

LUBRILEAN[®] Basic
LUBRILEAN[®] Smart

Minimum-quantity Lubrication System for External Lubrication

Operating Manual
Version 03



Imprint

The operating manual is part of the scope of supply of a SKF minimum-quantity central lubrication system.

The manual has been edited in conformity with applicable standards and rules for technical documentation.

© Copyright

SKF LUBRICATION SYSTEMS GERMANY AG reserves the right to make changes to adapt to technical improvement. Reprinting or copying even of parts of this manual requires the permission of SKF LUBRICATION SYSTEMS GERMANY AG.

Editor

Dipl.-Ing. S. Waschki

Contents

Part A: General Operating Manual

Contents	0 - 1
EC Declaration of Conformity and Manufacture	0 - 2
Introduction	A - 1
Notes on the Operating Manual	A - 1
Range of Application	A - 1
System types	A - 2
LUBRILEAN® Basic	A - 2
LUBRILEAN® Smart	A - 2
Safety Instructions	A - 2
Functional Description	A - 3
Principle of minimum-quantity lubrication	A - 3
Aerosol Production	A - 3
Design and function	A - 4
Operating Elements	A - 4
Lubricants	A - 4
Installation	A - 5
Setup	A - 5
First filling	A - 5
Connections	A - 6
First Operation	A - 7
Quick Flooding of the Transport Lines	A - 7
Basic Settings	A - 7
Checking the Settings	A - 8
Operation	A - 8
Failures	A - 9

Maintenance	A - 10
Filling with lubricant	A - 10
Draining lubricant	A - 11
Cleaning	A - 11
Closing Down	A - 12
Temporary standstill	A - 12
Final Standstill	A - 12
Service	A - 12

Part B: LUBRILEAN® Basic

Design and Function	B - 1
Operating Elements	B - 1
Indicators	B - 3
Connections	B - 3
Installation and Connection	B - 4
Specifications	B - 5

Part C: LUBRILEAN® Smart

Design and Function	C - 1
Operating Elements	C - 1
Indicators	C - 3
Connections	C - 3
Installation and Connection	C - 3
Specifications	C - 4



WILLY VOGEL AKTIENGESELLSCHAFT

EG-Konformitätserklärung KE 000065

Für das folgend bezeichnete Erzeugnis: **Minimalschmiersystem**
Baureihe: **LubriLean Smart / Basic / Vario / Digital**

wird hiermit bestätigt, daß es den wesentlichen Schutzanforderungen entspricht, die in der(n) Richtlinie(n) des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten ...

- Elektromagnetische Verträglichkeit 89/336/EWG,**
geändert durch
92/31/EWG, 93/68/EWG, 91/263/EWG und 93/97/EWG
- Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (Niederspannungs-Richtlinie) 73/23/EWG**
geändert durch
93/68/EWG
- Maschinen 98/37/EG**

... festgelegt sind.

Weitere Angaben über die Einhaltung dieser Richtlinie(n) enthält der Anhang zu dieser Erklärung. Diese Erklärung gilt für alle Produkte, die in der Tabelle als Anhang - Bestandteil dieser Erklärung - aufgeführt sind.

Diese Erklärung wird verantwortlich für den Hersteller / Importeur

WILLY VOGEL AKTIENGESELLSCHAFT

Mozzener Straße 35/37, 12277 Berlin Postfach 480149, 12251 Berlin

Vertreten durch

Heinz Goub

Ewe Schumann

Berlin, den 6.11.2001

- Die Anhänge sind Bestandteil dieser Erklärung.
- Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften.
- Die Sicherheitshinweise in der dem Produkt beigefügten Dokumentation sind zu beachten.
- Die Inbetriebnahme der bescheinigten Produkte ist solange untersagt, bis sichergestellt wurde, das die Maschine, Fahrzeug o. ä. in welche(s) das Produkt eingebaut wurde, den Bestimmungen und Forderungen der anzuwendenden Richtlinien entspricht.
- Der Betrieb der Produkte an nicht normgerechter Netzspannung, sowie die Nichtbeachtung von Installationshinweisen kann Auswirkungen auf die EMV-Eigenschaften und auf die elektrische Sicherheit haben.



Vorsitzende des Aufsichtsrates: Joachim Smetzold
Vorstand: Dipl.-Ingenieur Martin E. Neuber, Vizevorstand: Dipl.-Ing. Hans Goub, M.Sc.
Sitz der Geschäftsführung: Berlin - Pagenbergstr. 4, Ampergrund Charlottenburg, HRB 11 794
Mozzener Straße 35/37, 12277 Berlin • Postfach 48 01 49, 12251 Berlin
Tel. +49(30) 7 20 02-0 • Fax +49(30) 7 20 02-111 • Tlx 8 83 284



Dokument-Nr.: KE000065 / Seite 1 von 2 N:WVForumKonformitäts- und Herstellerklärungen/Konformitätserklärungen/KE000065.doc



WILLY VOGEL AKTIENGESELLSCHAFT

Anhang zur EG-Konformitätserklärung KE 000065

Die Übereinstimmung wurde festgestellt

a) durch Anwendung folgender (harmonisierter) europäischer Normen bezüglich der Richtlinie(n)

Elektromagnetische Verträglichkeit
EMV 89/336/EWG

EN 50081-1
EN 61000-6-2

Maschine 98/37/EG
(ggf. Herstellererklärung anfordern)

Niederspannung 73/23/EWG

EN60204-1

b) durch die Prüfstelle bezüglich Richtlinie(n)

Elektromagnetische Verträglichkeit
EMV 89/336/EWG

Maschine 98/37 EG

Name:

Name:

Anschrift:

Anschrift:

Bescheinigung:

Bescheinigung:

Ausgestellt am:

Ausgestellt am:

Niederspannung 73/23/EWG

Name:

Anschrift:

Bescheinigung:

Ausgestellt am:



Vorsitzende des Aufsichtsrates: Joachim Smetzold
Vorstand: Dipl.-Ingenieur Martin E. Neuber, Vizevorstand: Dipl.-Ing. Hans Goub, M.Sc.
Sitz der Geschäftsführung: Berlin - Pagenbergstr. 4, Ampergrund Charlottenburg, HRB 11 794
Mozzener Straße 35/37, 12277 Berlin • Postfach 48 01 49, 12251 Berlin
Tel. +49(30) 7 20 02-0 • Fax +49(30) 7 20 02-111 • Tlx 8 83 284



