General manual

Series Progressive Automated Lubrication System equipped with an electric piston pump.
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Safety precautions

1). Comply with 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 personal injury and material damage, before starting work on the equipment.

3). The electrical system of the equipment must be disconnected before any work is performed.

4). The pressurized air system of the equipment must be drained of all air and pressure.

5). Inquire with the facilities management to the prescribed procedure to immobilize equipment and prevent operation of equipment. When these are not prescribed, remove any means that can start the equipment (ignition key / main power switch) and place indicator tags to show others not to start the equipment.

6). Never work underneath a machine, vehicle or other equipment, which is raised by a jack only. Always use a jack stand and check that the ground is firm and sufficiently flat.

7). Keep in mind that a vehicle with air suspension may drop of its own accord.

8). Only work underneath a cab if it is fully tilted and latched, or otherwise secured preventing accidental return-tilt.

9). Disconnect the ground battery lead from the vehicle’s battery. This prevents electrical equipment from being inadvertently activated or otherwise electrically damaged.

10). Avoid working on a machine, vehicle or other equipment that recently was in use to allow components to cool (coolant, exhaust, turbo, etc).

11). A vehicle, machine or other equipment may only be operated by those who are trained and licensed to do so and are aware of all possible dangers.

12). Only use tools that fit and are designed for the specific task.

13). Adhere to all regulations, specifications and limitations as specified by the manufacturer of the machine, vehicle, equipment and /or engine.

Keep the environment in which you work clean for you and others.
About Lubecore™

Our Vision

Lubecore™ International’s vision, just like any other leading corporate vision, is a short, succinct and inspiring statement of what we intend to become and what aspirations we have in delivering value for our customers.

We also know that we must live to the standards set forth through our vision. Yet, we know, as an ancient Japanese proverb says, “vision without action is a daydream. Action without vision is a nightmare”. That’s why we have chosen our vision to create sustainable value through what we do. At Lubecore™,

We deliver sustainable value by protecting your company, your employees, the environment, and your equipment through next generation lubrication and after-care solutions.

We achieve our vision through our core values, the products and solutions we generate, and the customer service we provide. Look further at our web-site at www.lubecore.com or just ask any one of our colleagues.

A Step Ahead

What makes Lubecore™ International so different? Well, we think it is a number of things.

First, we are in a class of our own.

We are just not your regular, run-of-the-mill provider of automated lubrication systems. Instead, we are a provider of solutions mixed together with great product and service; we first listen to your business problem then we propose a solution that fixes the problem long term for the price you can pay.

Second, our 4P Value Chain makes all the difference in the world. Our business philosophy / principles, our product, our people, and our promise make us one of the best in delivering value, each and every day.

And, three, we keep you, the customer, in mind when we develop the solution that meets your business and budget needs.

Illustration 1. Lubecore™ pneumatic 4 Kg parallel pump with stone guard.
**Our Philosophy**

Lubecore™ was built on the principle of a network of trusted business partners working together to provide solutions for customers which want to protect their assets while making the most out of their resources; whether these are their people, their equipment, their environment or their organization.

Bottom-line, through our network and business dealings, we protect your organization’s financial resources and reputation. It’s about good business done well.

**Our Core Values**

Lubecore™ International’s core business values, listed below, guide our actions.

**Focus on the Customer, First**

Since our beginning, we have focused on providing the best possible experience for our Distributors, Dealers and End Customers. Whether we’re designing a new automated lubrication system or an air filtration devise, we take great care to ensure that they will ultimately serve you, rather than our own internal goal or bottom line.

**Be the Best at What We Do**

Our business is about protection. Protection of your organization’s equipment, protection of your employees while operating equipment, protection of the environment, and ultimately, protecting your organization. With well over 100 years of collective staff time on the job in this industry, we know what we do well, and how we could do it better. Through continued iteration on difficult problems, we’ve been able to solve complex issues and provide continuous improvements to products and services that most of our end customers demand almost on the spot. Our dedication to “being easy to do business with” helps us apply what we’ve learned to new products and services. Our hope is to ensure that every piece of company equipment doesn’t fail because of poor lubrication or people suffer due to poor air quality or air borne contaminants.

![Lubecore EP2 3 port variable output distributor](image)
Be Passionate

We are passionate about wanting to provide our Distributors and Dealers with the best products and the best possible service; we work tirelessly to do so. Our reward is measured by more than just meeting budgets and achieving sales targets. It’s more about the relationships we’re building, by going the extra mile, and doing what it takes to ensure our Distributors and Dealers, and ultimately the End Customer, obtain maximum value for their investment. At the end of the day, it is important for us to know we can share a friendly handshake when we meet, and look our partners in the eye with pride because our actions speak for themselves.

Show a Sense of Urgency

We know your time is valuable, so when you’re seeking an answer to a problem right away, we aim to please. We aim to understand the problem first, rather than just hear about the symptom. Once we’ve done that, then we move into hyper-speed to move to a solution that works for you.

Make Money the Honest Way

Lubecore™ International is a business. The revenue we generate is derived from the sale and service of our products around the globe. Hundreds of End Customers buy our products because they are great solutions to their air filtration or equipment lubrication needs. We hire employees and establish great relationships with Distributors and Dealers that we can trust. This trust is based on mutual respect, good business practices, honest and direct communications, helping each other out, and always doing good for our End Customer, even when we have to bear the cost when something goes wrong. It’s about trust. Trust in the relationship. But, trust always in the result.

Be Close to Our Partners, All the Time

In order to build and maintain long lasting relationships, we need to be close to our Distributors and Dealers, understanding the markets they serve, where their strengths lie, and what they envision for the future of their organization, so that we can better service their needs.

We are committed to meeting with our Distributors and business partners in annual meetings, and in training sessions to bring together a comprehensive knowledge base where we can learn from each other’s best practices and proven results. We believe that we have as much to learn from our Distributors as they have to learn from us, and we value the technical, sales, and general business experiences they bring to our organization and broader Lubecore™ network.

