



lubecore™

GENERAL MANUAL

Lubecore_GM_013

Modular Progressive Automated Lubrication System



NEXT GENERATION PROTECTION SOLUTIONS

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Contents Manual

2	Document Information
4	Preface to the Manual
5	Safety Precautions
6	Introduction
7	The Concept of Automated Lubrication
9	General Operation of the Modular Progressive Lubrication System
11	Modular Progressive Pump
15	Pump Mounting
16	Electrical Connections
17	Timer Setting and Display Operation
18	Testing and Programming
20	PIP - Positive Inlet Pressure Follower Plate
21	LLS - Low Level Sensor
23	Stainless Steel Metering Element
24	Pressure Relief Valve
26	Metering Process
31	Greasing Options
33	Filling the Reservoir
34	Technical Specifications
35	Lubecore™ Limited Warranty
36	Modular Progressive Pump (Assembly Sample)
37	Amendments

Preface to the Manual

The operation instructions contain important information for the safe and proper operation of an automated lubrication system. It is recommended that a user must read the instructions carefully prior to operation as Lubecore will not be held liable for damages and failures resulting from non-observance of these instructions. All instructions must be completed respective to national regulations pertaining to accident and environmental protection.

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Responsibility to ensure the safe operation of the automated lubrication system, the end user is responsible for the following:

- 1). The automated lubrication system shall be operated only for the intended use and its design shall neither be modified nor transformed.
- 2). The automated lubrication system shall be operated properly only if it is in a proper functioning condition and if it is operated in accordance with the maintenance requirements.
- 3). Personnel must be familiar with this operation manual and the safety instructions mentioned herein and observe these carefully.
- 4). Wastes (e.g. used oil, detergents, lubricant) must be disposed in accordance with relevant federal, state, provincial and territorial environmental regulations.

Service

Lubecore offers users full service in the form of advice, on-site installation assistance, training etc if requested. In case of inquiries pertaining to maintenance, repairs and parts, Lubecore requires model specific data to enable us to identify the components of the automated lubrication system. Lubecore will not accept any liability for damages caused by the misuse of the designed automated lubrication system and/or the repair of said system by using any other parts other than Lubecore International original (OEM) parts.

Safety Precautions

- 1). Comply with all safety regulations applicable within the locality where all work is performed.
- 2). Always take the necessary precautions to prevent potentially dangerous situations from occurring during installation, inspection and maintenance. Always apply or use adequate safety measures to prevent personal injury and material damage, before starting work on any piece of 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 any other piece of 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. Give time 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.
- 14). Symbol explanations The following pictogram and signal words used in this manual give the seriousness of danger.

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

Introduction

Lubecore™ Automated Lubrication Systems take care of daily regular and preventive maintenance for components requiring lubrication.

An automated lubrication systems prevents unnecessary wear and downtime, thus reducing operating costs and preventing unforeseen expenses.

Automated lubrication systems not only assist with extending maintenance intervals, they also prolong 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 manual over-lubrication, and grease waste. The reduced need for replacement components also has a positive impact on the environment reducing the need for raw materials and energy to produce these replacement components.

The most important advantages:

- Extension of maintenance intervals.
- Reduced wear on components.
- Lower 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.
- Improved 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 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 those components that are connected, 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 trouble-free operation, even under the most extreme operating conditions.

High Lubecore™ installation standards along with the use of the correct type of grease and periodic inspections ensures years of trouble-free system operations. Periodic inspections, which take little time and effort, can be performed during the regular daily circle check by the operator as well as monthly by the maintenance staff..

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, 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 elastohydrodynamic lubrication.

- 2). Carry away contaminants and debris ("Wash Out" or "Purge").

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 manual 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 of operation.

Proper equipment maintenance incorporates OEM recommended lubricant application at regular intervals. The goal is to ensure that the protective grease film is preserved between moving surfaces. The required interval (hours of operation or mileage) is determined by user operating information, equipment type, and environmental conditions. The equipment owner/operator is responsible to review the equipment and the lubricant application interval and adjust as needed 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, as mentioned earlier, to prevent metal to metal contact.

Benefits

Automated lubrication Systems by Lubecore are designed to ensure the proper quantity of lubricant is applied during equipment operation ensuring:

A better distribution of lubricant to the moving parts, the longevity and reliability of the equipment being lubricated, than when lubricated manually using a grease gun. Higher frequency of lubricant application with nominal quantities of lubricant to sustain the lubrication film while the equipment is in operation.

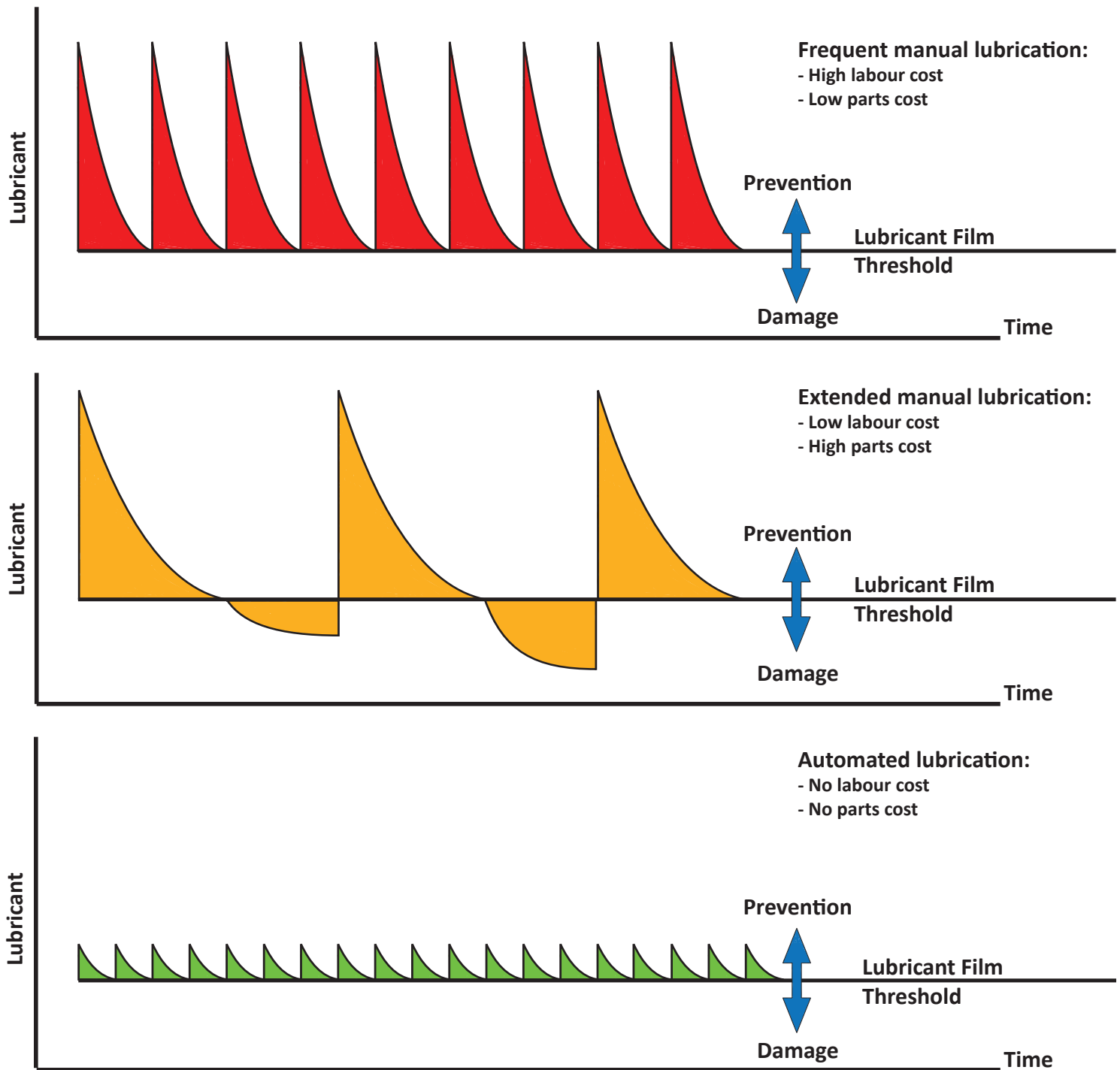


Illustration 1. **Manual versus automatic lubrication, representation of concept.**

General Operation of the Modular Progressive Lubrication System

The Lubecore Modular Progressive Automated Lubrication System can be used in a variety of applications. This section describes the general operation of Modular Progressive lubrication system with standard components. For details regarding the operation of our other pumps and components, please refer to the appropriate Lubecore documentation or contact Lubecore directly. A Lubecore Modular 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 Modular Progressive pump unit.
- ② Potted timer with 7 segment LED which is integrated into the motor housing.
- ③ Distribution blocks and ④ filler coupling.
- ⑤ Metering elements.

A Lubecore 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 electronic timer ② with power to perform its program. When ignition is turned to the on position, the 7- segment LED display indicates availability of power by a singular blinking LED in the lower right corner. If the LED does not come on, there is either no power present or the polarity is reversed.

After reaching the end of the interval timer count down, the timer engages an electric motor located on the bottom of the Modular Progressive pump ①. The electric motor drives a steel cam at 23 RPM and in a clockwise direction pushing against one or multiple metering elements ⑤. The 7- segment LED display indicates operation of the motor with a rotating segment.

Depending on the total pumping time preset in the timer, the motor will be activated for a predetermined and set the number of minutes and pump lubricant to the connected distributor blocks. ③ In a progressive lubrication system the total amount of lubricant to be dispensed to all connected points is determined by the timer setting.

