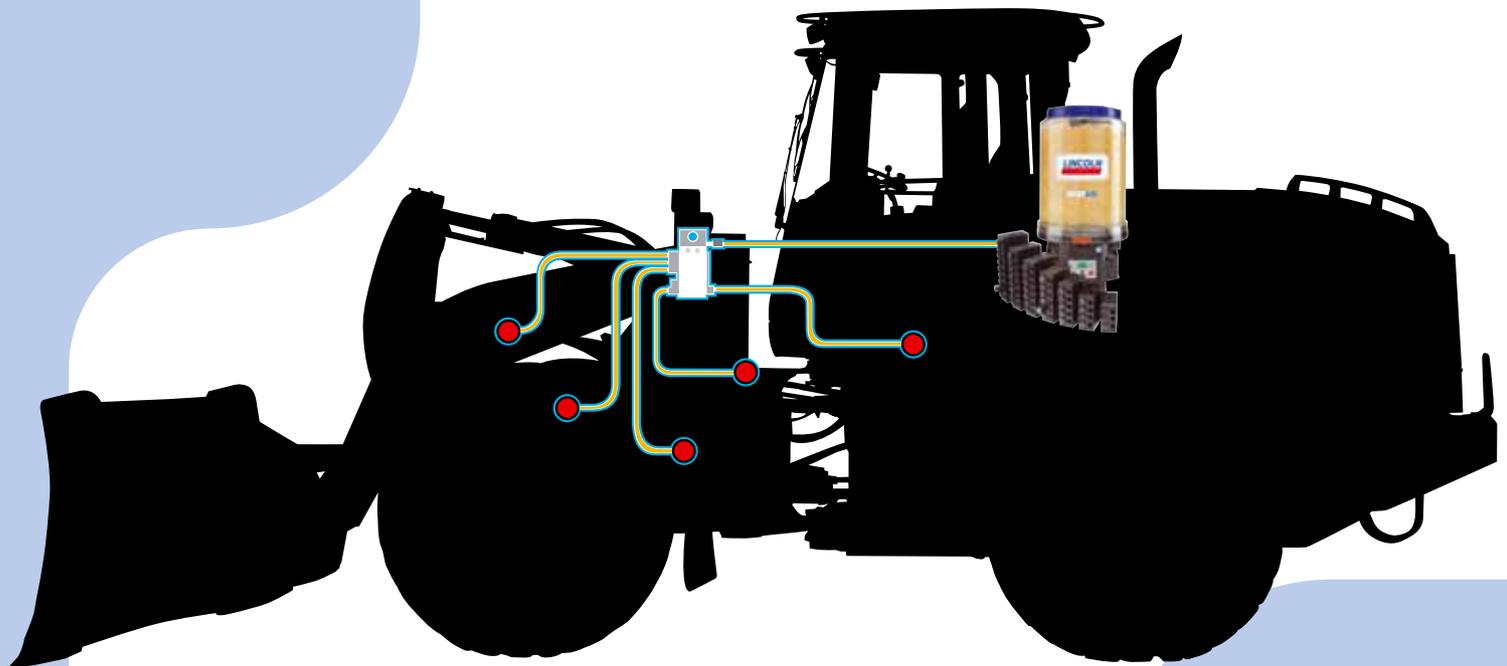


LINCOLN



Automatic lubrication systems for construction equipment

Helping lower maintenance costs and improve productivity



SKF

Daily lubrication is vital to the life of pins and bushings

Frequent lubrication not only maintains the proper lubrication film to reduce wear, but also acts as a means to purge the pins and bushings of contamination. If rock dust, dirt, sand and water are allowed to work their way into these components, they will form a “grinding compound” that reduces bearing life substantially. This will cause downtime and higher maintenance cost.

To properly lubricate manually, it normally takes at least 30 minutes per machine every day.

Daily manual lubrication is not easy due to:

- bad weather conditions
- production demands
 - prevent machinery downtime
- safety concerns
 - from climbing over machinery
- logistics
 - such as lubrication truck availability and equipment location
- many bucket and boom pins need to be lubricated in more than one position to evenly distribute lubricant and protect components under heavy loads
- manpower issues
 - not all employees perform lubrication properly

Failure to lubricate every lubrication point, on every machine, every day, can negatively affect schedules, maintenance costs and “on time” performance.



