

**LAARMANN**<sup>®</sup>

*Innovators in Solids*

# USER'S MANUAL

# LAARMANN LM 5000

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# 1 Safety Information

Before using the machine, make sure to read and understand this manual thoroughly. Keep the manual close to the machine, easily accessible to all the users.

Improper operation can cause injury to persons or damage to the equipment.

## 1.1 Warning symbols

The following are the warning symbols that are used in this manual.

	This symbol indicates a potential risk and alerts you to proceed with caution.
	This symbol indicates the presence of high voltage and warns the user to proceed with caution.
	This symbol indicates risks associated with hot surfaces.

## 1.2 Safety Instructions



	<b>Safety instructions</b> Claims for damages in any form whatsoever, for injury to persons or damage to the machine, caused through non-observance of the following safety instructions, are excluded.
	<b>Use according to the intended purpose</b> Do not make any alterations to the machine and use only approved spare parts and accessories. Otherwise the Declaration of Conformity will lose its validity and this will also lead to the loss of any guarantee claims.
	<b>Transport</b> Do not knock, shake or throw the LM5000 during transport. Otherwise the electronic and mechanical components may be damaged.
	<b>Packing material</b> Please keep the packing material for the duration of the guarantee period. In case of a complaint and return of the machine in unsuitable packing material, your guarantee claim will be lost.
	<b>Temperature variations</b> If the LM5000 is subjected to high temperature variations, protect it against condensed water. Otherwise the electronic components may be damaged.
	<b>Ambient temperature</b> If the temperature drops below 5°C or exceeds 40°C, electronic and mechanical components can be damaged. Performance can be changed to an unknown extent.
	<b>Atmospheric humidity</b> If the humidity exceeds 85%, electronic and mechanical components can be damaged. Performance can be changed to an unknown extent.
	<b>Electrical connection</b> If the values for the mains power supply on the name plate are not observed, the electrical and mechanical components may be damaged.
	<b>Inserting milling cups</b> Ensure that the milling cups are inserted correctly in the milling cup holder. Otherwise they can be damaged, when starting the machine. Both milling positions must always be used. Otherwise this will cause considerable unbalance.
	<b>Removing and opening hot milling cups</b> When removing and opening hot milling cups, always wear protective gloves. There is a danger of burning the hands.
	<b>Materials</b> Observe the relevant regulations and directives for handling chemicals and hazardous materials. Milling of materials, which give a risk of fire or explosion, is prohibited.
	<b>Cleaning</b> Do not clean the LM5000 under running water. Danger to life through electric shock. Use only a soft cloth moistened with water. Cleaning agents and solvents should not be used, not for cleaning the milling tools either.
	<b>Repair</b> For your own safety, repairs must be carried out only by authorized service technicians.

## 2 General Description

The LM5000 is a laboratory machine, which is suitable for pulverizing and homogenizing hard and brittle materials in the dry and wet state. It is used for fast pulverizing.

The closed milling pulverizing system guarantees complete recovery of the samples.

Final finenesses of down to 40 µm can be achieved, depending on the milling time and the specific properties of the sample material. The optimum filling of a LM5000 is around 3500cc of sample material.

	The sample quantity should not be less than 25% of the bowl volume. <b>The puck may otherwise damage the bowl.</b>
	The bowl, puck and lid must always be made of identical material.

### 3 Technical Features

#### 3.1 Construction

The housing of LM5000 is made of steel plate with powder coated RAL5005 paint.

#### Protective equipment

The milling chamber of the LM5000 is safely closed by an electrical safety switch.

Starting of the machine is possible only when:

- power is connected;
- air pressure is sufficient;
- the emergency switch is not activated;
- all parameters are given to the digital program of the machine.

