

Micro-Automatic-Dosing-Unit

ECOLOGICAL ★ CLEAN ★ EFFICIENT

Operating instructions

MDA 2

August 2009



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EG-Declaration of Conformity

according to Guideline Machines 98/37/EG, Appendix II A
according to EMV-Guideline 89/336/EWG
according to Low Voltage Guideline 73/23/EWG

The manufacturer

**WERUCON GmbH
Fahrenheitstraße 9
D-28359 Bremen
Germany**

herewith declares, that the machine

Name of the machine: **Micro-Automatic-Dosing-Unit**
Type of model: **MDA2**

in its concept and design is fully in accordance - including the changes made till the release of this declaration - with the EU regulations for machines.

Following harmonized standards have been applied:

DIN EN ISO 12100-1

DIN EN ISO 12100-2

EN 294:1992

EN 349:1993

EN 983:1996

EN 60204-1:1997

If there are any modifications made to the above product and/or its components without previously accepted by us, the above declaration is no longer valid.

Bremen, 01. August 2009

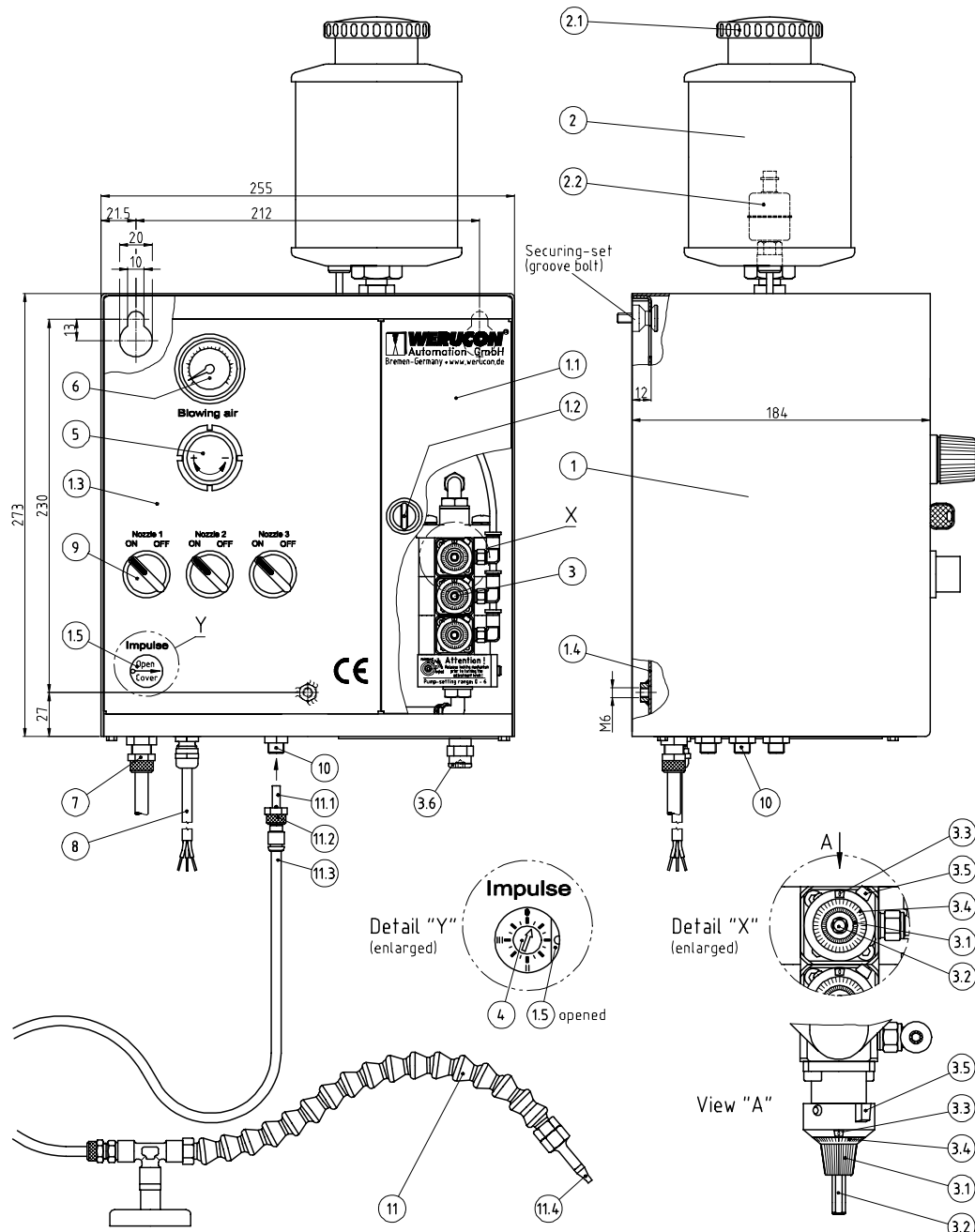
A handwritten signature in blue ink, appearing to read 'G. Ruhkopf', written over a horizontal line.

