be dirty. If it is, remove the filter and clean it.

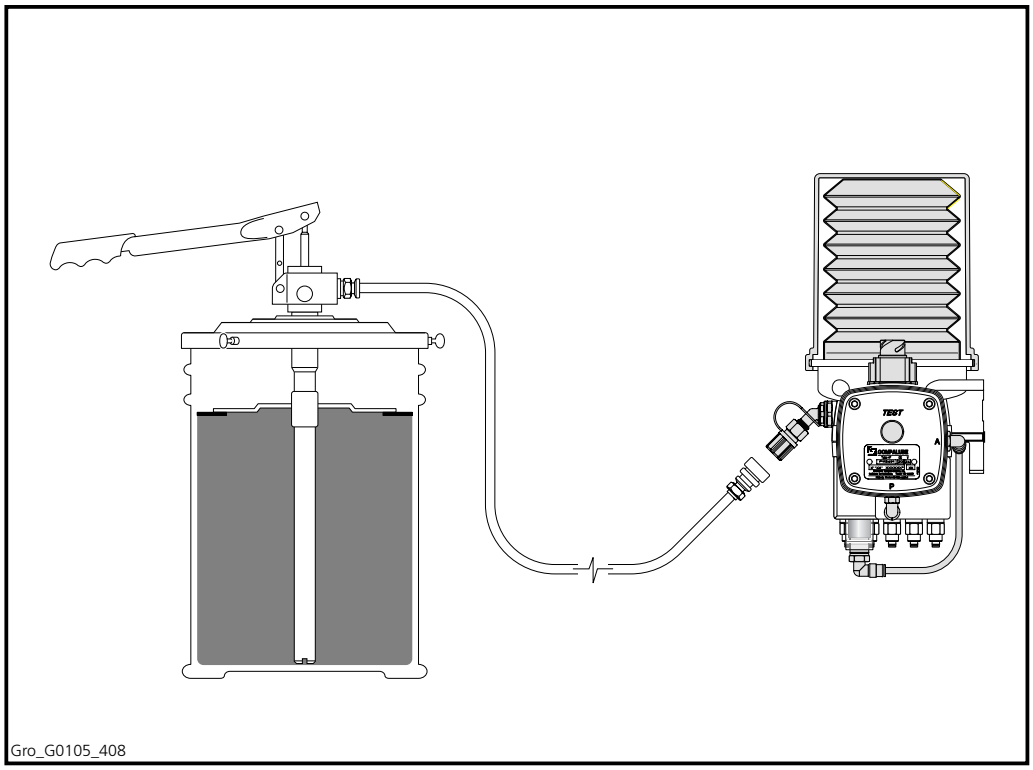


Figure 4.9 Filling with the filling pump

Publication date: September 2005

4.5 Setting the greasing interval

4.5.1 CompAlube with brake-counter

The greasing interval is set on the brake-counter integrated in the CompAlube pump unit. The number of times that the vehicle brakes is used as the basis for the greasing interval. A gauge is supplied for setting the greasing interval. This gauge is located on the inside of the brake-counter cover. For further information see: paragraph 5.10 - Putting into service.

4.5.2 CompAlube with electronic timer

The greasing interval is set on the electronic timer integrated in the pump unit. To set the greasing interval, you can set the DIP switches under the electronic timer cover to a different combination. See paragraph 5.10 - Putting into service for information about the method that you must use to set the greasing interval.

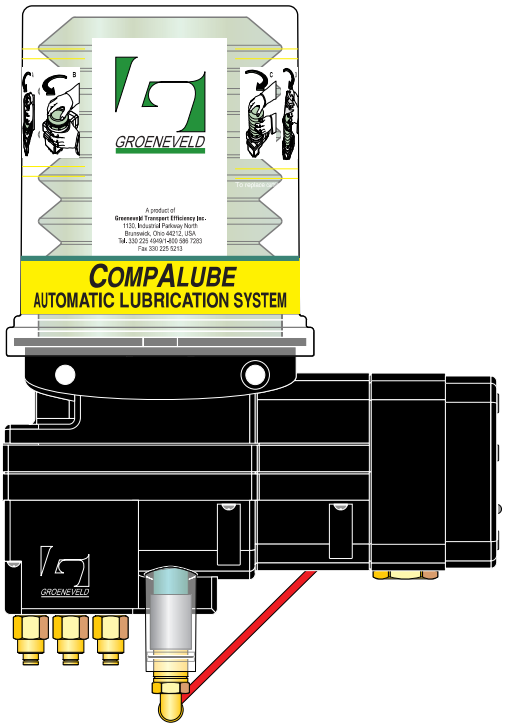
4.6 Venting

During normal operation, the greasing system never needs to be vented. The pump may only have to be vented if the grease cartridge is allowed to become completely empty, see paragraph 5.9 - Venting.

Publication date: September 2005

5.

INSTALLATION



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5.1 Introduction

To install a *Groeneveld* CompAlube greasing system, the following materials/ components must be fitted and the following tasks carried out:

1. The CompAlube pump, including grease reservoir, control unit, metering units and grease-pressure indicator.
2. The grease lines from the metering units to the individual grease points.
3. The pneumatic lines between the vehicle's compressed air system and the pump unit.
4. The electrical cables.
5. Venting the greasing system.
6. Setting and preparing the system for service.

5.2 General installation instructions

1. Before you start installing the greasing system, check whether all grease points are open and properly greased. If not, grease them. This prevents damage being caused by a lack of grease.
2. Prevent contamination from entering the greasing system during installation. Use clean tools and clean the surroundings (vehicle or machine) of the location of the pump unit before you start installing it. Even minor contamination can cause the greasing system to malfunction!
3. When fitting the air and grease lines, take care that:
   - you do not fit the lines to or near parts that become hot, such as exhaust, retarder, compressor, turbo or air-conditioning;
   - the lines are fitted neatly and straight, and are fitted in place with large or small tie wraps or clamps;
   - the lines are not fitted next to or over moving parts in such a way that they may become damaged (in time);
   - the lines that serve moving parts have sufficient slack to follow the movements of these parts. Check that!;
   - grommets are used wherever there is a chance of a line being damaged.

