OPERATING INSTRUCTIONS

Dynacut

Minimum quantity lubrication device KSM

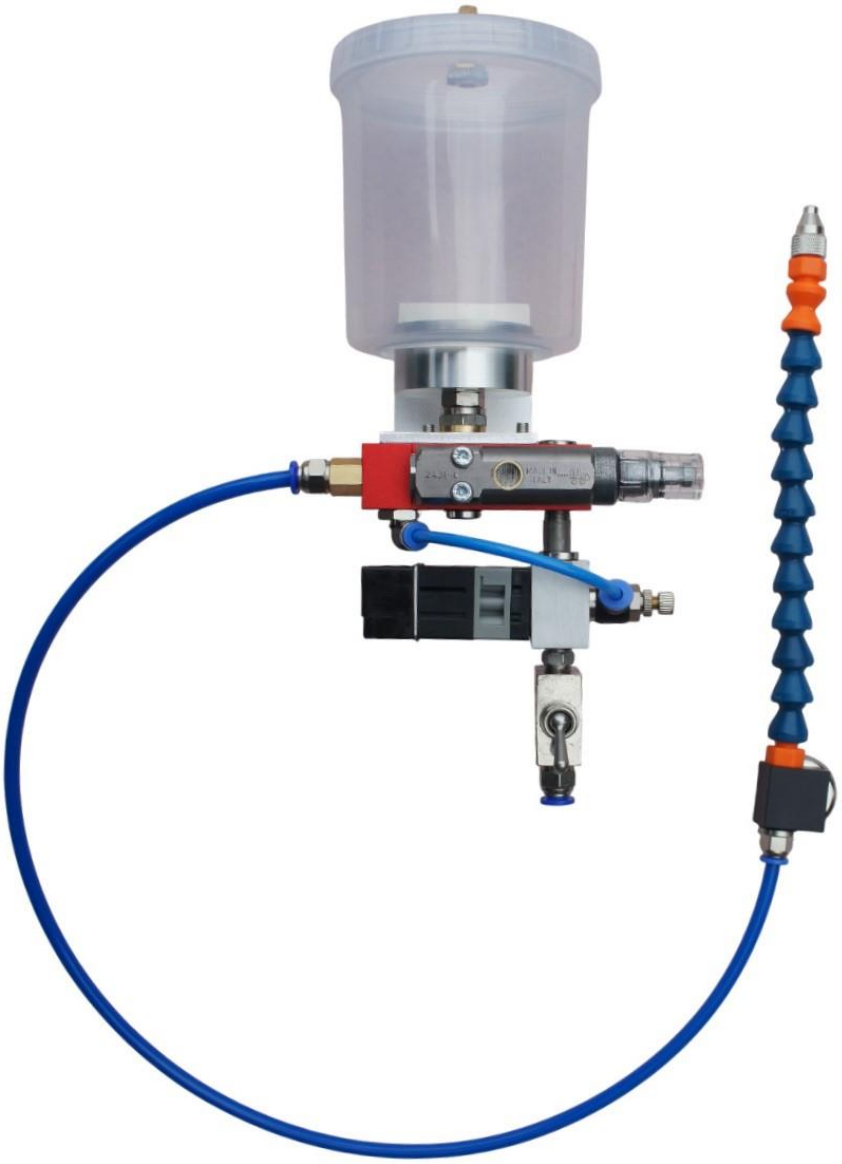

Table of contents

Foreword

Dear Customer.

We thank you for your trust in our product.

With the purchase of a DYNACUT-KSM minimum quantity lubrication system for With external lubrication you have opted for an environmentally friendly and economical technology.
Our high-quality minimal-quantity lubrication systems were designed for use on modern machine tools. DYNACUT minimal-quantity lubrication systems for external lubrication are constructed according to generally accepted engineering standards and comply with applicable occupational health and safety regulations. Nevertheless, their use may pose hazards that could result in physical injury to the user or third parties, or damage to the machine tool or other property.

To ensure trouble-free operation and avoid dangers, we ask you to read these operating instructions carefully and to observe the information contained therein.

Dynacut UG

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1) Notes on the operating instructions

 Texts marked with this symbol indicate particular hazards or work that requires particular caution.

This manual contains a general description of the system as well as instructions for installation and operation. It also addresses the system's special features.

Use the table of contents to find the information you need quickly and easily.

This operating manual is part of the system and must be handed over to the new operator if the system is sold.