When manually lubricating a bearing, grease is not typically evenly spread inside the bushing and not completely purged

The cost of improper lubrication



The cost of improper manual lubrication:

- increased spending for repairs and parts
- lost production due to unexpected repairs
- contamination
 - wearing down the pins, bushings and other components
- lower resale value for used equipment
- waste of lubricant caused by excess lubrication

CAUTION

For all systems described in this brochure, see important product usage information on the back cover.

You need automatic lubrication for daily and weekly lubrication points



Lincoln's recommendations

- 1 Use automatic lubrication systems for all your daily and weekly lubrication points.
- 2 Use manual lubrication only for small equipment with few lubrication points or machines with bearings that require extended lubrication intervals (every 250 hours).

Benefits from automatic lubrication:

- Gain 30 to 45 minutes a day of increased productivity for each machine by lubricating while the machines are running.
- Substantially improve bearing life and reduce repairs by delivering frequent, smaller amounts of grease to each bearing.
- Cut grease consumption by delivering the exact amount required.
- Improve safety by eliminating the daily practice of climbing over machinery to lubricate.
- Proper lubrication no matter the environment or weather conditions.
- Increase resale value of equipment.

The Quicklub advantage

Through Lincoln's unique Quicklub system, small, measured amounts of grease are delivered to each bearing at specific time intervals (typically every 10 to 30 minutes) while equipment is operating. This method produces a grease "donut" seal around each pin and bushing, which acts as a barrier to keep contamination out. Unlike manual lubrication, grease is spread evenly around the pins and bushings.

