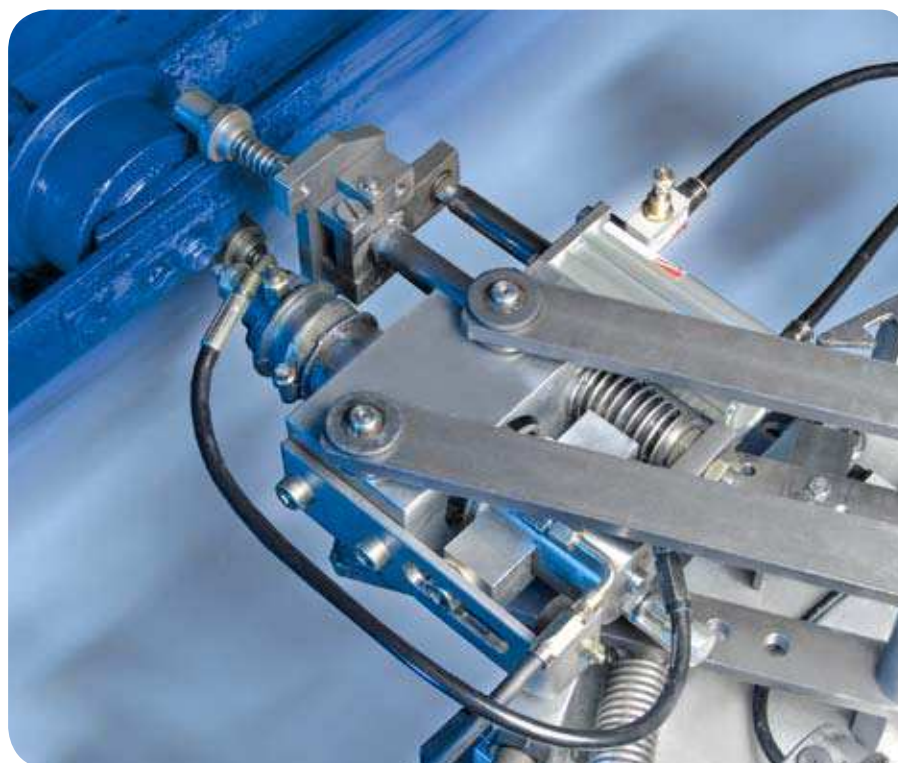


# Chain lubrication

Automated lubrication systems  
for oil and grease

- All chain sizes
- All chain speeds
- All operating conditions



# Index



**Chain lubrication . . . . . 3**

**MOS/MOP 201 . . . . . 4**

Mechanically driven oil lubrication pump  
– for the oil lubrication of slow moving  
chains

**MOS/MOP 212 – MGP 101 . . . . . 5**

Mechanical oil and grease lubrication  
system



**EOS . . . . . 6**

Single-line oil system for chain lubrication

**Quicklub . . . . . 7**

Progressive system for grease or oil –  
for slow moving, small chains



**Contact lubrication with guide blocks . . 9**

For conveyor chains in rough  
environments

**Centro-Matic . . . . . 10**

System operation and features

**Orsco chain lubrication . . . . . 12**

System operation and features



**PMA 2 . . . . . 13**

Contact-free oil lubrication – for fast  
moving chains

**COBRA 1X . . . . . 14**

Lubricates the inner rollers and studs of  
heavy-duty chains with grease or oil



**Compact controller LMC 2 . . . . . 15**

# Chain lubrication

Despite new types of material and advanced technology, many chains still require lubrication. Optimum lubrication reduces friction and subsequent wear on chains. The largest relative movement of all chains occurs between the link plate and the chain stud, and it is here where considerable forces are present. Insufficient lubrication of this area will result in premature wear and chain failure. The consequence is expensive production downtime. Precise and efficient lubrication is a prerequisite for trouble-free operation and long life of the chain.

Lincoln automated chain lubrication systems provide an exact metered quantity of lubricant and apply it reliably to the chain where it is required.