Gerd Ruhkopf
Managing director

Manual of the Micro-Automatic-Dosing-Unit

Model: MDA2 (elektric and pneumatic Activation)

1. Technical Discription



- | | | |
|--|---|--|
| ① Housing | ③ Metering pump (max. 6 possible) | ⑦ Air connection (ø8) |
| ①① Front cover | ③① Adjustment knob for quantity of lubricant | ⑧ Activation: electric cable / pneumatic hose |
| ①② Lock incl. two keys | ③② Manual valve-operation | ⑨ Selector switch: ON/ OFF of each Metering pump or group of Metering pump (max. 4 possible) |
| ①③ Control panel | ③③ Scale (1 - 6) | ⑩ Coaxial housing connection f. metering-nozzles |
| ①④ Housing-rear site | ③④ Fine scale (0,02) | ⑪ Metering-nozzel (shown here: Standard-nozzel) |
| ①⑤ Protection-cover | ③⑤ Scale-lock | ⑪① Coaxial-plug |
| | ③⑥ Bleeding screw | ⑪② Nut |
| ② Lubricant tank: 0,5 / 1 / 2 / 3 litre | ④ Pulse generator for metering pump frequency | ⑪③ Hose set |
| ②① Lid | ⑤ Pressure regulating valve for blowing air | ⑪④ Jet of the nozzle |
| ②② Level sensor (only with 1 litre tank) | ⑥ Pressure gauge for blowing air | |

2. Function

The lubricant flows out of the tank (2) to the Metering-pumps (3) due to gravity feed and pump suction. The pumps are pneumatically driven. When compressed air is applied to the Metering-pump, displacement piston is driven forward pushing the chosen amount of lubricant through a non-return-valve on the outlet side of the pump. After pneumatically switching over the spring-loaded piston returns to its zero-position.

This procedure is continually being repeated by the adjustable impulse-generator (4). The stroke depth of the piston as well as the amount of lubricant per stroke can be set infinitely using the adjusting knob (3.1). The lubricant is driven from the Metering-pump outlet (3) to the centre of the coaxial housing connection (10). The compressed air regulated by the pressure regulating valve (5) is transferred radially to the coaxial housing connection (10). The Coaxial-plug (quick release) (11.1) connects the Metering-pump (11) with the coaxial housing connection (10) via hose line (11.3). The mediums/substances of lubricant and compressed air are being conveyed separately to the jet of the Metering-nozzle (11.4). The hose (set) (11.3) consists of an inner- and outer-hose. The inner-(centre-) hose conveys the lubricant, the outer one the compressed air. The lubricant outlet port is located in the centre of the Metering-nozzle (11.4). The compressed air is being transferred around this port via a defined ring-shaped passage. Due to this type of nozzles an extraordinary well reproducible, fine sprayed cone of a lubricant-air-mixture is formed not before the jet of the Metering-nozzle (11.4). For each individual use the size of the sprayed cone can be altered by the pressure regulating valve (5).

3. Installation

ATTENTION, PLEASE!

- The installation and maintenance of the unit is to be carried out only by authorized persons!
- Beware of high voltage inside of the unit housing!

3.1 Assembly of the Automatic Dosing Unit:

For the transport of the Dosing Unit, the lubricant tank (2) is removed and separately packed. To prevent any leakages (lubricants remaining from the functions-test) the tank-outlet is plugged. Before commissioning the unit this plug must be removed (Allen-key, wrench size 6) and then assemble the lubricant tank (2) (open-end spanner, wrench size 27). The connecting-threat is prepared with sealing-tape.

