Minimum quantity lubrication system MDA for external lubrication

Operating instructions

Table of contents

Foreword

Dear customer,

We thank you for your trust in our product.

By purchasing a DYNACUT-MDA minimum quantity lubrication system for external lubrication, you have opted for an environmentally friendly and economical technology. Our high-quality minimum quantity lubrication systems have been designed for use on modern machine tools. DYNACUT minimum quantity lubrication systems for external lubrication are built according to the generally accepted rules of technology and comply with the applicable occupational health and safety and accident prevention regulations. Nevertheless, their use may result in hazards that result in physical damage to the user or third parties or impairment of the machine tool or other property.

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

Dynacut UG (haftungsbeschränkt)

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Notes on the operating instructions

Texts marked with this symbol indicate special dangers or indicate work that is being handled with particular caution

must.

This operating manual contains a general description of the system as well as instructions for installation and operation. The special nature of the system is also discussed.

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

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

Intended use

The DYNACUT-MDA minimum quantity lubrication system must only be used in accordance with the intended purpose and in accordance with the instructions provided in the operating instructions accompanying the device.

used and deployed.

In particular, we would like to point out that hazardous substances of any kind, especially substances that have been classified as hazardous according to EC Directive 67/548/EEC Article 2, paragraph 2, may not be filled into DYNACUT minimum quantity lubrication systems and components and conveyed and/or distributed with them.

The minimum quantity lubrication system described here is intended exclusively for external lubrication of machining and forming processes. In 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 type of processing, one or more spray nozzles can be used per tool.

The DYNACUT-MDE-A Minimum Quantity Lubrication System can be used both for the original equipment of machine tools and for the retrofitting of machine tools with an existing coolant supply.

Any other or further use shall be deemed not to be in accordance with its intended purpose. Dynacut UG is not liable for any damage resulting from this.

The lubricants suitable for use in DYNACUT minimum quantity lubrication systems for external lubrication have their chemical and physical properties specially adapted to the high requirements of the technology used here. For this reason, only lubricants suitable for minimum quantity lubrication may be used.

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

Safety

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

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

Before all 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 must not be inhaled directly under any circumstances.

We would like to point out that the spraying of mineral oils or substances containing mineral oil in particular can lead to damage to health.

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

It is essential to observe the generally applicable rules and safety regulations for working with machines and equipment carrying compressed air and electrical voltage.

The system may only be used in a technically perfect condition, as well as in accordance with its intended purpose, safety and hazard awareness in compliance with the operating instructions.

The existing safety devices must not be damaged, decommissioned 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 mains plug.

The unauthorized modification of the system and the use of unauthorized spare parts and aids are not permitted.

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

Description

Principle of minimum quantity lubrication (MQL)

Minimum quantity lubrication is a loss or consumption lubrication, i.e. the lubricant used is almost completely consumed during machining, so that there is no need for treatment in the cycle. The actual lubrication task at the point of action between the tool and the workpiece is performed by finely dispersed oil droplets, the so-called aerosol, in an air stream. With minimum quantity lubrication, effective lubrication of machining processes can be realized 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.

Aerosol generation

The DYNACUT-MDE-A minimum quantity lubrication system described here produces a very homogeneous aerosol in relation to the size and distribution of the oil droplets, as the lubricant is atomized in a controlled manner. The functional principle of the droplet nozzle makes it possible to generate aerosols with a droplet size of approx. 15 – 35 µm.

Structure and function

The DYNACUT-MDA minimum quantity lubrication system consists of a lubricant reservoir, one or more mixture regulating units and one or more drip nozzle lubrication lines.

The lubricant reservoir is pressurized via a compressed air connection and hand valve. By switching the main switch, the solenoid valves for air and coolant open, whereby the compressed air and lubricant are transported to the drip nozzle via separate hoses.

The required lubricant and atomizer air volume is regulated by the throttle valves mounted on the mixture control unit. The internal pressure of the lubricant reservoir is adjusted via the control valve mounted on the lubricant reservoir.

At the end of the lubricant line there is a droplet nozzle with the help of which the aerosol is generated. The lubricant is then transported directly to the lubrication point with the carrier air.

The DYNACUT-MDA minimum quantity lubrication system has a main air valve that can be used to interrupt the central compressed air supply.