## Advantages of automated chain lubrication

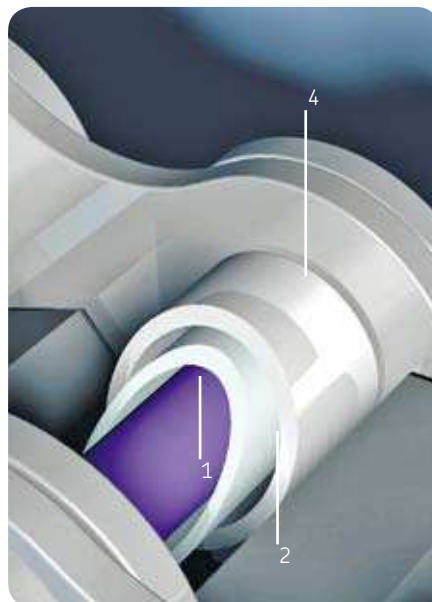
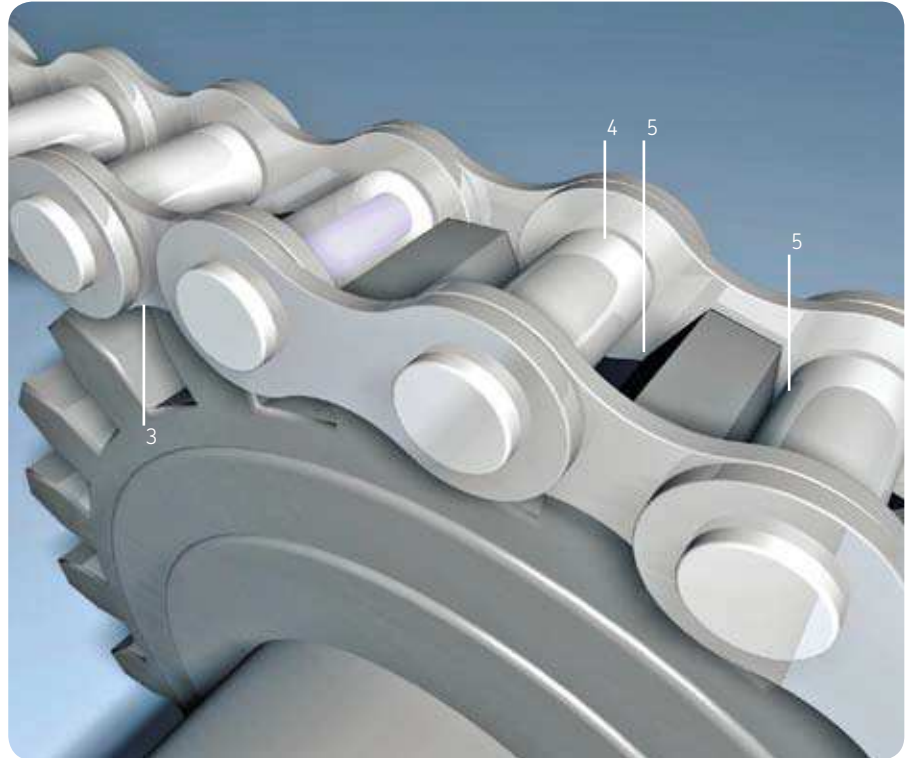
- Increases life expectancy of the chain
- Minimizes downtime resulting from insufficient lubrication
- Reduces energy consumption
- Reduces lubricant consumption
- Absorbs shocks
- Cools fast-running chains
- Lessens noise

## Suitable chain lubricants

All well-known chain manufacturers recommend the periodic relubrication of the chain with a suitable chain lubricant.

The most important chain lubricant requirements are:

- Good penetration characteristics
- High pressure resistance
- Reliable corrosion protection



## Friction points of a chain:

- 1 Friction between bushing/stud
- 2 Friction between bushing/roller
- 3 Friction between inner/outer plate
- 4 Friction between plate/bushing
- 5 Sprocket/roller/inner plate

Further friction points are found at the drive and chain attachments.

# MOS/MOP 201

## Mechanically driven oil lubrication pump – for oil lubrication of slow moving chains

The MOS 201 – a mechanically driven oil lubrication system – consists of multiple mechanically driven oil pumps. The pumps are connected directly to the chain.

The system is suitable for continuous operation. A typical industrial application is for packaging machines such as palletizers.

The MOS 201 lubrication system makes it possible to lubricate several, independently run chains. It is especially suitable for applications that require lubrication of more than 5 chains. Each chain and lubrication point uses one lubrication pump. The centralized oil supply to parallel pumps is provided by a ring feed connection.

The MOP 201 pump supplies all points with the same, exact metered amount of oil. As a result, chain wear caused by dust and dirt build-up is minimized. The oil is applied by brushes or felt-pads, where the felt-pads are an effective way of evenly applying oil over the entire chain.

Simultaneously, dirt and particles are scrubbed off the chain – making the lubrication process even more effective.

The MOP 201 is driven by an eccentric cam and probe which enables the rotating eccentric disk to be assigned to the appropriate running chain and its lubrication points. The rotating motion of the eccentric disk is converted by a tappet into a linear motion.

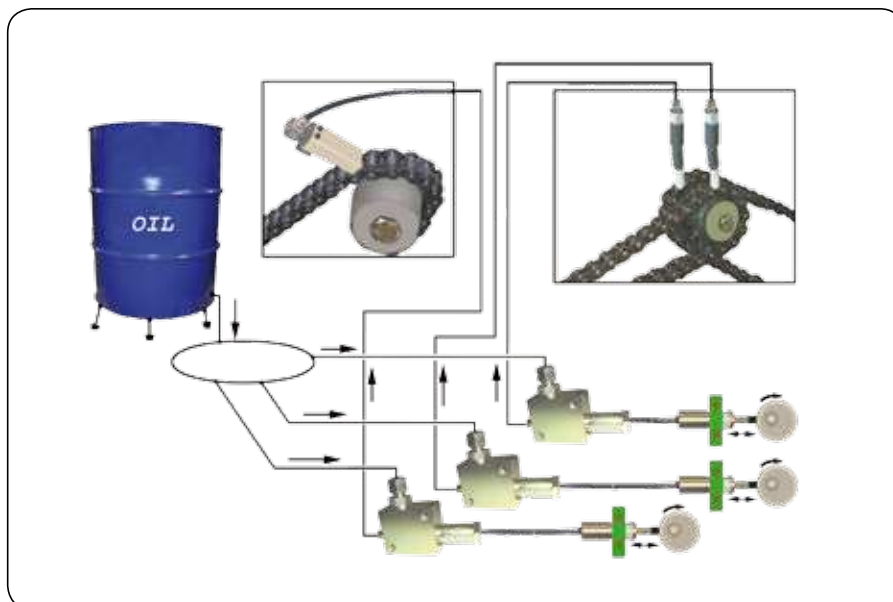
A bowden cable transfers the stroke of the tappet to the piston in the MOP 201 pump. It is the bowden cable connection that enables only the lubrication of the chain that is currently in operation.

Dependent on the number of chains, the system may be extended at any time.

