



# Operating instructions

## *Micro* Dosing Unit

MDA2

Actuation: electrical or pneumatic

Device type: MDA2  
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## **EC Declaration of Conformity**

### **in accordance with EC Machinery Directive 2006/42/EC Annex II A**

We herewith declare that the product specified below, in its conception and design and in the version we have placed on the market, complies with the basic safety and health requirements laid down in EC Directive 2006/42/EC.

**Manufacturer**                      **WERUCON GmbH**  
**Nantes-Straße 3**  
**D-28309 Bremen**

**Product:**                              **Dosing system**  
**Product designation:**          **Micro Dosing Unit**  
**Type designation:**                **MDA2**

### **We confirm conformity with other directives/regulations that also apply to the product:**

- EMC Directive (2014/30/EC)
- Low Voltage Directive (2014/35/EC)

### **The following harmonised standards were applied:**

<b>EN ISO 12100:2010</b>	Safety of machinery – General principles for design – Risk assessment and risk reduction
<b>EN ISO 13857:2019</b>	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
<b>EN ISO 13854:2019</b>	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
<b>EN ISO 4414:2010</b>	Safety of machinery – General principles for design – Risk assessment and risk reduction
<b>EN 60204-1:2018</b>	Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2016)

This EC Declaration of Conformity becomes void after any modification of the above-mentioned product or its components that was not agreed with us.