The internal pressure of the lubricant reservoir is indicated by a pressure gauge on the lid plate of the lubricant reservoir.

The lubricant reservoir is filled with lubricant by screwing the filler plug onto the top plate of the reservoir and filling the reservoir with lubricant. The fill level can be read from the visual level indicator.

Pictorial representation

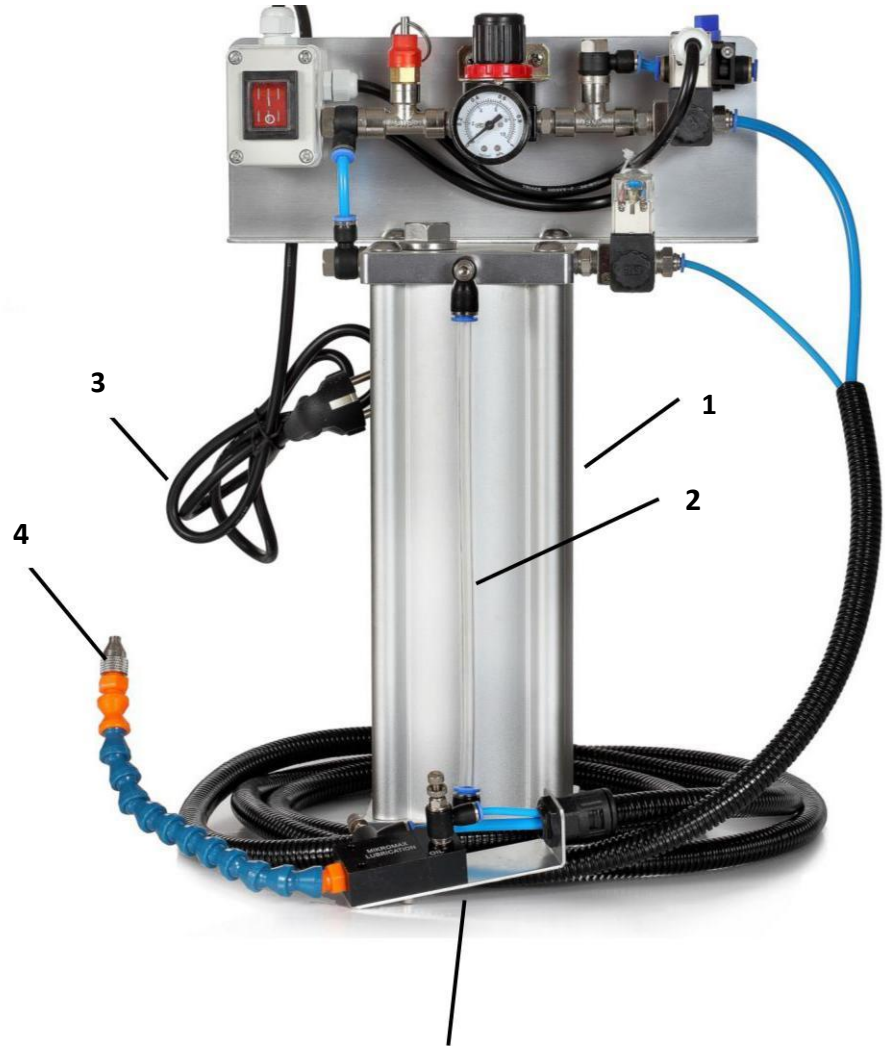

Image 1

Designation
1 lubricant reservoir
2 Visual level indicator
3 Power supply
4 Droplet nozzle
5 Drain plug in the bottom cover

