

Air-Oil Centralized Lubrication Systems

Keep in Motion!

2nd Edition 2007



A lubrication system should always be as modern and efficient as the machine it's lubricating. Lincoln air-oil systems are ideally suited for this because they offer:

- Optimal supply to the bearing
- Reduction in lubricant costs
- Environmental friendliness

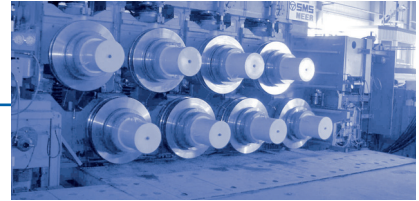
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- EFC Installation Assembly



Air-oil Centralized Lubrication Systems

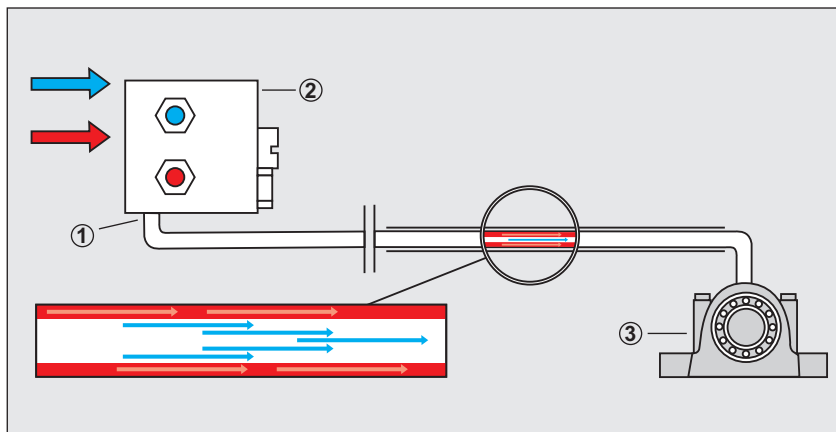
Advantages of Air-oil

- Reduced lubricant consumption: Reduction up to 1/100th of the quantity when compared to grease lubrication
- Continuous supply with fresh oil
- Increased bearing lifespan
- Positive pressure sealing of the bearing against contamination (water, dirt)
- Drastic reduction in maintenance costs; no cleaning of grease during bearing inspection
- No grease contamination of equipment, the working area and cooling water
- No misting of oil
- Environmentally friendly by simple disposal methods
- Oil and scale can individually be disposed of (clean separation)

Function Principle Air-oil Lubrication

An oil pump supplies a progressive or a single-line metering device with oil. The metered quantities of oil from the metering device are supplied to a mixing block that is connected to the compressed air network. The oil droplets in the line to the bearing are pulled apart in streaks by the flow of air. The airflow in the middle of the tube transports the oil along the inner wall of the tube. The carrier compressed air exits the bearing and simultaneously assists in sealing the bearing. No oil mist develops. A continuous, minuscule amount of oil enters the bearing.

Principal



- Compressed Air
- Oil

- ① Line
- ② Air-oil Mixing Block
- ③ Bearing

Air-oil Single-line System

Air-oil Mixing Distributor Type AOI-FL

Output quantity:

0.025 – 0.65 cm³/stroke

With metering screws in increments of 0.025; 0.05; 0.1; 0.3; 0.4; 0.5; 0.65

Oil pressure: max. 50 bar

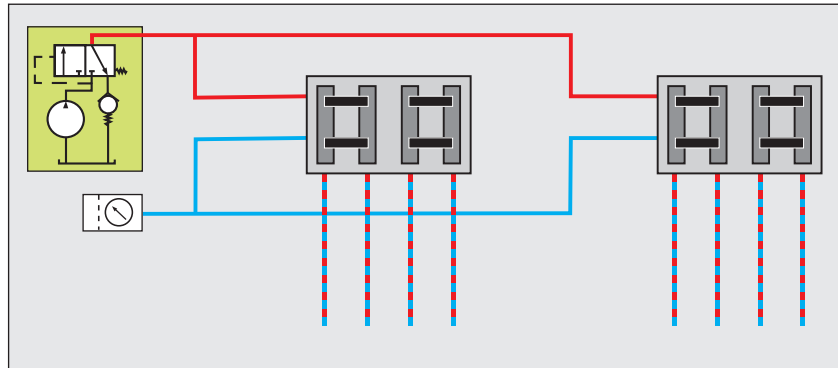
Venting Pressure: max. 6 bar

Air pressure: 3 – 6 bar

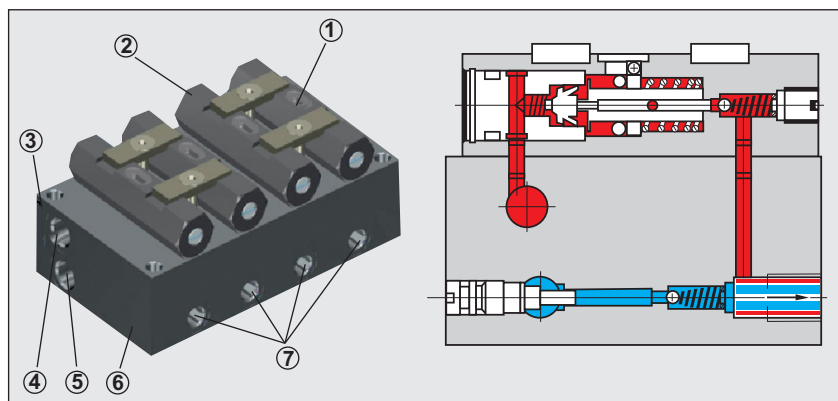
Monitoring: visual via steel ball that indicates the stroke of the distributor

For applications with large variances in lubricant requirements per point.

The AOI distributor injector operates on the single-line concept. This means, all injectors are connected via a mainline to the pump. The mainline is alternatively pressurized with oil and vented. Each injector outlet can be individually metered and the function is visually monitored via a steel ball. In addition, the airflow is adjustable for each outlet. As a result, the AOI injectors are especially suited for systems with lubrication points that have large variances in lubricant requirements per point. Visual monitoring is performed via a steel ball that externally shows the piston movement.



■ Air ■ Oil ■ Air/Oil



- | | |
|----------------|------------------|
| ① Steel ball | ⑤ Air inlet |
| ② Injector | ⑥ Mixing block |
| ③ Air throttle | ⑦ Outlet air/oil |
| ④ Oil inlet | |

Environmental Information Air-oil System

Lincoln air-oil systems with AOI and Ecoflow distributors, reduce and accurately meter the lubricant quantities.

- Cleaning and disposal cost are reduced, as grease contamination of equipment, cooling water and the sinter is eliminated
- When comparing to oil mist lubrication, the breathing air is not contaminated with micro oil droplets. The macro oil drops remain in the bearing, thus avoiding breathing air contamination.