2) Intended use

 The DYNACUT-KSM minimum quantity lubrication system may only be used and employed as intended and in accordance with the information in the operating instructions supplied with the device.

In particular, we would like to point out that dangerous substances of any kind, especially substances classified as dangerous according to EC Directive 67/548/EEC Article 2, Paragraph 2, as well as liquids such as chlorinated hydrocarbons, solutions containing alcohol, petrol containing benzene, nitro lacquers and nitro thinners (solvent mixtures for nitro lacquers made from hydrocarbons and esters) and concentrated acids must not be filled into DYNACUT minimum quantity lubrication systems and components and must not be pumped and/or distributed with them.

The minimum quantity lubrication system described here is intended exclusively for external lubrication of machining and forming processes. With external lubrication, the lubricant is transported directly to the friction point between the tool and the workpiece via spray nozzles attached to the machine tool. Depending on the machining process, one or more spray nozzles can be used per tool.

The DYNACUT-KSM minimum quantity lubrication system can be used both for the original equipment of processing machines and for the retrofitting of processing machines with an existing cooling lubricant supply.

Any other or additional use is considered improper. Dynacut UG is not liable for any resulting damage.

of lubricants suitable for use in DYNACUT minimum-quantity lubrication systems for external lubrication are specifically tailored to the demanding requirements of the technology used. For this reason, only lubricants suitable for minimum-quantity lubrication may be used.

We do not accept any liability for damage caused by improper use of lubricants or by the use of lubricants other than those suitable for minimum quantity lubrication.

3) Safety instructions

Please observe the following safety instructions to ensure the trouble-free operation of the minimum quantity lubrication system and to avoid damage.

Spraying lubricants or substances other than those approved for minimum quantity lubrication with DYNACUT minimum quantity lubrication systems is not permitted.

Before performing any work on the system, such as cleaning or refilling lubricant, etc., the system must be disconnected from the compressed air supply and depressurized. The system must also be disconnected from the electrical power supply.

People or animals must not be sprayed with aerosol. The aerosol must not get into the eyes and under no circumstances be inhaled directly.

We would like to point out that spraying mineral oils or substances containing mineral oils in particular can cause health damage.

Any type of fire, e.g., open flames, sparks, smoldering cigarettes, etc., must not come near the spray jet. The aerosol must not be sprayed onto hot surfaces.

The generally applicable rules and safety regulations for working with compressed air and electrical machines and devices must be strictly observed.

The system may only be used in technically perfect condition, as intended, with due consideration of safety and hazards and in compliance with the operating instructions.

The existing safety devices must not be damaged, deactivated or rendered unusable or replaced by parts other than those expressly approved by Dynacut UG.

In the event of a fault, the system should be disconnected from the compressed air and power supply as quickly as possible, e.g. by operating the quick coupling on the compressed air connection and pulling the power plug.

Unauthorized modification of the system and the use of unauthorized spare parts and accessories are not permitted.

Obsolete systems must be rendered unusable and then disposed of properly.

4) Functional description

Principle of minimum quantity lubrication (MQL)

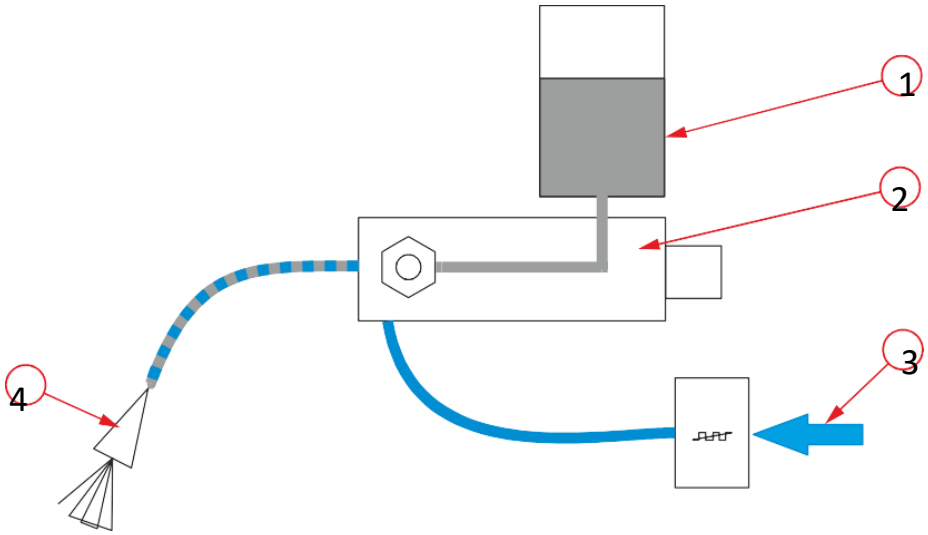
Minimum quantity lubrication is a loss or
Consumption lubrication, meaning the lubricant used is almost completely consumed during machining, eliminating the need for recirculation. The actual lubrication task at the interface between tool and workpiece is performed by finely dispersed oil droplets, known as aerosols, in an air stream. With minimum-quantity lubrication, effective lubrication of machining processes can be achieved using the smallest amounts of lubricant. The time-consuming cleaning and disposal of large quantities of lubricants and cooling lubricants is thus eliminated or reduced to a minimum.

