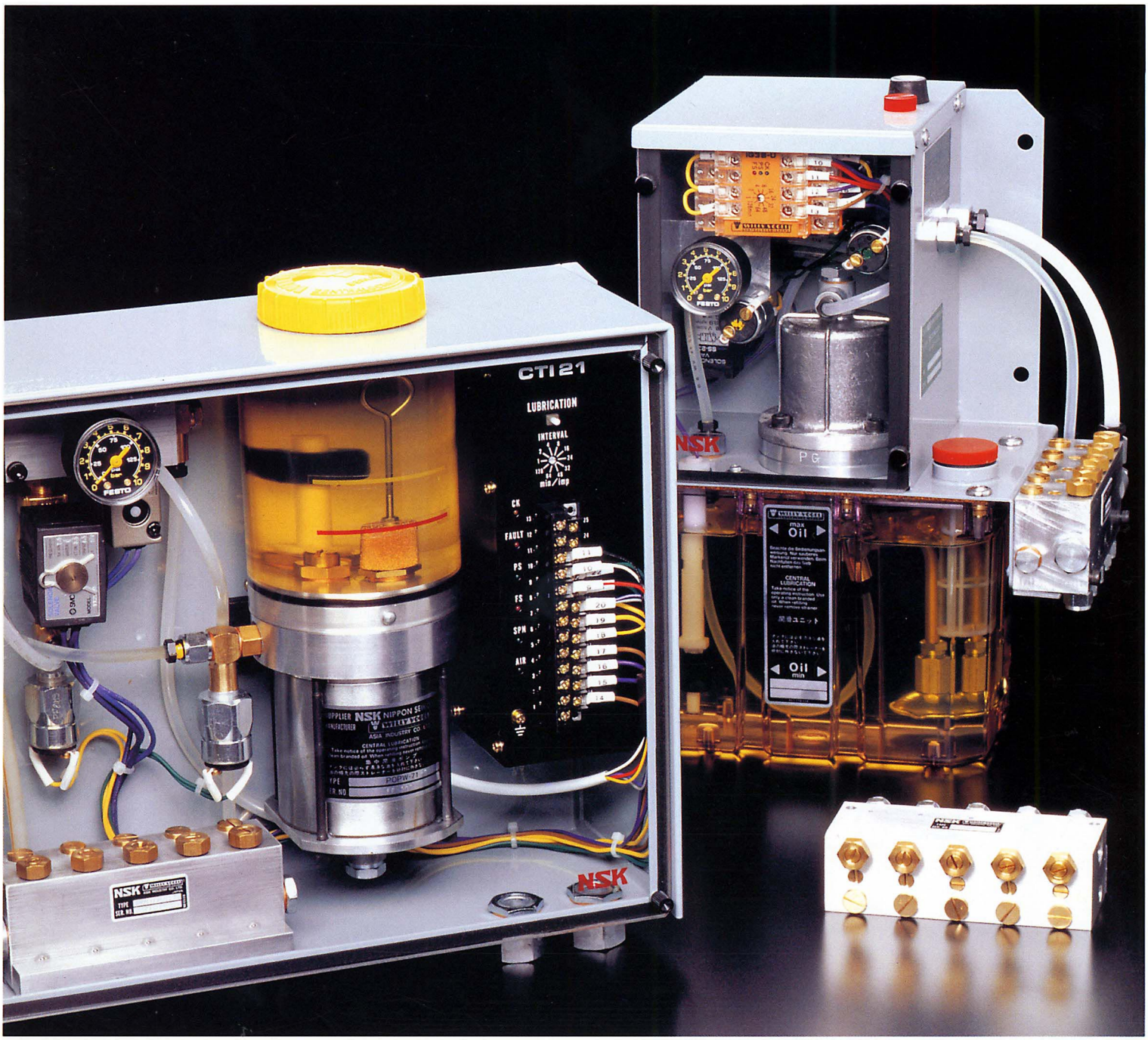
MOTION & CONTROL

NSK

FINE-LUB OIL-AIR LUBRICATORS

OAH HIGH-PERFORMANCE TYPE
OAE ECONOMICAL TYPE
OAM HIGH CAPACITY TYPE

Select an oil-air lubricator from among three types depending on the priorities of your application