Figure 3. Lubecore™ Single Line injectors and manifold.
Take the Long-Term View

We strive to face challenges head on, and see them as opportunities for improvement; always focusing on building a stronger and sustainable organization that will still be standing when the others are not.

Since the inception of Lubecore™, we have faced such challenges in bringing new products from schematic plan stage to the market and we continue to face new challenges daily. Those challenges may originate from newer equipment on the market which requires customization to our systems, to customer driven need for additional features, or new concepts in technology which we need to understand and help our Distributors and Dealers understand.

It is the nature of our business to be in a constant state of change and we’re up to the challenge.

Being Great Just Isn’t Good Enough

At Lubecore™, we always aspire to being great at something as a starting point, not an endpoint. We set ourselves objectives we know we can’t reach yet, because we know that by stretching to meet them we can get further than we expected. Through innovation and experimentation, we aim to take things that work well and improve upon them in unexpected ways.

Our founder, Jan Eisses, always reminds us that, “if you always do what you’ve always done, then you can only expect what have always got.” Ultimately, our constant dissatisfaction with the way things are becomes the driving force behind everything we do. We want you to partner with us in being great.

Turnkey Solutions

Our Distributors and Dealers are the cornerstone of our business; therefore what matters to them, is what matters to us.

From Distributor feedback, and from first-hand knowledge, we know that there is an overwhelming need for complete turnkey solutions for end customers. We also know that we create additional value by understanding the customer’s business and operational challenges in order to serve them. We show, at every stage of our value chain, that we care about them.

Figure 4. Lubecore™ MLP Spyder pump.
At Lubecore™ International, we prove that we care by providing total solutions, not just by selling a product or part. Our objective of “being easy to do business with” makes us make it easy for our Distributors, Dealers, and ultimately for the end customer; whether it is the sale and installation of a system solution, to providing aftermarket supplies, and / or to providing technical support.

For the Distributor, we provide sales tools, training, literature, in-house and onsite technical support, and wide ranging levels of information on our website for quick reference. For Dealers, we set them up with a local or regional Distributor that can assist them in the selling or installation process.

Our Founder’s Dream

Seasoned business entrepreneurs know that it takes 20 years to build a reputation and five minutes to ruin it. That’s why visionaries like Jan Eisses stick to their knitting when building and living their dreams.

As a pioneer of automated lubrication systems in North America, Jan knew that the secret sauce to success was when “locals deal with locals”. After watching, with dismay, customers across North America suffer from poor service support for automated lubrication systems, Jan realized he needed to get back into business to do it right. He knew that the product that he brought to North America would last in value only if serviced the way it was intended. That’s why Jan jumped back into the market to build the “great grease franchise”.

With a strong distributor network along with an efficient and cost effective strong supply chain focused on producing and delivering high performance products worldwide, Jan, Lubecore International, and its distributor network will be able to achieve that great big goal.

The power behind our promise, principles, people and product allows Lubecore and its distributors worldwide to achieve the world status of delivering next generation protection solutions.
Our History

Lubecore™ International Inc.’s history is intertwined with the history of Jan Eisses, our founder and pioneer of automated lubrication systems in North America.

Lubecore’s geneses as a global leader in next generation protection solutions evolved out of over 22 years of market leadership dominance driven by the vision of Jan Eisses. His keen business sense coupled with an exacting eye for filling a market void brought automated lubrication systems to the market.

It all started with one vision, a first-class distribution and manufacturing operation, and a commitment to quality, innovation and customer value. This is the history of Lubecore™ International Inc.:

1988 Jan Eisses immigrates to Canada from The Netherlands with 10 Automated Lubrication Systems (ALS). Eisses registers his own company. Immediate focus: to penetrate the “over the road” transport truck and trailer market with EPO lubrication systems. Canadian transport market is introduced to ALS.

1989 Eisses sets up an exclusive distributor coast-to-coast network in Canada. Customers serviced nationwide with ALS as their equipment moves across the country.

2001 After over 10 years building and managing his own organization, Jan Eisses sells majority ownership of the company while still managing the company.

2006 By 2006, as North American managing director, Jan Eisses expands into new markets and grows the business to $33 Million. 150 service points were added to the USA and Canadian markets.

2007 After substantial growth and a need to move on, Jan leaves the company to consider other business options.

2008 On April 15th, after witnessing several years of declining servicing of lubrication systems across North American, Jan Eisses starts a new company with a renewed push for “locals dealing with locals”. Lubecore™ International, Lubecore™ Ontario and Lubecore™ Alberta are all registered to gain a footprint in the Canadian market. The first product is a “next generation automated lubrication system”.

2009 By year end 2009, sales grow substantially along with the development of new products and addition of new distributors across the globe.

2010 Lubecore™ poises itself for expansion and growth.
Introduction

Lubecore™ parallel (single line) automated lubrication systems take care of daily regular and preventive maintenance for components requiring lubrication.

The automated lubrication systems prevent unnecessary wear and downtime, thus reducing operating costs and preventing unforeseen expensive problems.

Automated lubrication systems not only assist with extending of maintenance intervals, it also prolongs the useful technical and economic life of the equipment thus providing a higher residual value.

Lubecore™ automated lubrication systems are environmentally friendly; they are suitable for biodegradable lubricants, and prevent over-manual lubrication, and grease waste. The reduced need for replacement components also has a positive impact on the environment as it reduces the need for raw materials and energy to produce these replacement components.

The most important advantages:

- Extension of maintenance intervals.
- Reduces wear on components.
- Lower and less repair and replacement costs.
- Prevents downtime.
- More effective use of lubricant.
- Less time spent by technicians servicing equipment.
- Less expensive lubricant required, as expensive additives can be avoided.
- Reduces strain on equipment.
- Improves fifth wheel performance; avoid trailer-steer and improves safety.
- Promotes the use of a single type of lubricant. Preventing compatibility problems and the accidental application of the incorrect type of grease.

A Lubecore™ automated lubrication system ensures that all connected lubrication points on a vehicle or other equipment are lubricated with a predetermined amount of grease at the correct interval. As lubrication takes place while the vehicle is in use, the lubricant is dispensed to all the connected lubrication points during movement of the components, ensuring an improved distribution of the lubricant over the surface area.