Dokument-Nr.: KE000065 / Seite 2 von 2 N:WVForumKonformitäts- und Herstellerklärungen/Konformitätserklärungen/KE000065.doc



WILLY VOGEL AKTIENGESELLSCHAFT

Herstellereklärung HE 000031

Hiermit erklären wir, daß das Minimalmengenschmiersystem mit der Bestellbezeichnung

LUBRILEAN® Digital1 / Digital2 / Vario / Basic / Smart

nach EG - Maschinenrichtlinie 98/37/EG, Anhang II B

zum Einbau in eine Maschine / zum Zusammenbau mit anderen Maschinen zu einer Maschine bestimmt ist. Die Inbetriebnahme ist so lange untersagt, bis festgestellt wurde, daß die Maschine, in die dieses Teil eingebaut, bzw. mit der dieses Teil zusammengebaut werden soll, den Bestimmungen der EG - Richtlinie 98/37/EG entspricht.

Hier angewendete harmonisierte Normen sind insbesondere DIN EN 809, EN 292 Teil 1 EN 292 Teil 2, 9. GSGV und VBG4.

in bezug auf die EG - Richtlinie 97/23/EG über Druckgeräte

nur bestimmungsgemäß und entsprechend den Hinweisen aus der Dokumentation verwendet werden darf. Dabei ist folgendes besonders zu beachten:

VOGEL Produkte sind für den Einsatz in Verbindung mit Fluiden der Gruppe I (Gefährliche Fluide). Definition nach Artikel 2, Abs. 2 der RL 67/548/EWG vom 27. Juni 1967 nicht ausgelegt und nicht zugelassen.

VOGEL Produkte sind für den Einsatz in Verbindung mit Gasen, verflüssigte Gasen, unter Druck gelöste Gasen, Dämpfe und diejenigen Flüssigkeiten, deren Dampfdruck bei der zulässigen maximalen Temperatur um mehr als 0,5 bar über dem normalen Atmosphärendruck (1013 mbar) liegt, nicht ausgelegt und nicht zugelassen.

Die von uns gelieferten Produkte erreichen bei bestimmungsgemäßer Verwendung nicht die in Artikel 3 Abs. 1, Nummern 1.1 bis 1.3 und Abs. 2 der Richtlinie 97/23/EG aufgeführten Grenzwerte. Sie unterliegen damit nicht den Anforderungen des Anhang I der Richtlinie. Sie erhalten somit auch keine CE Kennzeichnung in bezug auf die Richtlinie 97/23/EG. Sie werden von uns nach Artikel 3 Abs. 3 der Richtlinie eingestuft.

Alle für die Inbetriebnahme und den Betrieb erforderlichen Angaben und Sicherheitshinweise, entnehmen Sie bitte der Produktdokumentation.

WILLY VOGEL AKTIENGESELLSCHAFT
Motzener Straße 35/37, 12277 Berlin Postfach 480149, 12251 Berlin

Heinz Gaub
(Vorstandsmitglied)

Uwe Schumann
(Vertriebsleitung Industriechmierung)

Berlin, den 18. Februar 2002



Vorsitzender des Aufsichtsrates: Joachim Dornwald
Vorstand: Dipl.-Vollrentner Manfred E. Neubert, Vorsitzender; Dipl.-Ing. Heinz Gaub, M. Sc.
Sitz der Gesellschaft: Berlin - Registergericht: Amtsgericht Charlottenburg HRB 11 794
Möckener Straße 35/37 - 12277 Berlin - Postfach 48 01 49 - 12251 Berlin
Tel. (+49)30 7 20 02-0 - Fax (+49)30 7 20 02-111 - Telex 1 83 284



LUBRILEAN[®] Basic
LUBRILEAN[®] Smart

Minimum-quantity Lubrication System for External Lubrication

Part A
General Operating Manual



Introduction

You have decided in favour of an environmentally-friendly and economic technology by purchasing a SKF minimum-quantity central lubrication system. Our high-quality systems were designed to be used on modern machine tools.

SKF minimum-quantity central lubrication systems are made in conformity with the generally recognized rules of technology and the applicable safe working practices and the rules for accident prevention. Still, hazards may be involved in their use, which can lead to injury of operators or other persons or damage to the machine or other property.

To ensure trouble-free operation and prevent hazards, we kindly ask you to read the present manual carefully and observe the notes contained in it.

Notes on the Operating Manual



This symbol indicates passages of text in which particular dangers or work which requires special caution is described.

This operating manual is subdivided into three parts. Part A contains a general description of both system types as well as basic notes concerning assembly and operation. In parts B and C, the special features of the LUBRILEAN® Basic and LUBRILEAN® Smart systems are described.

Use the table of contents to locate the desired information promptly and successfully.

This operating manual is a part of the system, and it must be given to the operating company upon sale of the system.

Range of Application



All products of SKF Lubrication Systems Germany AG may be used only in compliance with regulations and according to the stipulations of the respective operating manual.

We expressly emphasize that dangerous materials of any type, especially materials which are classified as dangerous according to EC directive 67/548/EWG article 2, paragraph 2, may be stored and transported and/or distributed with SKF central lubrication systems and components only after consulting SKF Lubrication Systems Germany AG and receiving their written consent.

The minimum-quantity lubrication systems described in this document are intended exclusively for the external lubrication of cutting and forming processes. In external lubrication, the lubricant is transported directly to the point of friction between the tool and the workpiece via spray nozzles which are fastened to the tool machine. One or several spray nozzles may be used, depending on the mode of operation.

System types

The minimum-quantity lubrication systems LUBRILEAN® Digital, LUBRILEAN® Digital and LubriLeanVario can be used for both fitting out machine tools and retrofitting machine tools with a previous cooling lubricant supply. Consultation with our engineers is necessary.

Other use or use beyond this purpose is considered unintended. SKF will not accept liability for damages resulting from such unintended use.

