Minimum quantity lubrication system MDM

for external lubrication.

Operation manual.

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Foreword

We would like to thank you for your confidence in our product.

With the acquisition of a DYNACUT-MDM minimum quantity lubrication system for external lubrication, you have decided to use environmentally friendly and economical technology. Our high-quality minimal-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 recognized rules of technology and comply with the applicable occupational safety and accident prevention regulations. However, hazards may arise during their use, which can lead to physical damage to the user or to third parties or to damage to the machine tool or other property.

In order to ensure trouble-free operation and to avoid dangers, please read this operating instructions carefully and observe the notes contained therein.

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Instructions for use

Texts marked with this symbol indicate special dangers or mark work which requires special caution.

This manual contains a general description of the system, as well as instructions for installation and operation. The system also examines the specificity of the system.

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

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

Intended use

The DYNACUT-MDM minimum quantity lubrication must only be used and used according to the instructions given in the operating instructions.

In particular, we would like to point out that hazardous 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 with alcohol contents of more than 30% Gasoline, nitro lacquers and nitro diluents (solvent mixtures for nitro lakes from hydrocarbons and esters) and concentrated acids must not be filled into and distributed with DYNACUT minimal-quantity lubrication systems and components and / or distributed with them.

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

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

Any other use or use beyond this is considered to be improper. Dynacut UG is not liable for damages resulting from this.

The lubricants suitable for use in DYNACUT minimal-quantity lubrication systems for external lubrication are specially adapted to the high requirements of the technology used in their chemical and physical properties.

For this reason lubricants suitable for minimum quantity lubrication may be used.

We cannot assume any liability for damage caused by improper use of lubricants or by the use of lubricants suitable for minimum quantity lubrication.

Safety instructions

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

Spraying of lubricants or substances which are released for minimum quantity lubrication with DYNACUT minimum quantity lubrication systems is not permissible.

Prior to any work on the system, e.g. cleaning or replenishing lubricant, etc., the system must be disconnected from the compressed air supply and depressurized.

Humans or animals must not be aerosolized. The aerosol must not get into the eyes and should not be inhaled directly.

We point out that the spraying of mineral oils or mineral oil-containing substances can lead to health damage.

Any kind of fire e.g. in the form of open flames, sparks, glowing cigarettes, etc., must not get into the vicinity of the spray jet. The aerosol must not be sprayed on hot surfaces.

The generally valid rules and safety regulations for the work with compressed air and electrical voltage carrying machinery and equipment must be observed.

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

The existing safety devices must not be damaged, immobilized 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 as soon as possible from the compressed air and voltage supply, e.g. by actuating the quick coupling on the compressed air connection and pulling the mains plug.

The unauthorized conversion of the system as well as the use of unauthorized spare parts and accessories are not permitted.

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

Function description

Principle of minimum quantity lubrication (MQL)

The minimum quantity lubrication is a loss or consumption lubrication, this means, the lubricant used is almost completely consumed during processing, so that preparation in the circuit is no longer necessary. The actual lubrication task at the point of action between the tool and the workpiece is achieved by means of oil droplet, the aerosol, which is finely dispersed in an air stream. With the minimum quantity lubrication, an effective lubrication of cutting processes can be achieved using the smallest amounts of lubricant. The elaborate cleaning and disposal of large quantities of lubricating and cooling lubricants are thus eliminated or minimized.

Aerosol generation

The minimum quantity lubrication system DYNACUT-MDM described here produces a very homogeneous aerosol, based on the size and the distribution of the oil droplets, since the lubricant is atomized in a controlled manner. The functional principle of the spray nozzles makes it possible to produce aerosols with a droplet size of approx. 15 - 35 µm.

Layout and function

The DYNACUT-MDM minimum quantity lubrication system consists of a lubricant reservoir, one or several mixture regulating units and one or several lubricant lines with spray nozzle.

The lubricant reservoir is pressurized via a compressed air connection and hand valve. The solenoid valves for air and coolant are opened by switching the main switch, whereby the compressed air as well as the lubricant are transported to the spray nozzle via separate hoses.

The required quantity of lubricant and atomizer air is regulated via the throttle valves mounted on the mixture regulating 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 is a spray nozzle, with the help of which the aerosol is generated. The lubricant is then transported directly to the lubrication point using the carrier air.

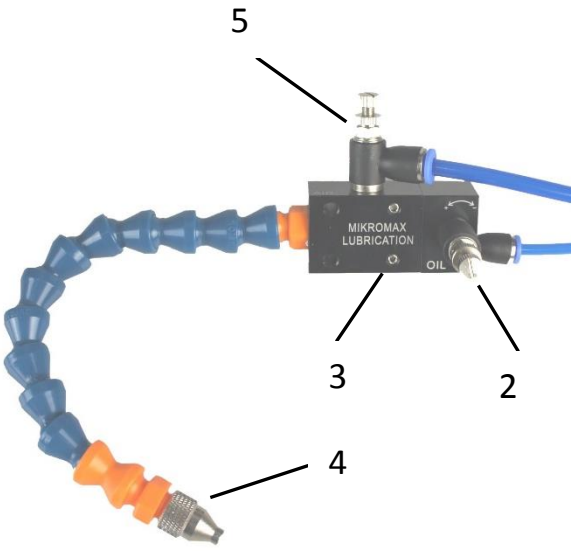
The minimum quantity lubrication system DYNACUT-MDM has a main air valve with which the central compressed air supply can be interrupted.