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5.3 Safety precautions

1. Ensure that dangerous situations are avoided when carrying out work (installation or repair).
2. Always apply or use adequate safety precautions to prevent bodily harm and damage before you start working.
3. Ensure that a machine or vehicle is immobilised before you start work. Remove the ignition key and store it in a safe place. Block parts that may move of their own accord. Engage the parking brake.
4. Pay special attention to blocking tailboards, loading flaps, and drop flaps, etc. Make sure that these parts are safe to work underneath, and that they cannot fall.
5. Never work underneath a vehicle or machine that is raised by a jack only. Always use a jack stand and check that the ground is firm and flat enough.
6. Keep in mind that a vehicle with air suspension may drop of its own accord, as a result of loss of air pressure.
7. Only work under the cab if it is fully tilted (and latched). Otherwise, a support must be placed underneath the cab to ensure that it cannot fall back.
8. If necessary, disconnect the ground cable from the vehicle's battery. This prevents electrical equipment from being inadvertently activated.
9. Avoid working on the cooling system without allowing it to cool down first. The system is pressurised and the toxic coolant can easily spray outwards and cause burns.
10. Adhere to all regulations, specifications and limitations, as specified by the manufacturer of the vehicle or machine.
11. Use only clean tools that are suitable for the task you want to perform with them.
12. A vehicle or machine may only be operated if the operation is fully known. If necessary, consult an expert.
13. Keep the working area clean and tidy; this promotes safety.

Publication date: September 2005

5.4 Installation of the CompAlube pump unit

5.4.1 The CompAlube pump unit

The CompAlube pump unit is always made specifically for the vehicle for which it is intended. Before the CompAlube pump unit can be installed on the vehicle, the following must be checked:

1. Does the pump have the right number and type of metering units?
2. Are the right line combinations present and are all lines long enough?

If the pump unit is part of a kit, it is usually correctly assembled and fitted with the right grease lines. If the pump unit is not part of a kit or if the grease lines are not assembled, we advise you to first fill the grease lines before fitting the pump unit. Use only NLGI-0 grease.

5.4.2 Fitting the pump on the vehicle

1. Determine where you want to fit the pump unit. Make sure that:

   - the grease lines are long enough, and reach the grease points;
   - the pump can be well accessed to replace the cartridge;
   - the level in the reservoir can be read;
   - the pump is protected against damage.

2. Check first if you can use existing holes in the chassis to fit the fitting bracket. Only drill new holes when you cannot use the existing holes and check if the positions where you want to drill are safe. Always follow the vehicle manufacturer's instructions. Do not let the fitting bracket rest on the chassis profile flange and do not drill holes in the flange for extra fastening of the fitting bracket. Before drilling a hole, make sure that you will not damage some essential component of the vehicle, such as ducts, wiring or air tanks. After drilling, clear the area of debris with an air gun or brush.

Warning!

If the fitting bracket is to be welded onto the vehicle, the relevant instructions and regulations issued by the vehicle's manufacturer must be strictly adhered to.

3. Fit the fitting bracket (with the pump) on the chassis.
4. Remove the blind plugs from the air connections on the pump.

Publication date: September 2005

5.5 Grease lines and couplings

The grease lines, which are connected to the metering units on the pump unit at one end, are connected by special couplings to the grease points at the other end. These couplings can be supplied in a wide variety of types. Which type should be used at a grease point depends on:

- the thread in the grease point;
- the position of the grease point;
- the type of grease line used;
- the operating conditions.

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

If a grease plan is available, it will specify which coupling or combination of couplings must be used at each grease point.

Usually, polyamide grease lines with an outside diameter of 3/16" (4.8 mm) are used on the CompAlube pump unit. To be able to connect these grease lines easily and quickly, the metering units on the pump unit are fitted with push-in couplings as standard. If polyamide grease lines cannot be used for some grease points, the metering units that serve these grease points must be fitted with pipe (nut and cutting-ring) couplings.

The polyamide lines can be supplied as composite lines (2 or 3 polyamide lines inside a common plastic outer jacket). To make them clearly distinguishable at both ends of the jacket, each grease line has a different colour (red, blue or black) (Figure 5.1). If the different polyamide lines in an outer jacket are connected to metering units with different outputs, this must be done as follows:

- metering unit with the lowest output : Red line
- metering unit with intermediate output : Blue line
- metering unit with the highest output : Black line

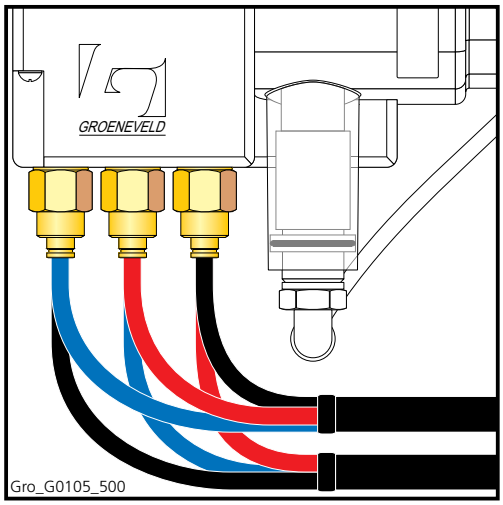

Figure 5.1 Polyamide lines

Publication date: September 2005

5.5.1 Fitting the grease lines and couplings

Caution!

Do not add or modify existing grease points on your own initiative. Certain constructions can be weakened by drilling holes. Always follow the relevant vehicle manufacturer's instructions.

1. First remove the original grease nipple from the grease point and replace it with the correct coupling or combination of couplings (see the grease plan). If the grease point to be connected is an "added grease point", a hole must be drilled (at the location shown on the grease plan). Now, a thread must be tapped, after which the coupling or combination of couplings can be fitted. With elbow couplings, make sure that they are at such a angle that the opening points in the direction of the grease line.
2. Before you start to lay the (composite) grease line, first determine the most favourable or suitable route.
3. Roughly determine the required length of line and cut or saw the line off.
4. With composite lines (polyamide), roughly determine the desired length of the individual lines and strip the outer jacket along this length (Figure 5.2.A/ B). Make sure that you do not damage the individual lines in the jacket. The stripped part of the composite grease line must look as in (Figure 5.2.C).