The lubricants stipulated for use in SKF minimum-quantity central lubrication systems have chemical and physical characteristics specially developed to meet the high demands of the minimum-quantity lubrication system technology used. For this reason only lubricants provided by SKF may be used.

We would be glad to answer any further questions you might have about the lubricants.

We assume no liability for damages which arise because of the improper use of lubricants or the use of lubricants other than those of which we have approved of in writing.

SKF offers two different minimum quantity lubrication systems for external lubrication. The systems differ in the number of lubricating points which can be supplied simultaneously and the size of the lubricant reserve container.

LUBRILEAN® Basic

Up to 8 lubricating points can be supplied with lubricant simultaneously with the minimum-quantity lubrication system LUBRILEAN® Basic, and the lubricant amount can be set separately for each lubricating point. The lubricant amount is set manually. The lubricant supply can be controlled for every lubricating point separately or for several lubricating points at once.

LUBRILEAN® Smart

Up to 2 lubricating points can be supplied with lubricant with the minimum-quantity lubrication system LUBRILEAN® Smart, and the lubricant amount can be set separately for each lubricating point. The lubricant amount is set manually.

Safety Instructions

Please observe the following safety instructions to ensure trouble-free functioning of the unit and prevent damage.



Spraying lubricants other than those approved of by SKF or with SKF minimum-quantity lubrication systems is prohibited.



The system must be disconnected from the compressed air supply and electric voltage and depressurized before undertaking any work on it, e.g. cleaning, refilling with lubricant, etc.



Do not spray people or animals with aerosol. The aerosol must not get into one eyes and must certainly not be directly inhaled.



Note that the spraying of mineral oils or mineral oil-containing substances can be particularly damaging to your health.



The spray stream must be kept away from every type of fire, e.g. open flames, sparks, lit cigarettes, etc. The aerosol must not be sprayed onto hot surfaces.

The general rules and safety regulations for work with compressed air-bearing machines and devices must be observed.

Use the units only in technically perfect condition for the intended use. Be aware of hazards and observe the operating manual.

The safety mechanisms must not be damaged, dismantled, or in any way made inoperable, nor must they be replaced by parts which have not been expressly approved of by SKF.

In the case of a malfunction, the system must be disconnected from the compressed air supply as quickly as possible, e.g. by triggering the quick-action coupling on the compressed air connection.

The electrical connection and all interventions such as repairs, component replacement, etc. may be carried out only by accordingly qualified and instructed personnel.

Unauthorised alteration of the device and use of unapproved spare parts and auxiliaries are not allowed.

Worn-out systems must be made inoperable and disposed of properly.

Functional Description

Principle of minimum-quantity lubrication

Minimum-quantity lubrication system lubrication involves a loss or consumption lubrication, i.e. the lubricant is used up almost completely during processing so that a preparation is not necessary in the cycle. An air current of finely distributed drops of oil, known as aerosol, performs the actual task of lubricating the point between the tool and workpiece. The minimum-quantity lubrication system can assure an effective lubrication of cutting processes with the smallest amounts of lubricant. The arduous task of cleaning and disposing large amounts of lubricant and cooling lubricant is, if necessary at all, made much easier.

Aerosol Production

The LUBRILEAN® Digital , LUBRILEAN® Digital and LubriLeanVario minimum-quantity central lubrication systems produce a very homogenous aerosol with respect to the size and distribution of the oil drops because the lubricant is sprayed in a controlled manner. The functional principle of the spray nozzles allow the production of aerosols with drops ranging in size from approx. 15 – 35 μm .

Design and function

The minimum-quantity lubrication systems LUBRILEAN® Basic and LUBRILEAN® Smart consist of one lubricant reserve container, one or several mixture regulating units as well as one or several lubricant lines with spray nozzle.

The lubricant reserve container is put under pressure via a compressed air connection, whereby the lubricant is transported via a system of ducts and lines to the spray nozzle. The control valves mounted on the lubricant reserve container regulate the necessary lubricant and atomizer amount as well as set the inner pressure of the lubricant reserve container.

The lubricant lines are laid out as coaxial lines in order to transport the lubricant and atomizer to the spray nozzle separately from one another.

There is a spray nozzle at the end of the lubricant line which assists in the production of aerosol. The lubricant is then transported directly to the lubricating point by the support air. The minimum-quantity lubrication systems LUBRILEAN® Basic and LUBRILEAN® Smart have a main air valve with which the central compressed air supply can be cut.

The inner pressure of the lubricant reserve container is displayed by a pressure gauge on the cover plate of the lubricant reserve container.

The lubricant reserve container is filled with lubricant via a lubricant inlet. When filling, observe

the maximum filling level marked on the lubricant reserve container. The current filling level is read with the help of the filling level indicator, which is mounted on the lubricant reserve container.

Operating Elements

The operating elements for the minimum-quantity lubrication system LUBRILEAN® Basic and LUBRILEAN® Smart are described in the corresponding chapters. Corresponding operating elements of both systems types are designated by the same numbers.

Lubricants

! **Spraying lubricants other than those approved of by SKF or with SKF minimum-quantity lubrication systems is prohibited.**

! **Note that the spraying of mineral oils or mineral oil-containing substances can be particularly damaging to your health.**

The lubricants stipulated for use in SKF minimum-quantity central lubrication systems have chemical and physical characteristics specially developed to meet the high demands of the minimum-quantity lubrication system technology used.

Table A - 1. Recommended Lubricants

Designation	Composition	Properties	Range of application
LubriFluid F100	Fatty acid ester with additives	Viscosity: 75mm ² /s at 20°C Density: 0.84 g/cm ³ at 20°C	All-purpose applications
LubriOil	Synthetic polyhydric ester based on natural fatty oil derivatives with oxidation inhibitors	Viscosity: 47mm ² /s at 40°C Density: 0.92 g/cm ³ at 20°C	Specially made for small tools and difficult lubrication tasks on aluminium, steel and non-ferrous metals

Installation

For this reason only lubricants provided by SKF may be used (see table A - 1).

The said lubricants are compatible with each another so that the laborious task of cleaning of the container is not necessary if the lubricant is changed.

We would be glad to answer any further questions you might have about the lubricants.



Do not mix different lubricants together unless you have the express consent of SKF to do so. Otherwise damages could arise, and a laborious cleaning of the system interior might become unavoidable.