3.2 Positioning the Automatic Dosing Unit:

The Micro-Automatic-Dosing-Unit should be placed, so that the operator can visually check the level of the lubricant at any time. There are two slots (ø10 mm, 212mm apart) with an entering-hole (ø20 mm) and also a hole M6-threaded in the rear side of the housing. The Dosing Unit can be secured using the two slots and the screw for safety. The safety-screw can either be secured from the inside of the housing into the wall (M5-screw) or through the wall into the housing (M6-screw). We recommend the Securing-set (BB-A) including the mounting-temple.

3.3 Connecting to the compressed air line:

Connect the pneumatic hose (ø6x1) to air connection (7) on the unit and then to the main air line. The pneumatic hose (3m length) with plug connector (male; DN 7,2) is part of the delivered equipment. The compressed should be oil-free and filtered (10µm). The applied air-pressure must be between 4 and 7 bar

3.4 Activation:

The external signal activates the start of the dosing. The signal must be there for the whole dosing period (monostable activation). This unit comes optionally with either electrical or pneumatic activation.

3.4.1 Connecting of the electric activation (if installed):

Before commissioning the Micro-Automatic-Dosing-Unit, all electrical connections must be checked according the specification-plate (inside of the front cover (1.1)). The 3-core cable (8) must be connected either to the control-unit or through a switch to the main power supply. Depending on the model of the Dosing Unit it can be equipped with one or more cable connections to allow separate activation of the Metering-pumps or nozzles.

There are four different available voltages:

- 24 V DC; 4 W
- 24 V AC; 6 VA
- 230 V AC; 6 VA
- 110 V AC; 6 VA

ATTENTION, PLEASE! When connecting with 24 V DC, please pay attention to the polarity: "1" = Plus, "2" = Minus, "yellow-green" = Earth

3.4.2 Connecting the pneumatic activation (if installed):

The pneumatic model has pneumatic hoses (ø 6x1) instead of electric cables (8). The compressed air should be oil-free and filtered (10µm). The applied air-pressure must be between 3 and 10 bar.

3.5 Connecting the lubricant-level sensor (if installed):

The lubricant-level sensor (2.2) is a potential-free magnetic switch, which reacts to a low level of lubricant. The customer can use the low-level signal of the lubricant-level sensor individually.

- max. 300 V AC/DC
- Switching current max. 0,5 A
- Contactload 30VA
- Cable: 2-core; 1 m length

3.6 Connecting the Metering-nozzles:

Depending on the model the Micro-Automatic-Dosing-Unit can have one or two housing connections (10). Generally the Metering-nozzles (11) have already been installed. If not, please proceed as follows:

1. Remove the dustcap from the housing connection (10) and the Coaxial-plug (11.1).
2. Place the Coaxial-plug (11.1) in the housing connection (10) socket.
3. Lightly tighten the nut (11.2) of the Coaxial-plug (11.1) on the thread of the housing connection (10).
4. With an open-end spanner (wrench size 12) lightly tighten the nut (11.2).

There is no lubricant inside the hose (11.3) after connecting the Metering-nozzle (11). To bleed the system quickly, when commissioning, the Metering-pumps should be set (according to 4.3.1) to „6“ on the scale for a short time, until the lubricant exits the mouth of the nozzle (11.4). If very long hoses (11.3) are installed the impulse-frequency should also be increased temporarily (according to 4.3.2).

4 Operating instructions

4.1 Filling the lubricant-tank:

ATTENTION, PLEASE!

- The DIN-Safety-Precautions for the used lubricant should be read carefully.
- A guarantee can only be given when using WERUCON-lubricant or lubricants recommended by WERUCON.
- Use only clean lubricant.
- Use only clean equipment when filling tank

Remove the lid (2.1) of the lubricant tank (2), fill it with lubricant and replace the lid. The bleed hose (2.3) fills itself to the same level as the lubricant tank.

During operation a refilling is necessary by all means, to prevent the Metering pump from running empty, resulting in the damage of tools. Therefore the Micro-Automatic-Dosing-Unit should be placed visible to the operator.