### Environmental information

The mechanically driven MOP 201 pump is an advancement over the MOS 101 that was developed for agricultural equipment. It is especially suitable for stationary industrial applications with more than 5 chains – e.g. palletizers. The connection takes place via an existing oil ring circuit. The separate pump element is connected directly by a Bowden cable with the drive, so that the defined individual lubrication of a chain is possible.

*Palletizer with Lincoln lubrication system in a brewery*



### System benefits

- Reduces wear on chains and chain drives with exact metered oil quantities.
- Only the chain whose drive is currently engaged is lubricated. Over-lubrication and unnecessary dripping of oil is avoided.
- Mechanical drive – no extra electrical drive necessary
- For the lubrication of more than 5 chains

# MOS/MOP 212 – MGP 101

## Mechanical oil and grease lubrication system

### MOS/MOP 212

The MOS 212 oil lubrication system comprises a mechanically operated oil pump MOP 212 with up to 12 pump elements that, with metering rings, have 3 different output sizes.

A lubrication line ( $\varnothing$  4 mm) is connected directly from each pump element to the drive chain that requires lubrication.

The oil is applied with brushes or felt pads. The felt pads are especially advantageous for applying the oil to the entire chain.

Simultaneously, dirt particles are scrapped off the chain resulting in a more effective lubrication.

*Combined  
MOS/MOP 212 and  
MGP 101*



### MGP 101

It is further possible to add a grease pump MGP 101 to the existing MOP 212 or to drive the MGP 101 via the MOP 212 as a drive pump.

The MGP 101 can also be used independently as a grease pump with a max. r/min of 20. The MGP 101 encompasses a K7 pump element and it can be equipped with downstream metering devices such as the SSV progressive metering device.

The pump uses 150/310 g lubricant cartridges or standard 400 g cartridges in a steel or transparent plastic tube. The result is a type of tandem pump for both oil and grease.

*Agricultural machine (baler) with  
MOS/MOP 212 lubrication system*



### Technical data MOS/MOP 212

Pump elements with different outputs:  
0,025, 0,05, 0,075 cm<sup>3</sup>

2 shaft types with different ratios  
(i = 7,7 and 19,53) to regulate lubricant that connect the drive shafts of the main unit

5 litre reservoir

Useable oils: Mineral oil,  
Ester base bio oil

Shaft connection  $\varnothing$ : 8 mm  
Rotational speed: 30 to 280 r/min  
Max. supply pressure: 10 bar  
Operating temperature: -10 to +70 °C

Oil viscosity: 40 cSt to  
max. 2 000 cSt

### Technical data MGP 101

RPM range (via MOP 212):

shaft 1 (i = 19,53): 30 to 280 r/min  
shaft 2 (i = 7,7): 30 to 150 r/min  
or direct: up to 20 r/min

Max. supply pressure: 200 bar  
Lubricant: Grease up  
to NLGI 2

Output: 0,22 cm<sup>3</sup>/stroke

### System benefits

- Reduces wear on chains and chain drives with exact metered oil quantities.
- Metered quantity is matched to chain size, length and demands.
- Extended filling intervals with 5 litre reservoir
- Mechanical drive – no extra electrical drive necessary

# EOS

## Single-line oil system for chain lubrication

EOS is the most reliable and economical solution for the oil lubrication of chains. It is a direct operating, electrically driven, single-line centralized lubrication system. It is ideal for machines with chain drives and 12/24 V DC power supply – e.g. agricultural equipment such as balers. A typical industrial application is for packaging machines such as palletizers.

It is different from systems that use basic restrictor or metering elements because the EOS uses a direct operating metering element that offers greater reliability and accuracy. The metering elements supply the required oil quantity in time-controlled intervals to brushes which evenly apply the oil to the chain. Each stroke of the pump charges the metering elements with a predetermined amount of oil and simultaneously supplies the previously charged oil quantity to the brushes. Thereby, all lubrication points receive the exact, metered quantity of oil that is required. As a result, wear caused by dust or dirt particles is minimized.

The required metered quantity of oil can be adjusted to properly match the working condition, the size and length of the chain. The frequency of the lubrication interval is determined by the degree of contamination potential that the chain is subjected to.

The metering range selection of 0,1, 0,3, 0,4 or 0,5 cm<sup>3</sup> provides versatility to ensure that requirements are met.



EOS pump

### EOT 1 – the EOS controller

For machines without a controller, for example, balers in the agricultural industry, Lincoln offers a 12/24 V DC controller. The run time is fixed at 4 seconds and the pause time is adjustable from 5 to 75 seconds and 5 to 75 minutes. The controller enables a simple retrofit installation of the EOS oil lubrication system.