How a Quicklub automatic lubrication system works

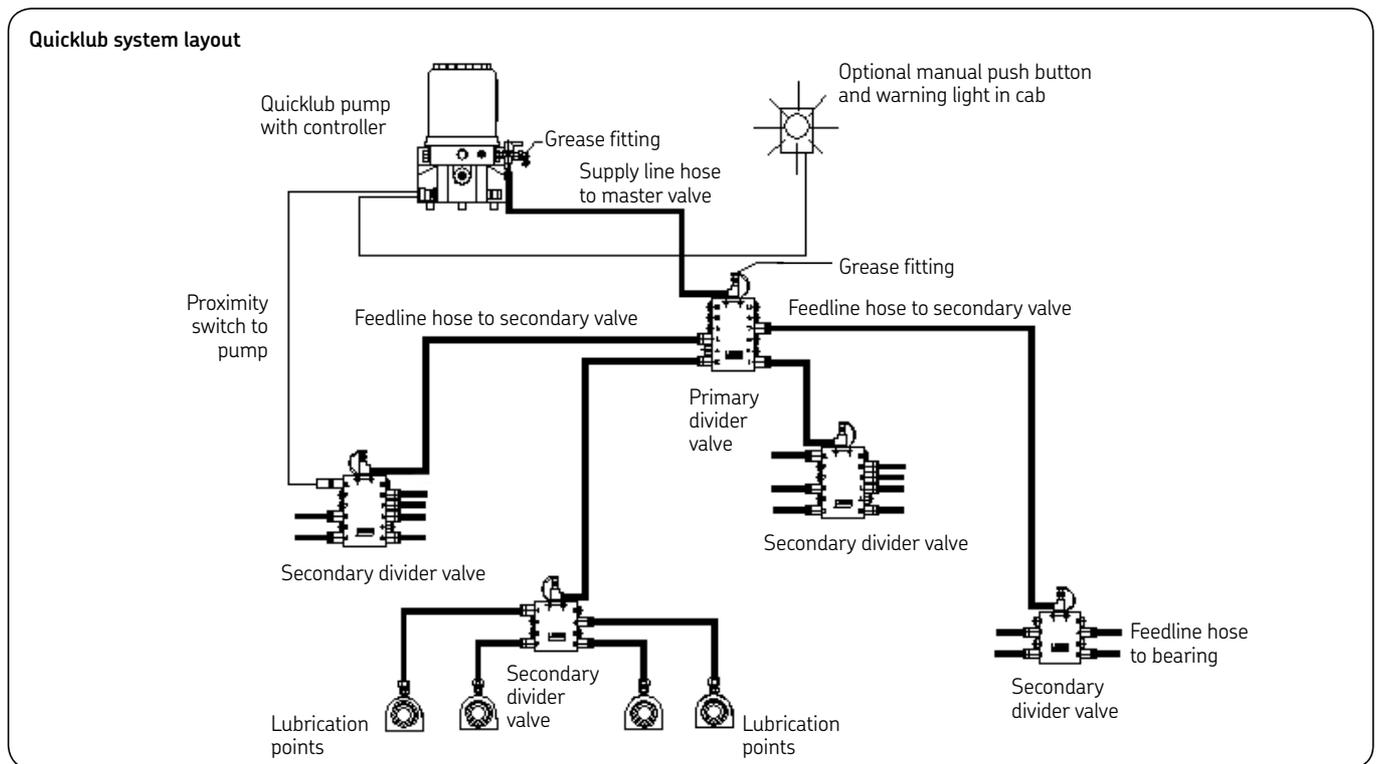
System description

A typical system includes an automatic electric pump, metering valves, supply line and feedline hoses, mounting hardware and custom guarding.

Lincoln's Quicklub pump combines a lubricant reservoir, pump and control system into one unit. Available control options include the ability to notify the

operator of a system malfunction using a special light and buzzer in the cab.

The metering devices used in Lincoln's system are the Quicklub SSV divider valves. The grease flow created by the pump is proportioned in the SSV divider valve and distributed to each bearing according to their needs.



System operation

- 1 The Quicklub pump is actuated automatically by an internal adjustable timer.
- 2 Grease flow starts and lubricant is delivered to the primary divider valve through the supply line hose.
- 3 The primary divider valve distributes grease in measured amounts to the secondary divider valves.
- 4 The secondary divider valves proportion the grease and deliver exact measured amounts to the bearings according to their specific needs through feedline hoses.
- 5 Typically, the pump shuts off after receiving a signal from a proximity switch located on a secondary divider valve. The proximity signal indicates a successful lubrication cycle. (Some systems do not use a proximity switch. Instead, a built-in timer turns the pump off).

Quicklub pump features

The Quicklub pump

Designed for the harsh environment of the construction and mining industries, Quicklub pumps are loaded with features:

- Available in 12 and 24 V DC and 120 V AC.
- Capable of dispensing no. 2 grease (oil systems available).
- Optional low-level alarms and system operation alarms with warning lights in the cab.
- Reservoir [0.5, 1, 2 or 4 gallon (2, 4, 8 or 15 liter)] can be refilled through a grease fitting, typically every 150 to 300 hours of operation.
- All pumps have high-pressure capability to help ensure grease is delivered to each component.
- A blocked lubrication point can be detected at the pump or in the cab with the optional alarm and warning light. A buzzer can be added.
- Pump controls run-time with built-in timer.
- Datalogger models available that store information on system operation history and can be connected to GPS or machine monitoring systems to remotely notify if the system requires service.