Apart from refilling the grease reservoir and performing a periodic quick system inspection, the Lubecore automated lubrication system does not require anything else to get the job done.

Lubecore’s automated lubrication systems are designed with the utmost care and tested rigorously. This ensures an extended operational life and problem free operation, even under the most extreme operating conditions.

The high Lubecore™ installation standards along with the use of the correct type of grease and periodic checks ensures trouble free operation of the system. The periodic checks, which take little time and effort, can be performed during the normal maintenance of the equipment.
The concept of automated lubrication

Greases are used where a mechanism can only be lubricated infrequently and where a lubricating oil would not stay in position. They also act as valuable sealants to prevent ingress of water and dust.

Equipment requires lubrication for the following reasons:

1. Keep moving components separated.

   Lubricants are typically used to separate moving components, thus reducing friction, surface fatigue, heat generation, operating noise and vibrations.

   The most common way lubricants achieve this is by creating a physical barrier. In cases of high surface pressure (EP) or temperatures the fluid film is thin and some of the forces are transmitted between the surfaces through the lubricant. This is termed elasto-hydrodynamic lubrication.

2. Carry away contaminants and debris.

   Any accidental metal-to-metal contact created by debris or externally introduced contaminants like dirt or water, need to be removed to reduce the risk of damage and prevent corrosion.

3. Protect against wear.

   Lubricants do not just prevent wear by keeping the moving parts apart. Lubricants may also contain anti-wear or extreme pressure additives to boost their performance against wear and fatigue.

4. Prevent corrosion.

   Quality lubricants are typically formulated with additives that form chemical bonds with surfaces to prevent corrosion and rust.

Under normal circumstances, lubricants / greases are applied to moving parts using a grease gun during regular maintenance intervals. These maintenance intervals could coincide with other service requirements like engine oil changes or can be determined based on hours in operation.

The goal of the maintenance interval and the pre-set type of lubricant is to overcome the period of lubricant film deterioration. Depending on the equipment application, the manufacturer based on user information and design data preset the interval to either hours or mileage, whichever is applicable. It is up to the operator and/or owner or the equipment to watch over the correct interval to refresh the lubricant and prevent (premature) wear.

The manual application of lubricant relies on flush out of old lubricant in one instance during a service interval, while the equipment is idle. The goal is to prevent the failure of the lubricant film, preventing metal to metal contact.
Frequent manual lubrication:
- High labour cost
- Low parts cost.

Extended manual lubrication:
- Low labour cost
- High parts cost.

Automated lubrication:
- No labour cost
- No parts cost.

**Benefits**

Automated lubrication by Lubecore™ is designed to ensure the proper amount of lubricant is applied during equipment operation ensuring:

- A better distribution of the lubricant on the moving parts, than manual greasing.
- Higher frequency of lubricant application with nominal quantities of lubricant to sustain the lubrication film when the equipment is in operation. Thus preventing metal to metal contact and wear without operator interference and reducing waste grease.
- Reduced need for lubricants that are manufactured with expensive additives that prevent wear during small periods of metal to metal contact.
- Reduced downtime; less time required to perform service and the potential to increase service intervals as the application of lubricant is performed during operation of the equipment.
General operation of progressive ALS

The Lubecore™ Automated Lubrication System (ALS) can be equipped with several options and a variety of pump styles. This section describes the general operation of an electric piston pump for series progressive ALS with standard components. For details regarding the operation of our other pumps and components, please refer to the appropriate Lubecore™ manual or contact Lubecore™ directly. A Lubecore™ progressive automated lubrication system consists of the following main components.

Note: The ① are identification markers referring to items in the illustration on the next page.

① Electrically operated piston pump.
② Electronic timer.
③ Progressive distribution manifolds.

Illustration 6. ④ Primary and ⑤ secondary tubing with fittings.
A Lubecore™ progressive automated lubrication system will be designed and assembled according to the specific type of equipment and the associated operating conditions. Starting with the manufacturer specifications regarding the lubrication requirement, the system layout will be designed and the appropriate components selected.

The automated lubrication system is designed to function as follows:

While the equipment is in operation, the ignition switch provides the electric timer ② with battery power to perform its program. The timer’s internal memory retains the last status prior to shut down; at start-up, the program resumes and counts down the time that remains in the predetermined interval.

After reaching the end of the interval, the timer engages an electric motor located in the bottom of the lubrication pump ①.

In turn the electric motor drives a cam that operates up to 3 (depending on system design) piston elements. The timer is programmed to operate the electric motor for a predetermined amount of time. As such the piston elements determine the total amount of lubricant to be distributed to all connected lubrication points.

All lubricant dispersed into the mainline by the piston elements is “progressively” (in succession) divided to the connected lubrication points ⑤ by the manifold assemblies. Depending on the design of the lubrication system a main-distribution manifold may be used to distribute the lubricant to secondary manifolds. Manifolds can also be connected to each piston element at the pump.

At the completion of the lubrication cycle, the electric motor is de-activated by the timer. The timer program sets the time interval back to the start of the pre-set value and initiates another countdown (as long as the timer is supplied with power).

The pump is equipped with a pressure relieve valve. This feature provides a safeguard against possible damage to the automated lubrication system in case of a blockage within the system or grease point. Lubricant which is not allowed to enter the (main) distribution manifold will be expelled from the lubrication system indicating a system malfunction.
Lubecore™ highly recommends using an automated lubrication system that is equipped with a low-level switch. The low-level switch helps prevent air from entering the automated lubrication system when the reservoir is not replenished in time. Any lubrication system, independent of brand or operating principle, may be negatively and severely affected by the ingress of air into the distribution side of the system.
Electric piston pump

The Lubecore™ electric piston pump, setup for the use in a progressive system, has a clear, impact-resistant reservoir holds 2, 4, 6, 8 or 10 Kg of lubricant. The lubricant is protected by a follower plate (except 2, 8a and 10 kg reservoir). The follower plate ensures that the lubricant remains separated from moisture—preventing a funnel effect—and provides a clear indication of the level of lubricant.