#### 3.2 Technical Data

Power supply	400V ± 10% - 50/60Hz
Rated power	2200W
Timer	5 sec - 99 min, timer HOLD function, in 1 sec steps (below 10 min), or 10 sec steps (above 10 min)
Max. volume of milling cups	3500cc
Dimensions W x D x H (inclusive base plate)	1400 x 730 x 1460 mm (1900mm with hood open)
Weight	490 kg
Noise emission (without milling bowl)	70 dB(A)
Ambient temperature	5°C - 40°C
Atmospheric humidity	< 85% RH

### 4 Installation

#### 4.1 Unpacking

Before the installation, carefully examine the delivery for possible damage or missing parts. Open the crate and take the machine out of the box. Check that the machine has not been visibly damaged during the transport.

Please keep the packing material for the duration of the guarantee period. In case of a complaint and return of the machine in unsuitable packing material, your guarantee claim will be lost.

Check that the mains cord is compatible with the local standard.

If any kind of damage occurred during transport, immediately make a complaint to the carrier. Any incorrect delivery or missing parts should be reported to the distributor.

#### **4.2 Selecting the right place**

When selecting the right place for the machine, please consider the following:

Put the device on smooth, horizontal and stable place.

Leave enough space beyond the device for normal air circulation, min. 200 mm at the back of the machine.

Leave enough space around the device, that you will easy control and maintain it.

Don't use the device in surroundings, where there are fast temperature and humidity changes. Also avoid places exposed to direct sunlight and places nearby heating devices.

Avoid places, where the possibility of shocks and vibrations exists.

**Note: The machine should not be placed so, that it is difficult to pull out the cord plug from mains power supply.**

#### **4.3 Connecting the power cord**

The correct voltage and frequency for the LM5000 are given on the name plate. Ensure that these values correspond to the available power supply system.

Fit one end of the power cord, included in the delivery, into the mains socket on the machine. Connect the other end of the cord to a grounded wall socket.

To avoid interference from noise, surges and spikes, a dedicated line is preferred. If no such line is available, avoid lines to which powerful electric motors, refrigerators and similar devices are connected.

The power can be turned on and off by the emergency switch, located on the front cover at the right side of the machine. Light in the switch indicates, when the power is on.

#### **4.4 Environmental conditions**

The machine has been built for operating in laboratory environment. Therefore the environmental conditions should be the following:

Temperature from 5°C to 40°C

Humidity up to 85% RH, non-condensing

## 5 Instructions for use

### 5.1 Overall view



### 5.2 Control Panel Description

Start screen, press any key (LM5000)

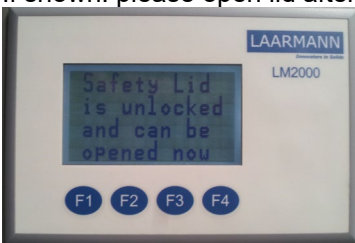
Choose manual or automatic

F3: Hand/Manual

F1: Automatic



If shown: please open lid after notification



Please follow instructions on display if shown.



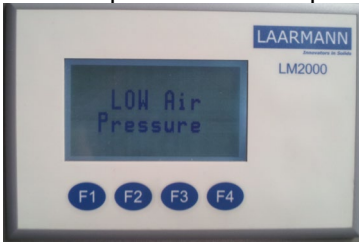
F1: Turn on machine  
 F2: Stop the machine  
 F3: Open Lid, to release safety switch  
 F4: Back



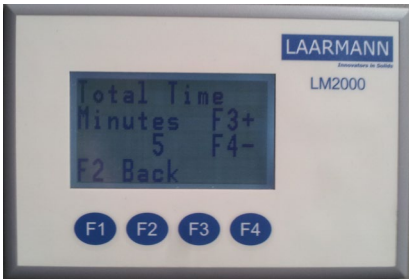
F1: Running  
 F2: Machine off  
 F3: Open lid  
 F4: Back



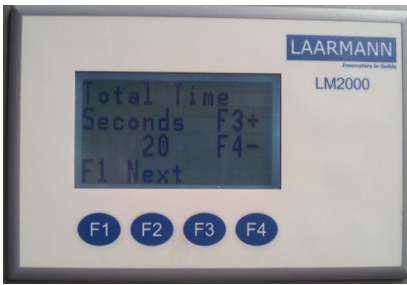
If shown please check air pressure.