5) Aerosol generation

The DYNACUT-KSM minimum quantity lubrication system described here generates a very homogeneous aerosol in terms of the size and distribution of the oil droplets, thanks to the controlled atomization of the lubricant. The operating principle of the spray nozzles allows the generation of aerosols with a droplet size of approximately 15–35 µm.

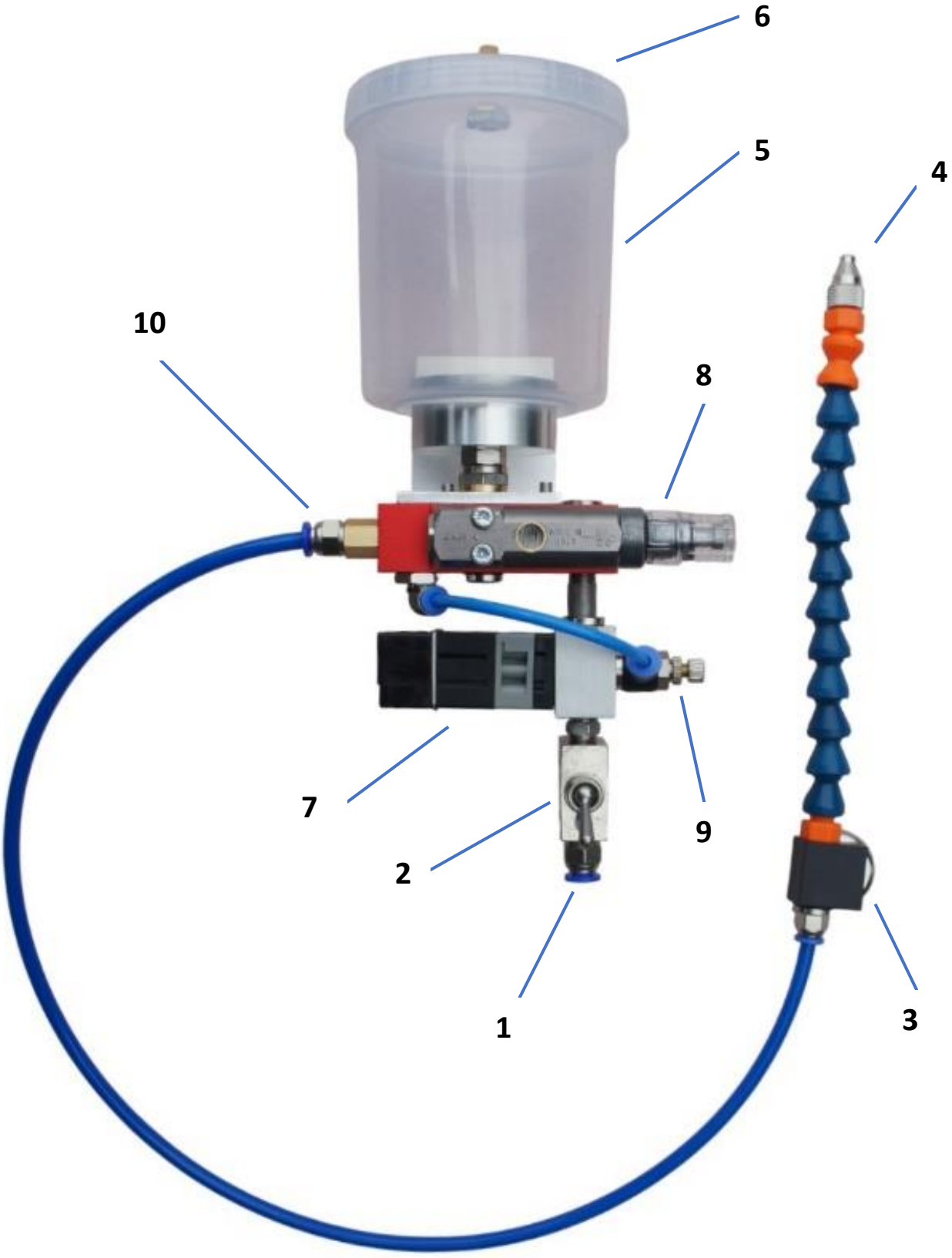
6) Functional description

A pulsed pump (2) pumps lubricant from a lubricant reservoir (1) through a capillary tube to the nozzles. Air (3) finely atomizes the lubricant at the nozzles (4) and applies it to the tool.



7) Main components

Minimum quantity lubrication device with pneumatic pump



Pos.	component	function
1	Plug connection	Connecting the air supply
2	rocker arm valve	Turn on the device
3	Magnetic holder	Attaching the nozzle to a metallic surface
4	Droplet nozzle	Lubricant atomization
5	Oil tank	Lubricant supply
6	tank cap	Lubricant filling
7	Pacemaker	Delivery of air pulses to the dosing pump
8	rotary knob	Setting the flow rate
9	needle valve	The valve regulates the amount of air flowing out of the nozzle.
10	hose connection	Oil and air supply to the nozzle

8) Technical data

Dimensions and weights

Dimensions (L x D x H)		161 x 165 x 300 mm
Weight (empty)	≤ 3 kg	

Information on power and media supply

Electric optional	
Power supply standard	24 V DC
Alternative power supply	230 V AC