We assume no liability for damages which arise because of the improper use of lubricants or the use of lubricants other than those of which we have approved of in writing.

Setup

The minimum-quantity lubrication system should be set up in the immediate vicinity of the machine. We recommend installation of the system directly on the machine housing. A drawing with the installation dimensions can be found in the chapter on the respective minimum-quantity lubrication system.

Do not fasten the system in a location subject to strong oscillations or vibrations.

The system must not be installed near a source of heat. Locations subject to rapidly and strongly changing temperatures are also unsuitable.



The system must be installed vertically for faultless operation. It must never be installed upside-down.

Also ensure good accessibility for purposes of maintenance or refilling with lubricant.

First filling



The lubricant reserve container must be depressurised before filling it with lubricant.

It is recommended to fill the container before connecting the compressed air supply when the system is put to use for the first time.

If the system is already connected to the compressed air supply, ensure that the container is depressurised before filling it.

To depressurise the container, first disconnect the system from the compressed air supply by either disconnecting the system from the compressed air line or closing the main valve.

Wait until the pressure has dissipated via the lubricant lines and spray nozzles.

The control valves for lubricant amount and atomizer must be open, i.e. clear passage for dissipating the pressure in the container must be ensured.

Check whether the pressure has completely dissipated. The pressure gauge must show the value 'zero'.

If you are certain that the pressure has been completely released, you can now screw on the inlet with a suitable tool.

Notice:

There is a seal ring underneath the screw.

Use a funnel to fill the container with lubricant to the maximum level marking.

Only the minimum-quantity lubrication system lubricants provided by SKF may be used.

Note that we assume no liability for damages which arise from use of lubricants other than those of which have approved of in writing.

! Close the lubricant inlet tightly after filling.

Ensure that the seal ring is in the correct position before you screw in the plug screw.

Tighten the plug screw, but do not use force; otherwise the seal could be damaged.

Connections



The system may be connected only by accordingly qualified and instructed personnel. Comply with the notes in this operating manual.

Compressed air connection



Ensure that the main air valve is closed before connecting the compressed air line.

The minimum-quantity lubrication systems have an NG8 coupler socket for hoses with an inner diameter of 8-8 mm for the compressed air connection. Please observe the defaults listed in table A - 2 for the compressed air.



The minimum-quantity lubrication systems may be operated only with the specified maximum operating pressures. Higher pressures are dangerous for both people and the machine.

Electrical Connection (Basic Only)

The electrical connection of the activation valves is assisted by terminal box according to DIN 43650-C for the LUBRILEAN® Basic.

Connection to the Machine Control Unit (Basic Only)

The DIN 43650-C terminal box installed on the activation valve connects the minimum-quantity lubrication system to the machine control unit. To make the connection, the terminal box must be removed from the activation valve and made up with a suitable cable.

The terminal box is then reinstalled on the activation valve. The other end of the cable is connected to a 24 V DC output on the processing machine.

Table A - 2. Compressed Air Requirements

Requirement	Values
Maximum primary mains pressure	6 bar
Minimum inlet pressure	2.5 bar
Maximum operating pressure	3 bar

Table A - 3. Operating Voltage Requirements

Requirements	Values
Rated current	24V DC
Operating voltage range	10% / +15% of the rated voltage
Power consumption	1.5 W

First Operation

The first operation of the minimum-quantity lubrication system involves the flooding of the transport lines, the setting of operating parameters and a functional check.

Flooding of the Transport Lines

The capillary hoses of the transport lines are not filled with lubricant when shipped. In order to fill the often metre-long lines, the system would have to remain switched on while the lubricant slowly made its way to the spray nozzle. To accelerate this process, a flooding of the transport lines should be carried out during first operation. This prevents long waiting times before using the system for the first time.

The procedure for flooding the transport lines (for LUBRILEAN® Basic, carry out the procedure for every control block) is described as follows:

- Connect the system to the compressed air supply,
- set the operating pressure with the help of the pressure reducing valve (5) to approx. 1 bar,
- close the atomizer air valve (3),
- direct the spray nozzles downward into a lubricant drip pan,
- open the atomizer air valve (3),

- completely open the lubricant control valve (4) in order to increase the lubricant flow,
- switch the solenoid valves (11) at the control blocks on and off during flooding approx. 10-20 times with the manual actuation (12) in order to wash out any air bubbles which might be in the control block ("Basic" only),
- As soon as the lubricant exits the nozzle without bubbles, close the lubricant control valve (4) again until stop is reached.

Basic Settings

The valve settings depend on all of the process parameters such as cutting speed, materials, cutting tool etc. and must therefore be realigned from time to time by the machine operator.

The basic settings of the system follow the scheme below:

- Set solenoid valves (11) to OFF ("Basic" only),
- set the operating pressure via the pressure reducing valve (5) to approx. 1 bar,
- open solenoid valves (11) ("Basic" only),
- set the required lubricant amount via the lubricant control valve (4),
- readjust the support air amount via the atomizer air valve (3), if necessary.

Operation

Checking the Settings

Direct the spray nozzle toward the cutting edge of the tool and observe whether a lubricant film forms. If necessary, increase the lubricant amount or the atomizer air amount.



The distance between the spray nozzle and the tool reference plane should be kept to a minimum. If they are too far apart from each other, the tool reference plane will not be supplied with a sufficient amount of lubricant.



Note: the greater the distance, the greater the spraying angle of the spray nozzle.

Start processing and adjust the aerosol amount and the aerosol composition to the process by taking criteria such as lubricant, cutting parameters, roughness of surface, and tool wear for the setting changes as a basis.

We recommend ascertaining and optimising the necessary settings for your application by undertaking test runs in order to attain the best results for your processing procedures.

If necessary, use two spray nozzles arranged 180° in relation to one another in order to optimize the aerosol supply to the lubricating point.

Information on operation of the minimum-quantity lubrication system can be found in the chapter on the respective system type.

Failures

The following prerequisites must be met for the compact system to function faultlessly:

- The system has been connected correctly.
- The inlet pressure of the air pressure supply of the minimum-quantity lubrication system is sufficient (at least 2.5 bar).