- Additional pump features:

  o Lubricant level switch: The electric piston pump can be equipped with a lubricant level switch that is triggered by the follower plate. This switch alerts the user to fill the reservoir to prevent air pockets from entering the system, which can cause a system malfunction.

  o Dichromate material surface treatment: Components within the pump are treated with an environmentally friendly and corrosion-resistant material. This treatment prevents premature wear of the components and increases system durability.

  o Depending on the pump model, the pump can either be equipped with a male quick disconnect or a standard grease fitting for easy and fast filling or the reservoir.

Pump operation

- An electric motor in the bottom of the pump drives a cam-shaft which in turn, operates up to a maximum of 3 piston elements. Depending on the size of piston elements installed (3 or 4cc), the pump output can vary from 3 to 12 cc’s per minute.

- In contrast to the electric piston pumps as used with the Lubecore parallel system, the electric piston pumps for progressive systems are not equipped with a electrically operated pressure relieve valve. Electric piston pumps for progressive systems are equipped with an over pressure protection relieve valve, which in case of system blockage protects the automated lubrication system from damage.
- The over pressure protection relieve valve is set at a standard level of 4500 psi. In case of a system blockage or other malfunction preventing correct lubricant flow, at pressures exceeding 4500 psi, lubricant will be expelled at the opening at the front of the valve. The over pressure protection relieve valve is adjustable and can be set at any desired pressure. Prior to making adjustments, please contact Lubecore or a local representative for a correct relieve pressure setting for your system.

- Piston elements are available in 2 sizes, 3 and 4 cc. The pistons can be identified by the color of the housing. 3cc piston element assemblies are gray and 4cc piston element assemblies are back.

Illustration 12. 3cc piston element with elbow connector.  
Illustration 13. 4cc piston element assembly.

**Reservoir follower plate and guide rod**

The Lubecore ALS electric piston pump is equipped with a silicone-based follower plate and dichromated center reservoir guide rod. These parts ensure that the lubricant in the reservoir is efficiently used and protected.

The primary function of the follower plate is to prevent the funneling effect that may occur during the replenishment of the grease piston in the bottom of the pump. The follower plate is being held in place over a retention spring, by the guide rod.

The guide rod guides the follower plate up and down during use and provides an escape for lubricant and air during the filling process. There are several cross-drilled holes in the top of the guide rod that provide an escape for both air trapped underneath the follower plate and for excess lubricant. Internally, pump channels guide air and lubricant to the opening on the right side of the electric piston pump. It is important to refill the reservoir past the cross-drilled holes on the guide rod when air is trapped under the follower plate.

Illustration 14. Opening connected to grease channel in guide rod to allow air and excess grease to escape during filling.
Timer operation

General operation of the Lubecore™ timer

Following is a functional description of the Lubecore™ ALS MKII truck timer used in a series progressive system with an electrically operated piston pump. This information pertains to the MKII timer, model 12.016. For a description of other Lubecore ALS timers, please see the appropriate manual.

The MKII is a 10-32V multi-use timer, which has been designed with the capability to operate all of the Lubecore™ pneumatic, hydraulic or electric pump models. There is therefore no need to modify or adapt the electrical schematic of the ALS when switching between a pneumatic, hydraulic or electrically operated pumps. In case of a series progressive system the timer is simply either programmed as an Air High Pressure or a Electric High Pressure timer.

Each automated lubrication system requires a timer to control the ALS operation. Depending on the model of pump connected (pneumatic, hydraulic or electric), the operation of the system may be slightly different, but the operation of the timer program remains the same.

Upon ignition, a programmed interval is counted down (‘pause phase’). Each time the ignition is switched on or off, the timer stores the current status and resumes that status after the ignition is turned on again. After the pause phase is concluded, the timer engages either a solenoid or motor, starting the “working phase”. If the system has been equipped with an optional in dash test switch and light, the light will be illuminated during working phase for 3 seconds in progressive mode. The working phase will last for a programmed period of time.

After the pause phase, the timer engages the electrically driven pump, starting the “working phase”. After the system has been equipped with an operator communication light, the light will illuminate for the duration of the working phase. This time has been determined by the total amount of lubricant to be dispensed by the pump and the total capacity of the piston elements installed.

The timer is equipped with a real time clock. This clock, synchronized during programming with a computer, registers all completed cycles, total running time, errors and more. See the timer report section for more details. Any errors are recorded with a date and time stamp from when it occurred and is resolved.

To prevent air from entering the lubrication pump, Lubecore™ automated lubrication systems can be equipped with a low-level switch. Once the follower plate triggers the low-level switch in the reservoir, the ground connection of the normally closed level switch is broken. Once the connection is broken, the externally mounted light illuminates (2 seconds on, 2 seconds off) until the lubrication cycle is complete.
As long as the reservoir is below minimum level, the truck timer will count pause and working phases, but will NOT execute a lubrication cycle. The alarm light will indicate to the operator that the reservoir is below minimum level during the working phase. Once the reservoir has been refilled, the timer will resume normal operation. Also low level alarms are permanently stored in the timer memory with a date and time stamp by the real time clock.

In case there is a low level when the ignition is switched on, a low grease level reminder alarm will sound for 15 seconds, during which time the operator communication light will flash as well.

At the end of the working phase, the timer resets the programmed time interval and resumes a count down of another pause phase.

### Alarm signals

The following is an overview of possible visual and audible warning signals for a series progressive ALS. Depending on installed system features, the low level indication by the timer and light may or may not occur. Refer to the installed features to check if a low level switch is present in the system.

The in cab manual test switch, when installed, is commonly located on the dash panel. A label surrounding the switch indicates the relationship to the Lubecore™ automated lubrication system.