Electrical power depending on model	3 VA
Pneumatic standard	
Compressed air connection	max. 6 bar

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Further technical data

Frequency generator	
Pneumatic	5 – 100 strokes/min

Lubricant pump	
Funding volume	0.12 mm³ to 39.00 mm³ per piston stroke
Viscosity lubricant	600 cSt .

Lubricant container	
Contents	0.5 ltr .

Environmental conditions for operation and storage

Permissible environmental conditions	
Ambient temperature	0…+40°C
Installation location	Dry, frost-free
atmosphere	Industrial environment, non-explosive

Protective devices

Operational phase	**Personal protective equipment**
Normal operation	• Protective gloves
cleaning	• Protective gloves
Maintenance and repair	• Protective gloves, safety shoes

9) Preparation for use

Transport and storage

storage

Store the device only in dry, frost-free rooms with a corrosion-free atmosphere.

Permissible environmental conditions	
Ambient temperature	0…+30°C
Relative humidity	max. 50%
Installation location	Interior, flat, dry, vibration-free
atmosphere	non-corrosive, non-explosive, non-flammable

10) Lineup

The minimum quantity lubrication system should be installed in close proximity to the machining center. We recommend mounting the system directly on the machine housing.

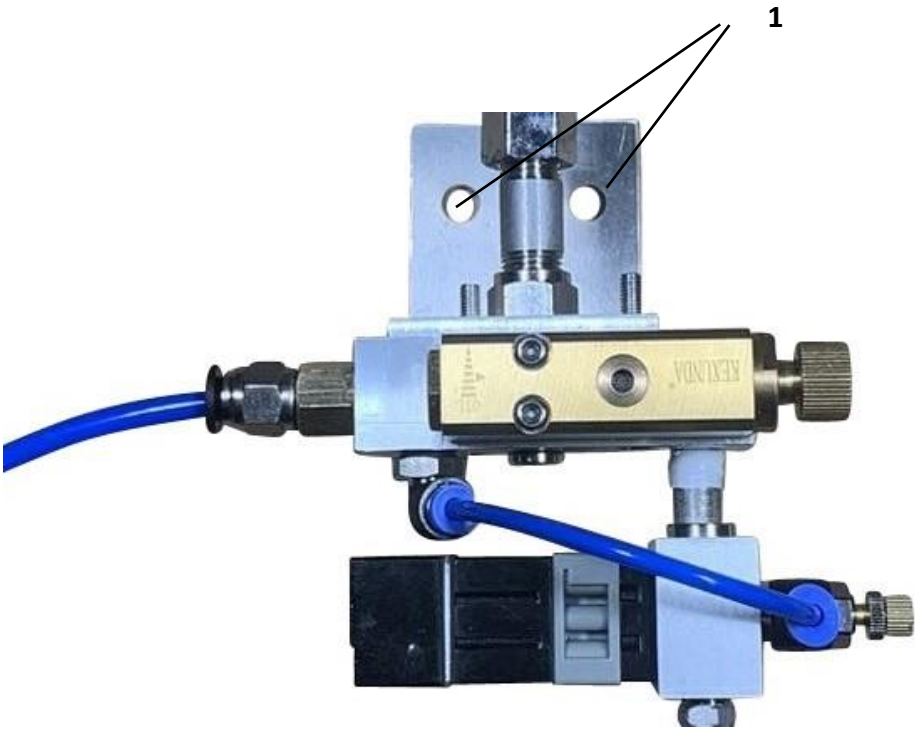
Do not mount the system in a location where it is subject to strong oscillations or vibrations.