If, however, failures nevertheless arise, they can usually be quickly remedied as long as there is no functional failure of the system.

Table B - 4 contains an overview of a series of problems which you can remedy yourself. You should contact us if the problem can not be rectified by taking the measures described here.

Table A - 4. Failures and their Remedy

Problem	Possible cause	Remedy
When switched on there is little or no oil to be seen at the nozzle.	Air in the capillary line	Flood the lubricant lines as described in the chapter "First Operation", page A - 7 and ensure correct ventilation.
	Oil filter is blocked or riser is loose	Contact our service department.
Air bubbles always appear when flooding the lubricant line.	Riser is leaky	Contact our service department.
Lubricant amount decreases during continuous operation or disappears.	Air has collected in the system at the oil control valve	Briefly switch device on and off. If necessary, flood the lubricant lines as described in the chapter "First Operation", page A - 7 and ensure proper ventilation. Replace the valve if necessary.

Maintenance

SKF minimum-quantity lubrication systems are low-maintenance systems. However in order to ensure faultless functioning and to prevent dangers from arising, check all connections regularly.

Filling with lubricant



The lubricant reserve container must be depressurised before filling it with lubricant.

To depressurise the container, first disconnect the system from the compressed air supply by either disconnecting the system from the compressed air line or closing the main valve.

Wait until the pressure has been released via the aerosol outlets. The control valves for lubricant amount and atomizer air must be open, i.e. clear passage for the release of the inner container pressure must be ensured.

Check whether the pressure has completely dissipated. The pressure gauge must show the value 'zero'.

If you are certain that the pressure has been completely released, you can now screw on the inlet with a suitable tool.

Notice:

There is a seal ring underneath the screw.

Use a funnel to fill the container with lubricant to the maximum level marking.

Only the minimum-quantity lubrication system lubricants provided by SKF may be used.

Note that we assume no liability for damages which arise from use of lubricants other than those of which have approved of in writing.



Close the lubricant inlet tightly after filling.

Ensure that the seal ring is in the correct position before you screw in the plug screw.

Tighten the plug screw, but do not use force; otherwise the seal could be damaged.

If you want to change the lubricant, please drain the previously used lubricant before adding the new lubricant. Read the following chapter for information on draining the lubricant.



Do not mix different lubricants together unless you have the express consent of SKF to do so. Otherwise damages could arise, and a laborious cleaning of the system interior might become unavoidable.

Draining lubricant



The lubricant reserve container must be depressurised before draining it of lubricant.

To depressurise the container, first disconnect the system from the compressed air supply by either disconnecting the system from the compressed air line or closing the main valve.

Wait until the pressure has been released via the aerosol outlets.

The control valves for lubricant amount and atomizer air must be open, i.e. clear passage for the release of the inner container pressure must be ensured.

Check whether the pressure has completely dissipated. The pressure gauge must show a value of 'zero'.

To drain lubricant, loosen the drainage screw on the bottom of the container with a suitable tool.

Please observe the legal directives for the disposal of lubricants.



Close the drainage opening tightly after draining lubricant.

Cleaning

Exterior cleaning

If necessary the minimum-quantity lubrication system can be cleaned with mild, material-safe (non-alkaline, no soap) cleaning agents.

For safety reasons we recommend that you disconnect the minimum-quantity lubrication system from the compressed air supply and electrical voltage as well as depressurise the container as described in the section "Filling with lubricant", page A - 10.

If possible, leave hoses and cables connected while cleaning and close any openings to prevent cleaning agents from entering the interior of the minimum-quantity lubrication system.

Interior cleaning

Interior cleaning is not necessary in normal operation if compatible lubricants are used.

If an unsuitable or dirty lubricant has been used, the interior of the lubricant container must be cleaned. Please contact us if this situation arises.



The lubricant container must not be disassembled; this would invalidate any warranty claims.

SKF LUBRICATION SYSTEMS GERMANY AG assume no liability for damages which accrue from improper installation work on the minimum-quantity lubrication system.

Closing Down

Temporary standstill

You should disconnect the entire system from the compressed air supply and depressurise the container for a temporary standstill of the minimum-quantity lubrication system.

It is recommended to drain the lubricant for longer standstill times.

Final Standstill

If you want to bring the minimum-quantity lubrication system to a permanent standstill, please comply with the legal stipulations for disposal of oil-containing components.

The system can also be taken back by SKF for disposal if the costs are covered.

Service

Please contact our sales offices or our international representatives if you have any questions or problems.

You can find a list with current addresses on the Internet at:

- www.skf.com/schmierung

LUBRILEAN[®] Basic

Minimum-quantity Lubrication System for External Lubrication

Part B
Device description



Design and Function

Figure B - 1 shows the design of the minimum-quantity lubrication system LUBRILEAN® Basic.

The principal functioning of the system has been previously described in the chapter "Functional Description", page A - 3 in the general information section of the operating manual. The following sections therefore cover only the special features of the minimum-quantity lubrication system LUBRILEAN® Basic.

Operating Elements

Main air valve (2)

The main air valve separates all subsequent units of the aerosol producer from the compressed air supply. No aerosol is produced when the main air valve is closed.



The aerosol container and subsequently connected units could still be under pressure whenever the main air valve is closed.

Solenoid valve (11)

The solenoid valve switches the spray process on and off for the respective control block and all other control blocks it actuates, depending on the model of the minimum-quantity lubrication system.

The solenoid valve is actuated via a 24V DC output on the processing machine. In order to be able to actuate the valve manually, it is equipped with a manual actuation (16). The manual actuation is a red screw on the solenoid valve.

Pressure reducing valve (5)

The pressure reducing valve regulates the inner pressure in the lubricant reserve container. The higher the inner pressure is set, the greater the lubricant amounts transported to the spray nozzle (14). The standard setting is 1 bar.



The device may be operated only under the specified maximum operating pressure. Higher pressures are dangerous for both people and the machine.

Lubricant control valve (4)

The lubricant control valve regulates the lubricant amount for the spray nozzle (14). The lubricant control valve is manually actuated with a turning knob and is infinitely variable. The markings (7) on the base of the turning knob help set the required lubricant amount.

Atomizer air valve (3)

The atomizer air valve regulates the atomizing of the air amount required for the lubricant. The atomizer air valve is set manually with a slotted screw.