- **Light illuminates continuously for 3 seconds when ignition is turned on.** Indicates a self check - **SYSTEM OK.**

- **Light flashes for 1 minute @ regular intervals.** Indicates low grease level. **SYSTEM WILL NOT OPERATE** **REFILL RESERVOIR/REPLACE PAIL**

- **At the beginning of each lubrication cycle the light will come on for 3 seconds indicating a lubrication cycle is in progress.**
When ignition is turned on, light flashes and audible alarm for 15 seconds this is a reminder of low grease level. **SYSTEM WILL NOT OPERATE REFILL RESERVOIR**

**Note:** Although the system will automatically resume after filling the reservoir, the low level alarm may be repeated until a full lubrication cycle is completed by the timer. (A test or manually initiated cycle does not reset the alarm, only a by the timer initiated cycle.)

**Performing a test cycle**

A manual “test cycle” can be performed with the timer without connecting to a computer. There are two ways to initiate a test cycle.

1). The timer has been equipped with a red test cycle switch in the timer cover.

2). A manual cycle switch with operator communication light can be installed in the dashboard.

**Red test button**

To prevent accidental operation of the ALS, the red button has been set flush with the cover.

To engage a test cycle:

1). Set ignition to auxiliary position.

2). Using a small instrument (e.g. pencil), press the red test button located in the timer cover. The timer will perform a single lubrication cycle as programmed.

![Illustration 17. Location and method to push test button on timer.](image-url)
External test switch with operator communication light

To engage a test cycle with the external switch:

1). Set ignition to auxiliary position.

2). Press the external test switch. While depressed, the light will illuminate, communicating to the operator that a test cycle has been initiated. The timer will perform a single lubrication cycle as programmed.

Programming the timer

The timer can be programmed using a CLS Dongle Timer Interface Unit and a computer with USB capability. For a more in-depth explanation on how to use the Dongle, please see the Timer Programming manual.

Using the CLS Dongle Timer Interface Unit, the timer can both be programmed and reviewed for lubrication system performance. The primary goal of programming the timer is to set the values for the “pause” and “working” phases, as described in the General Operation section.

To program the timer:

1). Connect the timer to the Dongle Timer Interface Unit.

2). Ensure the timer has power by turning the ignition switch to the auxiliary position.

3). Start the timer programming software and plug in the USB-cable to the computer.

4). In the menu bar, select “open connection” from the drop-down menu.

5). In the report tab of the program, click “refresh” to display current timer values.

6). Go to tab 3, “Parameters”.

7). In the left screen under “pause time”, use the up and down arrows to set the desired values for hours and minutes.

8). In the left screen under “working time”, use the up and down arrows to set the desired value for minutes.

9). In the bottom of the left screen, click “set” to send and save the values to the timer. Go to the “report” tab, click “refresh”, and return to tab 3 to verify that the values are set correctly.

10). Turn off the ignition switch and computer, and remove the Dongle device.

11). Verify the functionality of the ALS system by performing a test cycle. Do this either by pressing the red test switch in the timer cover or by pressing the optionally installed dash mounted switch with the ignition in the auxiliary position.

The timer is now programmed and ready for use.
Timer memory report

The timer is equipped with a real time clock (RTC), which enables more accurate record keeping. With the use of a low level and a proximity switch, the following is stored in the memory if each timer:

- Date of installation is automatically filed in system memory.
- Total running time: hours from first date of installation
- Total number of cycles performed.
- Number of low pressure alarms / proximity switch.
- Number of low level alarms.
- Real time clock synchronization will be recorded when performed.
- Timer serial number: a unique number pre-programmed and not erasable.
- Last Connected ID: Serial number of the last dongle connected to the timer
- Last Connected Time: date and time of last dongle connected to the timer
- Last Defect: last featured in a grease cycle failure A or B to make trouble shooting easier.

With the use of the CLS dongle the operator can push the report button in the reports tab and produce a report which is displayed on screen. In the report you can identify, add customer information. For example fleet, VIN or unit number and select the save button for future retrieval.

The errors as recorded for low level and no-grease flow (in reports identified as no-pressure) are stored with additionally the date and time from the real time clock. This will allow for more accurate performance review of the automated lubrication system.

When after an alarm notification the error is corrected, for example the reservoir is filled, the alarm is removed and the date and time stored as well. This is stored in the timer and represented in the report as an error-block, indicating the duration of the error.

Illustration 20. Screen shot of the timer performance report.
Electrical connections

The Lubecore™ timer is a multi-functional timer that can be connected to all Lubecore™ pumps. It can also be connected to systems of other brands that operate on similar operating principles. For this and other service purposes, we have included a standard electrical schematic below. For schematics related to the exchange of timers for other systems, please visit http www.lubecore.com or contact Lubecore™ directly.

The timer installation schematic below includes the low-level switch operation. For lubrication systems that do not have the low-level switch operation, a connection is required for input into the timer. To ensure proper timer operation without a low-level switch, connect a wire from pin location no. 7 to ground. This can also be done by combining it with the ground connection of pin no. 3.

In contrast to the Lubecore™ parallel lubrication system, the Lubecore™ progressive system does not require a pressure switch. As such pin no 2 is to be connected to ground.

Illustration 21. Common electrical schematic Lubecore™ MKII timer for series progressive aLS
Technical specifications Lubecore™ timer

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connection</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ignition</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Proximity switch or connect to ground</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>+ Motor</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Interface</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Interface</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Truck timer pin allocations.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Low level Switch</td>
</tr>
<tr>
<td>8</td>
<td>+ Cab light</td>
</tr>
<tr>
<td>9</td>
<td>- Motor</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Test button / switch</td>
</tr>
<tr>
<td>12</td>
<td>Battery</td>
</tr>
</tbody>
</table>

Table 2. Truck timer pin allocations.

Table 1. Timer technical specifications.