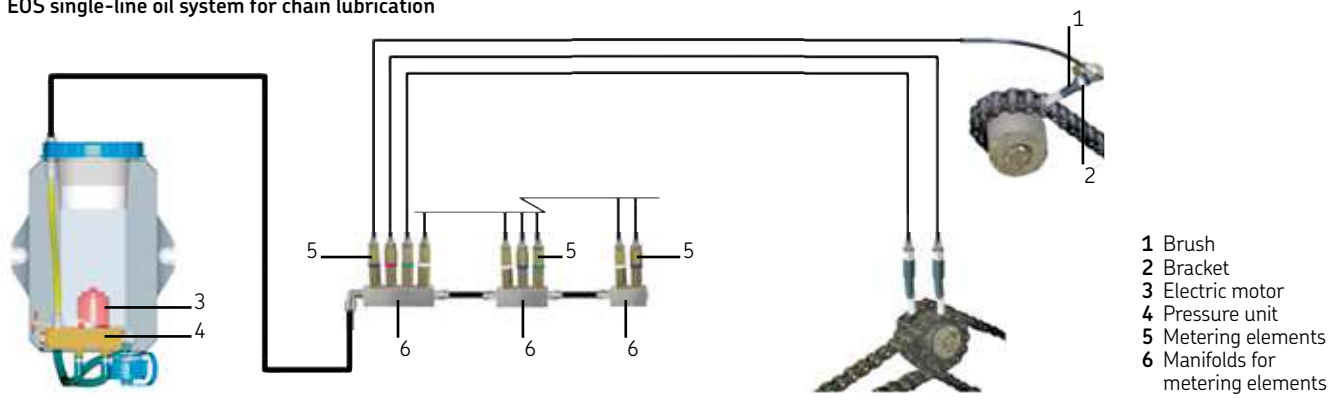
### EOT 1 – the EOS controller



### System benefits

- Precise, metered quantities of oil reduce wear on the chain and drive.
- Metered quantities can be selected to match the chain size and length as well as operating parameters.
- 5 litre reservoir provides extended filling intervals.
- Push-in fittings provide quick and easy installation.

### EOS single-line oil system for chain lubrication



# Quicklub

## Progressive system for grease or oil – for slow moving, small chains

### The new generation of Quicklub P 203 pumps

The Lincoln Quicklub pump is the standard lubrication pump for all applications. Quicklub pumps supply small to mid-sized machines and systems with up to 250 lube points.

Effective and clean lubrication for chains is an issue for many maintenance managers. Lincoln has the answer with three types of systems – brush, precision spray and metered squirt. Chain life is significantly increased, and chain stretch is significantly reduced when lubricated with a Lincoln automatic system.

The Lincoln brush lubrication, in conjunction with the Quicklub 203 pump, provides an economical entry-level chain lubrication system. The Quicklub range does however offer numerous add-on possibilities. As a result, it fulfils all expectations for an easy, maintenance-friendly and high quality lubrication system.

Brush lubrication not only lubricates the contact points of the links, but rather the entire chain. The pump supplies the lubricant either directly or via a progressive metering device to the brushes, which evenly apply the lubricant to the chain. As a result, high-viscous chain oils and lubricants up to NLGI 2 can be easily, economically and reliably applied.



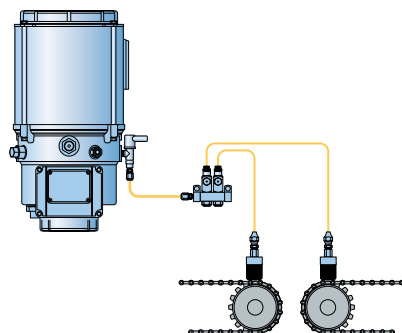
#### System benefits

- 2, 4, 8 and 15 l reservoir
- The filling of the reservoir occurs via the filling connection for cartridges – optional top-filling via the opening with lockable lid
- Reservoir with stirring paddle or with follower plate
- The pump is IP6K9K protected against damage and moisture
- Various pump elements with fixed or variable output
- Over-pressure valve – also equipped with an indicator and reservoir return
- Fully-automated option via integrated PCB
- Optional integrated display, touch pad and data logger function for the storage of important information such as operating time, faults or blockages and low-levels
- Installation can be performed with threaded or 350 bar rated Quicklinec plug-in type fittings

### Multi-line lubrication system in a roller coaster



#### Automatic brush system No air required



## Progressive lubricant metering devices in solid-block construction

### SSV, SSVD and variants

- Block form – less prone to failure
- Leaks are avoided
- A higher operating pressure ensures reliability – even at minus temperatures
- Easy to monitor
- Error-free exchange as complete blocks are always exchanged
- Mistakes in connecting or in settings are avoided



### SSV/SSV L

The proven SSV and SSVD metering devices are also available in a stretch “L” version (L = Large) for larger diameter piping. SSV and SSV L are piston metering devices that reliably divide the incoming lubricant in predetermined individual quantities.

Lincoln progressive metering devices do not have fault-prone rubber seals. As a result, they can be used with high back-pressures, and they are ideally suitable for a wide range of temperatures. The maximum operating pressure is 350 bar.

SSV metering devices are available with 6 to 22 outlets, and SSV L with 6 to 14 outlets.

### SSVD/SSVD L

Easy setting of the lubricant quantity via Lincoln metering screw technology

- Progressive metering device in solid-block form – with flexible metering
- Wide range of metering – leaves nothing to be desired
- Easy to alter metered quantities via metering screws – no disassembly and reassembly of metering device segments – also possible to do when the metering device is already fitted.

SSVD/SSVD L metering devices are adjustable per outlet pair, thus enabling a much better match to the optimum lubricant requirements. The metering occurs within the metering block by metering screws that are available in 10 different sizes.

SSVD metering devices are available in the standard 6 to 22 outlets.

SSVD L metering devices are available in 6 to 14 outlets.

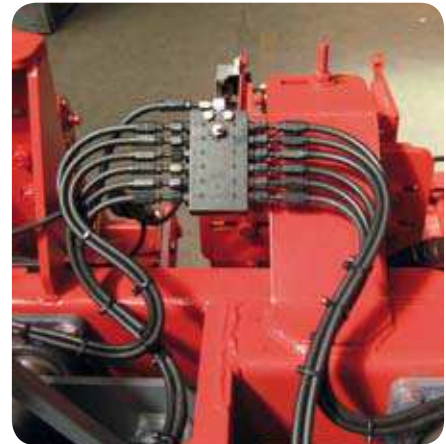
Metering screws per outlet pair are available in ten sizes – 0,08, 0,14, 0,2, 0,3, 0,4, 0,6, 0,8, 1,0, 1,4 and 1,8 cm<sup>3</sup> per outlet and stroke.