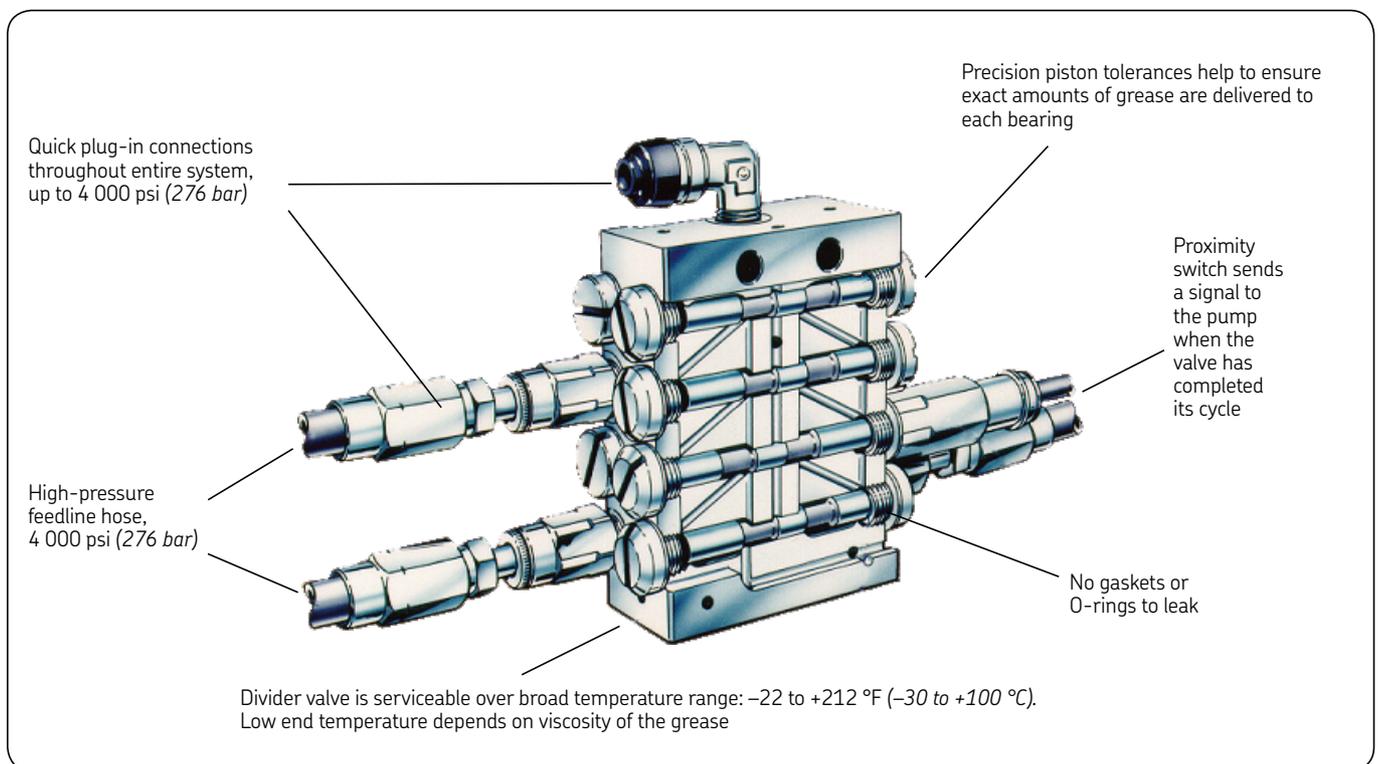


Quickclub divider valve features

Quickclub divider valves

The heart of the Lincoln system is the Quickclub SSV divider valve. These valves utilize unique internal pistons to precisely divide the grease flow to help ensure each pin and bushing receives the proper amount of lubricant.

- Operating pressures of up to 4 000 psi (276 bar). The valve delivers grease to every point, even under heavy loads.
- Standard SSV valves can be ported to deliver more grease to specific lubrication points.
- If the pump is ever damaged, the system can be cycled from the grease fitting on the pump or primary divider valve.
- Divider valves are available with cycle indicator pins to provide visual indication of operation.
- With advanced monitoring, a proximity switch sends a signal to the pump when the system has completed a lubrication cycle to each pin and bushing.
- A special Lincoln high-pressure hose, 4 000 psi (276 bar) working pressure, is used with the Quickclub fittings that work like a quick-coupler to facilitate system maintenance.



Automatic lubrication works for the most challenging applications

Lincoln knows how to tackle the toughest situations – including excavators

Many equipment OEMs offer Quickclub as a factory installed option. The Lincoln network of qualified distributors can also custom design and install systems on most pieces of equipment, including plant equipment – such as conveyers, crushers, screens, etc.