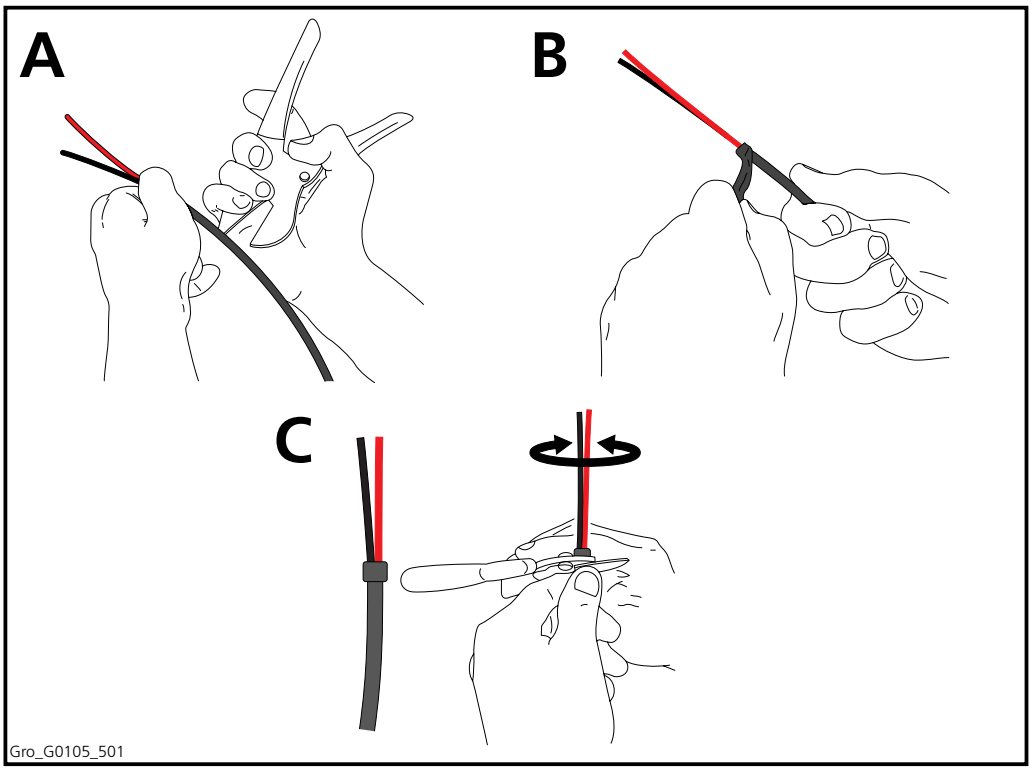

Figure 5.2 Removing the outer jacket

Publication date: September 2005

5. Fasten the grease line with clamps or brackets to just before the coupling on the grease point.

Warning!

If grease lines are laid along booster hoses, brake booster rubbers must always be used. These rubbers prevent the booster hose from being damaged or from being pinched by clamps

6. Cut the grease line to the correct length and connect it to the coupling.
7. Fasten any loose part of the grease line to the coupling.

5.5.2 Maximum grease line length

Temperature	*Maximum length of PA 3/16" line with metering unit no. 1*	*Maximum length of PA 3/16" line with metering unit no. 3*	*Maximum length of PA 3/16" line with metering unit no. 8*
-15°C/5°F	7.5 metres	7.5 metres	7.5 metres
-20°C/-4°F	5 metres	5 metres	5 metres
-25°C/-13°F	3 metres	3 metres	3 metres

Caution!

The maximum line lengths are determined for use with GreenLube EP-0 grease. If a different type of grease is used, the maximum line lengths can be different. At temperatures below -10°C/14°F, the ouput from the metering units can drop by 30%.

Publication date: September 2005

5.6 Pneumatic lines

Warning!

Before installing the pneumatic lines, you must always check if there are any specific legal regulations or provisions. Always follow these regulations or provisions. Failure to do so might have dire consequences in connection with the legal liability, accidents and damages, etc.

5.6.1 Pneumatic CompAlube with brake-counter

Two air lines must be connected to the pneumatic CompAlube with brake-counter (Figure 5.3):

- The air supply line - the line between vehicle's the air tank and port 'P' on the brake-counter. This air line is red.
- When the brake-counter is used, the brake service line is connected to port 'S' on the brake-counter. Use the yellow line.

Both pneumatic lines are made of high-grade polyamide and have an outer diameter of 8 mm (5/16").

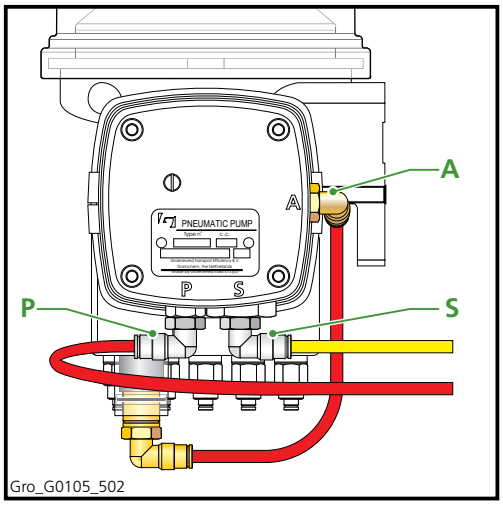

Figure 5.3 Pneumatic CompAlube with brake-counter

Publication date: September 2005

5.6.2 Pneumatic CompAlube with electronic timer

One air line must be connected to the pneumatic CompAlube with electronic timer (Figure 5.4):

- The air supply line - the line between vehicle's the air tank and port 'P' on the brake-counter. This air line is red.

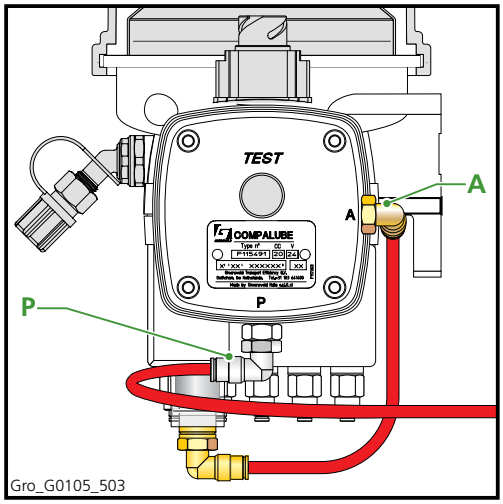

Figure 5.4 Pneumatic CompAlube with electronic timer

Warning!

Release the pressure in the air tank(s), before you install the air supply line.