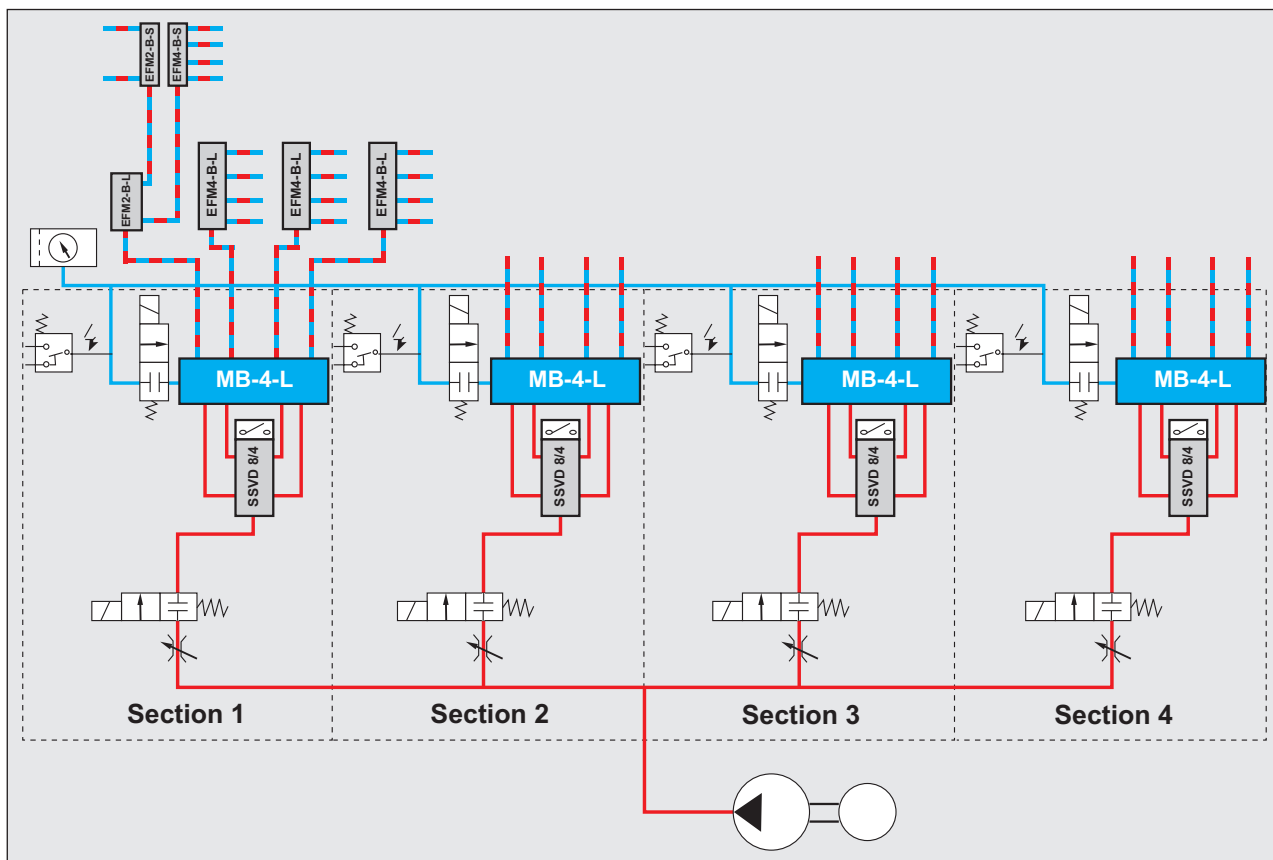
Air-oil Progressive System

When several hundred lubrication points are to be supplied, for example in continuous casting or roll-out areas, progressive systems with mixing blocks and ECOFLOW metering devices are used.

The air-oil mixture is produced within the mixing blocks. The distribution of oil to the mixing blocks occurs via SSV progressive metering devices. Depending on the size of the system, the mixing blocks are available in two different sizes. And, when different size strands are to be lubricated, SSVD metering devices may be used for the oil distribution. The air-oil flow is then distributed to the lubrication points by ECOFLOW metering devices - which are also available in two sizes: "S" (small), "L" (large).

The large ECOFLOW metering devices are used as primary units that supply the smaller metering devices. This reduces the total number of mixing blocks, and provides an even distribution for large systems.

Both the mixing blocks and the ECOFLOW metering devices do not have moving parts, thus eliminating wear.



■ Air
■ Oil
■ Air/oil

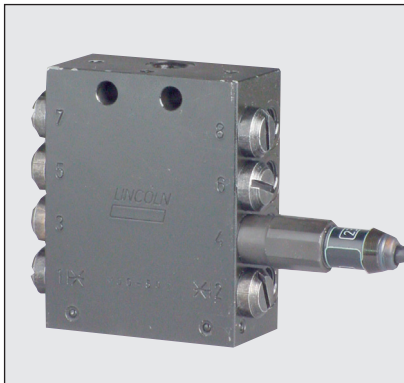
MB: Mixing Block
 EFM: ECOFLOW Metering Device
 SSVD: Progressive Metering Device

Air-oil Progressive System

Progressive Metering Devices SSV and SSVD

Metering Device SSV

The progressive metering devices SSV supply the oil in metered quantities to the mixing blocks.
Number of outlets: 6–22
Monitoring via piston detector (proximity switch)



Progressive Metering Device SSV

Metering Device SSVD

When vastly differing quantities are required, the SSVD may be used instead of the SSV. The SSVD is adjustable per outlet pair (metering from 0.08 to 1.8 cm³ in 10 increments). The metering occurs with the metering device block via metering screws.