- **Realize higher machine tool speed with NSK's reliable, compact oil-air lubricators**
- **Select from among three types that have been newly designed with additional functions**

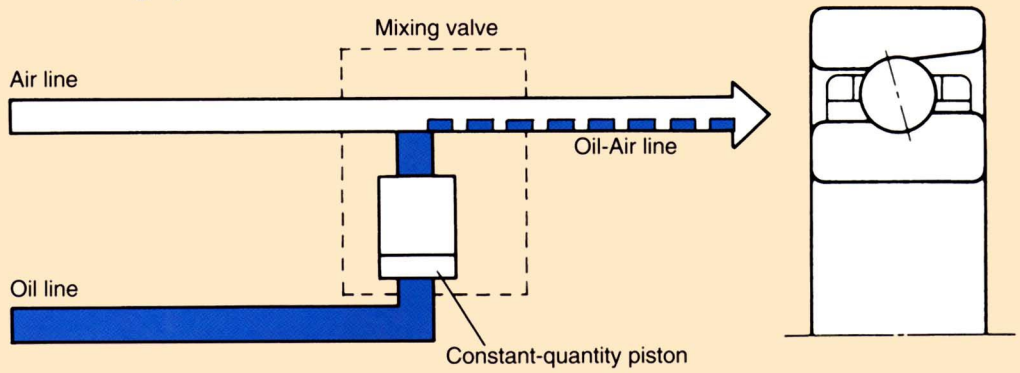
Remarkable technological innovation continues in the field of machine tools. Particularly, the speed of machine tool main spindles is increasing rapidly. Improving bearings and lubrication methods to facilitate higher speeds is therefore vital. Over ten years ago, NSK developed "FINE-LUB Oil-Air Lubricators." Adopted for use in many machine tools, they have earned a reputation for excellent performance and high reliability over the years. NSK has worked to constantly improve these products by applying knowledge gained through operating experience. For greater convenience and serviceability in a wider range of applications, NSK FINE-LUB Oil-Air Lubricators are now available in three newly designed types.

Features of Oil-Air Lubrication

●High-speed capacity and low dynamic torque

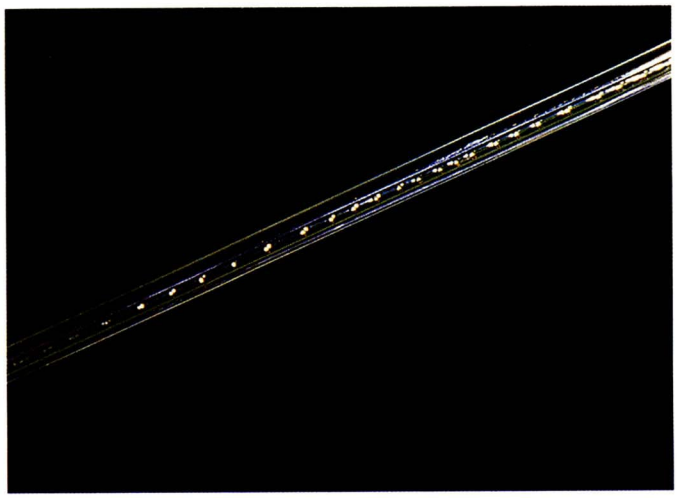
With oil-air lubrication (Fig. 1), constant-quanity pistons supply the minimum necessary amount of oil at preset intervals with a high degree of reliability. As a result, high-speed operation without excessive torque and temperature rise is realized.