The system must not be installed near a heat source, nor should it be installed in a location subject to rapid and severe temperature fluctuations.

For proper operation, the system must be installed vertically.

Also ensure good accessibility for maintenance purposes or to refill lubricant.

Fastening with screws



Secure the device with two screws through the holes (1) in the mounting bracket. Ensure the device is securely held.

Attachment with magnets (on ferrous surfaces)

Mounting with magnets is only possible if the device is not moved during operation.
Select a suitable magnet.
Attach the magnet through the middle hole in the bracket.
Attach the device to a suitable ferrous surface. Align the device horizontally.
Ensure reliable hold of the device

11) Electrical connection

Connection with 24 V DC (option)

Adapt connecting cables to local conditions.
Route the connecting cable in suitable cable protection devices. Connect the 24 V DC supply. Observe the polarity of the solenoid coil.

Connection with 230 V AC (option)

⚠ DANGER!	
	**Danger from electrical voltage!** Before working on the electrical installation: Disconnect the power supply! Work on the electrical installation must be carried out by a qualified electrician!

Pneumatic connection

ACHTUNG!
Property damage caused by oil-containing compressed air! Oil-containing compressed air can contaminate or damage components.

The compressed air connection is located on the bottom of the device as standard.

Control

Our minimum quantity lubrication device can be controlled in various ways:

- Solenoid valve (option)
- Rocker arm valve (standard)
- Roller lever valve (option)
- Foot pedal (option)
- Connecting the compressed air (standard)

12) Commissioning and settings

Fill with lubricant

⚠ WARNUNG!

Brand-, Explosions- oder Verletzungsgefahr durch ungeeignete Schmier- oder Kühlmittel!

Nur zugelassenes nicht brandförderndes Schmiermittel, das keine explosive Atmosphäre erzeugen kann, verwenden.

Befüllung nur durch eingewiesenes Personal.

Open the filler cap (1) on the lubricant reservoir.
Add lubricant.

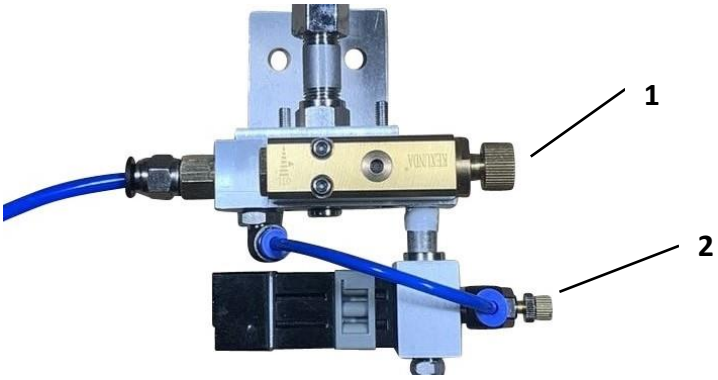
The minimum quantity lubrication device is ready for operation.

ACHTUNG!

Property damage caused by unsuitable lubricants or coolants!

Lubricants not suitable for minimum quantity lubrication can destroy the seals.

Set pump volume



Adjust lubricant volume

Reduce lubricant volume: Turn adjusting screw (1) clockwise.
Increase lubricant volume: Turn adjusting screw (1) counterclockwise.
Standard setting: Turn the adjusting screw (1) fully clockwise, then open it 2.5 turns.
When using the pump for the first time or after the reservoir has been pumped empty, open the adjusting screw (1) fully and pump until oil flows out of the nozzle.