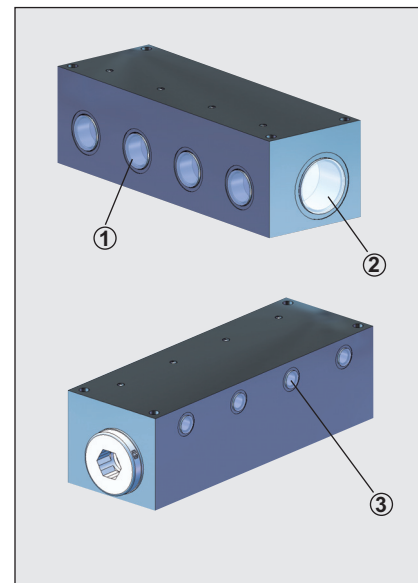


Progressive Metering Device SSVD with Metering Screws

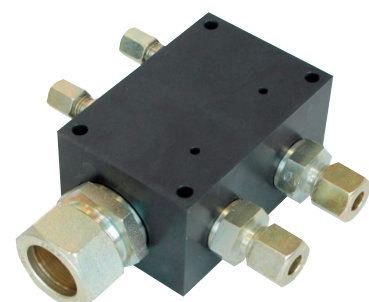
Air-oil Mixing Block Type MB

The air-oil mixing blocks produce the air-oil flow. They are available in 2 sizes: type MB..S and MB..L. MB..S mixing blocks have 2 to 6 outlets, and the MB..L have 2, 3 or 4 outlets. As a result, various size strands with different numbers of lubrication points can be supplied with a flow of air-oil. In accordance with the flow rate, the inlet and outlet port sizes are different.

