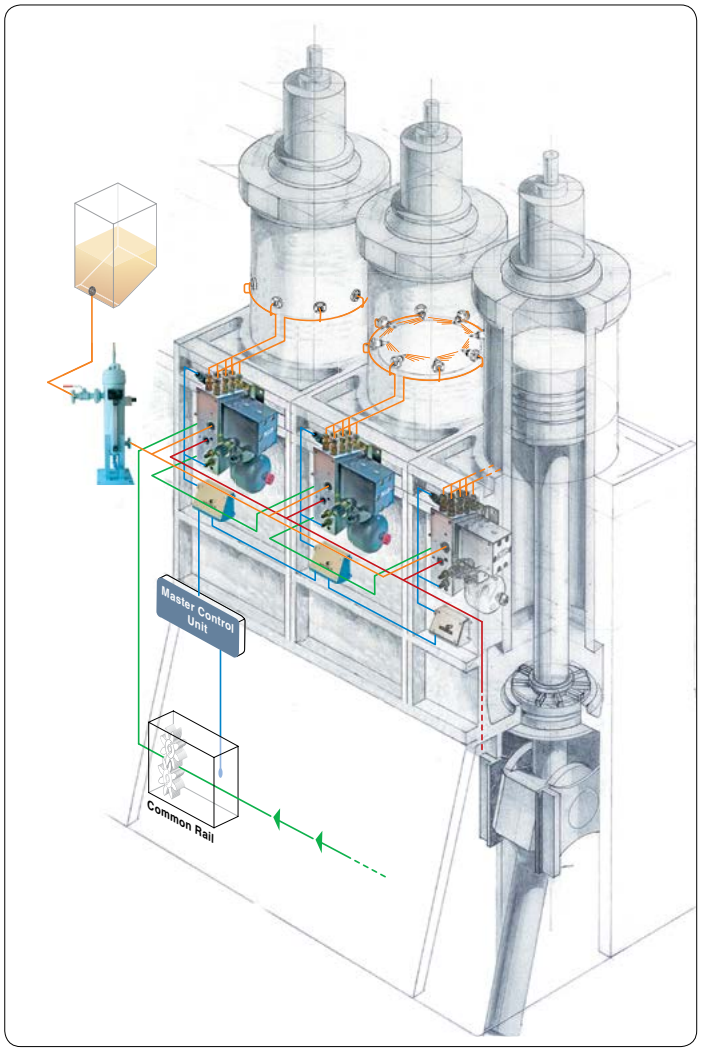
Lubrication System CLU4

for lubrication of large 2-stroke crosshead diesel engines
- resulting in your operating costs being cut due to lower oil consumption

The advantages you get from a system

- Driven by a common rail system or the optional oil supply unit
- Modular structure of the timed lubricator makes sure the system can be serviced while in operation (no redundancy required)
- Timed lubricator with piston port control and additional heating devices are normally not required
- Mechanically defined, non-adjustable metering rates and integrated valve functions prevent operating errors
- A separate control electronics unit monitors the lubrication functions of each cylinder (ALM-unit)
- High-performance filter system with scale to measure of total oil consumption
- Low installation costs thanks to the integrated bus-technology
- A modern timed lubrication system with nozzles, if required, for the OEM market
- Adaptable for all 2-stroke crosshead diesel engines ranging from 600 to 6000 kW/cylinder with 6 to 8 quills each
- **The mature CLU4 technology is now available in the compact CLU4-C size**
- WÄRTSILÄ offers a complete retrofit solution, including installation, for the engine series, RT 48-96.



For decades, **SKF Lubrication Systems Germany GmbH** has manufactured cylinder lubrication systems for large 2-stroke crosshead diesel engines. Specially developed lube pumps for use in conjunction with so-called accumulators ensure efficient, load-dependent lubrication of the cylinders.

In addition to the existing CLU 3 system with its system-related advantages, such as high reliability, ease of operation and simple maintenance, the fully electronically controlled CLU4 system was developed. The aim of the CLU4 development was to bring oil consumption even more into line with the main load factors and operating conditions.

The main factors include the engine speed, load, starting and running-in status etc. Moreover, attention is also paid to the fuel and the lubricant composition.

After the Master Control Unit evaluates the load factors, it optimizes the cycle rate and metering instant. With an optimal system design and adjustment, it is possible to cut oil consumption even more to roughly 0.8g/kWh (0.5g/BHPh), thus minimizing the use of valuable resources.