Publication date: September 2005

5.7 Electrical cables

5.7.1 The pneumatic CompAlube with electronic timer

Connect the wires according to the following table.

Pin no.	*Wire colour*	*Wire diameter*	*Description*
1	Red	2.5 mm²	+15 pump connection
2	Black	2.5 mm²	-31 pump connection

5.7.2 The electrical CompAlube with electronic timer

Connect the wires according to the following table.

Pin no.	*Wire colour*	*Wire diameter*	*Description*
1	Red	2.5 mm²	+15 pump connection
2	Black	2.5 mm²	-31 pump connection
3	Grey	0.75 mm²	+ control lamp connection
4	White	0.75 mm²	- control lamp connection

5.8 CompAlube for lorries

5.8.1 Pneumatic CompAlube with integrated brake-counter

A magnetic valve set is required if you want to install the pneumatic CompAlube with integrated brake-counter on a lorry. On lorries, it is not allowed to connect the integrated brake-counter directly to the pneumatic braking system and this is avoided by the use of the magnetic valve set.
This system corresponds with the standard CompAlube system, only the command pulse now comes from the brake light switch.
A 2-wire cable, connected to a cable coming from the brake light switch and the ground, is connected to the terminals on the magnetic valve. The magnetic valve should be connected in parallel with the brake lights, so that the magnetic valve opens at each brake pulse and air flows from the accessoires air tank to the command piston (S) of the brake-counter.

Publication date: September 2005

5.9 Venting

5.9.1 The pneumatic CompAlube with brake-counter

Normally, the pump never needs to be vented because it is vented and tested before delivery.
However, if the grease cartridge has been completely empty, the pump may need to be vented again:

1. Push the test screw inward and slowly turn it anti-clockwise, until a greasing cycle (if running) is finished (air will now escape from the pump). (Figure 5.5)

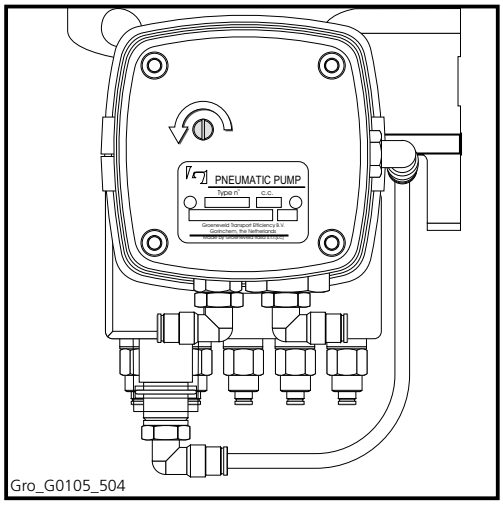

Figure 5.5 Test screw

2. Open the venting screw (Figure 5.6).

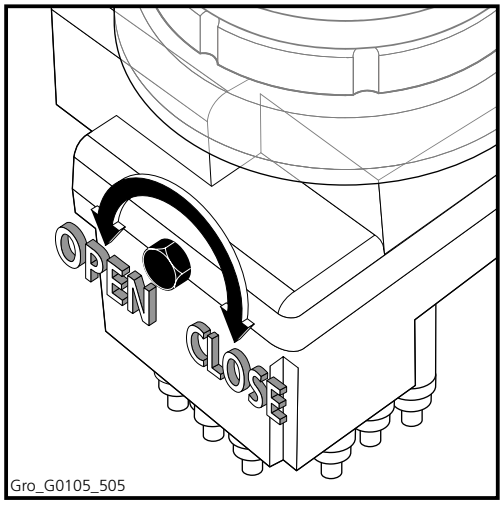

Figure 5.6 Venting screw

3. Turn the test screw slowly anti-clockwise until a greasing cycle is started (air will flow into the pump).
4. Close the venting screw (Figure 5.6).
5. Repeat this procedure until only grease (and no more air) exits the vent opening.

Publication date: September 2005

5.9.2 The CompAlube with electronic timer

Normally, the pump never needs to be vented because the pump is vented and tested before delivery.
However, if the grease cartridge has been completely empty, the pump may need to be vented again:

1. Open the venting screw (Figure 5.6).

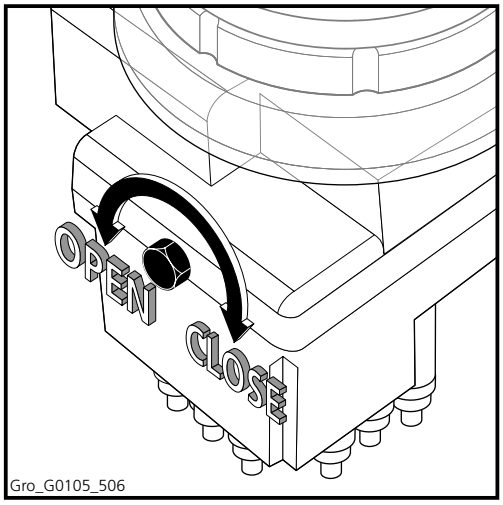

Figure 5.7 Venting screw

2. Press the test button on the right-hand side of the pump unit for a minimum of three seconds but not longer than five seconds, until you hear that the pump motor is switched on (Figure 5.8).

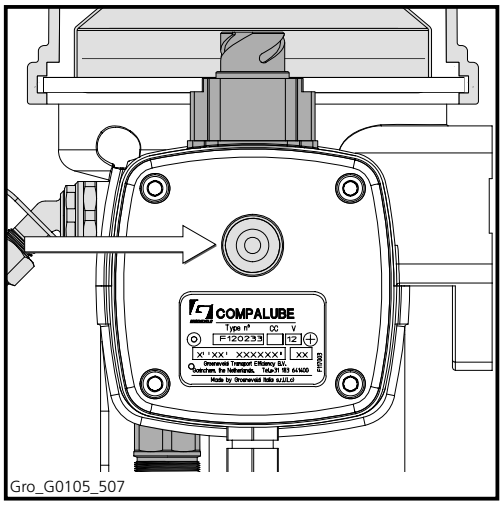

Figure 5.8 Test button

3. Close the venting screw (Figure 5.6) as soon as only grease exits the vent opening.

5.9.3 Grease lines

If prefilled grease lines were not used during the system installation, greasing cycles must be performed (see steps 1 and 3 in paragraph 5.9.1 or step 2 in paragraph 5.9.2) until grease exits the ends of the lines.