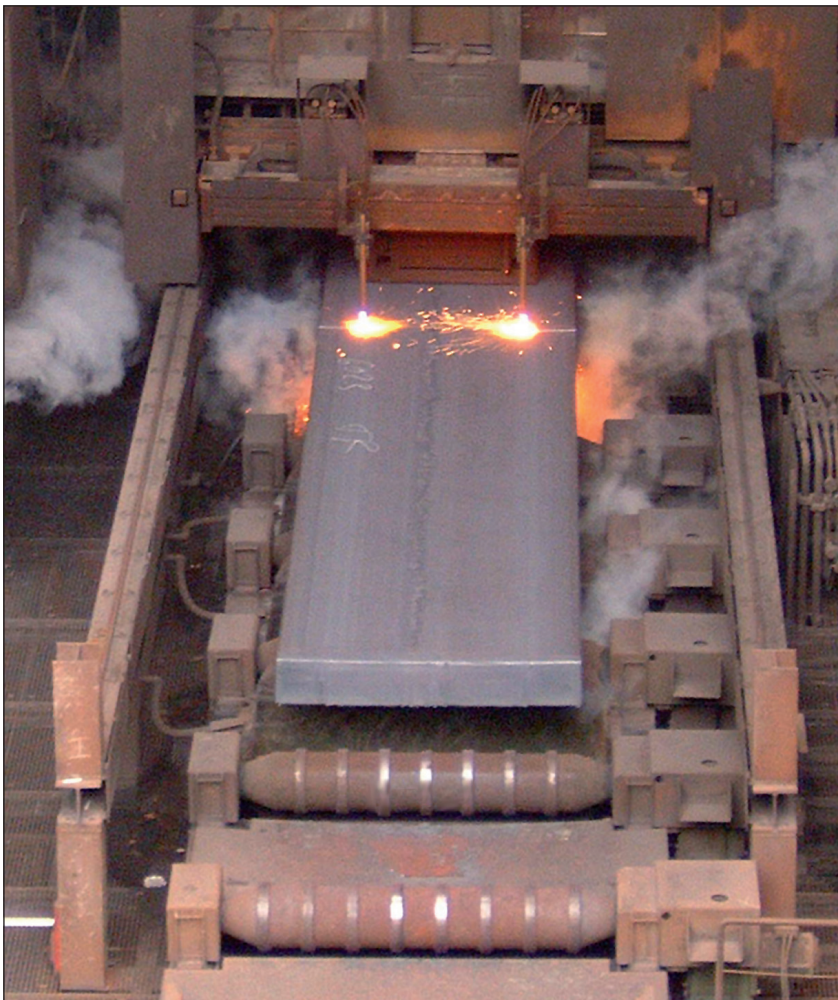
Mixing Block MB



- ① Air-oil Outlet
- ② Compressed Air Inlet
- ③ Oil Inlet



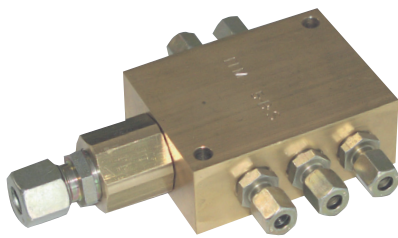
Mixing Block MB-2-S



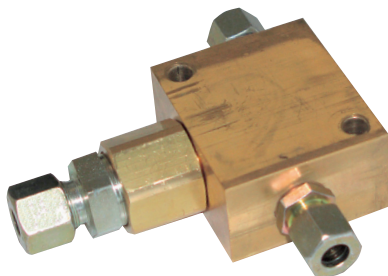
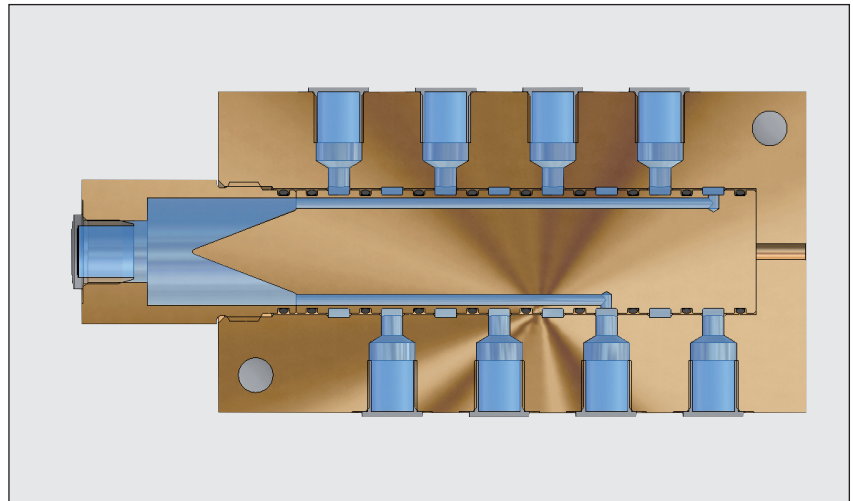
Air-oil Progressive System

with ECOFLOW Air-oil Flow Metering Device

The dividing of the finished air-oil flow is accomplished with the ECOFLOW air-oil flow metering device. The special design concept avoids the Coanda Effect* and achieves the desired split to secondary metering devices or to the lubrication points.



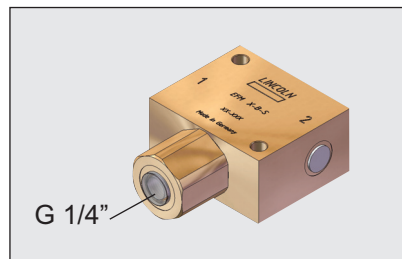
Air-oil Flow Metering Device Type EFM 5-B-S



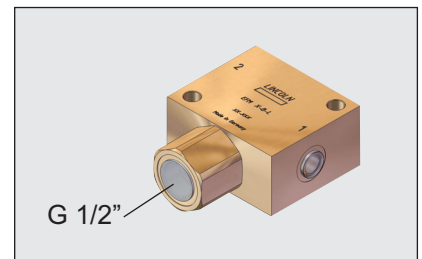
Air-oil Flow Metering Device Type EFM 2-B-L