The metering elements ⑤ are calibrated to dispense a predetermined amount of grease, per stroke of the cam (0.30 cc), to the connected distributors. The distributor blocks divide the lubricant to each connected lubrication point one after the other. This continues until the pump is deactivated by the timer or the ignition is turned off.

At the completion of the lubrication cycle, the electric motor is deactivated by the timer. After the timer deactivates the electric motor the system program sets the time interval back to the start of the preset value and initiates another countdown (as long as the timer is supplied with power).

Optionally the pump can be equipped with a low level sensor. Which when triggered by the follower plate at minimum grease level, will stop the pump and alert the operator that the reservoir needs to be filled.

Location manual test cycle magnet



Status LED indicating operation, alarms and time selection for pause and working times.

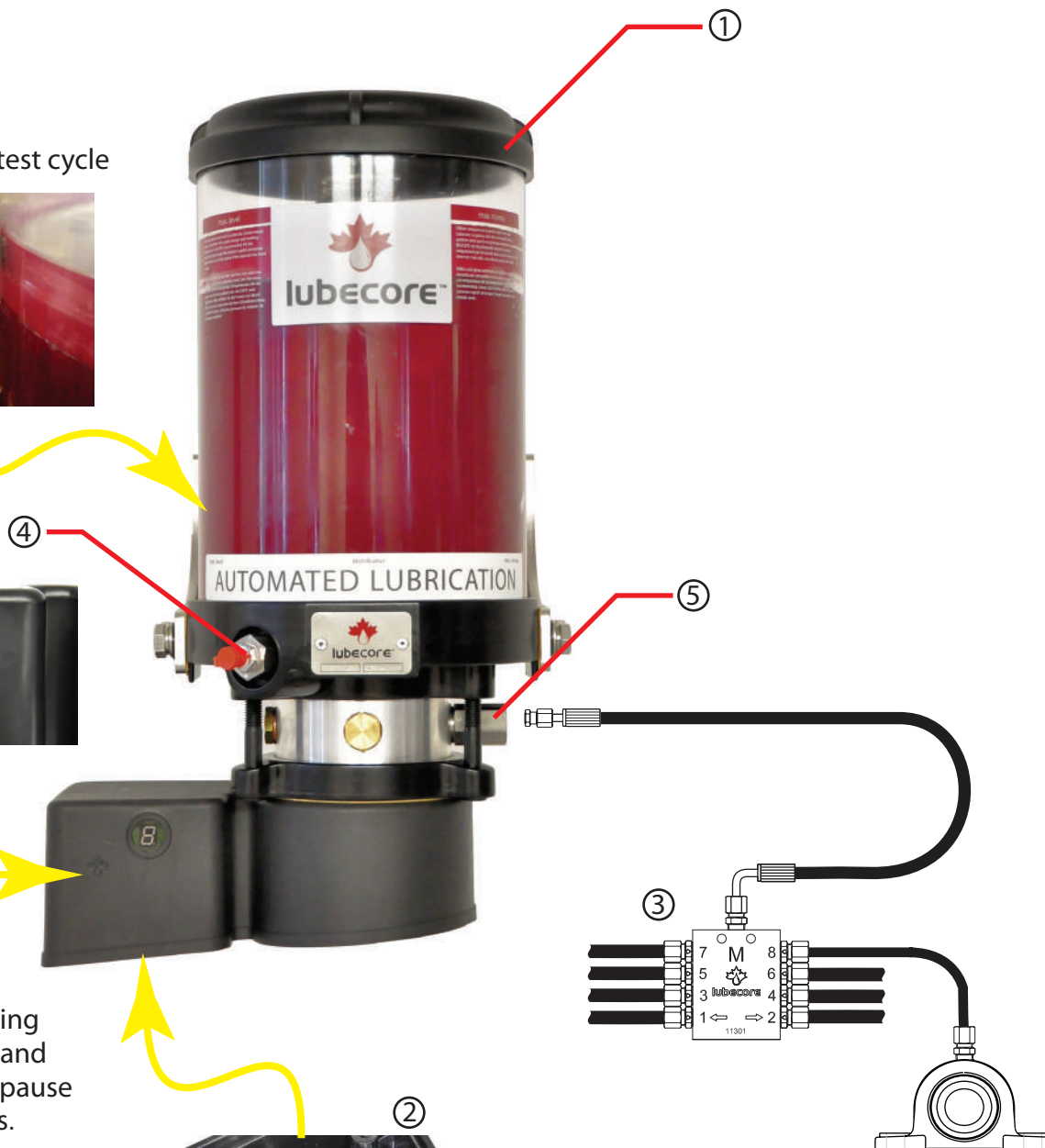


Illustration 2. **Modular Progressive Automated Lubrication System layout.**

Modular Progressive Pump

Pump features:

The pump is available with either a 4 Kg (8.8lbs.) or 6 Kg (13.2 lbs) capacity reservoir. The Makrolon® impact resistant reservoir is fitted with a bright red silicone follower plate and Positive Inlet Pressure (PIP™) spring. This provides a clear indication of the grease level and prevents funneling of the grease.



Illustration 3.
4 Kg Modular progressive pump.



Illustration 4.
Makrolon™ reservoir with red follower plate.

The 4 / 6 Kg reservoir comes equipped with a PIP™ - Positive Inlet Pressure spring (patent pending). This spring is situated on top of the red follower plate pushing it down, providing extra pressure to the grease. This prevents air-locks from developing in and at the elements, allowing the use of NLGI / EP2 grade greases.



Illustration 5.
PIP™ follower plate

A fill connector of either a 1/4" quick disconnect for EP0 or a standard grease fitting for EP2 or other greases may be used. The filler coupling is threaded into the pump housing and is equipped with a large capacity stainless steel filter. Lubricant can be pumped into the reservoir by using a hand filler pump or standard grease gun. It is recommended to service or replace the filter every 5 pails of grease to ensure ease of filling.



Illustration 6.
1/4" QD fill coupling with red dust cap.



Illustration 7.
Stainless steel filter with standard grease fitting and dust cap.



Illustration 9.
**Archimedes screw and steel cam
on motor shaft.**

Occasionally small air pockets may accidentally enter the reservoir during filling. In order to prevent air-lock at the metering elements during the recharge cycle, an Archimedes screw is installed to push the grease toward the metering element(s).

A steel rather than plastic cam with roller is used on the motor shaft to push the metering elements. This prevents premature wear and allows for higher operating pressures.

There is a magnet attached to a pump bracket mounting bolt. 1 extra large 5/16 washer is placed behind the bolt to provide an attachment surface for the magnet. It can be used to operate the pump manually or to make adjustments to the timer settings.



Illustration 10.
Magnet location



Illustration 11.
7- segment LED



Illustration 12.
Timer location



Illustration 13.
Timer location

A sealed 10 to 30 Volt timer is mounted inside the motor housing near the front 7- segment LED. Electrical connections are made with high quality fully insulated Deutsch® connectors.

There are a variety of timers available from Lubecore that are functional with Modular Progressive pump design.

The segmented LED, as installed in the motor housing, indicates when the pump is active and when timer setting adjustments are made.

The bottom of the motor and timer housing is slightly sloped. This allows for any accumulated moisture to run off through the slots in the bottom cover preventing any possibility of corrosion from taking place.



Illustration 8.
**Sloped housing prevents moisture
build up.**

The Modular Progressive pump is equipped with 1 ring collar (For more ring collar options inquire with Lubecore for more details). The ring collar has 3 openings for metering elements and 1 return port. A ring collar with 3 metering elements provide the Modular Progressive pump the ability to deliver of up to 18cc's of grease per minute.

The pump may optionally be equipped with a low level proximity sensor which can be installed in the base of the reservoir and connected to the timer. The timer is ready to receive the signal from the switch.

The pump is equipped with 2 overflow vents. The vents are located at the rear right of the pump housing when looking directly at the front of the pump. In case the pump is filled beyond the maximum level the vent opening in the guide rod will allow excess grease to escape. Also, when air is trapped under the follower plate it is recommended to fill the reservoir such that the bottom of the follower plate surpasses the vent opening to allow air to escape.

(Note: Do not fill to rapidly as you may blow the lid off!!!)

The pump is designed with 2 overflow vents. One of the vent locations is threaded which allows for a grease line to be attached and extend to overflow away from the pump.



Illustration 15.
Grease overflow location



Illustration 14.
Metering element



Illustration 16.
Low level proximity sensor



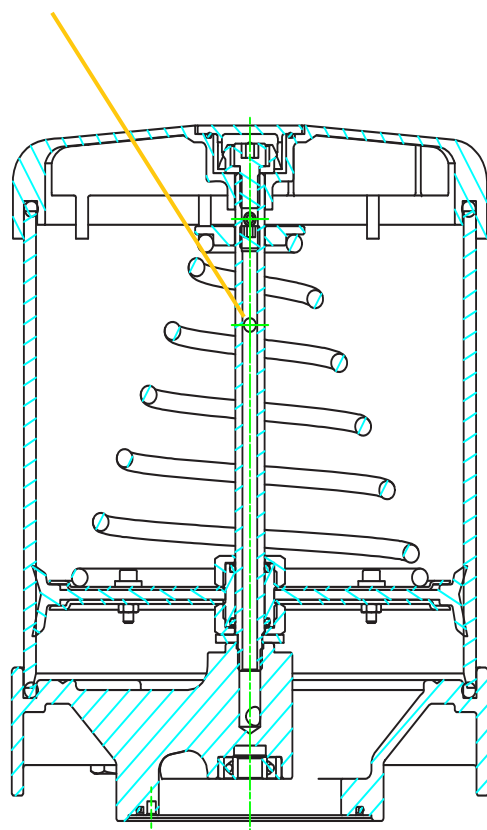
Illustration 17.
Grease overflow ports shown in yellow.
Low level sensor port shown in red

CAUTION:

Caution!!! Must be observed when changing elements, plugs, and low level sensor in the Modular pump series.