Display shows number of minutes.  
 F3 and F4 is to adjust.  
 F3: number of minutes up  
 F4: number of minutes down.  
 3: number of minutes  
 F1: Next screen.



Total time in seconds. F3 and F4 is to adjust.  
 F3: number of seconds up.  
 F4: number of seconds down.  
 10 = number of seconds  
 F1: Next screen

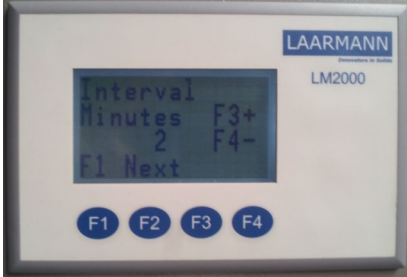


Interval adjustment F3 and F4.

0 = Off

1 = Number of minutes

F1: Next screen.



Pause time between intervals in seconds.

F1: next screen.



Changing the rotation of the motor Y/N.

F3: On.

F4: Off.

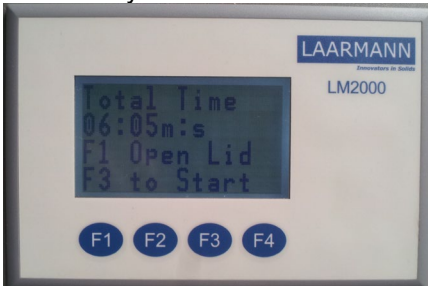
F1: Next Screen.



Total running time pulveriser, inclusive stop/start with interval.

F1: Open lid

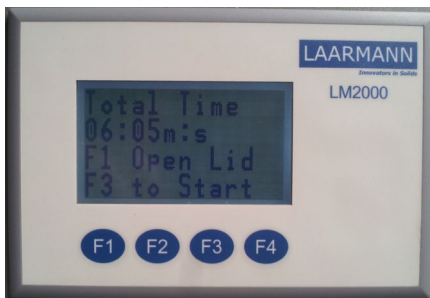
F3: Start cycle



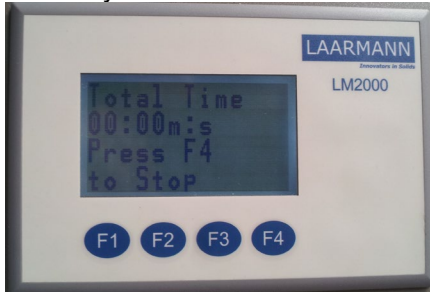
Countdown Function.

F4: to stop





End of cyclus



### 5.3 Usage of the Lift Boy

The optional lift boy makes the handling of the big grinding sets more easy.

## 6 Working instructions

### 6.1 General

The LM5000 is a high performance product. It is used mainly in the processing minerals.

#### Starting the milling process:

- Set the parameters as described before
- Open the lid of the machine and put in the sample on top of the puck in the bowl
- Pull the handle with the air bag clamp and lock it by pulling
- Close the machine lid and press start on the display.

	The milling process can only be started, when the hood is closed, the power is connected and when the air pressure is high enough.
	Do not open the hood during the milling process, also not by force.
	Do not mill inflammable or explosive samples! For these kind of samples, please contact Laarmann for special features.
	Please note that the properties and therefore the dangerous nature of your sample, can change during the milling process.

#### Stopping the milling process:

- Stop the milling operation by pressing the emergency switch.
- Or
- When the milling time elapses, the milling process is automatically ended. The display is reset to the last set value.

	When removing and opening the bowl, always wear protective gloves. There is a danger of burning the hands.
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## 7 Troubleshooting

Problem	Explanation / Solution
Machine is not starting	Check the mains power supply. Check the air pressure Call the emergency knob and release it.
Display doesn't work.	Call authorized service.

## 8 Maintenance

LM5000 needs to be greased first time after 20 hours.