The newly developed CLU4 electronic cylinder lubrication system does this with the help of the latest control electronics. Thanks to a smart combination, with special quills in the wall of the cylinder, it is possible to wet every point on the moving pistons, e.g. the ring package, piston skirt, etc.

In case of special quills with integrated spray nozzles, the heavily loaded cylinder wall can also be lubricated directly.

Since 2009, this system is also available as a CLU4-C version with a compact pump design.

System function CLU4 and CLU4-C

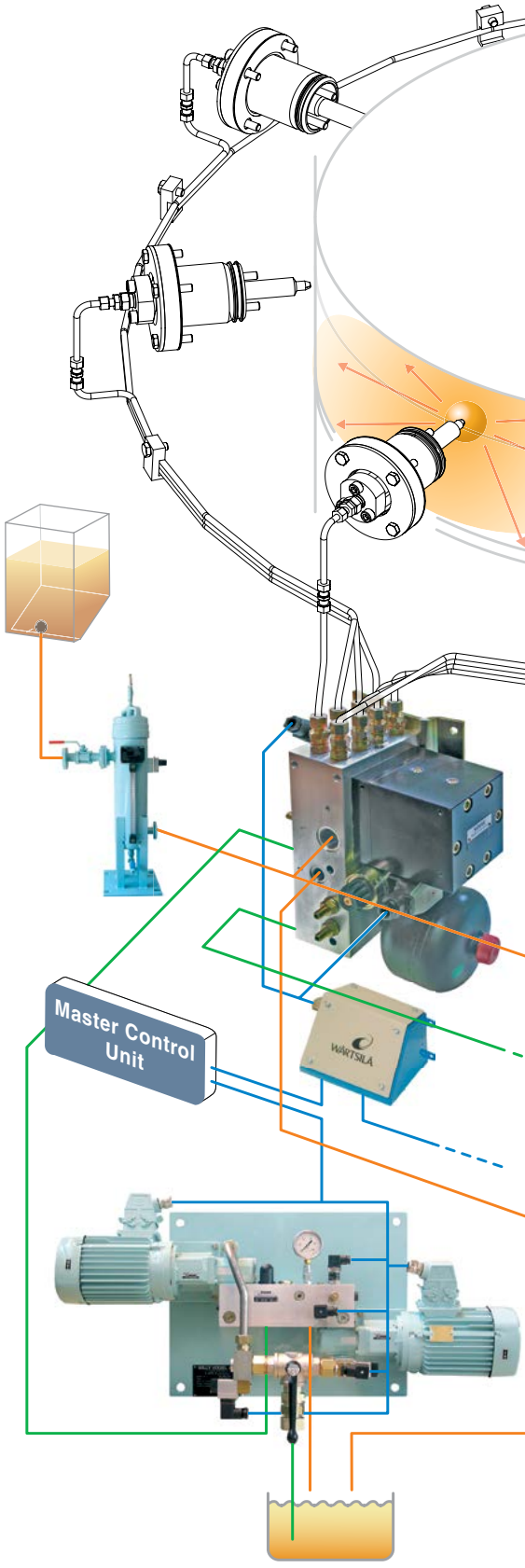
The CLU4 lube system on modern engines with common rail technology consists primarily of:

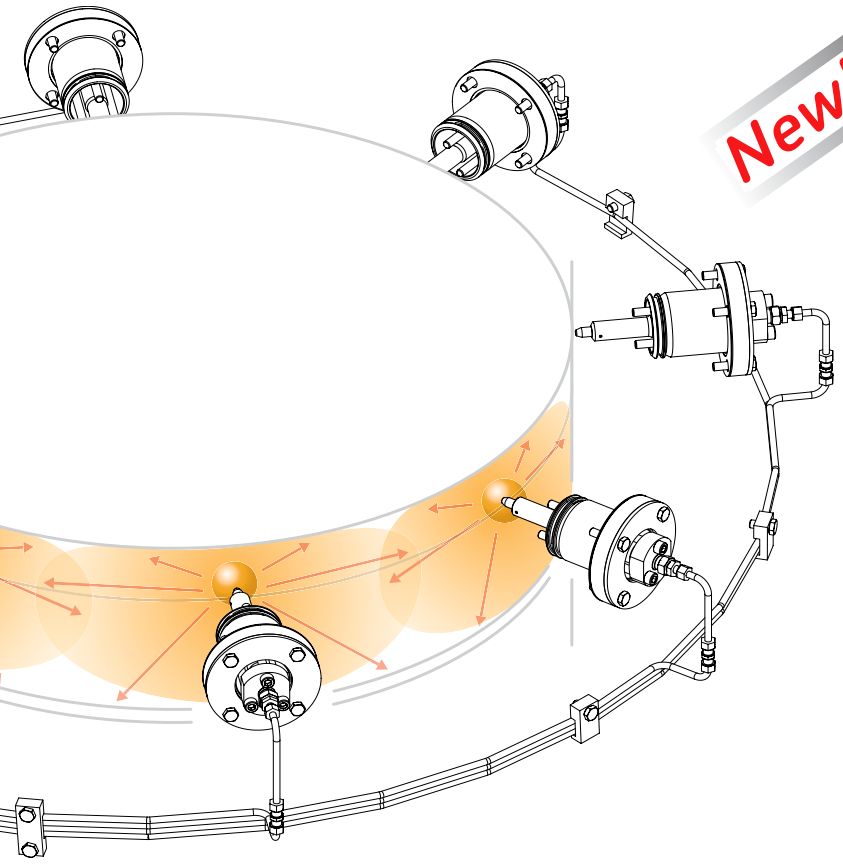
- Timed lubricators (1 per cylinder) with 6 to 8 outlet ports and external monitoring electronics
- Quills and specially developed master control unit (provided by customer).
- Filter system with scale for measurement of total oil consumption.

The centralized oil supply system is activated by the engine's management system before the engine starts up. So thanks to modern common rail technology, servo-oil is already available to the timed lubricators before the engine starts. The lubricating-oil needs of the respective cylinders are determined by the master control unit. A lube pulse is emitted through the control electronics due to actuation of a 4/2-way solenoid valve.

The metering pistons hung-in the central drive piston abruptly execute a jointly defined metering stroke. The special quills with or without a spray/injection function discharge their exact quantity of lubricant with pinpoint accuracy. Depending on the load and operating state, a lube pulse is triggered with every 2nd, 3rd, 4th or nth piston stroke or crankshaft revolution.

Monitoring electronics check the metering pressure. Thus, it checks the pulse lubrication system for blockage, trapped air, shortage of lubricant and drive faults.



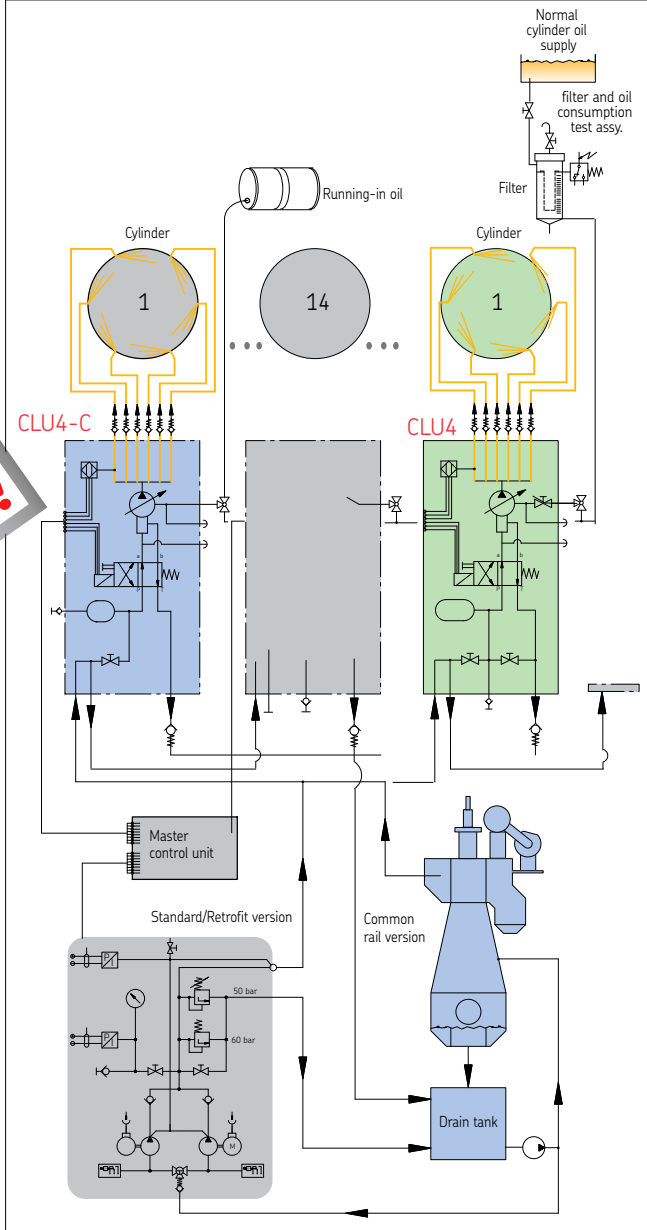


New!