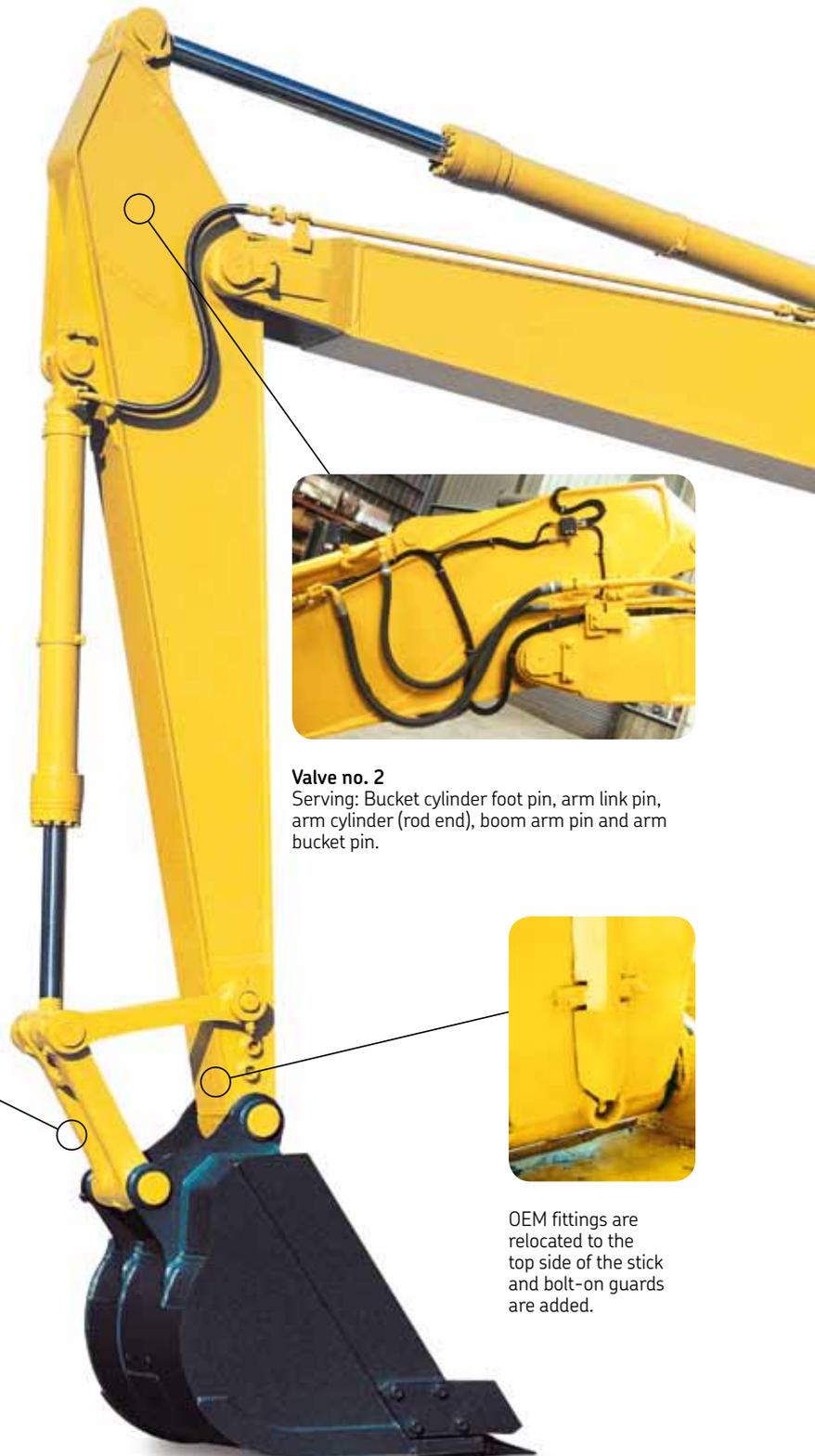
High impact areas

The H-link and bucket can be lubricated automatically with custom guarding installed. The OEM fittings for the stick and bucket connections are relocated to the top side and special guarding is added for protection.



Valve no. 3

Serving: H-link and bucket linkage. The valve guard has been added to the H-link.



Valve no. 2

Serving: Bucket cylinder foot pin, arm link pin, arm cylinder (rod end), boom arm pin and arm bucket pin.



OEM fittings are relocated to the top side of the stick and bolt-on guards are added.