Controls

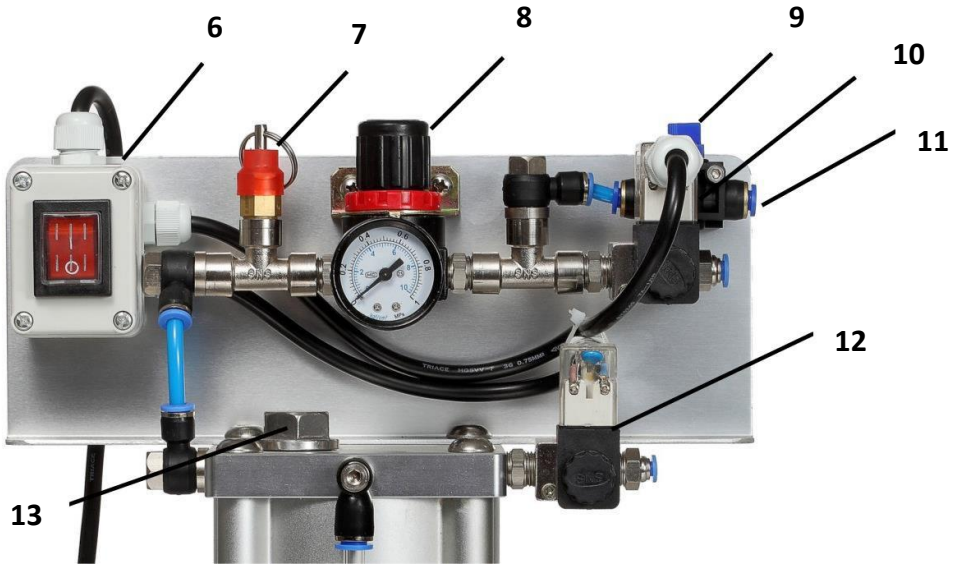

Image 2

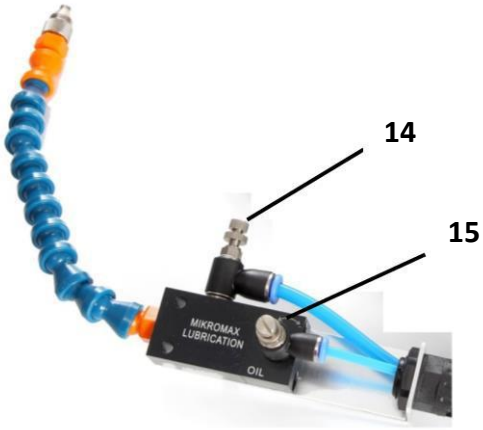

Image 3

Designation

6 Main switch
7 Pressure relief valve
8 Pressure regulating valve
9 Main valve air
10 Electrovalve Spray Air
11 Air connection 6 mm
12 Electrovalve Lubricant
13 Filler plug
Regulating valve
14 Regulating valve atomizer air
15 Schierstoff

Assembly

List:

The minimum quantity lubrication system was to be installed in the immediate vicinity of the processing machine. We recommend mounting the system directly on the machine housing.

Do not mount the system in a place where it will be exposed to strong oscillations or vibrations.

The system must not be placed near a heat source. Also unsuitable is a place that is exposed to rapid and strong temperature fluctuations.

For proper operation, the system must be mounted vertically. Under no circumstances should it be mounted upside down.

Furthermore, make sure that it is well accessible for the purpose of maintenance or to be able to refill lubricant.

Initial filling

The lubricant reservoir must be depressurized before the lubricant is filled.

For the first use of the system, it is recommended to fill the lubricant reservoir before connecting it to the compressed air and electrical power supply.

If the system is already connected to the compressed air supply, it is important to ensure that the lubricant reservoir has been depressurized before filling.

To depressurize the lubricant reservoir, first disconnect the system from the compressed air supply by disconnecting the system from the compressed air line or by closing the main valve (9 Figure 2).

When the main valve is closed, the tank pressure is relieved via this valve.

Check that the pressure has been completely dissipated. The pressure gauge must set the value
'Null'.

When you are sure that the pressure has been completely released, the filler plug (13 Figure 2) can be opened.

Attention:

Only suitable minimum quantity lubricants may be used as lubricants.

Please note that we do not provide any warranty for damage caused by the use of unsuitable lubricants.

Make sure to close the filler plug tightly again after filling.

Connections:

The system may only be connected by appropriately qualified and instructed personnel. The information contained in this operating manual
the information contained must be observed.

Compressed air connection:

Before connecting the compressed air line, make sure the main air valve is closed.

The minimum quantity lubrication systems may only be operated at the specified maximum operating pressure. Higher pressure poses dangers to man and machine.

Commissioning

The commissioning of the minimum quantity lubrication systems includes flooding of the transport lines, setting of operating parameters and functional testing.