EFM-Metering Device

Inlets

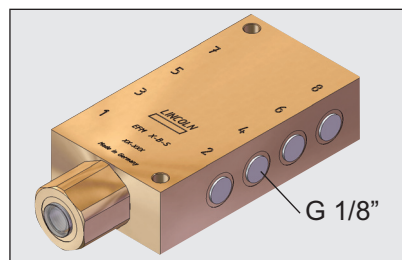


S = small

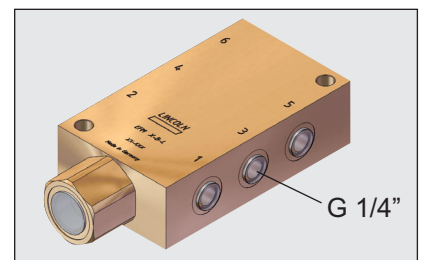


L = large

Outlets



S = small



L = large

The ECOFLOW metering devices are available in 2 sizes "S" (small) and "L" (large):

The large ECOFLOW metering devices are used as a primary to supply the smaller ECOFLOW metering devices.

The large ECOFLOW metering devices are available with 2 to 6 outlets, and the small metering devices with 2 to 8 outlets.

Model	Outlets
EFM 2-B-S	2
EFM 3-B-S	3
EFM 4-B-S	4
EFM 5-B-S	5
EFM 6-B-S	6
EFM 7-B-S	7
EFM 8-B-S	8

Model	Outlets
EFM 2-B-L	2
EFM 3-B-L	3
EFM 4-B-L	4
EFM 5-B-L	5
EFM 6-B-L	6

*Coanda Effect:
The tendency of a stream of fluid to stay attached to a convex surface. This results in an undetermined build-up of the oil film on one or more ports.