<table>
<thead>
<tr>
<th>Timer specification based on model 12.016</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range</td>
<td>10-30 Vdc</td>
</tr>
<tr>
<td>Audible Alarm</td>
<td>87 DbA</td>
</tr>
<tr>
<td>Output Current Max</td>
<td>40 / 500 Amp / Watt</td>
</tr>
<tr>
<td>Alarm light output Current Max</td>
<td>5 / 75 Amp / Watt</td>
</tr>
</tbody>
</table>

Technical specifications Lubecore™ timer

Timer specification based on model 12.016

Voltage range: 10-30 Vdc

Audible Alarm: 87 DbA

Output Current Max: 40 / 500 Amp / Watt

Alarm light output Current Max: 5 / 75 Amp / Watt

Table 1. Timer technical specifications.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ignition</td>
</tr>
<tr>
<td>2</td>
<td>Proximity switch or connect to ground</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
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<td>4</td>
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</tr>
<tr>
<td>11</td>
<td>Test button / switch</td>
</tr>
<tr>
<td>12</td>
<td>Battery</td>
</tr>
</tbody>
</table>

Table 2. Truck timer pin allocations.
Trouble shooting

For certain sections in this trouble shooting overview for the automated lubrication system the following tools might be required: Multi meter / Test-light, Pressure gauge, 10cm / 5 inch long loop wire or metal paperclip.

<table>
<thead>
<tr>
<th>Defect Description</th>
<th>Diagnosis / check item</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timer does not engage electric motor when test button is pressed.</td>
<td>Check for broken fuse.</td>
<td>Replace fuse if broken. Perform cycle test with timer to determine why fuse protected the electrical system.</td>
</tr>
<tr>
<td></td>
<td>Check ground connection. Measure resistance with multi meter between pin 3, and again with pin 7 to ground. (When ALS is not equipped with a low level switch check pin 7, this also must then be connected to ground.)</td>
<td>Measured resistance in range of 0-10 Ω: Go to next step, connection OK. Measured resistance in range of 100-∞Ω: Connection interrupted or broken lead wire, repair connection.</td>
</tr>
<tr>
<td></td>
<td>Check electrical connection at the pump. Remove connector; start timer test cycle. Measure voltage over harness connector with voltmeter.</td>
<td>Measured value is in range of 10-13V: motor defective, replace motor. No voltage measured: Broken lead in pump harness, replace pump harness. If all tests fail, this may indicate a timer defect; replace the timer.</td>
</tr>
<tr>
<td>Intermittent visual alarm from timer for 1 minute. (2 seconds on - 2 seconds off, no audible alarm)</td>
<td>Fill reservoir. If reservoir is full: Remove connector from low-level switch. Check connectivity over the low-level switch with multi meter.</td>
<td>Measured resistance in range of 100-∞Ω: Low-level switch is defective replace low level switch. Measured resistance in range of 0-10Ω: Check for broken wire lead in harness. Remove 12-pin connector from timer and insert wire loop between pin 7 and pin 3. Measure resistance at low-level connector to determine if there’s a defect in the harness and repair. If all tests fail, this may indicate a timer defect; replace the timer.</td>
</tr>
<tr>
<td>When ignition is turned on, light flashes and audible alarm for 15 seconds</td>
<td>Reminder of Low grease level</td>
<td></td>
</tr>
<tr>
<td>Light flashes and audible alarm for 1 minute at regular intervals during machine operation</td>
<td>This indicated that there is no grease flow from the pump, as determined by the proximity switch in the manifold.</td>
<td>Check grease level. Check pump operation as described above. Check for broken mainline. Also see solution for system blockage.</td>
</tr>
<tr>
<td>Grease coming from over pressure protection valve.</td>
<td>Possible system blockage</td>
<td>Check individual manifolds by removing the supply line, starting at the manifold furthest removed from the pump, and perform a test cycle. When grease is flowing from the supply line the removed manifold is the defective manifold. Prior to removing any manifolds or supply lines, be sure no residual pressure is present!</td>
</tr>
</tbody>
</table>

Table 3. Trouble shooting chart
Metering process

How does the single line (series) progressive metering process work?

The progressive manifold assembly forms the basis of the operating principle on which the automated lubrication system works. The manifold assembly is responsible for metering the amount of lubricant that needs to be dispersed to the connected lubrication point, also in this case, the Lubecore series progressive automated system; this is under full pump pressure.

Lubecore™ has progressive manifolds manufactured out of corrosion resistant steel of in total 4 different sizes. Beside the availability of different size manifolds, there are also manifolds available which the metered amount of grease, per segment can be adjusted.

Also available are manifolds with the capability of system performance monitoring by means of a proximity switch or an visual indicator pin.

**Operating principle**

A single line (series) progressive system consists commonly out of a main and secondary distribution manifolds. However, this is not required for the operation. Distribution manifolds can vary in size (number of piston bores) and piston volume output.

A single line progressive system uses lubricant flow from a pump to cycle individual metering pistons in the manifold assemblies in sequence. Each piston depends on flow from the previous piston to shift and displace lubricant. In case of a main distribution manifold, the dispensed lubricant operates the piston valves in subsequent secondary manifolds.

Lubrication begins when the timer sends a signal to the pump to start the lubrication cycle. The pump then feeds lubricant into the supply line which is connected to the (main) metering manifold.

Lubricant is fed to the multiple lubrication points one after another via (secondary) progressive metering manifolds sized for each series of lubrication points, and then directly to each point via the secondary tubing.

In contrast to parallel automated lubrication systems, series progressive lubrication systems continue to distribute the lubricant to all points as long as the pump is operating. Therefore the total amount of lubricant is determined by the pump and not the metering valves.
1: From above, a predetermined amount of lubricant from the pump enters the manifold under full pump pressure.

2: The lubricant pressure moves the main piston first because of the larger surface area in comparison with the control piston. Lubricant displaced by the larger main piston is displaced to outlet no 6.

3: After the larger main piston reaches it’s end-point, the smaller control piston moves and subsequent lubricant is added to the total volume output at outlet 6.

4: After the control piston reaches the end-point, it opens a channel in the center to allow lubricant to flow to the next main piston. Similar as to the first movement, lubricant is now dispensed at outlet port 4.
5: After subsequent movement of the control piston in step 4, lubricant moves the next main piston in the sequence.

6: After cycling the last control piston and dispensing the lubricant, the divider valves start the cycle, returning the pistons to their original starting position while dispensing lubricant to the remaining outlets.