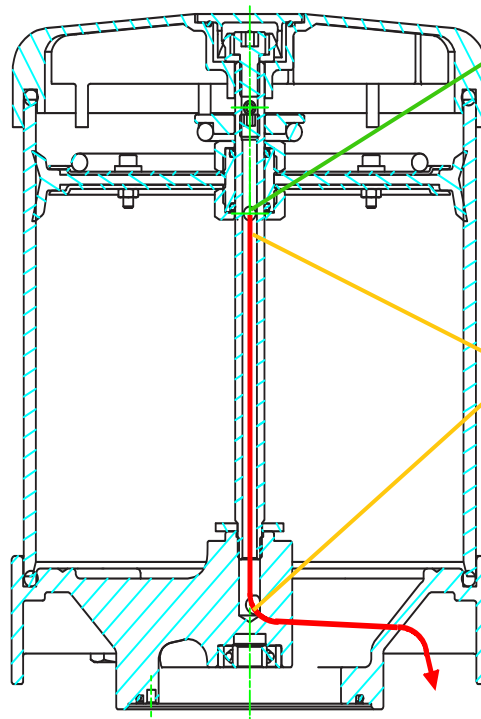
DO NOT ATTEMPT!!! To remove the guide rod and follower plate assembly in a Modular series pump, due to the increased downward force applied by the PIP spring upon the surface of the grease when the reservoir is full. It is highly recommended to perform all these procedures when the reservoir is empty of grease or is going to be emptied by removing of the fill connector.

Vent opening
in guide rod.



Bottom of follower
plate surpasses
vent opening

Escape route of
excess grease
and trapped air
through guide
rod and reservoir
base.



Pump Mounting

The pump should be mounted vertically at an easily accessible location. The pump mounting brackets (arms) and installation hardware are made from Stainless steel. As the pump housing is an aluminum casting, it is required to utilize the provided nylon inserts and gaskets to prevent a galvanic reaction leading to oxidation of metals.

The bolt pattern, to mount the pump bracket, is the same as used with the Lubecore pneumatic and hydraulic pumps. As such, if so required, pneumatic and hydraulic pump bracket can be interchanged.

It should be noted that the secondary lining to the lubrication points be kept as short as possible. These lines should not exceed 10 meters / 30 feet in length. Contact Lubecore or an authorized re-seller when secondary line length exceeds 10 meters long.



Illustration 18.
Stainless steel mounting hardware and insulation components.



Illustration 19.
Pump bracket mounting hardware assembly order. (Pre-tightening)



Illustration 20. **Pump bracket installation options: swap left / right and up / down to achieve desired installation configuration.**

Electrical Connections

The 10-30 VDC timer for the automated operation of the lubrication system is located inside the motor housing. The motor housing is slotted on the bottom to allow moisture to dissipate while the timer itself is permanently sealed (potted).

The pump comes pre-wired with a 2 core SAE approved cable connected to a Deutsch® DT weather proof connector. The DT connector is wired: Ignition (Red) +15 / Ground (Black) -31. When connecting ignition it is recommended to use a 5 Amp fuse.

A second connection is available for an optional low level sensor. That 3 - core wire provides a proximity sensor with a power source, ground and signal contact. The proximity sensor may be ordered separately and can be connected to the pump with no need for programming. When installing a proximity sensor adhere to the safety precautions as previously listed on page 14.

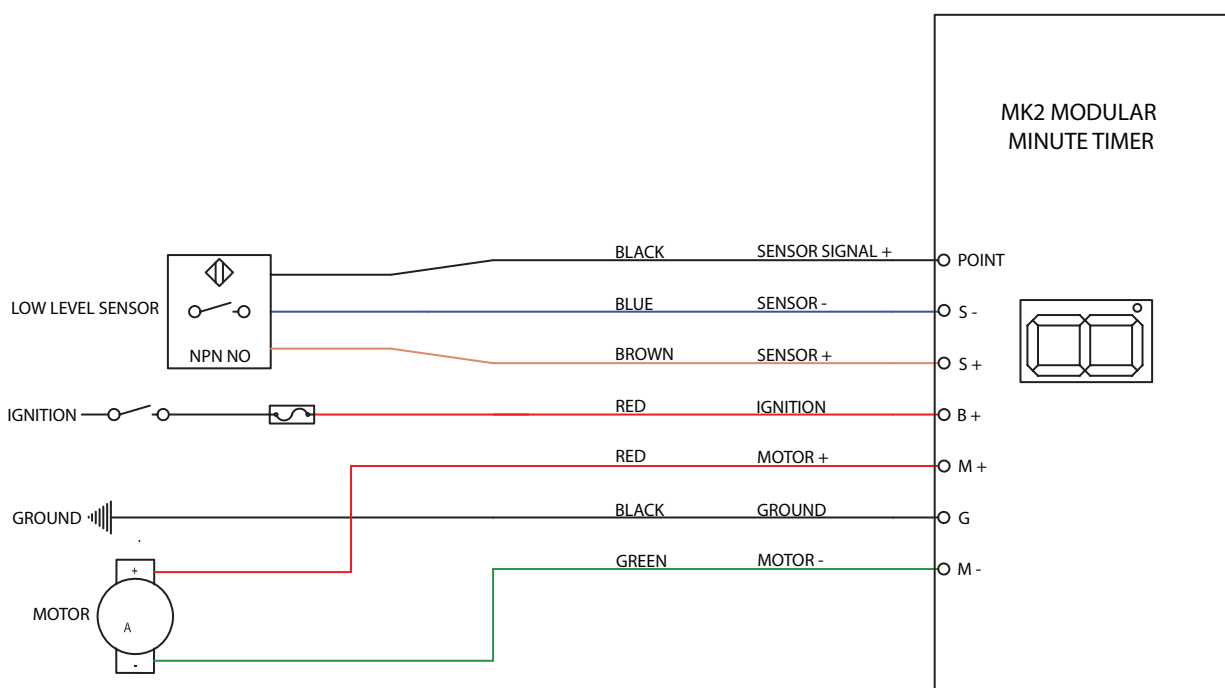


Illustration 38. Electrical connections for the Modular Progressive pump



Illustration 39.
Weatherproof with Deutsch® electrical connectors (ground / ignition) inside motor and timer housing of pump. Remove the 6 bottom cover screws to gain access.

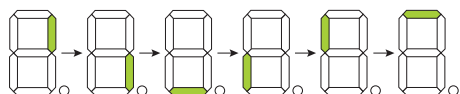
Timer Setting and Display Operation

The Modular Progressive pump is equipped with a 7 segment digital display.

This display indicates power, operation, error and is used for timer setting.

Following is an overview of possible display codes:

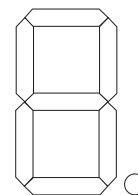
- No segments lit. Power is "off".
- Solitary LED (Bottom right corner of the Segmented display) momentarily stays on (5 Seconds) performing a self check.
- Solitary LED starts blinking, 2 blinks per second indicating that the timer is active
- Pump ON (T2) is started the segmented LED 'rotates'. The bar rotates clockwise for the entire pump cycle.



- If during a pump cycle (T2) an error occurs, the display shows "E". The error can be low level or over-current draw. The "ERROR" status is displayed throughout the entire T2 pump cycle time.

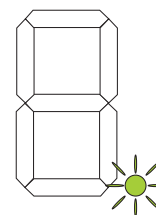
- After the pump cycle (T2) the display will show "E" and a blinking solitary LED during the T1, pause time. The "E" status will return to normal after the error is resolved (example: pump filled) and a new cycle is started.

Power "off"



No segments lit.

Power "on"
Battery and ignition



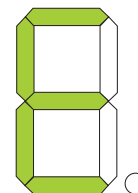
Solitary LED

Motor running



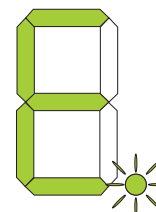
Rotating segments.

Error during
pump cycle



An error is present
during pump cycle.

Error at pause
time.



An error is present when
power is on. Blinking point

Testing and Programming

For correct operation of the pump (T1) the "Pause", and (T2) "Work" times must be set using the magnet. The following menu choices are available.

With power on (ignition) hold the magnet against the Lubecore logo on the motor housing near the segment display. After 3 seconds and with about 3 second steps thereafter, the segment display will change as follows:

7 segment display
mode selection

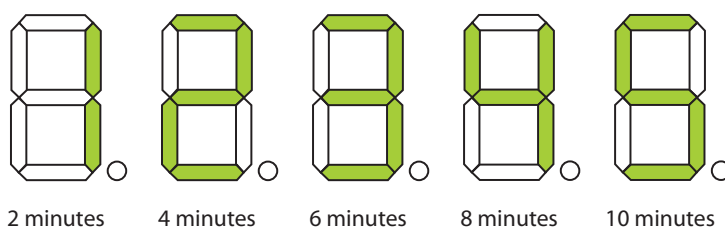
- 1). To start a single test cycle, place the magnet on the Lubecore logo. When the bottom horizontal bar lights up, remove the magnet from the logo to initiate a single test cycle. The pump will run for the programmed period of "on time".
- 2). To start a continuous cycle, place the magnet on the Lubecore logo. When the bottom 2 horizontal bars light up, remove the magnet to initiate continuous running of the pump. Turn off power or place the magnet back on the maple leaf logo to stop the pump.
- 3). To change the pump running/working time (T2) setting. Place the magnet on the Lubecore logo until 3 horizontal bars light up.



When the display shows 3 horizontal bars, remove the magnet to go into time selection mode.

- When the sensor is not operated for 20 seconds it will return to the start.
- After a change the display will show an "A" for accept after 20 seconds or if the magnet is placed on the sensor for 5 seconds.