Lubricant inlet (7)

The lubricant inlet is closed with a screw. The screw is unscrewed with a suitable tool in order to open the inlet. Further notes can be found in the chapter "Maintenance" in the general information part of the operating manual.



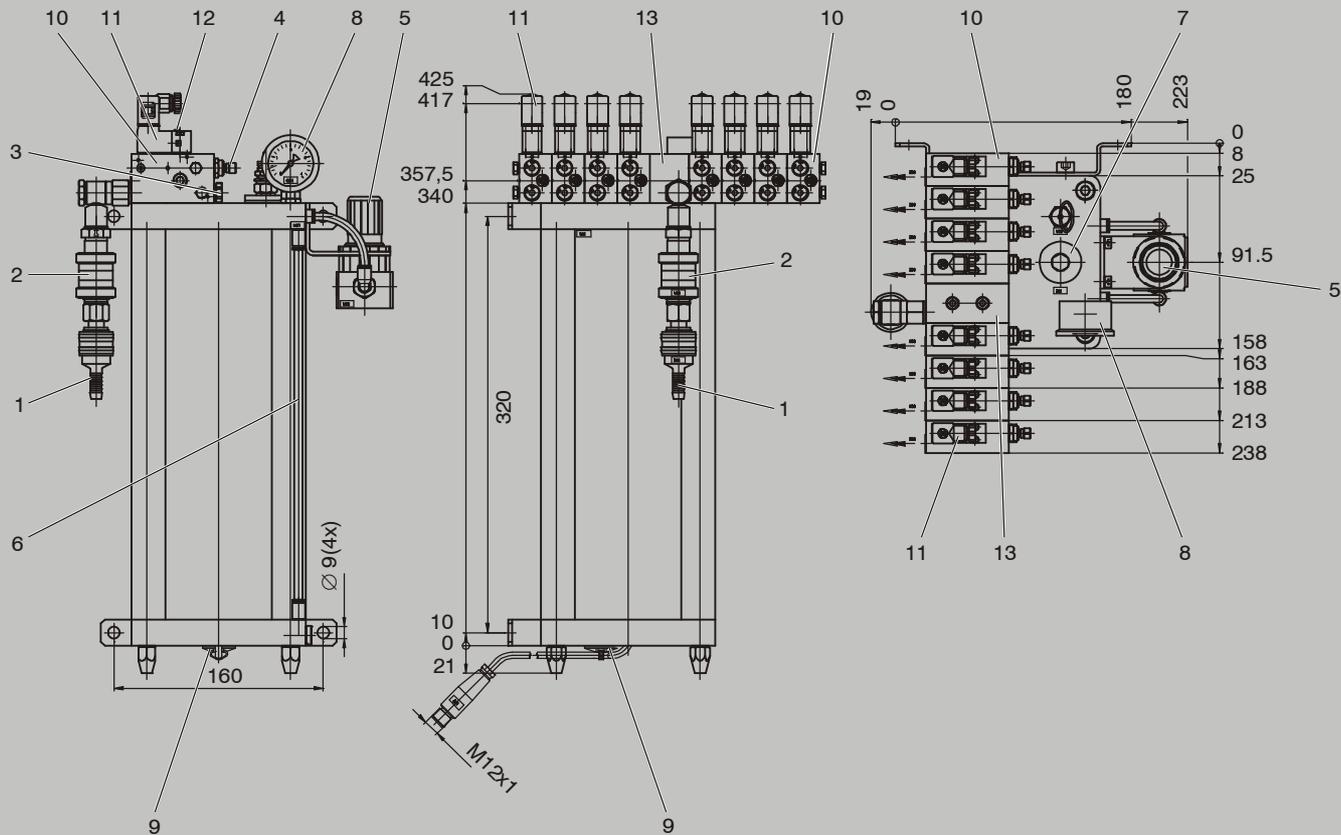
The container must be depressurised before filling it with lubricant.

Lubricant outlet (9)

The lubricant outlet is closed with a screw. The screw is unscrewed with a suitable tool in order to open the inlet. Further notes can be found in the chapter "Maintenance" the general information part of the operating manual.



The lubricant reserve container must be depressurised before draining it of lubricant.



Indicators

Filling level indicator (6)

A riser is installed on the front side of the lubricant reserve container from which the filling level of the lubricant reserve container can be read directly.

Pressure indicator

The pressure gauge (8) installed on the middle block displays the inner pressure of the lubricant reserve container.

Connections

Compressed air connection (1)

The minimum-quantity lubrication system LUBRILEAN® Vario has an NG8 coupling socket for hoses with an inner diameter of 7-8 mm for connection to the compressed air supply.

Electrical connection

The electrical connection is made via a terminal box according to DIN 43650-C.

Figure B - 1. Design of the LUBRILEAN® Basic (schematic drawing, subject to technical alterations)

- 1 Compressed air connection
- 2 Main air valve
- 3 Atomizer air valve
- 4 Lubricant control valve
- 5 Pressure reducing valve
- 6 Filling level indicator
- 7 Lubricant inlet
- 8 Pressure gauge
- 9 Lubricant outlet
- 10 Control block
- 11 Solenoid valves
- 12 Manual actuation
- 13 Middle block

Filling level indicator (8)

Installation and Connection

! The system may be connected only by accordingly qualified and instructed personnel. Comply with the notes in this operating manual.

! The minimum-quantity lubrication system may be operated only under the specified maximum operating temperature. Higher pressures are dangerous for both people and the machine.

The minimum-quantity lubrication system LUBRILEAN® Vario is equipped with a bracket with which the minimum-quantity lubrication system can be fastened to the machine tool.

Also observe the notes in the general information part of the operating manual for installation and connection of the minimum-quantity lubrication system.

The dimensions for the installation of the minimum-quantity lubrication system LUBRILEAN® Basic can be seen in figure B - 2.