SSVD-V1/SSVD L-V1 metering devices with internally connected outlet numbers 1 and 2 allow for additional better matching of applications with an uneven number of lube points.

### SSVE and SSVE E lubricant metering devices

Lincoln SSV and SSVD metering devices are also available in an “E” version with an emergency lubrication fitting on the front face of the block.

The “E” metering devices are ideal for single-nipple lubrication systems. The additional, easy to access lubrication fitting simplifies service and trouble-shooting tasks as a manual grease gun can be used. Also, additional emergency over-ride greasing is possible without having to change the system configuration.





# Contact lubrication with guide blocks

## For conveyor chains in rough environments

The main applications for this genuine simple new lubrication system are transport/conveyor chains found in all industries. This system simultaneously cleans, guides and continuously lubricates the chain.

The Lincoln contact lubrication has an extraordinary long life thanks to highly wear-resistant plastics and is very robust and insensitive to contamination and knocks.

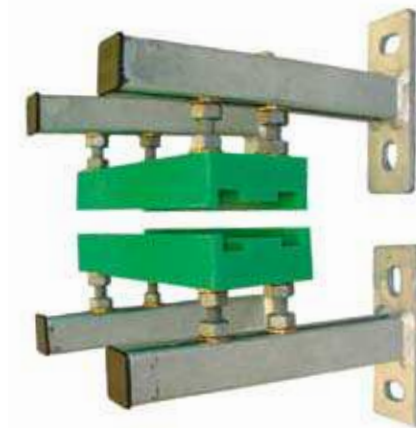
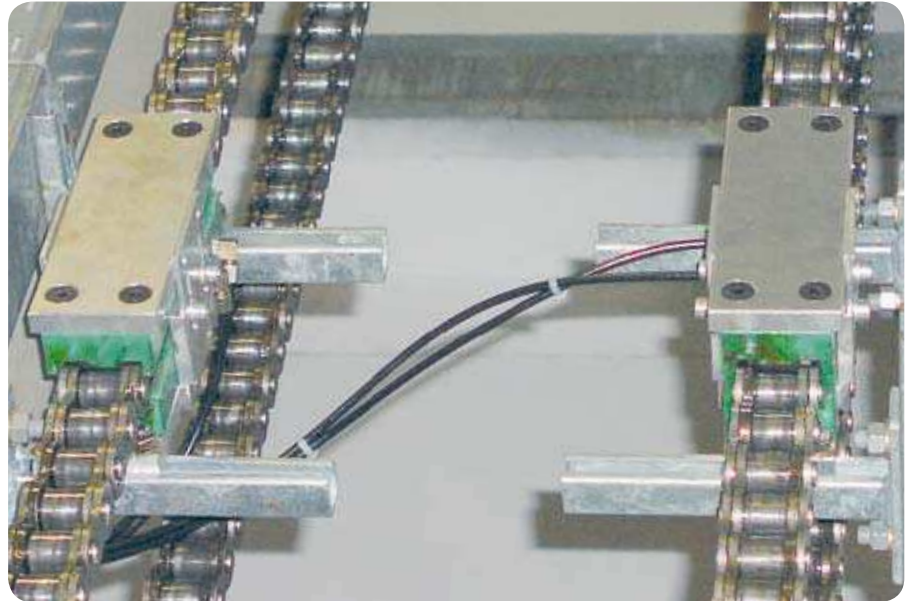
The system is patent pending and underlies protection of registered design No. 20210758.2.

### Application areas

The system has been designed especially for chains in pallet conveyor systems, e.g. in the food and beverage industry. Pallet systems for return goods are particularly exposed to a high grade of contamination: wood chips, broken glass, and in the winter, ice particles stick to the chain and result in premature wear.

Other applications for a contact lubrication system are passenger or freight elevators as well as escalators.

For the lubrication of conveyor chains, the newly developed contact lubrication system offers essential advantages compared to conventional brush lubrication. By using a plastic chain guide, the worst of the dirt on the chain is cleaned off and, at the same time, the chain wear is reduced by an automatic and continuous lubricant supply. Additionally, the chain is held in position or directed by the guide block of the lubrication system.



*Contact lubrication with guide blocks in an elevator*

### System benefits

- Cleaning effect of the chain, sticking dirt particles are cleaned off.
- Suitable for a wide range of roller chains according to DIN 8187 (1/4 in. single up to 2 in. double)
- All types of chain lubricants (from low-viscous oil to lubricating grease) can be applied.
- Suitable for low and high chain speeds (up to max. 40 m/min)
- Robust and insensitive to contamination and knocks
- Long life due to highly wear-resistant plastics
- Can be supplied with lubricant by any Lincoln centralized lubrication system (progressive system, single-line system, etc.).
- Chain is additionally guided.
- Simple and favorable in price

# Centro-Matic

## Centralized lubrication system – for chains and chain groups of machines

The Centro-Matic system is designed for the centralized oil lubrication of slow moving chains and especially for groups of chains that are individually operated. The chain speed can be up to 6 m/min if brushes are used. For contact-free squirt applications, the chain speed is dependent on the chain division and the number of employed SL-43 lubricant injectors.