The display will show your current choice of one of the following 5 settings:



A one second touch or slow swipe with the magnet, at the Lubecore logo, will change the time selection.

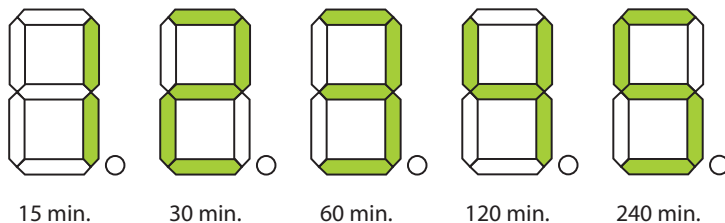
- 4). To set the "Off time" (cycle interval), place the magnet on the Lubecore logo until the top 4 bars light up in the shape of a square. This indicates that the "off time" change mode is selected. The function is the same as in the "on time" programming mode. When the sensor is not operated for 20 seconds or the magnet is placed on the sensor for longer than 5 seconds the timer returns to normal start mode. If a change has been made the display will indicate this with an "A" for accept.

7 segment display
mode selection



The display will show your current choice of one of the following 5 settings:

A one second touch or slow swipe with the magnet, at the maple leaf logo, will change the selection.



After changing settings or testing, switch off the ignition and verify that the timer accepted the new values. The timer can at any point be returned to 'normal' by switching off the ignition.

Error reporting by the display

When the display indicates an "E" for error, the following could be the problem:

- Low grease level detected.

When installed and activated by the follower plate, the low level switch signal stops the pump from pumping and indicates

- Motor Over-load / Short Circuit.

PIP - Positive Inlet Pressure Follower Plate

PIP (Positive Inlet Pressure Spring patent pending)

Modular Progressive and Modular Spyder MLP lubrication systems are suitable for use with NLGI-2 / EP2 grade grease when a PIP - Positive Inlet Pressure spring is installed on top of the follower plate. Especially with low temperatures, it may occur that air pockets present in the grease accumulate at the intake opening of the metering elements. The PIP-follower plate allows, even at low temperatures, the use of a NLGI2 / EP2 grease.

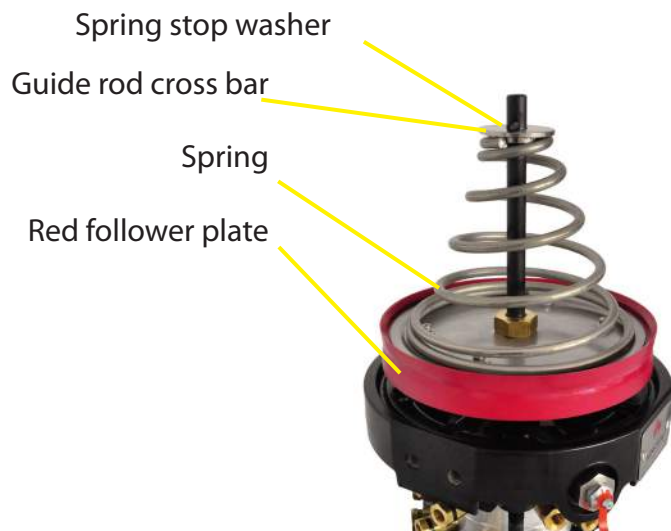


Illustration 23.
PIP spring follower plate

Note In case of service / repairs:

Before starting any repairs ensure reservoir is empty to reduce spring tension.

*When removing M8 Allen cover bolt ensure guide rod is not rotating / coming loose: it is under spring tension, when guide rod is spinning loose **stop** and call Lubecore for alternative disassembly procedure.*

Always follow supplied instructions with OEM replacement part to prevent damage and personal injury!

Although when reservoir is empty there is still an assembly tension in the spring! When loosening components this may be released and cause harm when done incorrectly!

CAUTION:

Caution!!! Must be observed when changing elements, plugs, and low level sensor in the Modular pump series.

DO NOT ATTEMPT!!! To remove the guide rod and follower plate assembly in a Modular series pump, due to the increased downward force applied by the PIP spring upon the surface of the grease when the reservoir is full. It is highly recommended to perform all these procedures when the reservoir is empty of grease or is going to be emptied by removing of the fill connector.

LLS - Low Level Sensor

The pump may be equipped or retrofitted with a low level proximity sensor. This sensor is a normally closed proximity sensor which detects the metal components on the bottom of the follower plate. The benefits of a low level proximity sensor are that the operators are additionally informed by the 7 segment LED display of a low level event when the reservoir is obscured by dirt such that a clear level indication is not visible.

The timer stops the pump from operating during a low level event, preventing air from being pumped into the grease points and the requirement to prime the pump after filling.

The sensor is located on the lower rear right side of the reservoir assembly.



Illustration 24.
12.045 Low level sensor.

Fitting instructions:

Remove the bottom cover from the pump housing. Make sure that there is no power to the timer (disconnect the 2 pin Deutsch connector)

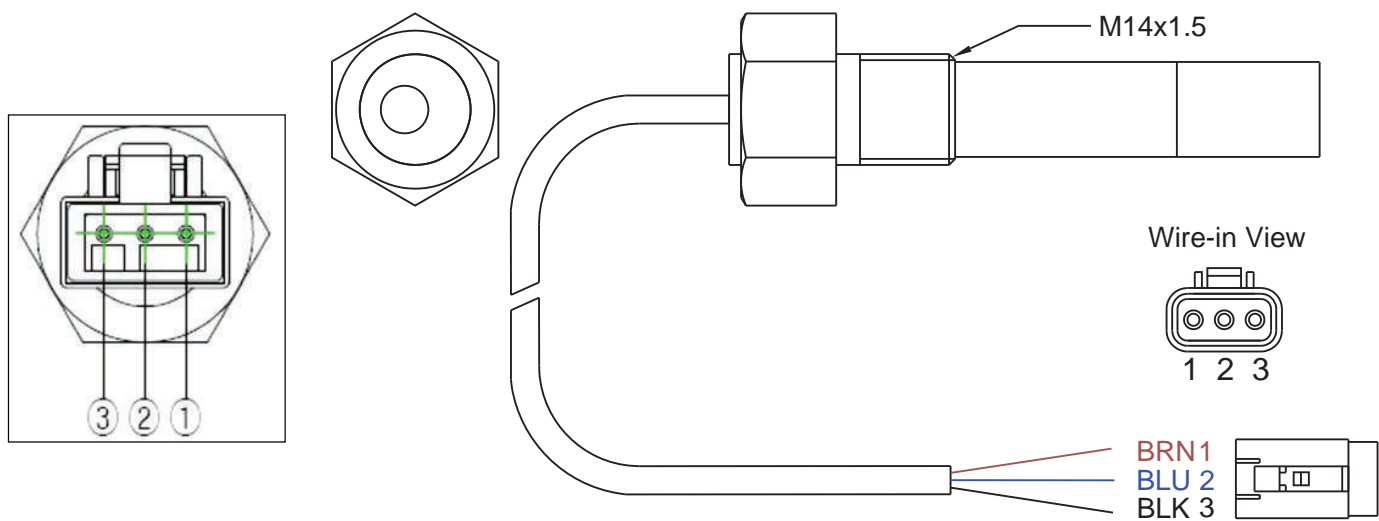
Inside the housing you will find a black cable with a white insulator cap on the end. This is the 3 core low level switch pigtail. Cut off the end cap and strip the 3 wires so that the terminals provided in the kit can be connected. Use appropriate stripping and crimp tools to do this.

After crimping the terminals plug them into the Deutsch body that is in the kit, match the colors of the wires (i.e. blue on blue, brown on brown and black on black).

Remove the brass plug from the underside of the pump body (grease will come out if the reservoir is full, (it is highly recommended that this procedure be done with the reservoir empty) and fit the low level sensor in place. Move "O" ring from plug to the sensor. Lead the low level switch wire into the pump housing and connect the two halves of the 3 pin connector and re-connect the two pin power connector. Secure the wires and connector and close the housing.

Your Lubecore Modular pump is now ready and will signal a low level event when the follower plate in the reservoir is nearing 'empty'. In case of a low level event the timer will show an 'E' on the display for as long as the reservoir is empty. As long as the 'E' is displayed, the pump will not do any cycles. After filling the pump, it is advisable, to perform at least one minute continuous test cycle to make sure the pump is operational and functioning normally.

Note: When the pump is empty (low level event) and showing an "E" on the display, it is possible to use the magnet to initiate a continuous cycle, this will override a low level event ('E' error). Filling while the pump is running assist with re-priming the pump.



Position	Color	Identity
1	Brown	+
2	Blue	-
3	Black	signal

Table 25. Low level sensor connections

Stainless Steel Metering Element

The Modular Progressive pump is equipped with at least 1 stainless steel metering element. There are 3 models of metering elements available.

The metering element is made from stainless steel to prevent corrosion, this also allows for higher tolerances. Because of the high tolerances the metering element is capable of achieving extremely high pressures, exceeding 400 Bar / 6000 Psi. It is therefore recommended to install a pressure relief valve. Standard from Lubecore the pressure relief valves are set to a maximum system pressure of 250 Bar / 3700 Psi.

Each metering element is threaded into the outlet port until it meets with solid resistance. Then use a suitable wrench to turn the elements for further 1/8 turn (45°) with torque of 16Nm / 12 ft-lbs.