In-cab warning light

The optional warning light alerts the operator if the pump reservoir is low or if a lubricant line is blocked. This light also functions as a manual button to initiate a lubrication cycle.



Primary valve

Serving: Secondary valves 1, 2 and 3 as well as right and left boom foot pins.



Quicklub pump
8-liter Datalogger pump with integrated timer, low-level and system alarms.



Valve no. 1

Serving: Swing circle, right and left boom cylinder (head end), right and left boom cylinder foot and arm cylinder foot pin.

Lincoln offers custom systems for all brands of wheel loaders

Both factory installed and locally installed systems sold through distribution are available.

Quicklub metering valves help to ensure more grease is delivered to high-demand bearings



On this loader, a Quicklub pump is mounted on the operator deck or fender near the cab for ease of visual monitoring and service



Ground level reservoir filling is made easy with optional remote fill fitting



Lincoln systems hose distributors are experienced to help ensure installations are clean and neat

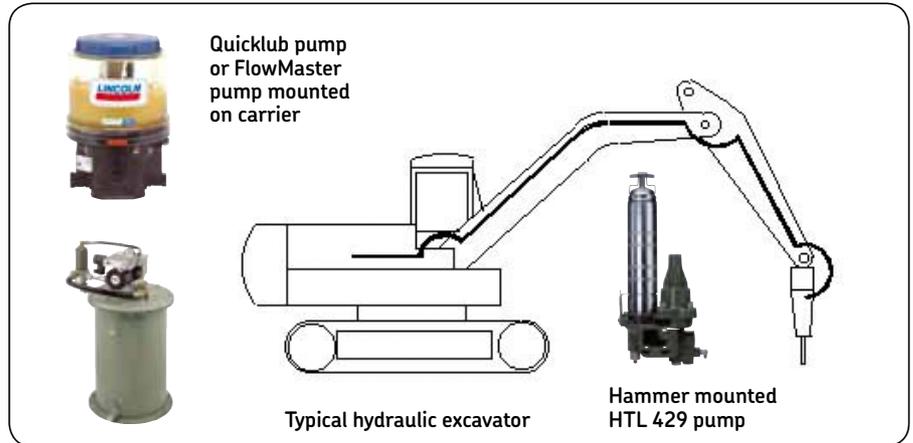


Feedline hoses are protected in high-impact areas with custom bolt-on guarding

Lubricate equipment while it is running and reduce downtime



A Datalogger pump safely mounted on the deck level. This pump is connected to a GPS or machine monitoring system that will remotely notify the operator if the system requires service.



Haul trucks are a popular application due to high productivity requirements

Keep both articulating and stiff-framed trucks moving.

Lincoln's automatic lubrication systems create a consistent, properly greased "donut" that seals out grit and grime from articulating joints, pins and bushings. Lines going to high-impact zones are consistently protected.

Other equipment

The Lincoln network of qualified distributors has experience installing systems on many types of mobile and stationary construction equipment.

Other common applications include:

- graders, scrapers, dozers
- drills (horizontal and vertical)
- on-road trucks paving equipment (milling machines)
- trenchers
- crushers, screens, conveyors
- ready mix trucks
- cement pumps
- recyclers
- backhoes
- and many more



Demolition hydraulic hammers – keep your hammer on the job

Lincoln is the only company that offers three types of lubrication systems for hammers, even one that mounts directly on a hammer.



Quicklub divider valve mounted on a milling machine



Quicklub system installed on a ready mix truck

The single source for all your lubrication needs ...



Centro-Matic automatic lubrication (for larger mining equipment)

The system trusted by the mining industry world-wide is the same system used for large equipment. Major original equipment manufacturers install Centro-Matic systems in their factories to help ensure their customers get the best value and longest service possible. The well-known SL-1 and the new SL-V injectors provide consistently reliable, large doses of grease to all critical lubrication points. Our latest FlowMaster pumps drive these system using either DC electric or hydraulic power sources.

State-of-the-art lubrication truck

Many contractors rely on the services of a good lubrication truck to maintain equipment in the field. The Lincoln network of qualified distributors can help build and maintain the best lubrication trucks in the business. They feature on-board pumps, reels, control devices and accessories that enable quick work of lubricating equipment on-site.