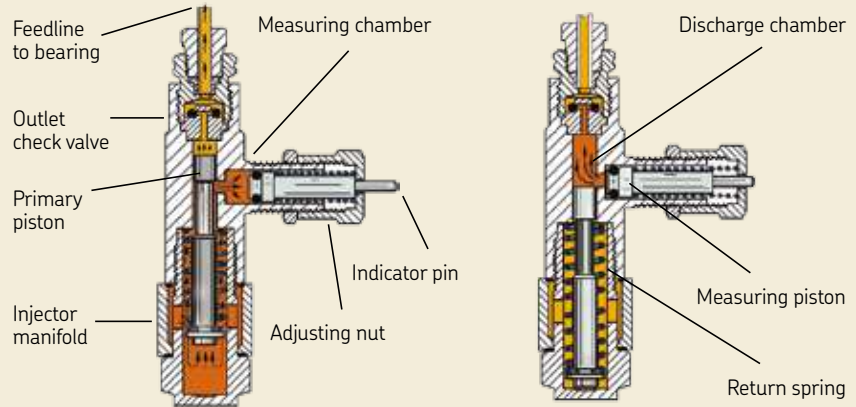
Centro-Matic systems meter the oil in exact quantities, independent of the oil viscosity and flow resistance. The high operating pressure of the injector enables an accurate expulsion of oil. The result is optimum chain lubrication and an economical usage of lubricant.

The lubrication of the chain does not require compressed air, the only air that may be required is to drive the pump that supplies the lubricant injectors with oil.



*Stainless steel SL-32 grease injectors are used here to prevent corrosion from daily "wash-down" maintenance practices at this food plant.*

### How the Centro-Matic injector series (SL-32, 33, 42 and 43) works



#### Stage 1 – pressurized

Incoming lubricant, under pressure from the pump, moves the primary piston forward.

The primary piston forces a pre-charged amount of lubricant from the discharge chamber through the outlet check valve through the feed line to the bearing. Simultaneously, lubricant fills the measuring chamber and pushes the indicator pin out.

#### Stage 2 – relieved (vented)

When the system is vented (pressure relieved), the primary piston returns to the rest position, allowing the measuring piston to transfer lubricant to the discharge chamber for the next cycle.

Top-adjusted injector models operate on a different principle with similar features

#### System benefits

- Switching on and off of individual chain groups is possible.
- Exact metering, independent of oil viscosity and flow resistance
- The high operating pressure of the injector enables accurate oil expulsion.
- Lubricates without compressed air

Injectors are typically mounted in manifolds. The number of grease or oil injectors in a manifold ranges from one to 15 depending on the series.



### Centro-Matic system features

- Extremely flexible
  - easy to add or subtract lubrication points
- Adjustability
  - injector outputs are adjustable – down to 0,016 cm<sup>3</sup> (0.001 cubic inches).
- System monitoring
  - alarm systems are available to monitor pressure, low reservoir level and the flow of lubricant at the bearing (System Sentry).
- Capable of pumping long distances
  - over 91,4 m (300 ft.) with grease, pressures up to 414 bar (6 000 psi) depending on the injector and pump models
- Large number of bearings
  - over 500 lubrication points (depending on bearing size)



- Excellent in harsh conditions
  - injectors are available for high heat, up to 177 °C (350 °F), and corrosive environments (stainless steel models available).
- Wide range of pumps
  - pneumatic, hydraulic, electric and manually operated
- Wide range of pump reservoirs
  - from 0,45 to 181 kg (1 to 400 lb.) drums or bulk tanks



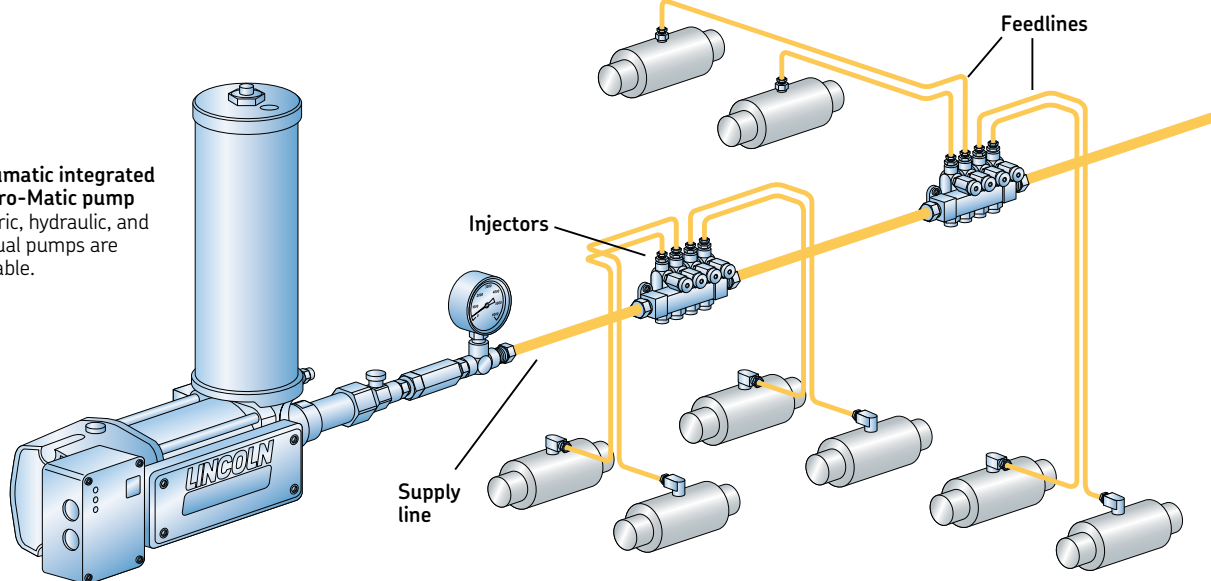
**P 603/653 Single-line lubrication system**

### System overview

A pump automatically develops lubricant pressure through a single supply line to the injectors. Each injector services one lubrication point and may be accurately adjusted to deliver the precise amount of grease or oil required for each bearing. Both oil and grease injectors are available in various output ranges, in stainless steel and in high-heat models.