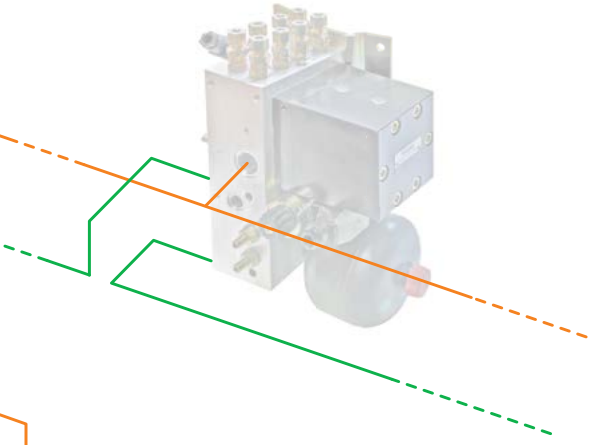
Basic pump CLU4-C

Basic pump CLU4

flow diagramme CLU4 und CLU4-C



New!



Example of an application, consisting of an oil supply unit, timed lubricator, system filter and quills (WÄRTSILÄ).

WÄRTSILÄ

Timed lubricator

Depending on the application and type of engine the pumps are equipped with 6 to 8 metering pistons and a calibrated meter ing screw. The baseplate contains the valve functions and is supplemented with a pressure accumulator and solenoid valve.

Basic pump CLU4 / CLU4-C

Common features of the timed lubricators (versions CLU4 and CLU4-C)

- Forced metering of the lubricant
- Wide range of lube oil viscosities - thanks to piston port control
- Solenoid valve to be both electricallyand manually operated
- Compact design with integrated valvescrews used to shut off the lubricating-oil and servo-oil system, and to relieve the system of pressure during maintenance work
- Only one pressure accumulator per pump, which permits fast meter ing strokes and “soft” operation
- Only two centrally located venting screws (lube oil and drive oil)
- Directly driven by the common rail system or by the oil supply unit designed with double walls for maximum safety
- If necessary, e.g. to test individual cylinders, it is possible to feed running- in oil or special oil
- Powerful pressure boost, can also be used for metering purposes in pressure zones or with nozzle concepts
- Calibrated to your needs and tested at the factory, adjust able by means of exchangeable metering screw
- Long service life thanks to the selection of special material combinations and extra long guide arrangements
- Constant stroke volume ensures constant delivery characteris tics and/or spray patterns
- All important components are mounted on a baseplate and thus quickly exchangeable
- High suction performance

Neu!

Special features of the timed lubricator CLU4-C

- a compact version, without integrated screw valves for lube oil cut-off and pressure relief,
- including quick coupling for checking and filling the Nitrogen (N) filled pressure accumulator

Oil supply unit Type SA/B

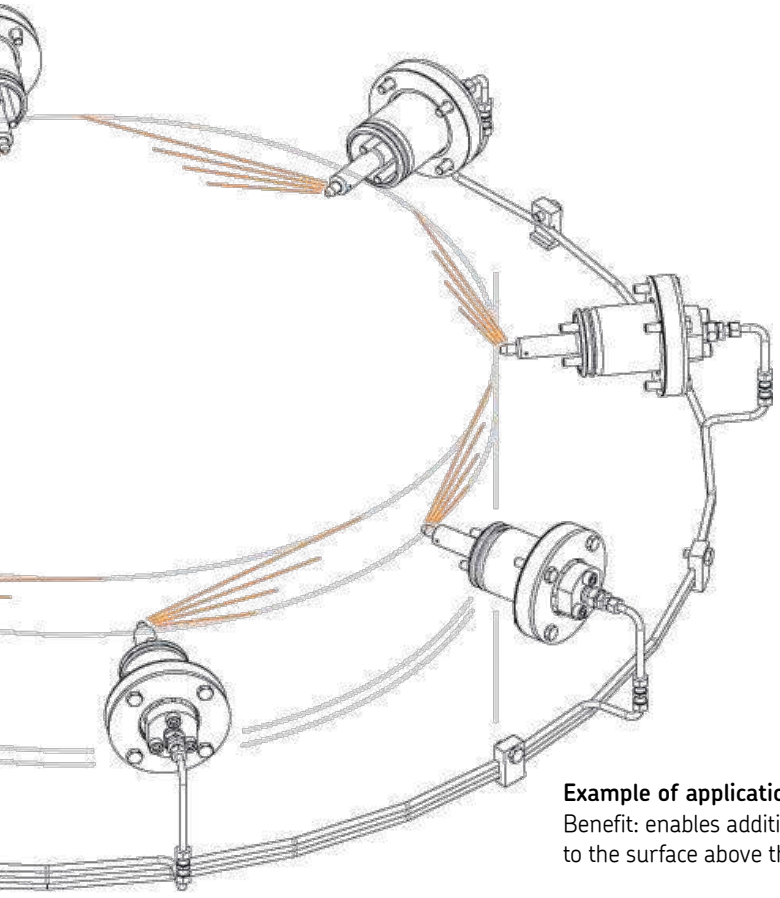
(Only required for engines without common rail injection system or retrofit applications.)