### **Authorised documentation editor:**

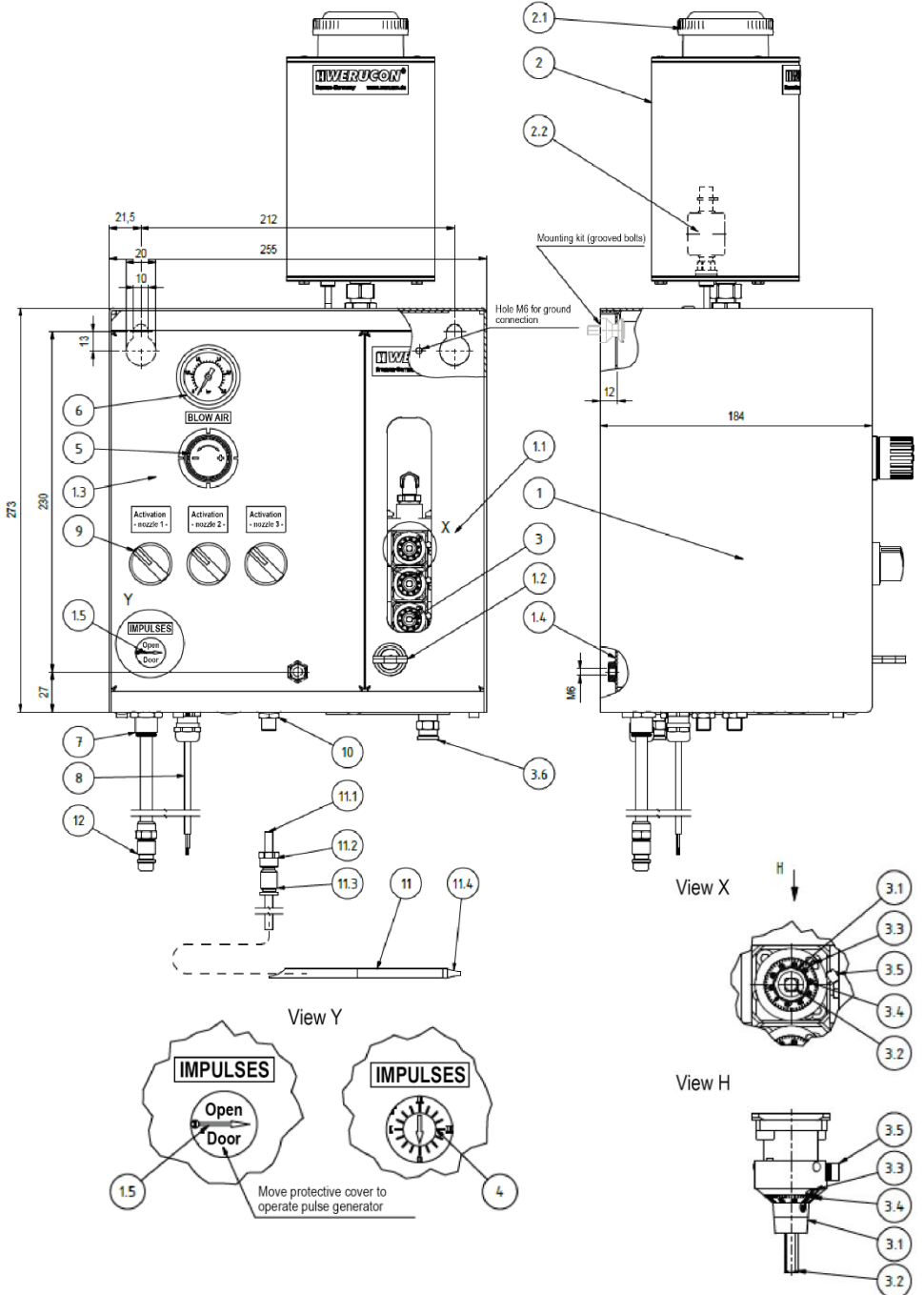
Jan-Bernd Meyer

Bremen, 24 July 2023



**Gerd Ruhkopf**  
Managing Director

# 1. Technical description



1	Housing
1.1	Housing door
1.2	Lock with key
1.3	Operating panel
1.4	Housing rear panel
1.5	Protective cover
2	Lubricant reservoir 1.0 / 3.0 / 5.0 litres
2.1	Cap
2.2	Low level sensor (optional)
3	Dosing pump
3.1	Adjustment knob for lubricant quantity
3.2	Manual actuating plunger
3.3	Display (1 to 6 turns)
3.4	Scale (graduation: 0.02)
3.5	Locking lever
3.6	Bleed screw (for dosing pump)
4	Pulse generator for dosing pumps frequency
5	Pressure control valve for blow air
6	Pressure gauge for blow air
7	Plug-on connection for compressed air (Ø 8 mm)
8	Connection cable/hose for electr./ pneum. actuation
9	Selector switch for switching dosing pump on and off (max. 4 possible)
10	Coaxial housing connection for dosing nozzles
11	Dosing nozzle Here e.g: spray lance direct connection
11.1	Coaxial connector
11.2	Union nut
11.3	Hose set
11.4	Dosing nozzle tip
12	Plug nipple DN 7.2

## 2. Intended use

- The Micro Dosing Unit may only be used for its intended purpose as a device for lubricating machinery with minimal quantities of lubricant.
- Any other usage will be considered improper use.
- The manufacturer shall not be held liable for any damage resulting from its use for any other than the intended purpose.

## 3. Improper use

- It is not permitted to use the Micro Dosing Unit from WERUCON in conjunction with hazardous substances of any kind, gases, liquefied gases, pressure-released gases, vapours or foodstuffs.

- The usage of accessories that are not designed to be used with this Micro Dosing Unit is not permitted.

## 4. Functional principle

- Gravity and the suction performance of the dosing pump cause the lubricant to flow out of the lubricant reservoir (2) into the dosing pump (3).
- This is a pneumatic displacement pump. When the pump is supplied with compressed air, the displacement plunger moves forwards and presses a defined quantity of lubricant through a non-return valve into the pump outlet.
- The spring-preloaded displacement plunger returns to its start position after the pneumatic switch-over. This operation is continually repeated by the adjustable pulse generator (4).
- The stroke length of the displacement plunger, and therefore also the quantity of pumped lubricant per stroke, can be infinitely varied with the adjusting knob (3.1).
- The lubricant is supplied from the dosing pump outlet (3) into the centre of the coaxial housing connection (10).
- The blow air is supplied radially through the pressure control valve (5) into the coaxial housing connection (10).
- The coaxial connector (11.1) connects the dosing nozzle (11) by means of the hose set (11.3) with the housing connection (10).
- The lubricant and blow air are supplied separately to the tip of the dosing nozzle (11.4).
- The hose set (11.3) comprises an inner hose and an outer hose. The inner (centre) hose carries the lubricant, the outer hose (closed circuit) carries the blow air.
- The outlet opening for the lubricant is located in the centre of the dosing nozzle tip (11.4). The blow air is supplied through an annular gap around this opening.
- This nozzle design causes an ideally reproducible, ultra-fine spray cone of lubricant to be created at the nozzle tip (11.4). The size of the spray cone can be adjusted as specifically required with the pressure control valve (5).

## 5. Installation



### IMPORTANT

The device may only be installed by an authorised technician.



### IMPORTANT

Dangerous body currents can occur when reaching into the device!