The internal pressure of the lubricant reservoir is indicated by a manometer on the cover plate of the lubricant reservoir.

The lubricant reservoir is filled with lubricant by opening the filler plug in the container cover with an Allen key (10 mm) and filling the lubricant.

Pictorial representation

Image 1



Description

1 Reservoir for lubricant

2 Regulating valve lubricant

3 Mixing head

4 Spray nozzle

5 Regulating valve atomizing air

Controls

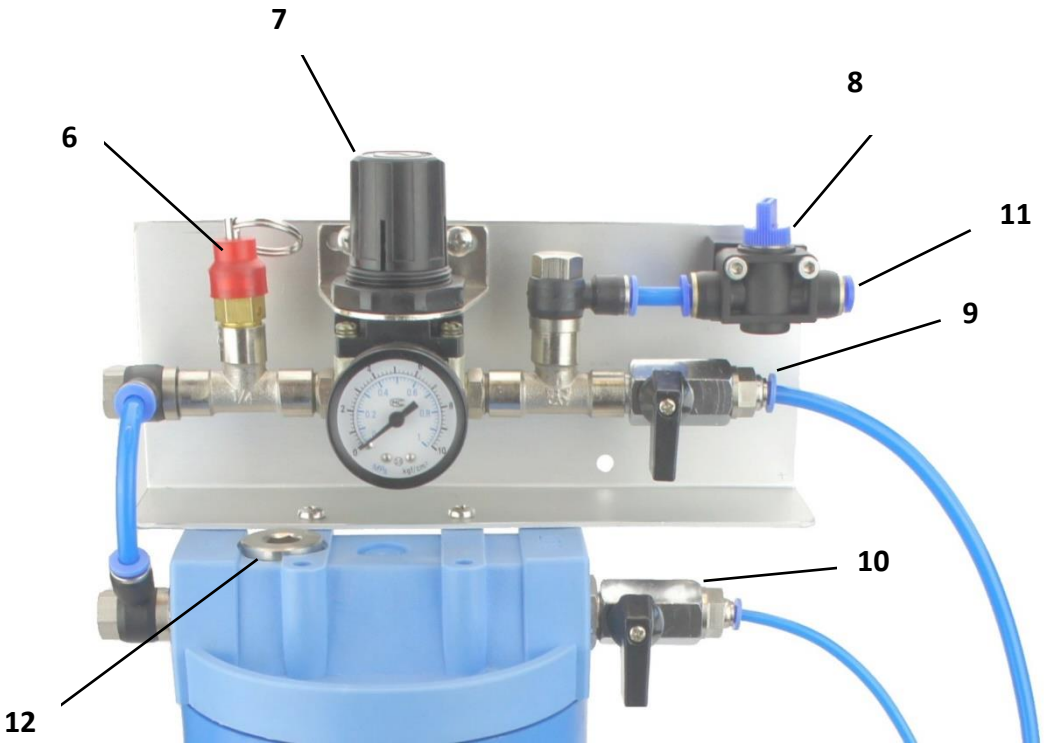


Image 2

Description

6 Safety valve

7 Pressure regulating valve

8 Main valve air

9 Ball valve spraying air

10 Ball valve lubricant

11 Air connection 6 mm

12 Filling plug

Assembly

Installation:

The minimum quantity lubrication system should be set up close to the processing machine. We recommend mounting the system directly on the machine housing.

Do not install the system in a location where it is exposed to strong vibrations.

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

The system must be installed vertically for proper operation. Under no circumstances should it be installed upside down.

Also ensure good accessibility for the purpose of maintenance or lubrication.

Initial filling

The lubricant reservoir must be depressurized before filling the lubricant.

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

If the system is already connected to the compressed air supply, it must be ensured that the lubricant supply tank has been depressurized before filling.

To make the lubricant reservoir unpressurised, first disconnect the system from the compressed air supply by disconnecting the system from the air line or closing the main valve (8 Figure 2).

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

Check that the pressure has been completely removed. The manometer must show the value 'zero'.

If you are sure that the pressure has been completely relieved, you can now open the filling plug (12 Fig. 2) and fill the lubricant.

Attention:

Only suitable minimum quantity lubricants may be used as lubricants.

Please note that we cannot assume liability for damage caused by the use of unsuitable lubricants.

Be sure to close the filler plug after filling.

Connections:

The connection of the system may only be carried out by appropriately qualified and instructed personnel. The instructions contained in this operating instructions must be observed.

Compressed air supply:

Before connecting the compressed air line, ensure that the main air valve is closed.