7: In accordance with the progressive principle, the pistons continue to operate and dispense lubricant as long the pump is operating.
Combining manifold outlets

In case a single outlet has insufficient lubricant to dispense to the lubrication point per cycle, it is possible to combine outlets of the manifold to increase to total lubricant output.

Cross drilled channels between outlets are normally, when tubing is connected, closed with the use of a check valve. During normal operation, lubricant is dispensed to the connected lubrication point. When the check valve is removed and an appropriate blanking plug is applied, the dispensed lubricant during a lubrication cycle is added to the outlet below.

This process of combining outlets, can be repeated successively on each side of the manifold, until the desired output is achieved.
Lubricants / Grease

Lubecore™ has, with years of experience and in conjunction with the leaders in the petroleum industry, developed a superior lubricant specifically designed for use in the transport, off-road sector to provide superior protection with the Steadylube™ line. Besides providing excellent and superior protection under a wide range of climatic conditions, it also is “the” lubricant for use in Automated Lubrication Systems of the NLGI-2 class.

Lubecore™ is so confident of Steadylube’s™ performance, that if you decide to use Steadylube™ EP2 lubricant in the Lubecore™ Automated Lubrication System, Lubecore extends the warranty. (For details see Chapter Lubecore Limited Warranty.)

Features of Steadylube™ EP-2
- Stable and pumpable to -25º C / -13 ºF
- Excellent EP protection
- Contains heavy base oils
- Corrosion protection
- Environmentally friendly (does not contain heavy metals)
- Dependable delivery of grease
- Prevents System clogging
- Exceeds original equipment manufacturer’s specifications

Lubricant selection

The use of appropriate grease is not only important for the vehicle, machine or other equipment, but also for the correct operation of the Automated Lubrication System. Lubecore recommends the use of the specifically designed Steadylube-line of lubricants. However, it’s not mandatory and other lubricants are allowed to be used in the Automated Lubrication System, as long as they meet the following criteria:

- They must be of the appropriate class of NLGI-grade as specified for the Automated lubrication system. In case of the single line distributor system, this is the NLGI-2 grade. For lower ambient temperatures it is allowed to switch to a NLGI-1 grade or use Steadylube EP2 - Low Temp.
- The following additives are to be avoided: Graphite and Teflon. Up to and including a percentage of 3% of Molybdenum is allowed.
- When in doubt, please contact Lubecore™ or your lubricant supplier.
# Steadylube™ EP2 specification

<table>
<thead>
<tr>
<th>Testing standard</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI_grade</td>
<td></td>
<td>Steadylube EP-2</td>
</tr>
<tr>
<td>ASTM D 217</td>
<td>Cone Penetration 77°F, worked 60 strokes</td>
<td>2</td>
</tr>
<tr>
<td>ASTM D 128</td>
<td>Thickener type</td>
<td>Lithium 12 Hydroxy</td>
</tr>
<tr>
<td>ASTM D 128</td>
<td>Thickener content, %</td>
<td></td>
</tr>
<tr>
<td>ASTM D 2265</td>
<td>Dropping point, °F</td>
<td></td>
</tr>
<tr>
<td>ASTM D 445</td>
<td>Base Oil Viscosity: CST @ 40°C CAT @ 100°C</td>
<td></td>
</tr>
<tr>
<td>ASTM D 2270</td>
<td>Viscosity Index</td>
<td></td>
</tr>
<tr>
<td>VISUAL</td>
<td>Colour</td>
<td></td>
</tr>
<tr>
<td>VISUAL</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>ASTM D 2509</td>
<td>Timken OK Load LBS.</td>
<td></td>
</tr>
<tr>
<td>ASTM D 2296</td>
<td>Four Ball Weld Point [KG]</td>
<td></td>
</tr>
<tr>
<td>ASTM D 2266</td>
<td>Four Ball Wear</td>
<td></td>
</tr>
<tr>
<td>ASTM D 4048</td>
<td>Rust Prevention</td>
<td></td>
</tr>
<tr>
<td>ASTM D 1743</td>
<td>Copper Corrosion</td>
<td></td>
</tr>
</tbody>
</table>

*For a copy of the Material Safety Data Sheet please visit [www.lubecore.com](http://www.lubecore.com) or call 1-905-865-3110*
Filling of the reservoir

When either the timer indicates that the level switch has been triggered or during a system inspection it’s visible that the follower plate has reached minimum level, the pumps reservoir needs to be filled with an appropriate NLGI 2 / EP2 lubricant.

For filling the reservoir, follow the steps as described below to ensure that no contaminants and/or air enter the lubrication system.

**Step 1:** Remove the dust cap from the male filler coupler located on the pump.

**Step 2:** Clean the male filler coupler located on the pump.

**Step 3:** With the female coupler of the filler pump still mounted on the lid to the male coupler, ensure there are no air-pockets in the filler hose by making at least 3 strokes, circulating the grease. This is especially important when exchanging buckets of grease.

**Step 4:** Inspect the female coupler for dirt and clean when required. Then secure it to the male coupler on the pump, until it latches.

**Step 5:** Fill the reservoir with grease until the top of the follower plate has reached the maximum level mark on the reservoir. (This is located 1 inch / 3cm below the black reservoir cover.) The bottom of the follower plate should have passed the vent-opening in the follower plate guide rod. (See illustration on the lower left of this page.)

During filling of the reservoir or immediately after the maximum level has been reached, some lubricant may be expelled from the pump at the side vent opening on the right hand side of the pump. Air trapped underneath the follower plate and excess lubricant could come out at this opening. The opening corresponds to the vent opening as located in the center guide rod as described under step 5.a

Illustration 22. Reservoir level minimum level.

Illustration 23. Step 1, remove dust cap and clean coupler.

Illustration 24. Circulate grease to remove air pockets.

Illustration 25. Fill the reservoir until maximum level.

Illustration 26. Overflow opening in the center guide rod.

Illustration 27. Overflow opening on the right side of the pump.
Note: the lubrication pump male filler connector is equipped with an internal filter. When filling of the reservoir is difficult, inspect the filter, clean or replace when necessary.