### 5.1. Installing the lubricant reservoir:

- The lubricant reservoir (2) is disassembled and enclosed with the dosing unit for shipping purposes.
- To prevent lubricant from leaking (during a functional test), the connection thread for the reservoir is sealed with a plug.
- This plug must be removed before putting the dosing unit into operation.
- Seal the connection thread properly (e.g. with thread sealant Loctite 542) and screw in the lubricant reservoir (2) (open-ended wrench AF19).

### 5.2. Placement of the dosing unit

- The dosing unit should be positioned where it is clearly visible to the operator so that the fill level of the lubricant can always be kept under visual observation.
- There are two slotted holes (Ø 10 mm) with insertion holes (Ø 20 mm) spaced 212 mm apart in the rear panel of the housing (1.4). There is also an M6 through-hole thread in the rear panel.
- The dosing unit can be hooked into the slotted holes and secured with a screw. This locking screw can be screwed into the device from behind through a wall (M6 screw) or attached to a wall from the inside with an M5 screw (or smaller) through the M6 thread.
- The mounting kit with mounting template supplied with the dosing unit is recommended for this purpose.

### 5.3. Connection to the compressed air supply

- Push the pneumatic hose (Ø 8x1) supplied with the dosing unit into the compressed air plug-in connection (7) on the device side and then connect the plug nipple (12) (male part; DN 7.2) to the compressed air supply.
- The compressed air should be unlubricated and filtered (10 µm).
- The feed pressure must be between 4 and 6 bar.

## 5.4. Actuation

- This device can be optionally actuated either electrically or pneumatically
- The device is actuated by the start signal for the dosing. The signal must be sustained for the duration of the dosing operation (monostable actuation).
- There is an M6 threaded hole in the housing for grounding the dosing unit. A protective conductor can be attached here.

### 5.4.1. Connecting the electrical actuation (if applicable)

- Before the dosing unit is put into operation, check that the voltage stated on the type plate (inside of the housing door (1.1) corresponds to the voltage supply that is to be connected.
- The 3-wire connecting cable (8) must be connected to the appropriate control unit or switch at the customer. Depending on the design, the dosing unit can also be equipped with multiple connecting cables in order to be able to separately activate individual dosing pumps or nozzles.
- Four different electrical actuations are available:
  - 24 V DC; 4 W
  - 24 V AC; 6 VA
  - 230 V AC; 6 VA
  - 110 V AC; 6 VA



### IMPORTANT

Pay attention to the polarity when connecting to 24 V DC! The conductors are labelled:

"1" = positive terminal, "2" = negative terminal,  
"yellow-green" = earth

#### 5.4.2. Connecting the pneumatic actuation (if applicable)

- The pneumatic version is provided with compressed air plug-in connections (Ø 4) instead of the electrical connecting cables (8).
- The control air should be unlubricated and filtered (10 µm).
- The control pressure must be between 4 and 6 bar.

#### 5.5. Connecting the fill level sensor (if applicable)

- The fill level sensor (2.2) is a potential-free float solenoid switch that is actuated when the lubricant level is low. The output signal must be evaluated by the customer.
  - Voltage: max. 30 V AC/DC
  - Switching current: max. 0.5 A
  - Switching capacity: 10 W/VA
  - Cable: 3 wires; 2 m long

#### 5.6. Connecting the dosing nozzles

- The dosing unit can be equipped with up to 12 housing connections (10) dependent upon the model.
- When connecting the dosing nozzles, proceed as follows:
  1. Remove the protective caps from the housing connection (10) and the coaxial connector (11.1).
  2. Push the coaxial connector (11.1) into the opening of the housing connection (10).
  3. Screw the coupling nut (11.2) for the coaxial connector (11.1) by hand onto the thread of the housing connection (10).
  4. Lightly tighten the coupling nut (11.2) using an open-jaw spanner (AF 12) until a perceptible resistance can be felt.
- When the dosing nozzle (11) has been connected, there is no lubricant in the inner hose of the hose set (11.3). To fill the hose with lubricant relatively quickly, during the initial commissioning the dosing pump setting (see 6.3.1) should be briefly set to 6 until the lubricant emerges from the tip of the dosing nozzle.
- With longer hose sets (11.3), the pulse frequency should also be temporarily increased (see 6.3.2) to accelerate the hose set filling process.

## 6. Operating instructions

### 6.1. Filling the lubricant reservoir



#### IMPORTANT

The DIN safety data sheets for the utilised lubricants must be heeded.