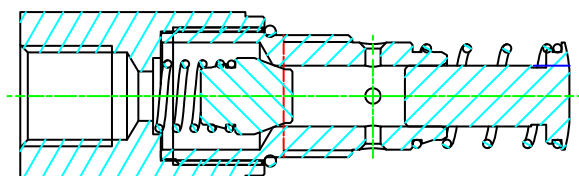
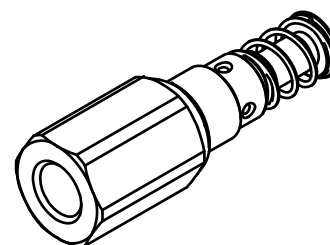


Illustration 26.
Stainless steel metering element # 11.637



Part Number	Description	Identifying Markings
11.637	Element Progressive MK2 0.30cc (SS) M16x1.5 (6cc/23RPM)	# 6 (Stamped on hex)
11.639	Element Progressive MK2 0.20cc (SS) M16x1.5 (4cc/23RPM)	# 4 (Stamped on hex)
11.640	Element Progressive MK2 0.10cc (SS) M16x1.5 (2cc/23RPM)	# 2 (Stamped on hex)

Table 28. Available metering pistons



Illustration 27.
Pump with single metering element installed.

RPM	23		PRO Pump Elements		
	Part Number		11.640	11.639	11.637
ON Time	Per Minute		2.00cc	4.00cc	6.00cc
	Per Stroke		0.10	0.20	0.30
Setting	Seconds	Strokes			
T2 - 1	8	3.07	0.307	0.613	0.920
T2 - 2	12	4.60	0.460	0.920	1.380
T2 - 3	16	6.13	0.613	1.227	1.840
T2 - 4	20	7.67	0.767	1.533	2.300
T2 - 5	24	9.20	0.920	1.840	2.760
MIN	60	23.00	2.300	4.600	6.900

Pressure Relief Valve

The Modular Progressive pump is equipped with 1 pressure relief valve. This valve should be placed directly in-line with the stainless steel metering element. The system is capable of achieving extreme high pressures, exceeding 400 Bar / 6000 Psi. It is therefore recommended to install a system pressure relief valve.

Standard Lubecore pressure relief valves are set to a maximum system pressure of 250 Bar / 3700 Psi.

Its function is to protect the lubrication system against extreme pressures which possibly can cause damage, also informs the operator or service technicians of any system blockages if they occur.

When grease is accumulating near or around the pressure relief valve it is important to inspect the lubrication system for blockages in the distributor blocks and or grease points.

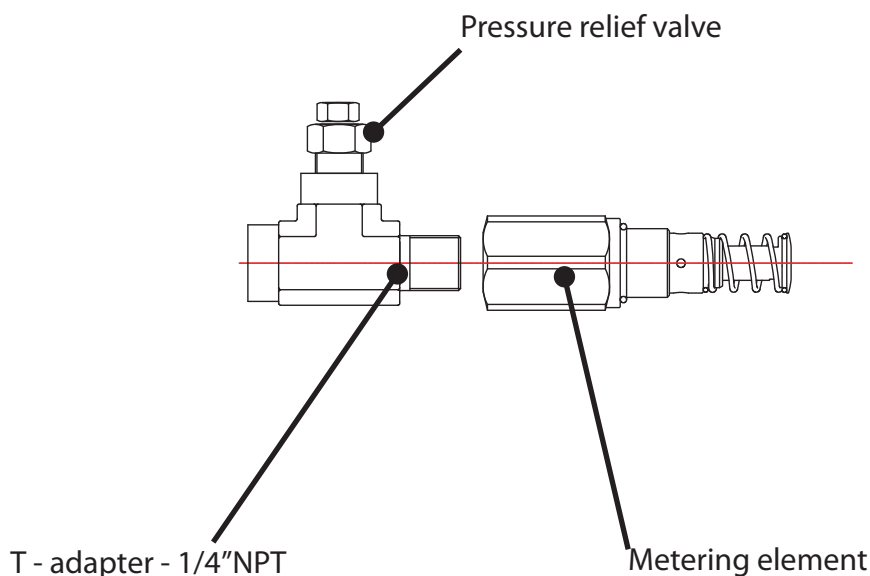


Illustration 29.
Pressure relief valve 10.641: is non-adjustable

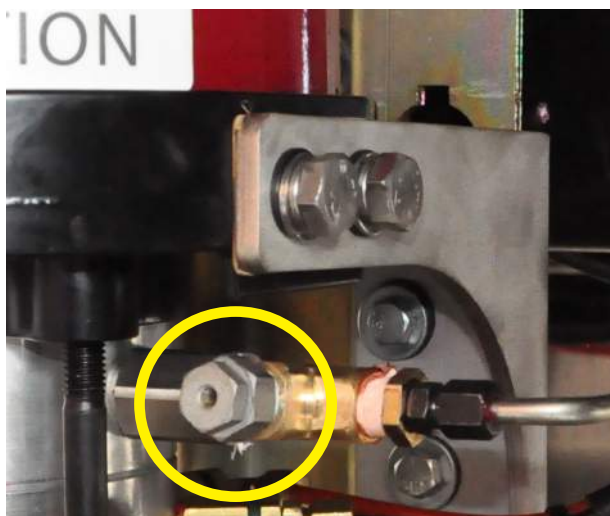


Illustration 30.

Example location of a pressure relief valve at pump. Use of 1/4" ID Korilla Hose with #4 JIC fittings recommended to be used as standard from pump to first divider.

Tracing a system blockage

When grease is visibly coming out of the pressure relief valve the lubrication system may be blocked or experiencing a increased resistance from a restriction at a distribution block or in a hose / fitting. Follow the next steps to determine the location of the blockage / restriction.

Blockage or restriction:

- Install a pressure gauge capable of handling at least 345bar (5000psi) between the check valve in the end of the pump element and the first or main distributor block. This will give you the system operating pressure.
- Start a single lubrication cycle.
- Carefully monitor the pressure gauge. A pressure reading of between 1400-1700psi may be experienced depending on the size of the system and the ambient temperature of the grease.

Under normal system operation some pressure may arise in the system to overcome natural distributor and grease point resistance, however the pressure relief valve, when correctly set, should not open under these circumstances.

Resolving / tracing a blockage - restriction:

- With the pressure gauge still installed, maintain maximum system pressure.
- Follow the primary grease line from the pump and locate the first distributor block, this is the main distributor for the system.
- Slowly loosen the secondary grease lines from the main distributor block one by one, while observing the pressure gauge; check if system pressure has dropped: If so, blockage or restriction is being caused by one of the other disconnected distributor blocks in the system. If the secondary lines are all loose and pressure still does not drop than the main distributor is the issue.
- Re-connect secondary lines to main distributor and locate another distributor block, repeat the above procedure. If no pressure drop is observed, blockage or restriction is in one of the lubrication points.

Distributor blocks can be cleaned and repaired by using EP0 grease. Inject grease into the block without the secondary lines attached. When distributor block does not operate freely; replace.

Metering Process

How does the (series) progressive distributor metering work?

The series progressive distributor assembly forms the basis of the operating principle on which the automated lubrication system works. The distributor is responsible for metering the correct amount of lubricant that is needed to be dispensed to the lubrication points. The Lubecore™ series progressive automated system does this under full pump pressure.

Lubecore™ series progressive distributor blocks are manufactured from corrosion resistant steel and are available in 6, 8, 10, 12, 14 and 18 port configurations.

Operating principle

A single line (series) progressive system consists of a main and several secondary distribution.

A single line progressive system uses lubricant flow to cycle individual shuttle valves that are located in the distributor blocks. Each shuttle valve depends on flow from the previous shuttle valve to shift and displace lubricant. In case of a main distributor, the dispensed lubricant operates the shuttle valve in subsequent secondary distributors.

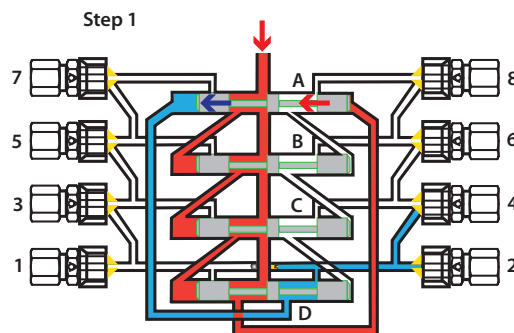
Lubrication begins when the timer sends a signal to the pump to start the lubrication cycle. The pump then feeds lubricant into the supply line which is connected to the main distributor.

Lubricant is fed to the multiple lubrication points one after another via (secondary) distributors which are calibrated to deliver precise lubrication directly to each individual lubrication point via secondary tubing.

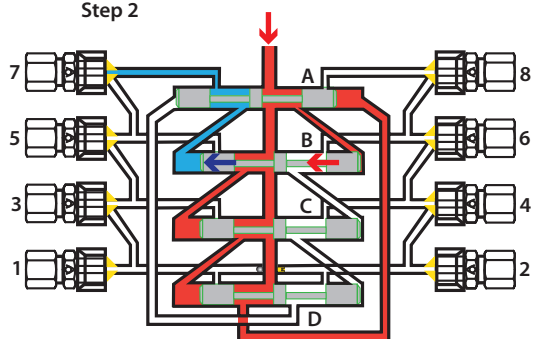
In contrast to parallel automated lubrication systems, series progressive lubrication systems continue to distribute the lubricant to all points as long as the pump is operating. Therefore the total amount of lubricant is determined by the combination of pump and distributor block configuration.

Step 1

- 1). In the illustration to the right, grease is delivered to the top of the distributor block, red arrow, grease under pump pressure travels through the distributor block (red) and moves through the distributor, to the right hand side of the shuttle valve (A).
- 2). Shuttle valve (A) moves, under pressure, to the left, displacing the grease on the opposite side of the distributor block through the shuttle valve (blue) and out of the distributor at gallery #2 (blue arrow).