Publication date: September 2005

5.10 Putting into service

After the installation, the CompAlube greasing system must be put into service.

5.10.1 The pneumatic CompAlube with brake-counter

The main task is to set the brake-counter. The number of brake demands (the greasing interval) that must be set depends on several factors:

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

A gauge supplied with the brake-counter is used to set the number of brake demands to beween 10 and 80 brake demands.

The setting procedure:

1. Remove the 4 screws from the cover of the brake-counter with a suitable Allen key (Figure 5.9).

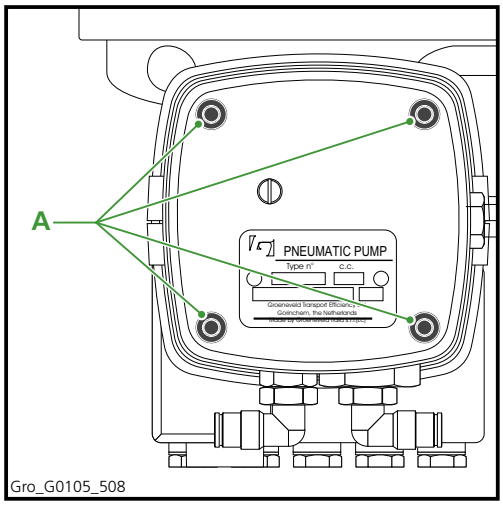

Figure 5.9 Fastening screws

2. Remove the cover (remember the gasket) and take the gauge out of the cover (Figure 5.10).

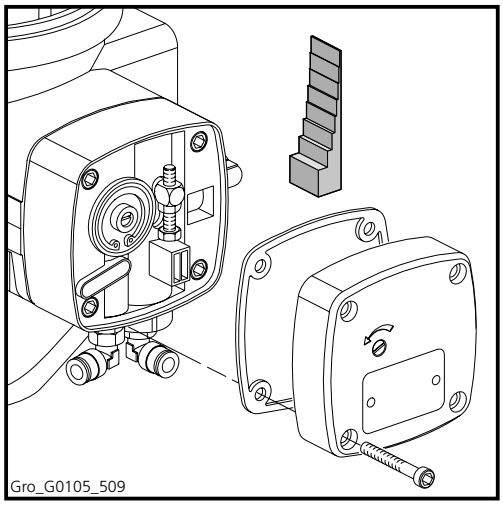

Figure 5.10 Gauge

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3. Make sure that the setting screw attached to the piston in the brake-counter does not rest on the end stop by activating the vehicle's brakes (Figure 5.11).

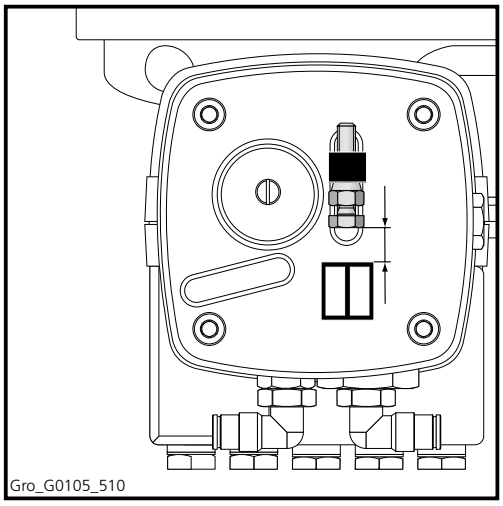

Figure 5.11 Setting screw

4. Use the gauge and two open-ended spanners (10 mm) to set the desired number of brake commands (Figure 5.12).

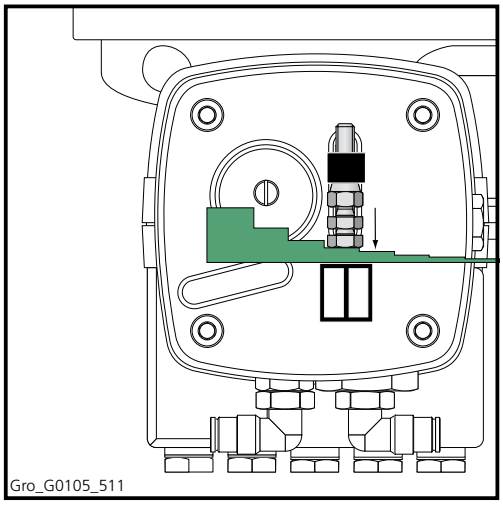

Figure 5.12 Setting the desired number of brake commands

5. Replace the cover. Check that the gasket is positioned properly. Fit the cover with the 4 screws (Figure 5.9).

Publication date: September 2005

5.10.2 The pneumatic CompAlube with electronic timer

The main task is to set the electronic timer. The duration of the greasing interval depends on:

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

The setting procedure:

1. Remove the 4 screws from the cover of the timer with a suitable Allen key (Figure 5.9).
2. Remove the cover (remember the gasket).
3. There are two DIP switches on the printed circuit board (Figure 5.13). Set the switches to the right position for the desired greasing interval (see following table).