**Step 6:** Place the dust cap back on the male coupler on the pump and the female filler pump coupler on the male coupling on the lid of the filler pump.

Illustration 28. Return female coupler to the male coupler on the lid.

Illustration 29. Place dust cap back on the male filler coupler.
## Technical specifications

<table>
<thead>
<tr>
<th>Electrical piston pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range</td>
<td>12 - 24 VDC</td>
</tr>
<tr>
<td>Electrical motor speed</td>
<td>20-24 RPM</td>
</tr>
<tr>
<td>Power consumption at 20 C</td>
<td>4 Amp</td>
</tr>
<tr>
<td>Reservoir capacity</td>
<td>4 &amp; 6 Kg (8.8 / 13.2 lbs)</td>
</tr>
<tr>
<td>Maximum pressure</td>
<td>250 Bar - 3700 Psi</td>
</tr>
<tr>
<td>Pump grease output</td>
<td>3cc or 4cc per pump element per minute. Maximum of 3 elements.</td>
</tr>
<tr>
<td>Operating / ambient temperature range</td>
<td>-25 C / 80 C</td>
</tr>
<tr>
<td>Lubricant grade:</td>
<td>NLGI-2 (NLGI-1 for extreme cold conditions)</td>
</tr>
<tr>
<td>Pump weight with grease / without grease</td>
<td>-</td>
</tr>
<tr>
<td>Follower plate:</td>
<td>Standard for 6 &amp; 8 kg reservoir.</td>
</tr>
<tr>
<td>Filler coupling size:</td>
<td>1/4” quick disconnect or standard grease zerc.</td>
</tr>
</tbody>
</table>

**Table 4.** Overview of the technical specifications of the electrical piston pump.
Lubecore™ limited warranty

Lubecore™ warrants the product manufactured and supplied by Lubecore™ and authorized distributors to be free from defects in material and workmanship for a term as defined in enclosed table, following the date of purchase, excluding there from any special, extended, or limited warranty published by Lubecore™.

If product is determined to be defective during this warranty period, it will be repaired or replaced, within Lubecore™’s sole discretion, without charge. This warranty is conditioned upon the determination of Lubecore™ or authorized representative that the product is defective. To obtain repair or replacement, you must ship the product, transportation charges prepaid and non-refundable, with proof of purchase to Lubecore™ or authorized representative within the warranty period. For a complete list of Lubecore™ and authorized representative locations call 1-905-864-3110 or visit http://www.lubecore.com.

This warranty is non-transferable and applies to the original retail purchaser only. This warranty does not apply to product damaged from accident, overload, abuse, misuse, negligence, faulty installation or abrasive or corrosive material, equipment that has been altered, or equipment repaired by anyone not authorized by Lubecore™.

This warranty applies only to product installed, operated and maintained in strict accordance with the written specifications and recommendations provided by Lubecore™ or authorized representative.

This warranty is exclusive and in place of any other warranties, express or implied, including, but not limited to, the warranty of merchantability or warranty of fitness for a particular purpose.

In no event shall Lubecore™ or authorized representative be liable for incidental or consequential damages. Lubecore™ or authorized representative’s liability for any claim for loss or damages arising out of the sale, resale or use of any Lubecore™ equipment shall in no event exceed the purchase price. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, therefore the above limitation or exclusion may not apply.

Lubecore™ has specially designed Steadylube Grease to provide optimal performance in the Lubecore™ Automated Lubrication System (ALS). Lubecore™ Steadylube Grease ensures trouble-free operation of the Lubecore™ ALS even in extreme climate applications.

Lubecore™ stands behind the capabilities of the Steadylube and will extend the Lubecore™ ALS regular warranty. If Steadylube is used exclusively in the Lubecore™ ALS, the regular warranty will be extended to the terms as listed in the table 1.

Both regular and extended warranties apply to injectors, manifolds, electronics (including wiring harnesses) pumps and or combinations thereof.
<table>
<thead>
<tr>
<th>Product name</th>
<th>Limited product warranty</th>
<th>Limited Steady-Lube extended warranty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel pneumatic* EP0</td>
<td>1-year</td>
<td>6-years</td>
</tr>
<tr>
<td>Parallel Electric* EP0</td>
<td></td>
<td>3 years</td>
</tr>
<tr>
<td>Parallel High Pressure Electric* / SLD</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Series Progressive Electric*</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Series Progressive Pneumatic*</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Multiline (Electric*)</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5. Limited warranty terms / period.</th>
</tr>
</thead>
</table>
* Defines the method of pump operation.

Warranty terms apply to automated lubrication systems installed on standard equipment and environmental conditions. In case deviated from the standard application, inquire with Lubecore™ or authorized representative for a warranty statement specific to your application.

### Steadylube Grease

Lubecore™ has specially designed Steadylube Grease to provide optimal performance in the Lubecore™ Automated Lubrication System (ALS). Lubecore Steadylube Grease ensures trouble-free operation of the Lubecore™ ALS even in extreme climate applications.

#### What it means to YOU:

Steadylube has a number of advantages over regular greases that will save time and money for an operator of the Lubecore™ ALS.

**Steadylube:**

- Exceeds equipment manufacturer’s specifications.
- Protects against corrosion.
- Withstands extreme pressure.
- Environmentally sound.
- Guarantees performance.
- Prevents ALS clogging.
- Increases pump life.
- Superior water resistance.
- Includes heavy base oil.
- Pumpable and regular consistency.

Lubecore™ stands behind the capabilities of the Steadylube and will extend the Lubecore™ ALS regular warranty. If Steadylube is used exclusively in the Lubecore ALS, the regular warranty can be extended:

Both the Regular and the Extended Warranty are void in case of the following:

- Damage from grease contamination or using alternate grease.
- Service from an unauthorized dealer.
- Cut wires or missing parts.
- Water above the follower plate from pressure washing.
- Damage caused by negligence, theft, or accident.
Head-office:
Lubecore International, Inc.
7065 Twiss road
Campbellville, Ontario
Canada L0P-1B0
Web site: http:\www.lubecore.com