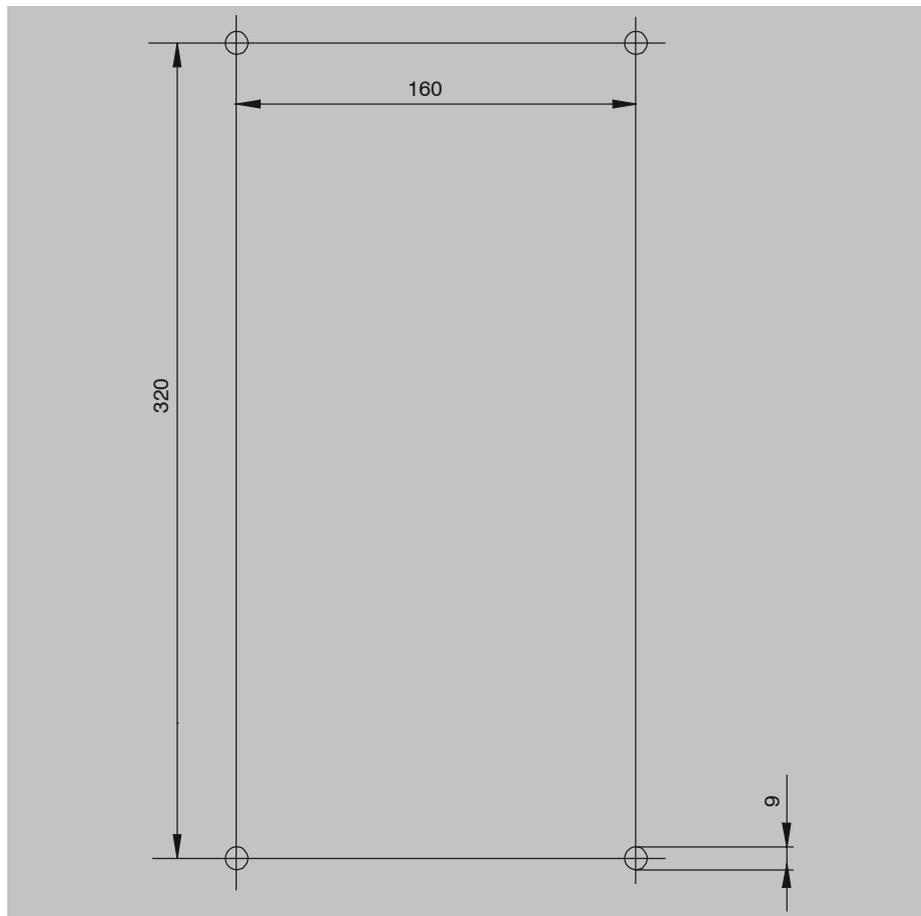


Figure B - 2. Drilling scheme for installing the LUBRILEAN® Basic

Specifications

Table B - 1. Specifications for the system LUBRILEAN® Basic

Designation	Unit	LUBRILEAN® Basic
Container		
Housing design		Metal
Installation position		Vertical
Filling amount	l	3
Oil consumption	ml/h	0-100
Aerosol outlets		2 - 8, upward
Outer dimensions of aerosol container	mm	H: 340, W: 140, D: 140
Increase of the volume boxed because of projecting add-on pieces (without connections)	mm	H: 450, W: 250, D: 240 (with 8 control blocks)
Empty weight	kg	6
Compressed air		
Maximum primary pressure	bar	6
Minimum primary pressure	bar	2.5
Maximum operating pressure	bar	2
Air consumption per output	NI/min	25 - 50
Connections		
Compressed air connection		Coupler socket NG8 for inner diameter of hose, 7-8mm
Electrical connection of the activation valve		24V DC via terminal box according to DIN 43650-C

LUBRILEAN[®] Smart

Minimum-quantity Lubrication System for External Lubrication

Part C
Device description



Design and Function

Figure C - 1 shows the design of the minimum-quantity lubrication system LUBRILEAN® Vario.

The principal functioning of the system has been previously described in the chapter „Functional Description“, page A - 3 in the general information section of the operating manual. The following sections therefore cover only the special features of the minimum-quantity lubrication system LUBRILEAN® Smart.

Operating Elements

Main air valve (2)

The main air valve separates all subsequent units of the aerosol producer from the compressed air supply. No aerosol is produced when the main air valve is closed.



The aerosol container and subsequently connected units could still be under pressure whenever the main air valve is closed.

Pressure reducing valve (5)

The pressure reducing valve regulates the inner pressure in the lubricant reserve container. The higher the inner pressure is set, the greater the lubricant amounts transported to the spray nozzle. The standard setting is 1 bar.



The device may be operated only under the specified maximum operating pressure. Higher pressures are dangerous for both people and the machine.

Lubricant control valve (4)

The lubricant control valve regulates the lubricant amount for the spray nozzle (14). The lubricant control valve is manually actuated with a turning knob and is infinitely variable. The markings (7) on the base of the turning knob help set the required lubricant amount.

Atomizer air valve (3)

The atomizer air valve regulates the atomizing of the air amount required for the lubricant. The atomizer air valve is set manually with a slotted screw.

Lubricant inlet (8)

The lubricant inlet is closed with a screw. The screw is unscrewed with a suitable tool in order to open the inlet. Further notes can be found in the chapter "Maintenance" in the general information part of the operating manual.