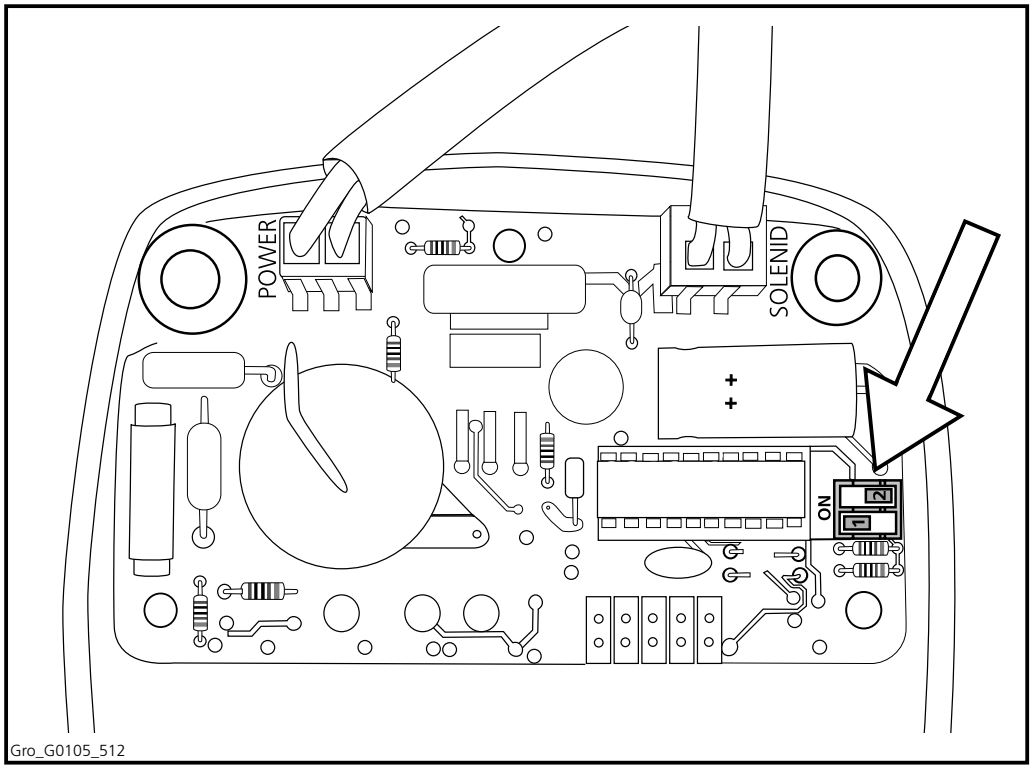

Figure 5.13 DIP switches

DIP switch settings

Interval	*DIP switch 1*	*DIP switch 2*
90 minutes	ON	ON
120 minutes	ON	OFF
150 minutes	OFF	ON
180 minutes	OFF	OFF

4. Replace the cover. Check that the gasket is positioned properly. Fit the cover with the 4 screws.

Publication date: September 2005

5.10.3 The electrical CompAlube with electronic timer

The main task is to set the electronic timer. The duration of the greasing interval depends on:

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

The setting procedure:

1. Remove the 4 screws from the cover of the timer with a suitable Allen key (Figure 5.9).
2. Remove the cover (remember the gasket).
3. There are 4 DIP switches on the printed circuit board (Figure 5.13). Set the switches to the right position for the desired greasing interval (see following table).

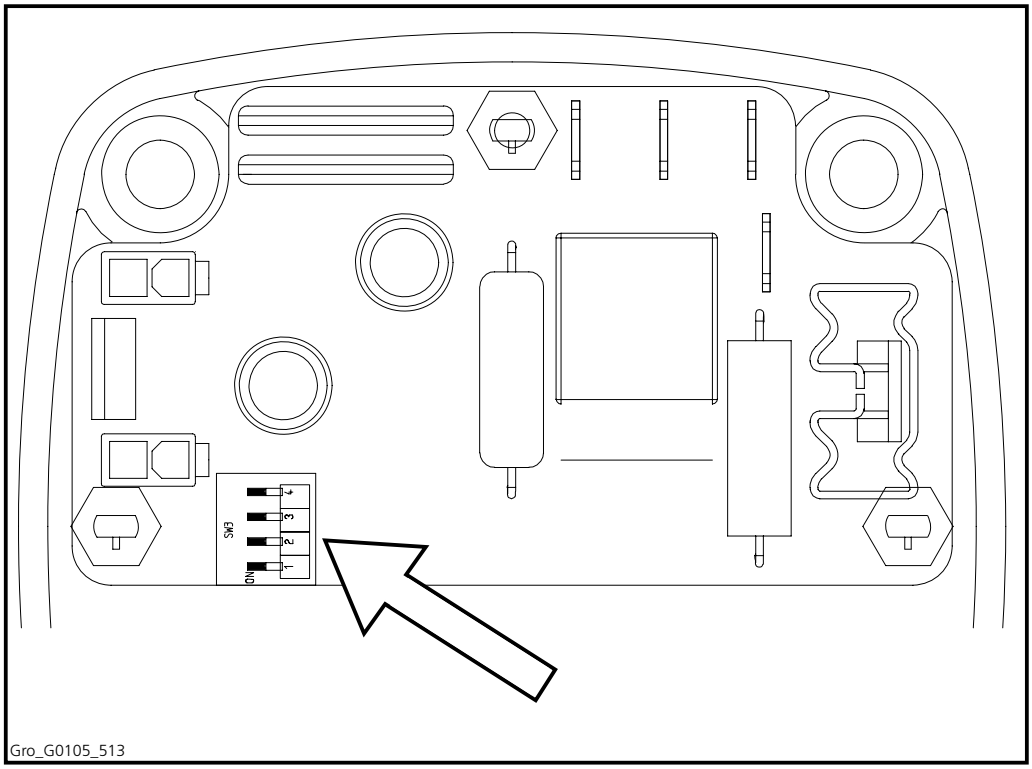

Figure 5.14 DIP switches

Publication date: September 2005

DIP switch settings

Interval	*DIP switch 1*	*DIP switch 2*	*DIP switch 3*	*DIP switch 4*
30 minutes	OFF	OFF	OFF	not relevant
45 minutes	ON	OFF	OFF	not relevant
60 minutes	OFF	ON	OFF	not relevant
90 minutes	ON	ON	OFF	not relevant
120 minutes	OFF	OFF	ON	not relevant
150 minutes	ON	OFF	ON	not relevant
180 minutes	OFF	ON	ON	not relevant
240 minutes	ON	ON	ON	not relevant

4. Replace the cover. Check that the gasket is positioned properly. Fit the cover with the 4 screws.

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Notes

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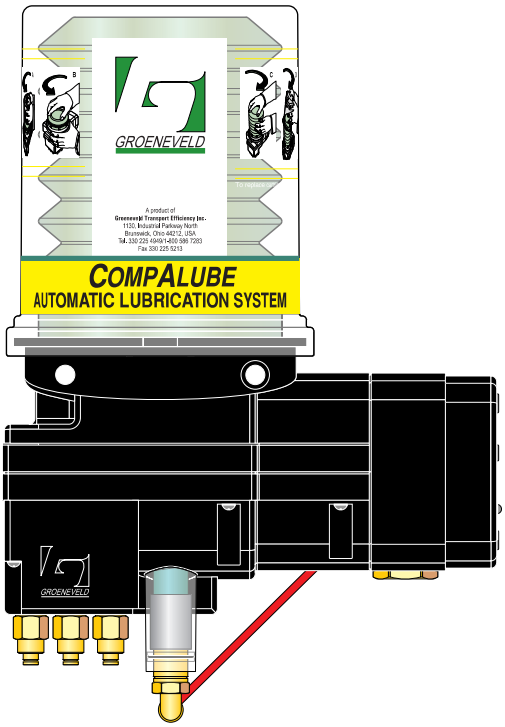
6.