#### IMPORTANT

Warranty claims are only possible if WERUCON lubricants or other approved lubricants are used.



#### IMPORTANT

Only use uncontaminated lubricant to fill the reservoir.



#### IMPORTANT

Only use clean filling aids.

- Remove the cap (2.1) from the lubricant reservoir (2), fill the reservoir with lubricant, and then replace the cap.
- During operation, it is essential to refill the lubricant reservoir in good time to prevent the dosing pump from running dry and to avoid any tool damage that could be caused as a result.
- The dosing unit should therefore be mounted where it is clearly visible to the operator.

### 6.2. Venting the dosing pump

- Venting is necessary when the device is put into operation for the first time or if the lubricant reservoir has run empty (was not refilled in time). For this procedure, a small collecting container should be available for the draining lubricant.
- The bleed screw (3.6) must be loosened (2 to 3 turns) with an Allen key (size 5) when the lubricant reservoir is full.
- When the lubricant flows continuously out of the bleed screw (3.6), tighten it again.

### 6.3. Setting the lubricant quantity

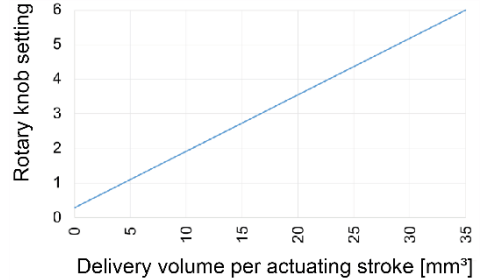
- Before making the adjustment, open the lock (1.2) and swing open the housing door (1.1).

- The lubricant quantity is dependent upon two setting parameters and is set at the dosing pump (3) and the pulse generator (4).
- The device is shipped with a basic setting. By experience, this setting is roughly correct for many applications (sawing, drilling, thread cutting, etc.).
- The dosing pump (3) is set to 2, the pulse generator (4) is set to approx. 40 pulses/minute. If the lubricant quantity needs to be changed, this should always be done by first adjusting the dosing pump (3).
- If the required lubricant quantity still cannot be attained, the pulse generator (4) must be adjusted accordingly.

### 6.3.1. Setting the dosing pump

- The dosing unit can be equipped with up to 6 dosing pumps (3) dependent upon the model.
- First release the adjusting knob (3.1) by pushing the locking lever (3.5) upwards.
- Turn the adjusting knob (3.1) clockwise to increase the lubricant quantity or anti-clockwise to decrease it.
- The number of turns of the knob (max. 6) is shown on the display (3.3).
- The position between the full turns is indicated by a scale (3.4) (reading: scale division 0.02).
- The pump setting range lies between 0 and 35 mm<sup>3</sup> lubricant per actuating stroke (see diagram). This setting range is infinitely variable.
- After the lubricant volume has been set, fix the adjusting knob (3.1) in position by pushing the locking lever (3.5) downwards.
- In the centre of the adjusting knob (3.1) is the manual actuating plunger (3.2). This can be pressed to initiate a manual actuating stroke of the pump.
- This plunger performs a stroke movement during the automatic dosing process.
- This allows the function to be visually checked.

Theoretical delivery volume of the dosing pump



### 6.3.2. Setting the pulse generator

- The housing door (1.1) must be opened for the adjustment procedure.
- Only then can the protective cover (1.5) in front of the pulse generator (4) be moved to the right.
- The pulse generator (4) can be adjusted using a screwdriver.
- Turn it clockwise for a lower frequency and anti-clockwise for a higher frequency.
- The device should be running when adjusting the pulse generator so that the change in frequency is perceptible.
- The adjustment must be made with great sensitivity because even a slight twist of the pulse generator can change the frequency significantly.
- Possible frequency range:
  - 1 to 180 pulses/minute;
- Usual frequency range:
  - 30 to 90 pulses/minute;

### 6.4. Setting the blow air

- The blow air is set using the pressure control valve (5).
- The set pressure can be read off the pressure gauge (6).
- The blow air has absolutely no effect on the lubricant quantity, but is only used to create a spray cone which settles on the cutting edges of the tools as an ultra-fine film of lubricant.
- With some lubricating products, misting can occur if the blow air pressure is too high and the dosing nozzle (11) and tool are very close together. The intensity of the blow air should be reduced if this happens.
- Normal blow air pressure:
  - 0.2 to 0.8 bar.