4.2 Bleeding the Metering pumps:

Before commissioning or after having run the system empty of lubricant (inadequate filling) it is necessary to bleed the system. A small container is needed to catch any lubricant flowing out. When the lubricant tank is full the bleeding screw (3.6) can be loosened by using a Allen-key (wrench size 5; 2 to 3 turns). Tighten the screw when the lubricant flows continually out of the bleeding screw (3.6).

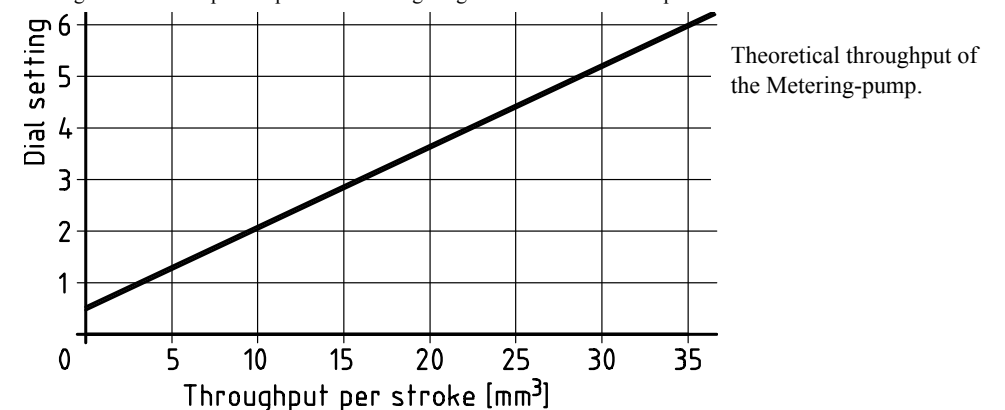
4.3 Adjusting the quantity of lubricant:

For adjustment unlock (1.2) and then open the front cover (1.1). The quantity of lubricant depends on two parameters, which are set both on the Metering-pump (3) and the pulse generator (4). The unit is delivered with a basic setting, which is -through experience- approximately correct for many applications, such as sawing, drilling, thread cutting etc. The Metering-pump (3) is set to „2“ and the pulse generator to approx. 40 pulse/min. When a different quantity of lubricant is required the first adjustment should be made on the Metering-pump (3). Adjustment on the pulse generator (4) should be made, when this is not sufficient.

4.3.1 Setting the Metering pumps:

Depending on the model the Micro-Automatic-Dosing-Unit a unit can be equipped with one or two Metering-pumps (3).

First push up the locking lever (3.5) to allow the adjustment dial (3.1) to be turned. Turn the dial (3.1) clockwise to increase the amount of lubricant, or anti-clockwise to decrease it. The display window (3.3) shows the number of complete turns of the dial (max.6). The position between each complete turn is displayed on the fine scale (3.4) (each unit 0.02). The pump adjustment range, which is infinite, is between 0 and 35mm³ lubricant per stroke (see graph below). After adjustment the adjustment knob (3.1) must be locked by pushing the lever 3.5) down. A manual pump stroke can be made by pressing the centre pin (3.2) of the adjustment knob (3.1). During automatic the pin reciprocates and so giving a visual control of the process



4.3.2 Setting the impulse generator:

To allow adjusting open the front cover (1.1). Now slide the protection-cover of the impulse generator (4) to the right.

By using a screwdriver the pulse generator (4) can be adjusted, by turning clockwise a higher and anti-clockwise a lower frequency. During the adjustment the unit should be working to sense the change of the frequency. This should be carried out with precaution, because even a slight adjustment causes large changes of the frequency.

Possible frequency-range: 1 - 120 pulse/min.; usual frequency-range: 30 - 90 pulse/min.

4.4 Setting the blowing air:

The blowing air is set via the pressure regulating valve (5). The pressure gauge (6) shows the set pressure. **The blowing air has no influence on the amount of lubricant**, but is there to create a conical spray of lubricant, which forms a micro-fine film on the cutting edge of the tool. If the blowing air is too high and the distance between nozzle (9) and tool inadequate, an atomisation effect may occur with certain lubricants. In this case the blowing air should be decreased.

Usual blowing air pressure: 0,2 - 0,8 bar; exception: „Drip-Stop“-Metering-nozzle, over 3 bar.