MAINTENANCE



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6.1 Introduction

The maintenance of the Groeneveld CompAlube greasing system can be combined with the normal maintenance on the vehicle or the machine.

Caution!

The automatic greasing system significantly reduces the time and effort spent on manual greasing. However, do not forget that universal joints, for instance, must still be greased by hand.

6.2 Periodic check

1. Check the grease-pressure indicator (must be green) or the control lamp (must not be lit).
2. Check the grease level in the grease cartridge (replace the cartridge time or refill the cartridge through the filling connection).
3. Check the pump unit for damage and leakage.
4. Check the grease lines for damage and leakage.
5. Check the condition of the grease points on the vehicle. There must be sufficient fresh grease present.
6. Perform a test cycle to check the system operation. Note that every time you perform a test cycle a small amount of grease is supplied to the grease points (do not perform a test cycle too often).

Warning!

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

Publication date: September 2005

6.3 Trouble shooting

6.3.1 Pneumatic CompAlube malfunctions

Problem	*Cause*	*Solution*
Grease-pressure indicator shows 'red'.	1. Cartridge or reservoir is empty.	Replace cartridge with full cartridge or refill the reservoir through the filling connection
	2. Internal leakage in a metering unit.	Check if a grease point is receiving too much grease. Replace the metering unit that serves this grease point.
	3. Defective grease-pressure indicator.	Repair or replace the grease-pressure indicator.
	4. Air in the system.	Vent the system.
	5. Defective pump.	Repair or replace the pump.
All grease points are too dry, while the system appears to operate properly (the grease-pressure indicator shows 'green').	1. Brake-counter not set properly (number of set brake applications between greasing cycles is too large).	Set brake-counter correctly.
	2. The grease used is not suitable for the current working environment (temperature too low).	Replace the cartridge with a cartridge containing the correct grease.
	3. The pump is not receiving any compressed air from the air tank.	Check the air supply and pressure in the air tank. Check the air line beween air tank and pump.
	4. The pump is not receiving any signals through the brake-command air line.	Check the air line beween pump and valve. Check the restriction in the coupling on the fast-braking valve for contamination.
All grease points are too greasy	Brake-counter not set properly (number of set brake applications between greasing cycles is too small).	Set brake-counter correctly.
Some grease points are dry, while others receive sufficient grease.	1. Grease line(s) damaged.	Repair or replace grease line(s).
	2. Metering unit(s) defective.	Replace the metering unit(s).
A single grease point is receiving too much grease.	Metering unit leaks internally.	Replace the metering unit.

Publication date: September 2005

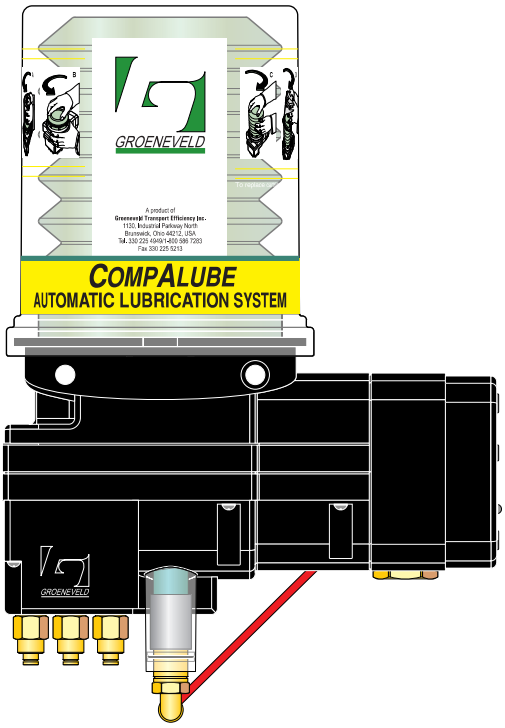
6.3.2 Electrical CompAlube malfunctions

Problem	*Cause*	*Solution*
The control lamp is lit continuously.	1. Cartridge or reservoir is empty.	Replace cartridge with full cartridge or refill the reservoir through the filling connection
	2. Internal leakage in a metering unit.	Check if a grease point is receiving too much grease. Replace the metering unit that serves this grease point.
	3. Defective grease-pressure switch.	Repair or replace the grease-pressure switch.
	4. Air in the system.	Vent the system.
	5. Defective pump.	Repair or replace the pump.
All grease points are too dry, while the control lamp does not indicate a defect.	1. Time switch not set properly (set interval between greasing cycles is too large).	Set time switch correctly.
	2. The grease used is not suitable for the current working environment (temperature too low).	Replace the cartridge with a cartridge containing the correct grease.
	3. No voltage.	Check the wiring and the fuse.
All grease points are too greasy	Time switch not set properly (set interval between greasing cycles is too small).	Set time switch correctly.
Some grease points are dry, while others receive sufficient grease.	1. Grease line(s) damaged.	Repair or replace grease line(s).
	2. Metering unit(s) defective.	Replace the metering unit(s).
A single grease point is receiving too much grease.	Metering unit leaks internally.	Replace the metering unit(s).

Publication date: September 2005

7.