Fig. 1 Oil-Air Lubricating System



●Continuous supply of oil

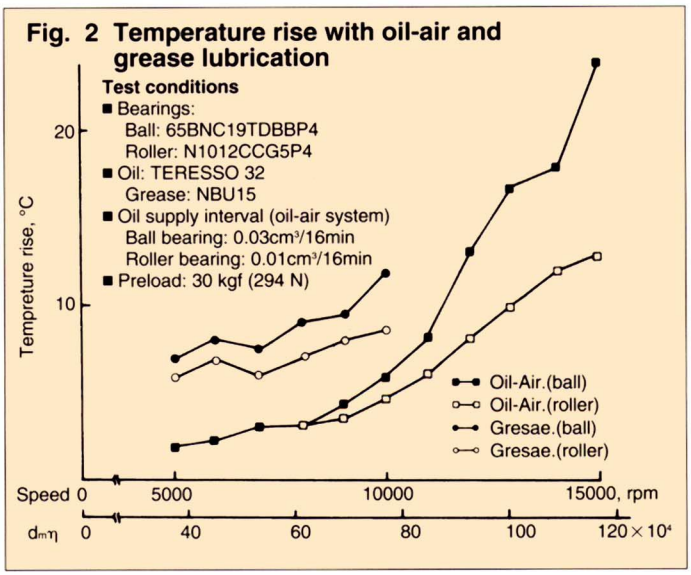
Though oil is fed at preset intervals by the constant-quatity pistons, it arrives at the bearings at a nearly constant rate and temperature because it is carried along the supply tubes by a continuous flow of clean, dry compressed air.



●Reduced temperature rise

Because of the small amount of oil supplied, there is very little agitation resistance and temperature rise. In addition, the constant flow of compressed air through the spindle carries away heat. Fig. 2 compares temperature rise with oil-air and grease lubrication.