Step 2

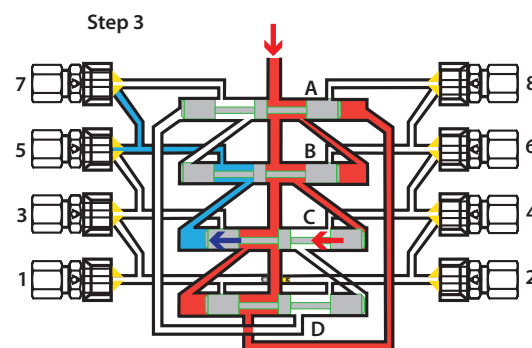


Step 2

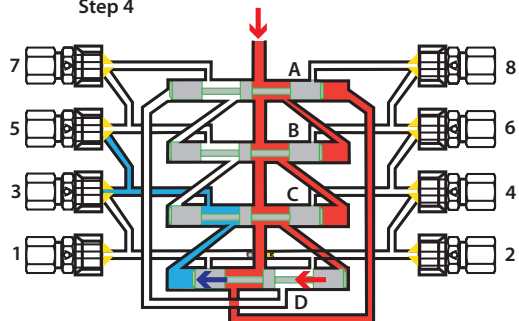
- 3). As long as grease continues to move through the distributor block, red arrow; and the shuttle valve (A) reaches its end-point on the left. A gallery opens to shuttle valve (B).
- 4). Shuttle valve (B) moves, to the left, displacing the grease on the opposite side of the shuttle valve (blue) and out of the distributor block at port #7 (blue arrow).

Step 3

- 5). As long as grease continues to flow, red arrow; and shuttle valve (B) has reached its end-point on the left. Another channel is opened this time to shuttle valve (C).
- 6). Shuttle valve (C) moves to the left hand side of the distributor block again, displacing grease on the opposite side of the shuttle valve (blue) and out of the distributor at gallery #5 (blue arrow).

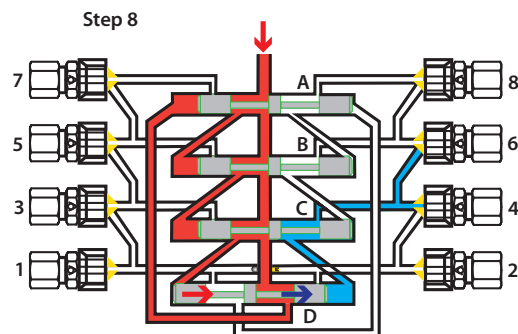
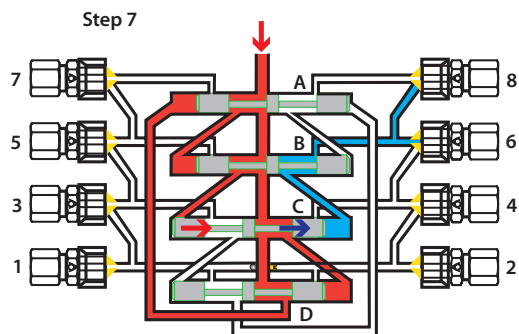
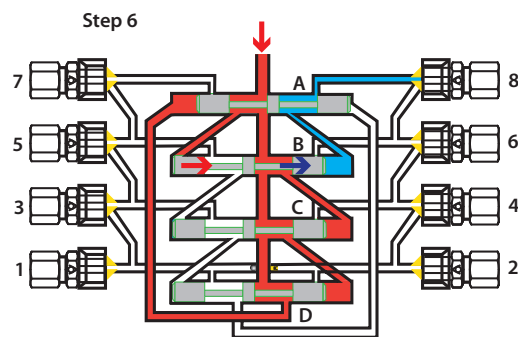
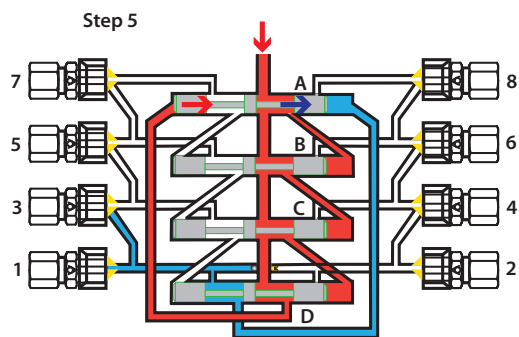


Step 4

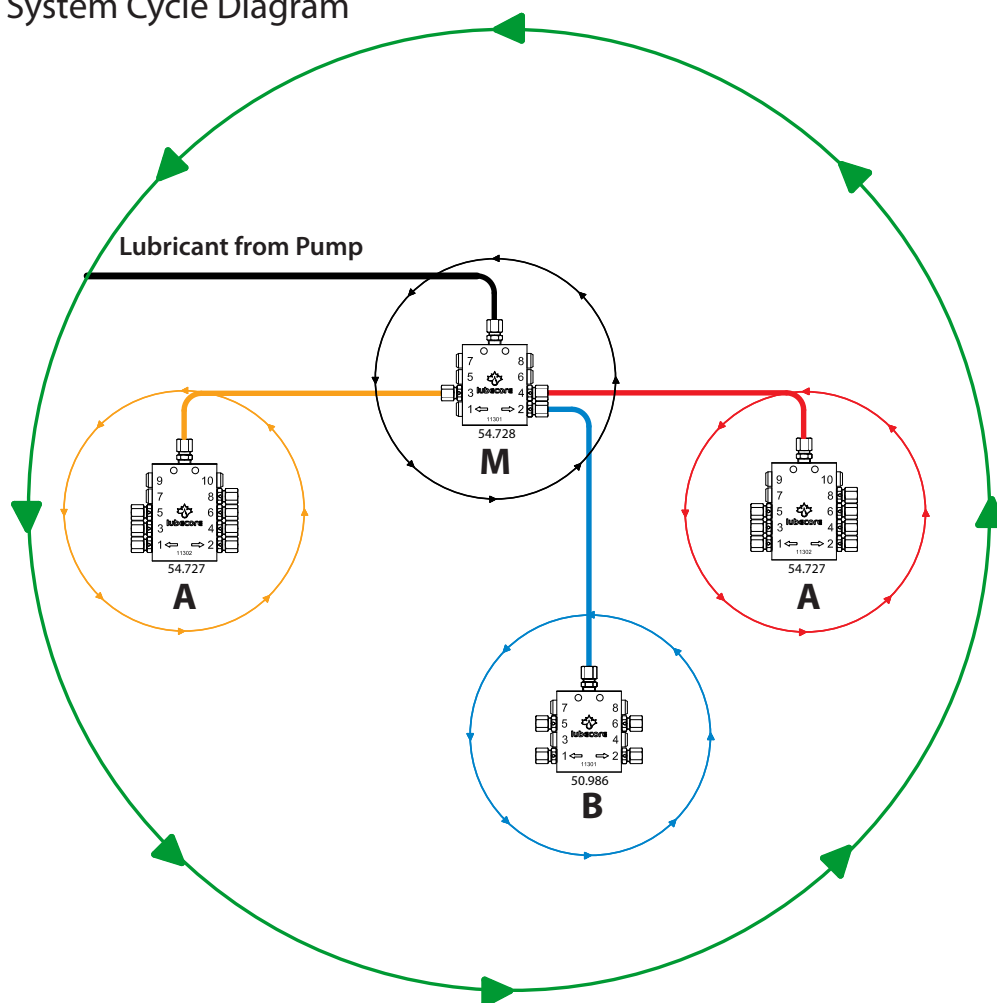


Step 4

- 7). This circular process continues throughout the entire cycling of the pump, via the timers programming. Grease is then transmitted to each individual lubrication point through this process, which is multiplied numerous times over a lubrication cycle, by the use of multiple distributor blocks which deliver grease in predetermined quantities.



Progressive System Cycle Diagram



Combining Outlet Ports for Volume Adjustment

Series progressive distributor outlet ports are cross-drilled to allow for increases in grease delivery. Brass olives that are attached to the outlet check valve fittings are used to normally close off these ports to only allow grease delivery to 1 outlet.

Once these check valves are removed and replaced with a plug. The grease normally delivered to the now plugged outlet is diverted to the next port. (Same side of the distributor, numbered lower)

As shown in the illustrations to the right, port #7 has been plugged with the check valve removed, thus opening and diverting grease delivery to port #5.

At step 2, with the movement of shuttle valve B to the left, the grease is diverted to port #5.

At step 3, also the regular amount of grease is delivered to port #5, thus increasing the amount of grease delivered in this situation from 12.5% to 25% of the pump output.