The oil supply unit comes in two performance ranges for small/medium-size and large two-stroke engines. The two pump units (one of them a standby pump) are pre-installed on a baseplate together with a valve block.

Oil supply unit SA/B

Features of the oil supply unit to be emphasized:

- Vibration-proof version of an electric motor with safe plug-type connection
- Rugged high-pressure gear pump, also suitable for oil feed systems (3 to 8 bar)
- Valve block with multiple functions and integrated outlet-port connectors for system pressure relief and maintenance while in operation
- Double-walled piping, thus no lubricant can leave the system due to a possible leakage, leakage monitoring centralized with pressure sensor.



Example of application with spray nozzles
Benefit: enables additional application of oil to the surface above the piston.

Oil filter system with scale for measurement of oil consumption

A high-capacity suction filter is provided for between the daily tank and the timed lubricators located on the cylinders.

Features of the oil filter system to be emphasized:

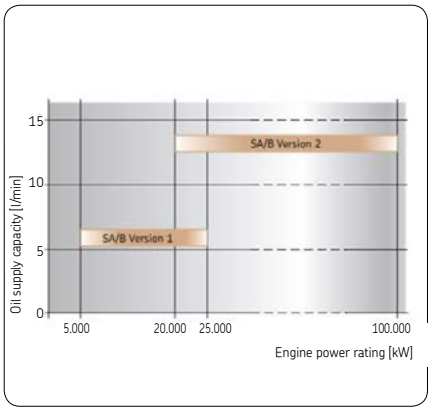
- Generous dimensioning ensures long service intervals
- Benefits of the ingenious arrangement of the shutoff valve and venting valve:
  - change of filters while the system is in operation enabled
  - measurement of the lubricating oil consumption for all cylinders enabled
  - air pockets in the oil flow avoided
- Filter with dirt indicator as a standard feature
- Re-usable filter elements of stainless steel.

With the CLU 4 or CLU4-C cylinder lubrication system you get a product that meets the latest lube technology requirements in the large diesel engine sec tor. A maximum fire prevention results from it's double-walled piping, which at the same time meets the maximum safety requirements. The CLU 4 or CLU4-C system can be expanded to handle any future development.

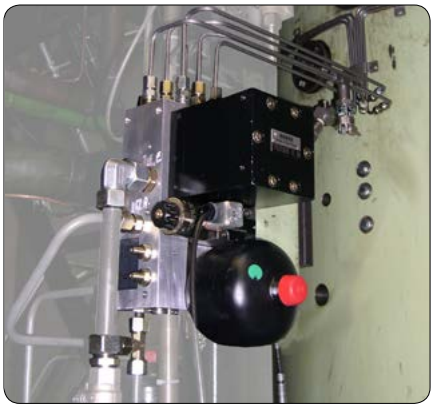
Talk to your 2-stroke engine manufacturer.

Decide in favor of a modern SKF cylinder lubrication system

Oil filter system with scale for measurement of oil consumption



Selection chart, SA/B oil supply unit



Extensive test series over a number of years prove the effi ciency of our CLU4 cylinder lubrication system.

Order No. 1-0304-EN
Subject to change without notice! (07/2014)

Important product usage information
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 (1013 mbars) 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.

Brochure note

951-130-314-DE/-EN	Operator manual Lubrications system CLU4
951-170-206-DE-EN	Operator manual Lubrications system CLU4-C
951-160-012-DE/-EN	Spare Part list CLU4/CLU4-C

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