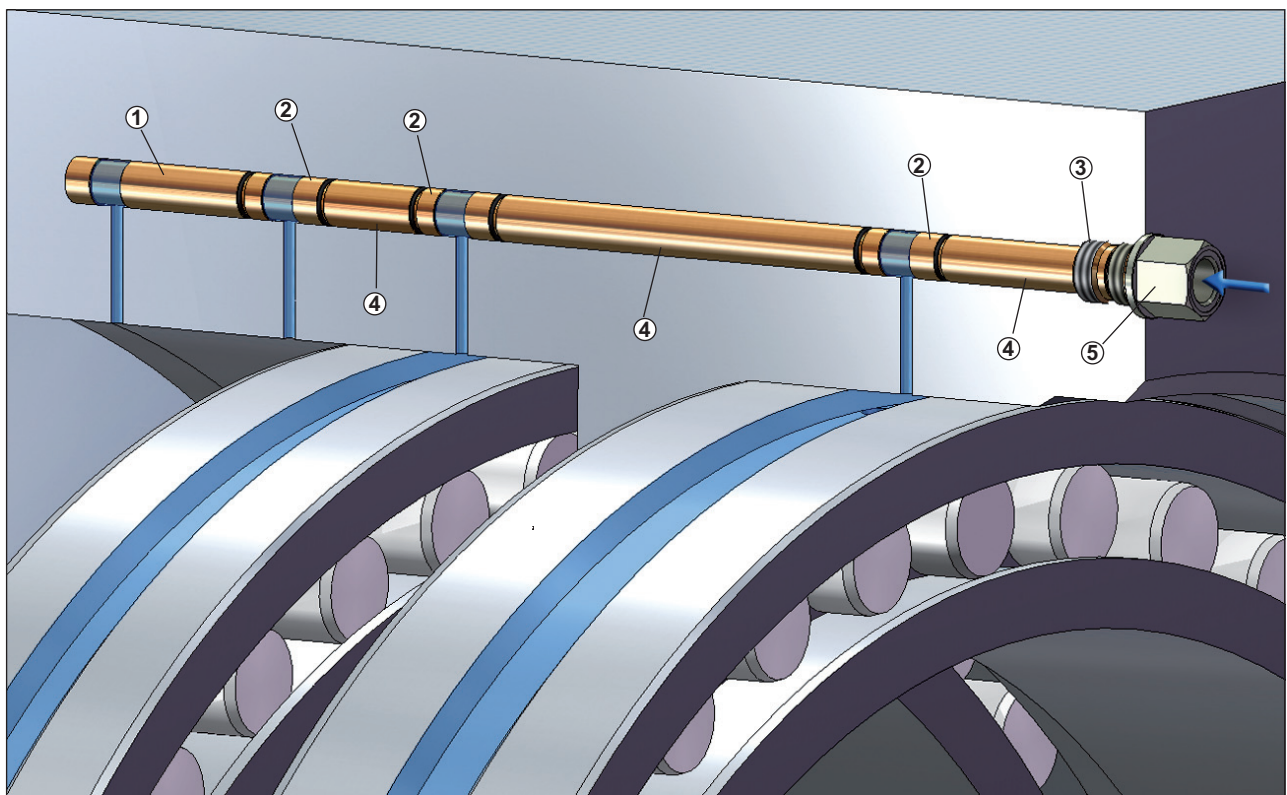
Air-oil Progressive System

EFC Installation Assembly

EFC installation assembly units are used for the lubrication of bearings in rolling mills or straighteners. The EFC supplies 2, 3 or 4 lubrication points from a single inlet with an air-oil flow mixture.

Every assembly consists of a number of installation cartridges and spacers.

The special design of the cartridges enable the air-oil flow to be divided into the desired portions for each connected lubrication point. The spacers are used to match the length of the assembly to that of the bearing.

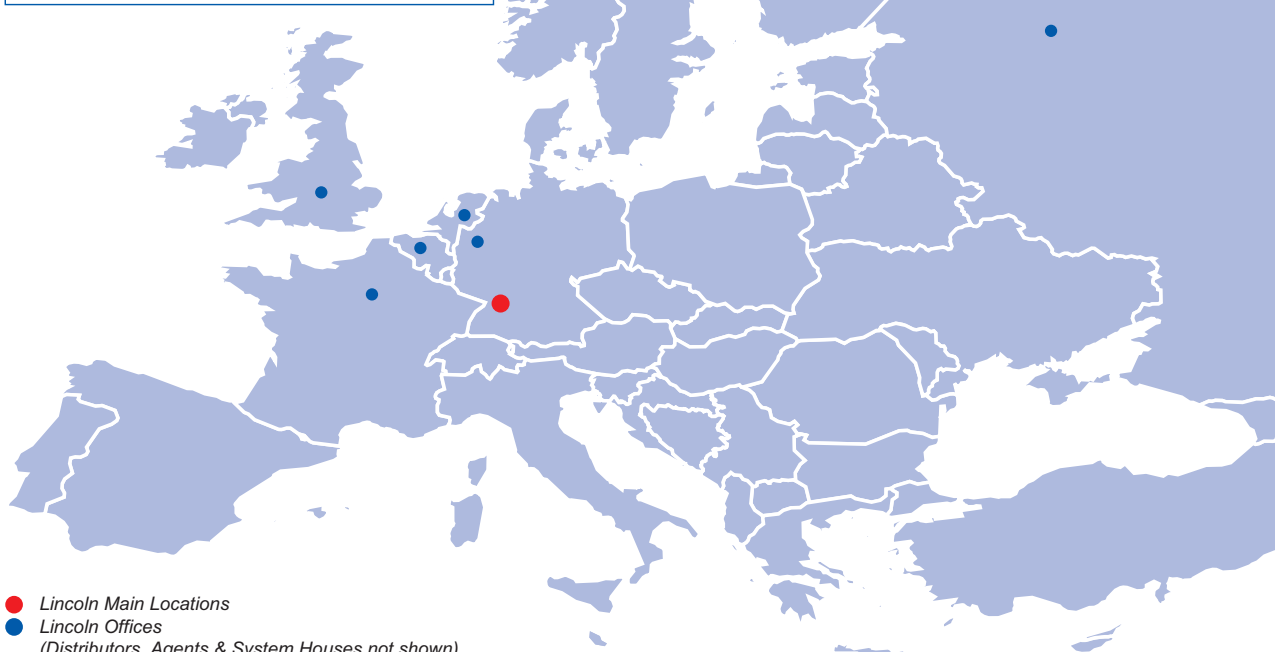


- ① Spacer
- ② Cartridge
- ③ Holding ring
- ④ Spacer
- ⑤ Connector with strainer

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