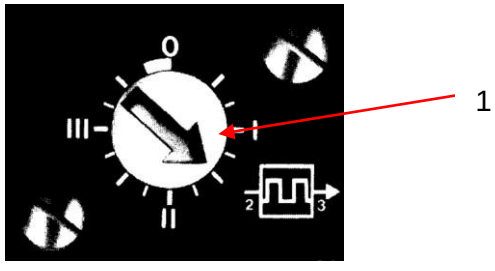
Adjust air volume

The throttle valve regulates the amount of air that the lubricant drops on the nozzle outlet.
Reduce air supply: Turn throttle valve (2) clockwise.
Increase air supply: Turn throttle valve (2) counterclockwise.

Setting the frequency generator

The frequency generator sends an air pulse to the oil pump so that the set volume of lubricant is pumped.
The air pulse moves the pump piston forward. After venting, a spring returns the pump piston to its original position.

Pneumatic frequency generator



Reduce cycle time: Turn adjusting screw (1) clockwise.
Increase cycle time: Turn the adjusting screw counterclockwise.
Standard setting: Turn the adjustment screw to 1.5.
Switch off the frequency generator: Turn the adjusting screw to 0.

13) Normal operation

In normal operation, the minimum quantity lubrication device is operated according to the installed control system.

The ball valve on the lubricant reservoir must be opened.

Refill lubricant

Refilling is possible during ongoing operations.

14) Maintenance

DYNACUT minimum quantity lubrication systems are low-maintenance. However, to ensure proper functioning and avoid potential hazards, you should check all connections and fittings regularly.

15) Cleaning

Cleaning outside:

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

For safety reasons, we recommend disconnecting the minimum quantity lubrication system from the compressed air and electrical power supplies. Leave the hoses connected during cleaning, if possible, and close any openings to prevent cleaning agents from penetrating the interior of the minimum quantity lubrication systems.

Cleaning inside:

During normal operation and when using compatible lubricants, internal cleaning is not necessary. Should an incorrect or contaminated lubricant be accidentally used,
Lubricant has been filled, the inside of the
lubricant reservoir.

16) Maintenance

Safety measures during maintenance

Maintenance plan

interval	Part/component	Task
	(Magnetic) attachment	Check
	nozzles	Check, replace if necessary
	hoses, Connecting lines	Check, replace if necessary
	Area below the device	Check for leaked Lubricant, leak detection and sealing if necessary

Fault table

Mistake	Possible cause	Possible activities
No lubricant film on the tool cutting edge	Compressed air interrupted	Check compressed air supply
	Hoses or lines defective	Check hoses and lines
	Dosing pump closed	Attitude Check dosing pump. If necessary, readjust the dosing pump
	Dosing pump defective	Check dosing pump, replace if necessary
	Air bubbles in Lubricant container	Vent the container
Frequency generator does not clock	Frequency is set to “0”	Check and adjust frequency
	Compressed air interrupted	Check compressed air supply
	Hoses defective	Check hoses

17) Decommissioning

Temporary shutdown

To temporarily shut down the minimum quantity lubrication system, you should disconnect the entire system from the compressed air and electrical power supplies and close the ball valve on the lubricant reservoir.

Final decommissioning

If you wish to permanently shut down the minimum quantity lubrication system, please observe the legal regulations regarding the disposal of oil-containing components.

Liquids	
lubricant	Dispose of as hazardous waste in an environmentally friendly manner
Cleaning media	Dispose of as hazardous waste in an environmentally friendly manner
Devices	
Cables, electrical Components	dispose of as electronic waste
Mechanical components	Dispose of separately

Declaration of conformity in accordance with Low Voltage Directive 2006/95/EC Original declaration of conformity	Dynacut UG

Manufacturer:	Dynacut UG (limited liability) Barbarastraße 16 48734 Reken Germany

Product:	Minimum quantity lubrication system Dynacut KSM

We hereby declare that the above-mentioned product complies with all relevant provisions of the following directives:

Low Voltage Directive 2006/95/EC:2006-12-12

EMC Directive 2004/108/EC:2004-12-15

The following harmonized standards were applied:

EN 60204-1:2006/AC:2010 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

EN 61000-6-2:2005/AC:2005 Electromagnetic compatibility (EMC) –

Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-4:2007/A1:2011 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standards for industrial areas

EN ISO 4414:2010 Fluid power - General rules and safety requirements for pneumatic systems and their components

Year of CE marking: 22

(the last two digits)

Reken, the May 4, 2022