#### Pneumatic integrated Centro-Matic pump

Electric, hydraulic, and manual pumps are available.



# Orsco chain lubrication

## System operation and features



### System overview

Lincoln's Orsco system is the latest technology in chain lubrication. The major difference between the Orsco oil lubrication system and other lubrication technologies is the use of a continuous, ultra-fine, non-misting delivery of lubricant.

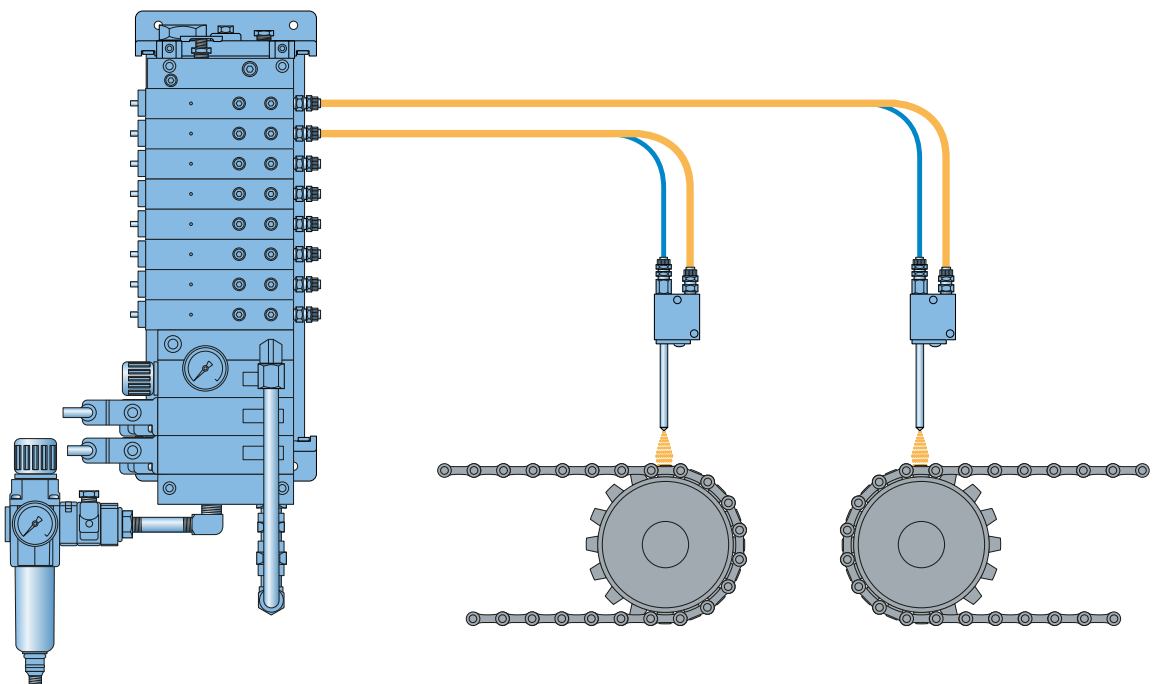
In applications where cleanliness is critical, the Orsco system achieves exceptional performance. The Orsco system has the capability to spray one drop of oil continuously for more than one minute. Each system is custom designed for the application.

Typical chain applications include power and free conveyors, paint lines, ovens – anywhere that precision chain lubrication is required.

### How the Orsco system works

An Orsco or customer-supplied controller cycles the air-operated injectors that deliver small metered amounts of oil through tubing to the nozzles. The nozzles mix the oil with air and create a consistent, continuous spray that will not mist and become airborne. For larger chain and other applications, the Orsco system can be designed to spray intermittently.

Automatic Orsco spray system  
Air required



# PMA 2

## Contact-free oil lubrication – for fast moving chains

The PMA 2 solenoid pump is designed for a contact-free oil lubrication of chains. The exact metered quantity of oil is squirted without air (airless), and without producing an oil mist, while the chain is in operation.

The pump is capable of lubrication of fast moving chains – maximum 5 cycles per second. A single pump can supply 1 to 6 oil squirt nozzles. The metered quantity of oil per cycle is either 30 mm<sup>3</sup> or 60 mm<sup>3</sup>. Double-nozzles are also available which further increase the number of points served by the pump.

The drive magnet is characterized by its high performance and long duty-cycle, thus enabling a reliable operation of the pump in extreme conditions.

The pump is available in 24 V DC, 120 V AC and 230 V AC versions. An optional proximity switch for the pump offers a simple method to electrically monitor the function.

Other accessories include a 13 or 36 litre reservoir for oil. Both reservoirs are equipped with electrical low-level control and a large filling port comprising a strainer.



*Pump station with PMA2*

*Contact-free oil lubrication with PMA2-nozzles in a paint shop*

### System benefits

- Metered oil quantity 30 mm<sup>3</sup> or 60 mm<sup>3</sup> per cycle
- Available in 24 V DC, 120 V AC and 230 V AC versions
- Optional electrical monitoring via a proximity switch
- 1 to 6 outlets that can serve individual or double nozzles.
- Up to 5 lubrication cycles per second (depending on the system)
- Airless lubrication – oil mist free



# COBRA 1X

## Lubricates the inner rollers and studs of heavy-duty chains with grease or oil

The enhanced COBRA 1X from Lincoln's chain lubrication range is particularly suitable for conveyor chains and conveyor lines, in which the inner roller and stud of the chain are lubricated while the chain is in operation. The system can supply either NLGI 2 grease or oil.