Flooding of the transport pipelines

In the state of delivery, the capillary tubes of the transport lines are not filled with lubricant. In order to fill the often meter-long pipes, the system would have to remain switched on for a longer period of time while the lubricant slowly travels to the spray nozzle. In order to speed up this process, flooding of the transport lines should be carried out during initial commissioning. This avoids long waiting times before first use.

The procedure for flooding the transport pipelines is as follows:

Close solenoid valves for atomizer air and coolant by switching off the main switch (6 Figure 2).

Connect the system to the compressed air supply.

Use the pressure reducing valve (8 Fig. 2) to adjust the operating pressure to approx. 0.3-1.5 bar, depending on the viscosity of the coolant.

If possible, point spray nozzles downwards into a lubricant drip pan,

Open solenoid valves by switching them on,

Open the lubricant control valve (14 Fig. 3) completely to increase the lubricant flow.

As soon as the lubricant at the nozzle escapes without bubbles, close the lubricant control valve again as far as it will go.

Close solenoid valves.

Default

The setting of the valves depends on all process parameters such as cutting speed, materials, cutting tool, etc. and must therefore be readjusted by the machine operator on a case-by-case basis.

The basic configuration of the systems is as follows:

Main valve for air opening.

Adjust the operating pressure to approx. 0.3-1.5 bar via the pressure reducing valve (8 Fig. 2),

Switch on solenoid valves for atomizer air and coolant.

Adjust the required amount of lubricant via the lubricant control valve (14 Figure 3).

Regulate the volume of carrier air and thus the pressure via the atomizer air valve (15 Fig. 3).

Checking the settings

Point the spray nozzle at the cutting edge of the standing tool and observe if a lubricant film forms. If necessary, increase the amount of lubricant or the atomizer air volume.

The distance between the spray nozzle and the tool cutting edge should be kept as short as possible. If the distance is too great, the tool cutting edge will not be sufficiently supplied with lubricant.

Note: The greater the distance, the greater the spray nozzle's spray angle.

Start machining and adjust the aerosol quantity and composition to the machining process using criteria such as lubricant, cutting parameters, surface roughness achieved and tool wear to change the setting.

We recommend that you determine and optimize the setting values required for your applications with the help of test runs in order to obtain the best result for your machining process.

If necessary, use two spray nozzles that you place at an angle of 180° to each other to optimize the aerosol delivery to the lubrication point.

Turn off the system

The minimum quantity lubrication is switched off in the reverse order as commissioning.

Maintenance

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

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 supply and depressurizing the container. During cleaning, keep the hoses connected as much as possible and close any openings so that no cleaning agents can penetrate the inside of the minimum quantity lubrication systems.

Cleaning inside:

During normal operation and when using mutually compatible lubricants, internal cleaning is not necessary. If an incorrect or dirty lubricant has been accidentally filled, the inside of the lubricant reservoir must be cleaned.

Decommissioning

Temporary shutdown

For a temporary shutdown of the minimum quantity lubrication system, you should disconnect the entire system from the compressed air and electrical power supply and depressurize the container. In the event of a longer shutdown, it is advisable to drain the lubricant as well.

Final decommissioning

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

Specifications

Designation	Unit	DYNACUT MDA
Container		
Housing design		Aluminium
Installation position		Vertical
Capacity	L	2,0
Coolant consumption	ml/h	0-100
Air consumption	l/min	25-50 per outlet
Coolant outlets		1-2
Weight	medical history	4,5
Compressed air		
Inlet pressure max.	bar	8
Inlet pressure min.	bar	2,5
Operating pressure max.	bar	2 (set to 1 bar)
Connections		
Compressed air connection	Mm	6
Electrical connection for valves	V	230V AC/24V AC/24V DC

Declaration of Conformity within the meaning of the Low Voltage Directive 2006/95/EC

Original Declaration of Conformity	Dynacut UG

Manufacturer:	Dynacut UG (haftungsbeschränkt) Gewerbering 3 48734 Reken Germany

Product:	Minimum quantity lubrication system DYNACUT-MDA

We hereby declare that the above product complies with all relevant provisions of the following guidelines:

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

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

The following harmonised standards have been applied:

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

EN 61000-6-2:2005/AC:2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial sectors

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

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

EU Directive 2011/65/EU RoHS Compliance

Year of CE marking: 15
(the last two digits)

Reken, den 04.05.2015

Hermann Lensing, Managing Director