TECHNICAL SPECIFICATIONS



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7.1 Pump

Description	*Pneumatic pump with brake-counter*	*Pneumatic pump with electronic timer*	*Electrical pump with electronic timer*
Power supply voltage	n.a.	12 VDC or 24 VDC	12 VDC or 24 VDC
Current consumption (nominal at 20°C)	n.a.	1A (12 VDC) 0.5A (24 VDC)	9A (12 VDC) 4A (24 VDC)
Required air pressure	6 - 10 bar	6 - 10 bar	n.a.
Pressure ratio	9 : 1	9 : 1	n.a.
Grease output	20 cm³ per stroke	20 cm³ per stroke	n.a.
Grease pressure	54 - 90 bar	54 - 90 bar	55 bar
Maximum allowable grease pressure	100 bar (1400 psi)	100 bar (1400 psi)	100 bar (1400 psi)
Temperature range	-25°C to +80°C (-13°F to +160°F)	-25°C to +80°C (-13°F to +160°F)	-25°C to +80°C (-13°F to +160°F)
Contents of grease cartridge	1.8 litres	1.8 litres	1.8 litres
Type of grease	NLGI EP-0 grease	NLGI EP-0 grease	NLGI EP-0 grease
Weight of complete pump	7 kg	7 kg	7 kg
Weight of grease cartridge	2 kg	2 kg	2 kg
Connector type	n.a.	bayonet	bayonet
Type of approval in accordance with the following guidelines			
Protection class	IP67 (pump unit)	IP67 (pump unit)	IP67 (pump unit)

Publication date: September 2005

7.2 Metering units

Maximum 19 metering units on the CompAlube pump.

Available metering units	*Output*
Type 0	0.025 cm³/greasing cycle
Type 1	0.050 cm³/greasing cycle
Type 2	0.100 cm³/greasing cycle
Type 3	0.150 cm³/greasing cycle
Type 4	0.200 cm³/greasing cycle
Type 8	0.400 cm³/greasing cycle
Type 9	1.000 cm³/greasing cycle

7.3 Maximum grease line length

Temperature	*Maximum length of PA 3/16" line with metering unit no. 1*	*Maximum length of PA 3/16" line with metering unit no. 3*	*Maximum length of PA 3/16" line with metering unit no. 8*
-15°C/5°F	7.5 metres	7.5 metres	7.5 metres
-20°C/-4°F	5 metres	5 metres	5 metres
-25°C/-13°F	3 metres	3 metres	3 metres

7.4 Brake-counter (pneumatic CompAlube)

Greasing interval : 10 ... 80 brake applications (adjustable)

Length of greasing cycle : 3 ... 25 brake applications (not adjustable: depends on the set greasing interval)

7.5 Electronic timer (pneumatic CompAlube)

Greasing interval : 90 ... 180 minutes (adjustable)

Length of greasing cycle : 3 minutes

7.6 Electronic timer (electrical CompAlube)

Greasing interval : 30 ... 240 minutes (adjustable)

Length of greasing cycle : 2 minutes

7.7 Control lamp

Power consumption : 3 W

Publication date: September 2005

7.8 Pump dimensions

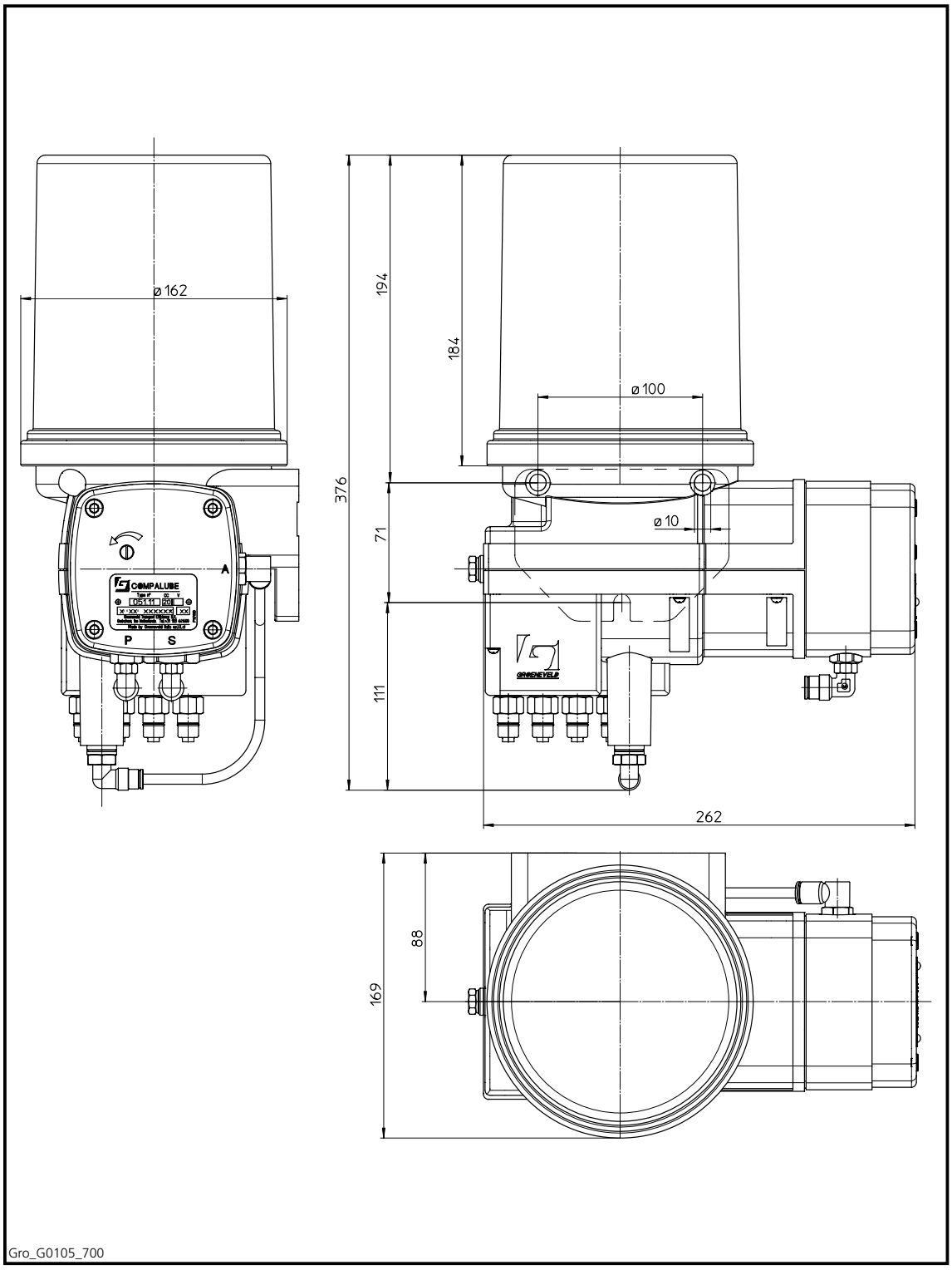

Figure 7.1 Dimensions of the CompAlube pump unit

Publication date: September 2005

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