The minimum quantity lubrication systems may only be operated with the specified maximum operating pressure. Higher pressure causes danger for human and machine.

Commissioning:

For the commissioning of the minimum quantity lubrication systems, the flooding of the transport lines, the setting of the operating parameters and a functional test are important.

Flooding of the transport lines:

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

The procedure for flooding the transport lines is as follows:

Close hand valves for atomizer air and coolant (9 and 10 Fig. 2).

Connect the system to the compressed air supply.

Use the pressure reducing valve (7 Fig. 2) to adjust the operating pressure to 0.3 to 1.5 bar, depending on the viscosity of the coolant.

Hold the spray nozzles as far down as possible into a lubricant collecting tank.

Open hand valve for lubricant. (10 Fig. 2).

Fully open the lubricant control valve (2 Fig. 1) to increase lubricant flow.

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

Close the hand valve.

Default

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

The basic setting of the systems is as follows:

Open main valve for air.

Adjust the operating pressure via the pressure reducing valve (7 Fig. 2) depending on viscosity to 0.2 - 1.5 bar.

Open hand valve for atomizer air (9 Fig. 2).

Open hand valve for coolant (10 Fig. 2).

Adjust the necessary lubricant quantity via the lubricant control valve (2 Fig. 1).

Adjust the carrier air quantity and thus the pressure via the atomizer air valve (5 Fig. 1).

Check the settings

Point the spray nozzle onto the cutting edge of the standing tool and observe if a lubricant film is formed. If necessary, increase the amount of lubricant or atomizing air.

The distance between the spray nozzle and the tool tip should be kept as low as possible. If the distance is too long, the tool cutting edge is not sufficiently lubricated.

Note: The larger the distance, the greater the spray angle of the spray nozzle.

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

We recommend that you use test runs to determine and optimize the setting values required for your application in order to get the best result for your machining process.

If necessary, use two spray nozzles, which are arranged at an angle of 180 ° to optimize the aerosol supply to the lubrication point.

Switch off the system

The minimum quantity lubrication is set in the reverse order of commissioning.

Close the ball valve for the coolant first (prevents coolant dripping).

Close ball valve for atomizer air.

Maintenance

DYNACUT minimum quantity lubrication systems are low maintenance. However, to ensure proper operation and to avoid dangers from the start, 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 (not alkaline, no soap) cleaning agents.

For safety reasons, we recommend that the minimum quantity lubrication system be disconnected from the compressed air and electrical voltage supply and that the container must be depressurized. When cleaning, connect the hoses as far as possible and close any openings so that no cleaning agents can penetrate into the interior of the minimum quantity lubrication system.

Cleaning inside:

In normal operation and when using lubricants which are compatible with each other, an internal cleaning is not necessary. If an incorrect or dirty lubricant has been accidentally filled, an internal cleaning of the lubricant reservoir must be carried out.

Decommissioning

Temporary decommissioning

For a temporary shutdown of the minimum quantity lubrication system, disconnect the entire system from the compressed air and electrical power supply and depressurize the tank. In the case of a longer shutdown, it is advisable to also drain the lubricant.

Final decommissioning

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

Technical specifications

Description	Unit	DYNACUT MDM
Reservoir		
Housing design		PE-plastic
Mounting position		Vertical
Capacity	l	1,5
Coolant consumption	ml/h	0-100
Coolant outlets		1-2
Mass	kg	3
Compressed air		
Input pressure max.	Bar	8
Input pressure min.	Bar	2,5
Operating pressure max.	Bar	2 (Adjusted to 1,0 bar)
Air consumption	l/min	25-50 Per exit
Connections		
Compressed air connection	mm	6

Konformitätserklärung im Sinne der Maschinenrichtlinie Anhang II 1A

Original-Konformitätserklärung

Hersteller:	Dynacut UG (haftngsbeschränkt) Gewerbering 3 48734 Reken Deutschland
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:	Hermann Lensing Gewerbering 3 48734 Reken Deutschland
Produkt:	Minimalmengenschmierung MDM

Hiermit erklären wir, dass das oben genannte Produkt allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Das oben genannte Produkt erfüllt die Anforderungen der folgenden einschlägigen Richtlinien:

Folgende harmonisierte Normen wurden angewandt:

- EN ISO 12100-1:2003/A1:2009, Sicherheit von Maschinen – Grundbegriffe, allgemeine Gestaltungsleitsätze – Teil 1: Grundsätzliche Terminologie, Methodologie
- EN ISO 12100-2:2003/A1:2009, Sicherheit von Maschinen – Grundbegriffe, allgemeine Gestaltungsleitsätze – Teil 2: Technische Leitsätze
- EN 983:2009-06 Sicherheit von Maschinen – Sicherheitstechnische Anforderungen fluidtechnische Anlagen und deren Bauteile – Pneumatik
- EU-Richtlinie 2011/65/EU RoHS Konformität

Reken, den 12.02.2013

Hermann Lensing Geschäftsführer