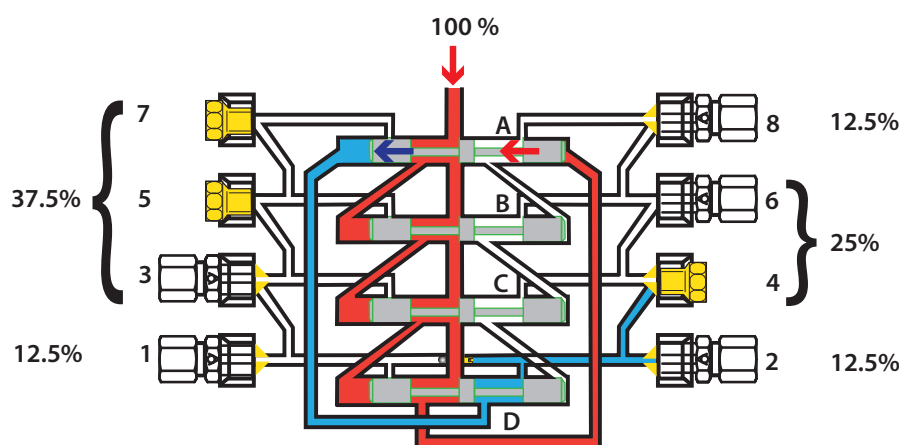
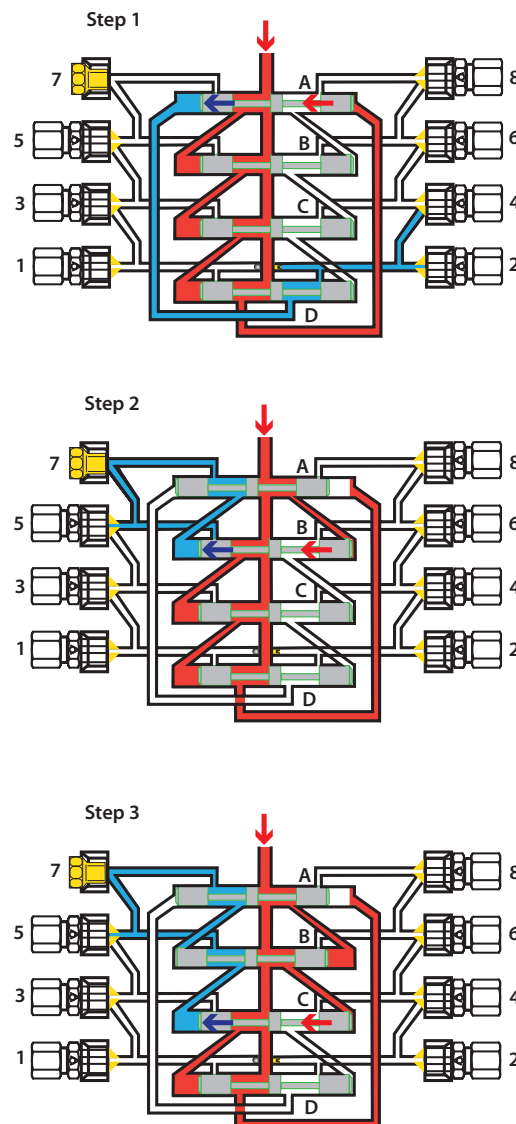


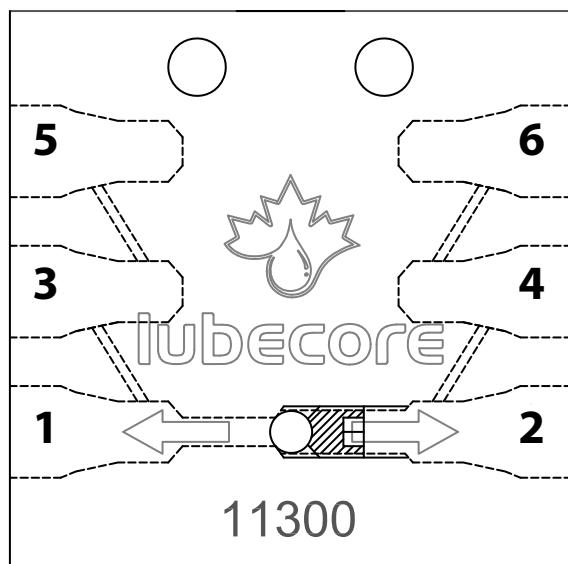
Illustration 31.
Sample displaying the disbursement of grease when several outlets are combined.

Combining outlet ports for volume adjustment

Ports 1 and 2 in Lubecore series progressive distributors are drilled through and can also be combined. However, prior to combining outlet ports 1 or 2 with each other a 3mm Allen screw and steel sealing bearing must be removed from the grease channel.

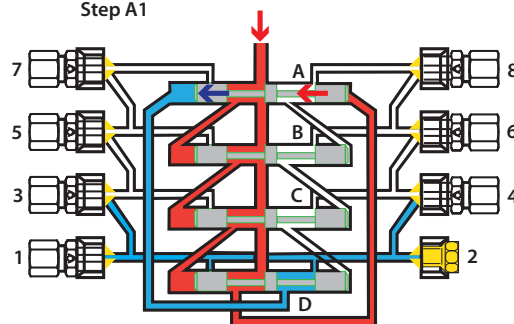
Note: Gallery 1 or 2 must be used and one must be plugged. You may not plug galleries 1 and 2 at the same time.

Distributor block top view

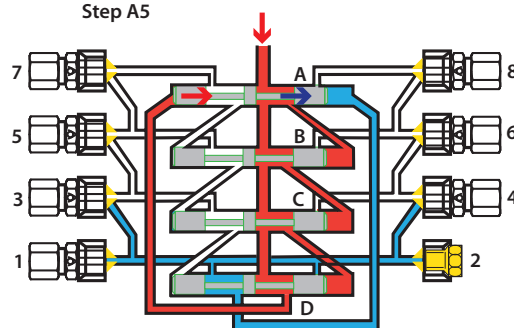


3mm Allen wrench

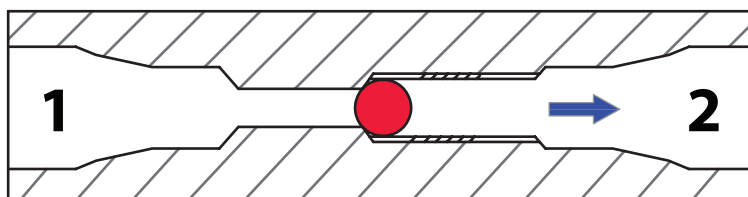
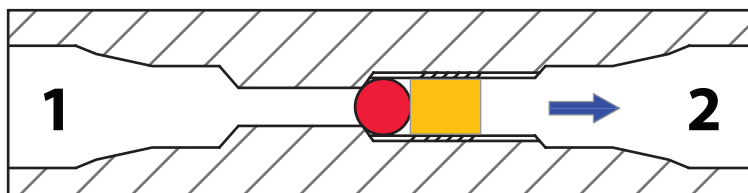
Step A1



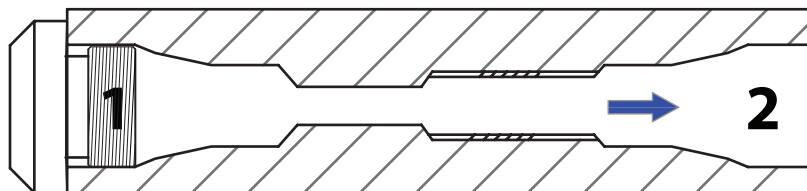
Step A5



Lower distributor block delivery gallery cross sections end view



Port 1 or 2 need to be plugged

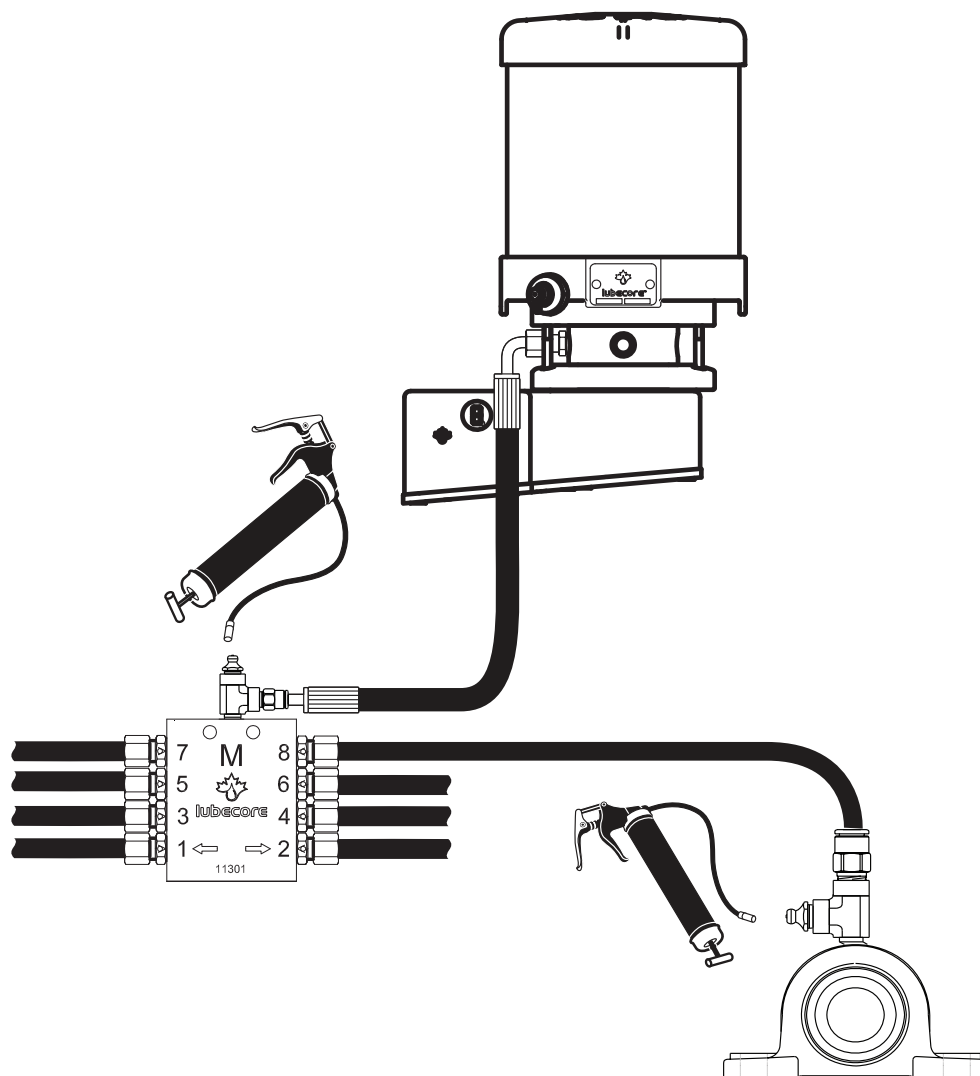
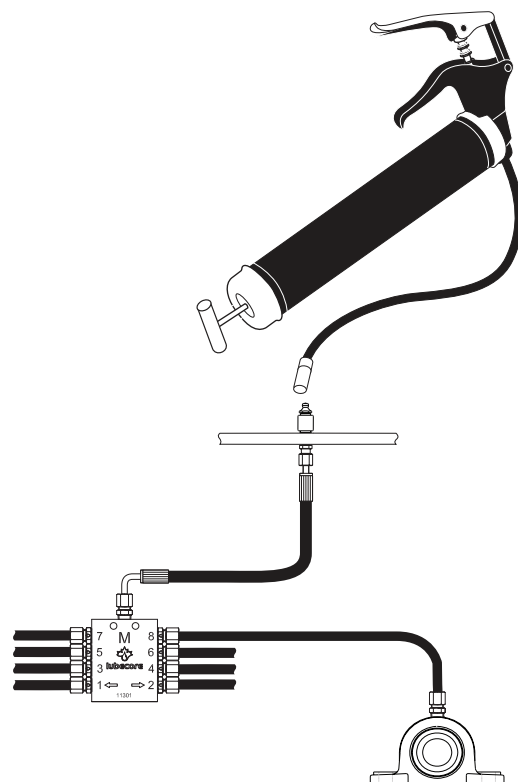


Lubrication Options

The Lubecore series progressive lubrication system also offers the option to have a single or multiple point centralized lubrication point.