A new drive technology, which is a combination of a pneumatic and mechanical drive, as well as a newly designed lubrication head, provides two key advantages:

- The load subjected to the chain is substantially lower.
- A higher maximum lubricant pressure of up to 150 bar is possible.

The newly designed lubrication head enables an exact metering from 0,2 cm<sup>3</sup> to 2 cm<sup>3</sup> per lubrication cycle, and the adjusting screw allows infinite metering adjusting within this range.

Visual monitoring of the lubrication head function is performed via the movement of an indicator pin.

### System benefits

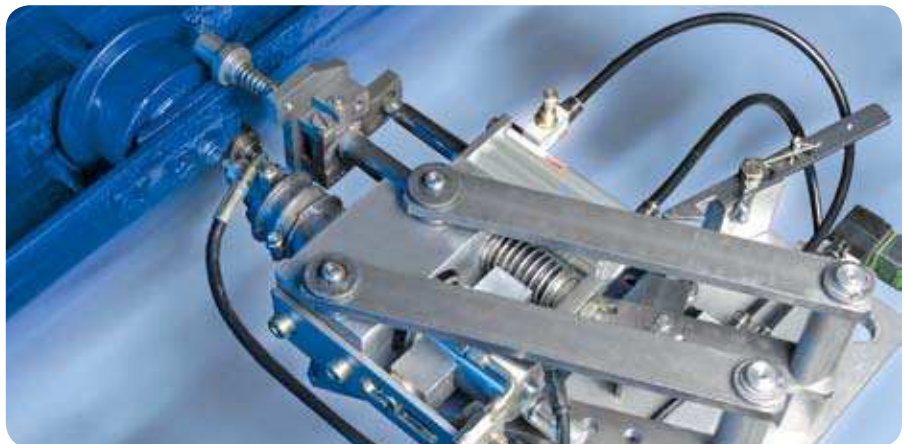
- For oil and grease up to NLGI 2
- Lubrication frequency of 1 cycle per second
- Supply quantity of 0,2 cm<sup>3</sup> to 2 cm<sup>3</sup> per stroke
- Lubricant pressure of max. 150 bar
- For chain speeds up to 20 m/min
- Manual Start/Stop or optional automated (electro pneumatic)
- Visual monitoring via indicator pin
- No control cabinet required (for the standard version)



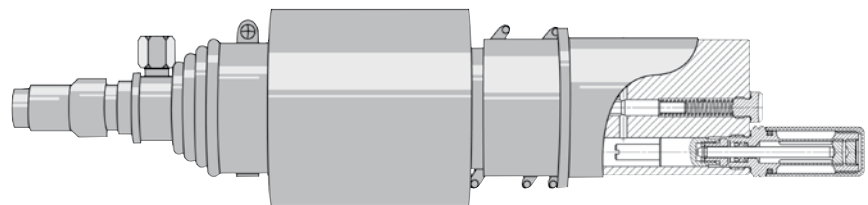
*Overhead conveyor*



*Coil conveyor*



### Metering and monitoring unit



# Compact controller LMC 2

## Compact and multi-functional controller for electronic control and monitoring of Lincoln lubrication systems.

The LMC 2 is a controller for the electronic control and monitoring of lubrication systems. It combines the advantages of a specially developed printed circuit board (PCB) and a PLC in an economical, compact unit.

The LMC 2 has 8 inputs and 5 outputs (4 Relays, 1 electrical output), enabling it to run and monitor complex systems with an automated filling system.

Selectable programs are defined for progressive, two-line, single-line and spray systems, as well as chain lubrication systems such as the Cobra and PMA.

The desired application is selected by a dip switch and the parameters are set by using the menu and keypad. Special set-up configurations are also available on request.

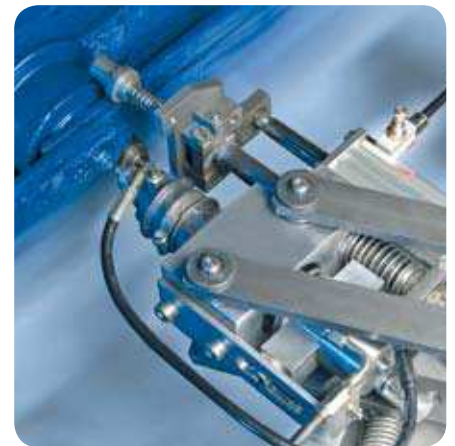
In addition, to the standard applications, customer specific programming is possible.

Two base models are available (24 V DC and 240 V AC).

Besides time dependent intervals, an integrated counter enables the control of lubrication intervals in terms of the number of cycles.

The LMC 2 system can be integrated via procedure-neutral interfaces in common field-bus systems.

The unit is mounted in its own IP54 enclosure and does not need to be integrated into a control cabinet.

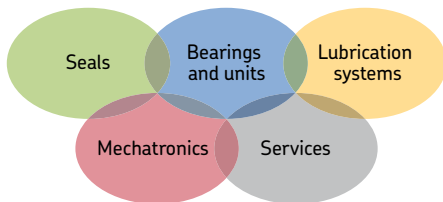


*SSV and VSKH2-KR lubricant metering dividers at a conveyor belt (Beverage industry)*

### System benefits

- Integrated flexible lubrication programs
- 8 inputs/5 outputs – suitable for complex lubrication systems
- IP54 enclosure
- Time or cycle dependent control of lubrication intervals
- Can be interfaced with common field-bus systems.
- Well-structured prompting on the display for parameter settings and output signals





### The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

#### **!** Important information on product usage

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

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