Complete in-shop maintenance equipment

Our comprehensive line of performance-proven pumps, hose reels, controllers, grease guns and fluid inventory control systems offer everything needed to build a fully functional lubrication station. From the tools used to pump and dispense to the ones designed to accurately track the use of fluids, oils and greases, Lincoln offers dependable solutions when designing a vehicle maintenance shop.



... including lubrication trucks, pump and reels for maintenance shops and manual lubrication tools



A broad range of pumps

Whether pumping grease, oil, antifreeze, windshield washer fluid or other vital solutions, Lincoln has the medium- or high-pressure pump to get the job done. Choose from our new series of PMV pumps and PowerMaster reciprocating pumps, diaphragms and transfer pumps, bulk oil systems, plus all the needed accessories.

Hand-held lubrication

Our 14.4 V battery-powered PowerLuber outperforms traditional lever-action grease guns by generating as much as 7 500 psi (517 bar) of working pressure.

- Each battery dispenses two tubes of grease.
- Convenient whip hose allows for easy access to hard-to-reach points.
- Comfortable trigger makes one-hand operation easy.



If extended battery time is needed, order model 1444 in a case with two batteries, or select model 1415 battery charger that plugs into the accessory or lighter receptacle of any construction machine.

Lincoln also carries a full line of the most dependable hand-operated grease guns in the business.

A Quickclub system can pay for itself in less than a year

Calculate the return on your investment *

Annual costs to manually lubricate a mid-size loader

Labor	Typical	Your anticipated benefits
30 minutes per 8 hour shift x \$32.25/hour x 250 days	\$4,031.25	_____
Lost production 30 minutes per 8 hour shift x \$102/hour x 250 days	\$12,750.00	_____
Manual lubrication cost	\$16,781.25	_____

Annual costs to repair failed components

Replacement pins and bushings 2 pins x \$537.50 each	\$1,075.00	_____
Repair labor One person x \$70.00 x 2 repairs x 6 hours each	\$840.00	_____
Lost production 2 repairs x 6 hours each x \$102/hour	\$1,224.00	_____
Repair cost	\$3,139.00	_____
Annual manual lubrication cost	\$19,920.25	_____

Estimated savings with a Quickclub automatic lubrication system

	% Savings	\$ Savings	
Labor and lost production to manually lubricate	95%	\$15,942.18	_____
Parts, labor and lost production to repair failed components	50%	\$1,569.50	_____
Total annual savings		\$17,511.68	_____

System cost and return on investment

Typical installed Quickclub system cost for a loader with Datalogger pump	\$8,385.00	_____
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Return on investment

System cost/annual savings x 12 months = R.O. I.

\$8,385.00/\$17,511.68 x 12 months =	5.7 months pay back (ROI)	_____
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System cost will vary based on options, local labor costs and location of installation.

* All numbers are rounded off and based on customer estimates. Your particular cost savings may vary.

Lincoln's global distribution network



Whatever the service – evaluating lubrication needs, installing custom-engineered systems, supplying top quality accessories or selling manual lubrication components – the Lincoln network of qualified distributors gives the best value on the best products.

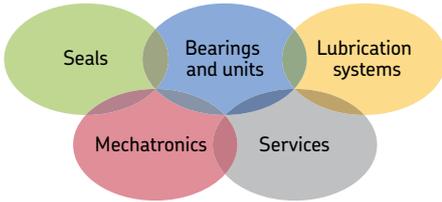
Local distribution is here to help!

Our distribution system houses offer the highest level of expertise and service levels.

- custom design systems for equipment
- custom guarding packages to protect feedline hoses
- turn-key systems for new and used equipment
- on-site installation, service and maintenance contracts
- training for operators and maintenance personnel
- large backup parts inventory

Visit our web site www.lincolnbuilds.com for the nearest authorized sales and service representative and international contact information.





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.

Please contact:
SKF USA, Inc.
 One Lincoln Way
 St. Louis, MO 63120 USA
 Tel. +1 (314) 679 4200

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