Fig. 2 Temperature rise with oil-air and grease lubrication



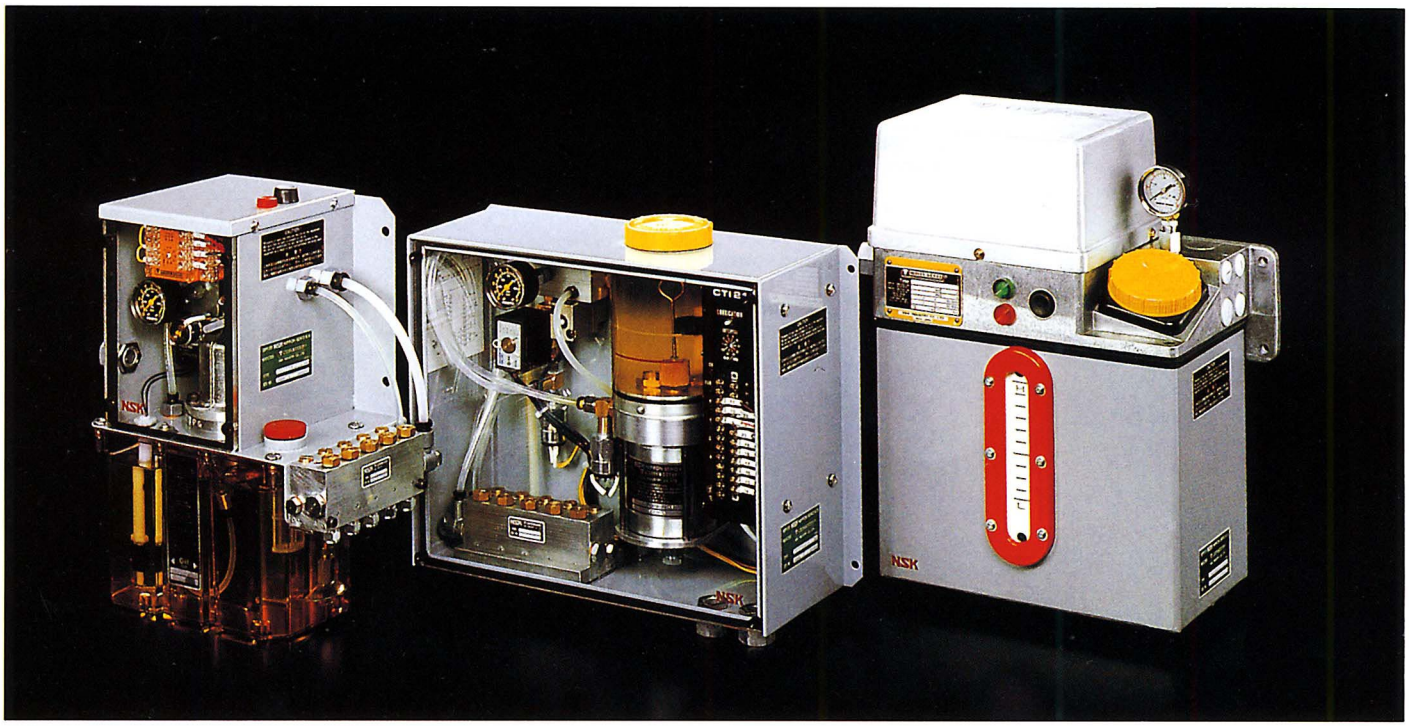
●Clean operation

Unlike oil mist lubrication systems, oil-air lubrication does not contaminate the surrounding area.

●Improved reliability

Because compressed air is used to transport oil to the bearings, the high air pressure inside the spindle stops coolant, cutting chips and other material from entering. Unlike grease and some forms of oil lubrication, there is no concern with deterioration of the lubricant because only fresh clean oil is used. These advantages make NSK FINE-LUB Oil-Air Lubricators ideal for modern machine tools.

Description of and Operating Precautions for FINE-LUB



The two main parts in an NSK FINE-LUB system are the pump/control unit and mixing valve unit.

⟨Pump/Control Unit⟩

●Oil Pump

In the case of the OAH and OAE types an air-driven pump is used because these two models use low-viscosity oil. For the OAM high-capacity type, a geared pump is used because it can supply a larger quanity of oil.

●Ten Oil Supply Intervals

A timer allows selection of any one of ten different oil supply intervals: 1, 2, 4, 8, 16, 24, 32, 48, 64 and 128 minutes.

●Safety Devices

Various safety devices are standard to shut off power to the spindle motor and prevent bearing damage in case of a malfunction.
These devices include:
1) An oil level switch to monitor the lubricating oil level
2) A circuit to check power to the controller
3) An air pressure switch to monitor the air supply
4) An oil pressure switch to monitor pump operation

●Double float Switches

Double float switches that sound an alarm when the oil level is low are standard on the OAH and OAM types and opitonal on the OAE type.

●Control Chrcuit for Oil and Air Supply (for OAH only)

If a spindle is stoped for a long time while the oil and air, remain on, the bearings may become excessively lubricated. To prevent this, a controller starts and stops the oil and air depending on spindle.

⟨Mixing Valves⟩

In the mixing valve unit, constant-quantity pistons discharge very small quantities of oil.
Any one of five quantites can be selected: 0.01, 0.03, 0.06, 0.1 and 0.16cm³ per stroke.This ensures sufficient oil for safe bearing lubrication without causing excessive heat generation.

⟨Optional Parts⟩

●Oil Filter and Air Bleed Valve

As optional equipment, a filter can be installed halfway between the pump/control unit and mixing valves to remove fine particles from the lubricating oil. An air-bleed valve convenient for purging air is also available.

⟨Precautions When Using FINE-LUB⟩

- Always use clean, dry compressed air at a pressure of 0.25 to 0.49 Mpa (2.5 to 5kgf/cm²). Preferably, it should be between 0.34 and 0.44 MPa (3.5 and 4.5 kgf/cm²).
- Use fresh clean lubricating oil with a viscosity of ISO VG 10 (ISO VG 20 for OAM) or more. Keep in mind that dust in the oil can shorten bearing life.
- Be sure to bleed air from all lines and other parts before starting operation. Refer to the operating manual for the procedure.
- For the OAH and OAE types, select the oil line between the pump/control unit and mixing valves with care. If plastic tubing is used, it should be of a type recommended by NSK.
  Please note that extra long oil lines can lead to damage of the mixing valves. Contact NSK if the length exceeds 5 m.

For oil-air lubrication to reach its full capability, it's important to select the optimum oil quantity, oil viscosity, and oil supply method for each bearing. NSK has much a lot of experience with oil-air lubrication and associated equipment. Please contact us when designing your system.

FINE-LUB Flow Chart (OAH)