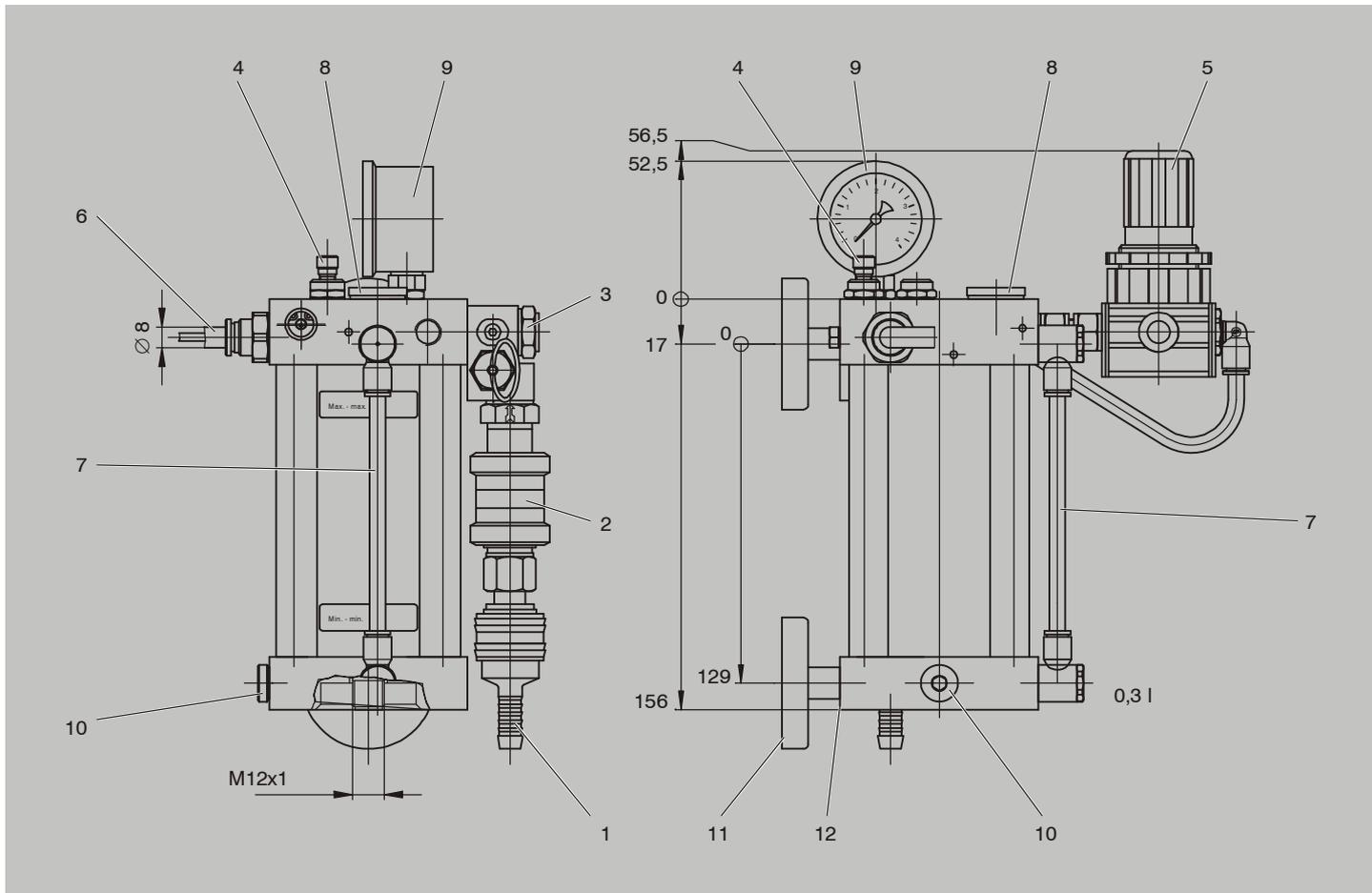
The container must be depressurised before filling it with lubricant.

Lubricant outlet (10)

The lubricant inlet is closed with a screw. The screw is unscrewed with a suitable tool in order to open the outlet. Further notes can be found in the chapter "Maintenance" in the general information part of the operating manual.



The container must be depressurised before draining it of lubricant.



Indicators

Filling level indicator (7)

A riser is installed on the front side of the lubricant reserve container from which the filling level of the lubricant reserve container can be read directly.

Pressure indicator

The pressure gauge (10) installed on the cover plate of the lubricant reserve container indicates its inner pressure.

Connections

Compressed air connections (1)

The minimum-quantity lubrication system LUBRILEAN® Vario has an NG8 coupling socket for hoses with an inner diameter of 7-8 mm for connection to the compressed air supply.

Figure C - 1. Design of the LUBRILEAN® Smart (schematic drawing, subject to technical alterations)

- 1 Compressed air connection
- 2 Main air valve
- 3 Atomizer valve
- 4 Lubricant control valve
- 5 Pressure reducing valve
- 6 Lubricant line (coaxial hose)
- 7 Filling level indicator
- 8 Lubricant inlet
- 9 Pressure gauge
- 10 Lubricant outlet
- 11 Permanent magnet (optional)
- 12 Fastening thread M6 - 12mm deep

Installation and Connection



The minimum-quantity lubrication system may be operated only under the specified maximum operating pressure. Higher pressures are dangerous for both people and the machine.



The system may be connected only by accordingly qualified and instructed personnel. Comply with the notes in this operating manual.

The LUBRILEAN® Smart is screwed firmly to the housing of the processing machine. There are screw threads in the cover and base plate of the lubricant reserve container for this. The dimensions and location of the screw thread can be found in figure C - 1.

The minimum-quantity lubrication system LUBRILEAN® Smart can as an option be fastened to the machine housing with the help of two permanent magnets. The machine housing must be made of a magnetic material and you must order this option.

Also observe the notes in the general information part of the operating manual for installation and connection of the minimum-quantity lubrication system.

Specifications

Table C - 1. Specifications for the system LUBRILEAN® Vario

Designation		Unit	LUBRILEAN® Basic
Container			
Housing design			Metal
Installation position			Vertical
Filling amount		l	0.3; 0.5; 0.8
Aerosol outlets			1 - 2, upward
Outer dimensions	0.3 l filling amount	mm	H: 160, W: 75, D: 75
	0.5		H: 230, W: 75, D: 75
	0.7		H: 330, W: 75, D: 75
Increase of the volume boxed because of projecting add-on pieces (without connections)	0.3 l filling amount	mm	H: 225, W: 180, D: 120
	0.5		H: 295, W: 180, D: 120
	0.7		H: 395, W: 180, D: 120
Empty weight (version with 0.3 l filling level)		kg	3,5
Compressed air			
Maximum primary pressure		bar	6
Minimum primary pressure		bar	2,5
Maximum operating pressure		bar	3
Air consumption per output		NI/min	25 - 50
Compressed air connection			Coupler socket NG8 for inner hose diameter of 7-8mm

SKF Lubrication Systems Germany AG

Motzener Straße 35/37

12277 Berlin

Postfach: 970444, 12704 Berlin

Telefon: (++49) 30-7 20 02-0

Fax: (++49) 30-7 20 02-111

E-Mail: lubrication-germany@skf.com

WWW: www.skf.com/schmierung