Series progressive distributors can individually or in combination be utilized to create a single point to grease the equipment.

It is also possible to integrate a manual service port into the lubrication system to manually provide additional lubrication to individual points or sections of the equipment.



Available Progressive Distributors

Distributor Size (ports)	Standard
6	11.300
8	11.301
10	11.302
12	11.303
14	11.297
18	11.299

Table 32. Overview of available progressive distributor blocks.



Figure 33.
11.301, standard 8 port progressive distributor.

Due to the great variety of available parts, which can be used in the construction and design of a series progressive automated lubrication system, it is highly recommended that you contact your local Lubecore Distributor or Lubecore International for assistance in determining your equipment and business needs.

Filling of the Reservoir

If during a system inspection it is visible that the reservoir has reached minimum level, the pump needs to be filled with an appropriate NLGI - grade lubricant. Review the labeling as the pump is suitable for use with a wide range of lubricants.

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 (EP0) or grease fitting (EP2) located on the pump.

Step 2: Clean the male filler coupler or grease fitting 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 or other filler nozzle used, 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 / 3 cm below the black reservoir cap.) The bottom of the follower plate should have passed the vent opening in the follower plate guide rod.

During filling of the reservoir or immediately after the maximum level has been reached, some lubricant may be expelled from the pump at the vent opening. Air possibly trapped underneath the follower plate and excess lubricant may come out at this opening. The opening corresponds to the vent opening as located in the centre guide rod.

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

It is suggested that the filter be replaced after every 5 pails of grease



Illustration 35.

Male filler coupling with dust cap. Either a regular grease Zerk for EP2 grease or a male quick disconnect for EP0 grease.



Illustration 37.

Reservoir overflow / Vent location



Illustration 34.

Circulate grease to remove air pockets.



Illustration 36.

Overflow opening in the center guide rod.



Illustration 38.

Reservoir filter.

Caution note:

Automatic Lubrication Systems are not compatible with Moly or Metallic greases!

Extra caution must be used when mixing greases. See Lubecore Grease Compatibility chart for details

Technical Specifications

Standard Modular Progressive Pump

Feature	Available
Reservoir capacity	4 & 6 Kg (8.8 - 13.2 Lbs)
Standard number of injectors openings	3 port collar
Pressure at 24 RPM - relieve valve	250 Bar - 3625 Psi
Timer	10V-30V minute timer
Working time interval [minutes] - T2	2/4/6/8/10
Pause time interval [minutes] - T1	15/30/60/120/240
Operating / ambient temperature range	-20 C / 80 C -4 F / +160 F
Lubricant grade:	NLGI 000 to NLGI 2 Depending on installed tubing size and follower plate.
Pump weight without grease	8 Kg / 18 Lbs (4Kg reservoir model)
Available number of piston elements	1 (0.30 cc/stroke)
Cycle counter	Optional - external
Low level switch	Optional - proximity sensor
Filler coupling size:	1/4" Quick Disconnect for EP0 with filter or standard grease fitting for EP2 with filter.
Voltage / Amp	(12V) 2 Amp (24V) 1 Amp

Table 39. Overview of standard specifications for Modular Progressive pump.

Lubecore™ Limited Warranty

Lubecore™ warrants the product manufactured and supplied by Lubecore and its authorized distributors to be free from defects in material and workmanship for a term as defined in the enclosed table, following the date of purchase, excluding 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 conditional upon the determination by Lubecore or authorized representative that the product is defective. For a complete list of Lubecore and authorized representative locations call 1-905-864-3110 or visit 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 of any other warranties, expressed or implied, including, but not limited to, the warranty of merchantability or warranty of fitness for a particular purpose.

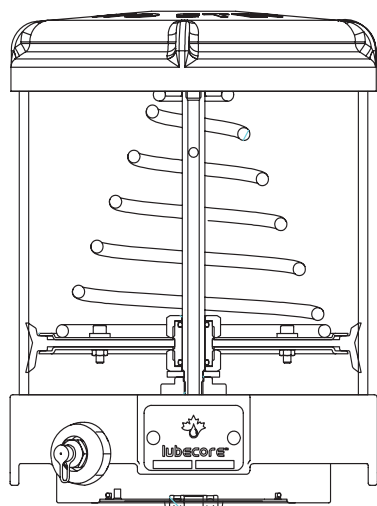
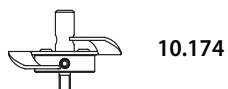
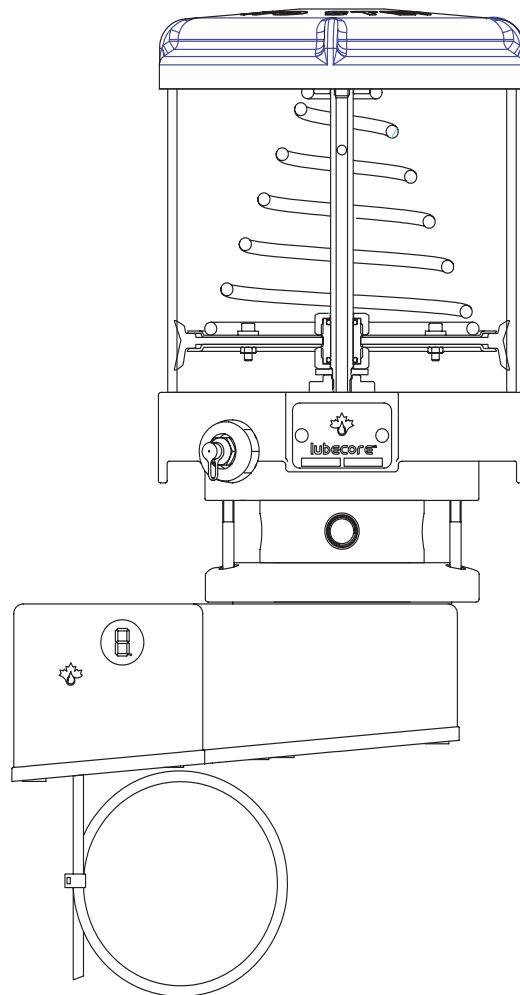
In no event shall Lubecore or authorized representative be liable for incidental or consequential damages. Lubecore or authorized representative's liability for any claim for loss or damages arising out of the sale, resale or use of any Lubecore™ equipment shall in no event exceed the purchase price.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

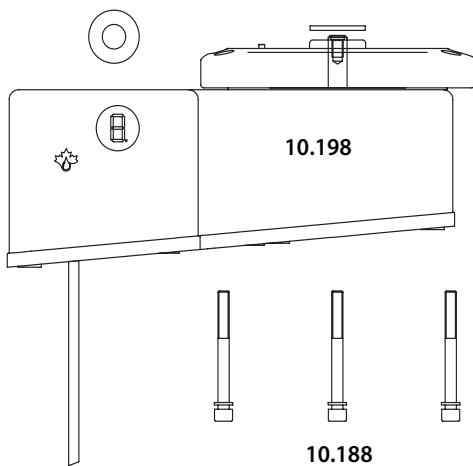
Product	Limited Product Warranty	Limited Steadylube Extended Warranty	
		On-Road / Transport	Off-Road
Parallel Pneumatic* EP0	1 - year	5 -years	2 -years
Parallel Electric* Gear EP0		2 years	1 -year
Parallel High Pressure Electric* - Hydraulic		-	1 -year
Series Progressive Electric*		-	1 -year
Series Progressive Pneumatic*		5 -years	2 -year
MLP/Multiline - Including Modular		1 -years	1 -year

Table 57. Limited warranty terms / period. * Defines the method of pump operation.

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.
- Contact Lubecore International or your local distributor for further details pertaining to the extended warranty provided with the use of Lubecore lubrication products.


10.213

10.174

10.175

10.198
50.581
10.188

QTY.	Description	Part #	U/M
1	Spyder 4Kg Res Module	10.213	ea.
1	Spyder, Bottom, 24 Volt Pro.	10.198	ea.
1	Ring Module, 3 Port Modular	10.175	ea.
1	Screw Plate Module	10.174	ea.
1	Bolt Kit - 60mm (1L)	10.188	ea.
1	Spyder, Bracket Kit, 6mm	10.187	ea.
1	Bolt Kit, Modular Bracket	50.594	ea.
1	Kit, LCI Modular Hardware	50.931	ea.
1	Kit, 30' Power Harness	50.581	ea.


4kg Progressive Sample
LUBECORE

Grease: EP2	03/04/2014	57.005	
Volt: 24 VDC	Bert VanBaalen		



lubecore™

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Distributor:



<http://www.lubecore.com>



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