Later intervals each 40 Hours.

LAARMANN advises to use LAARMANN GREASE. Similar can be graphite free, high temperature grease.

### 8.1 Wear

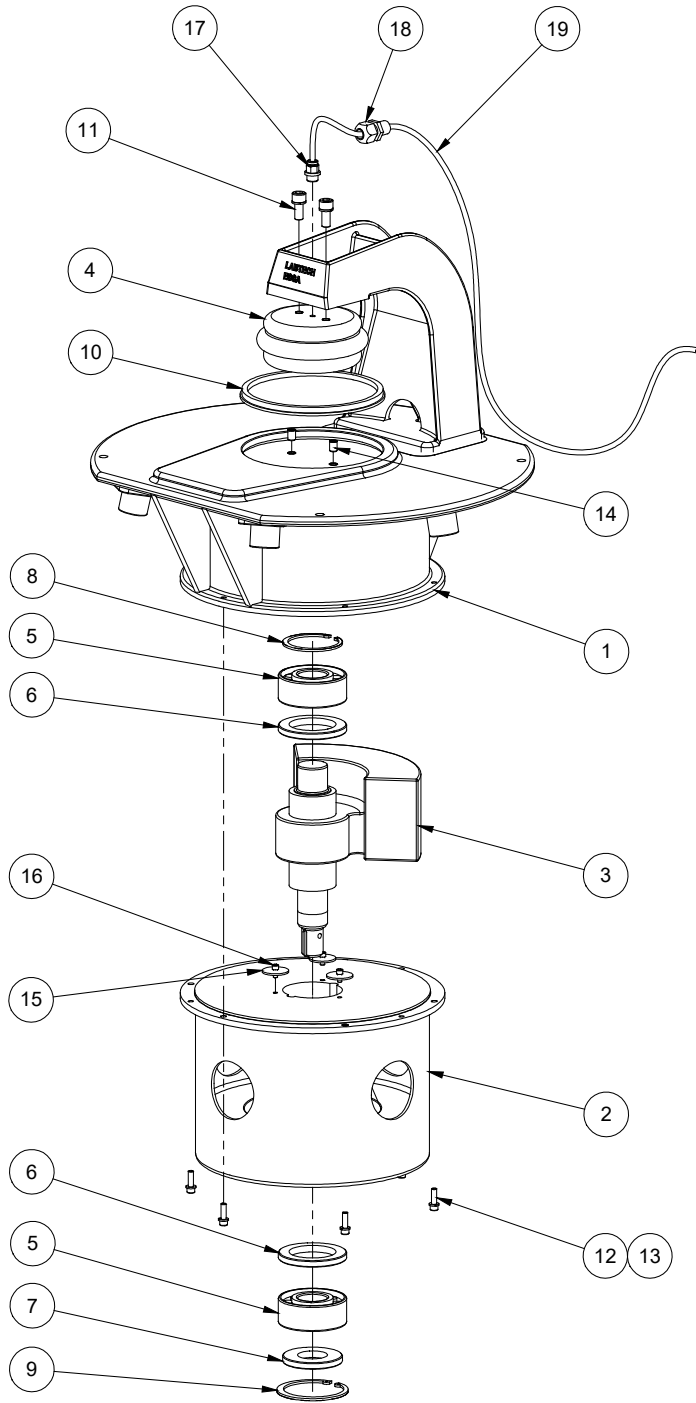
The milling tools can become worn out, depending on the frequency of the milling operation and the milled material. The milling bowl, lid and puck should be regularly checked for wear and replaced, if necessary.

### 8.2 Cleaning

	Before cleaning the machine, unplug the mains cord from wall socket. Use only a soft cloth moistened with water. Cleaning agents and solvents should not be used, not for cleaning the milling tools either.
	Do not clean the LM5000 under running water. Danger to life through electric shock.

## 9. PARTS LIST LAARMANN LM2000

### MILL HEAD ASSEMBLY

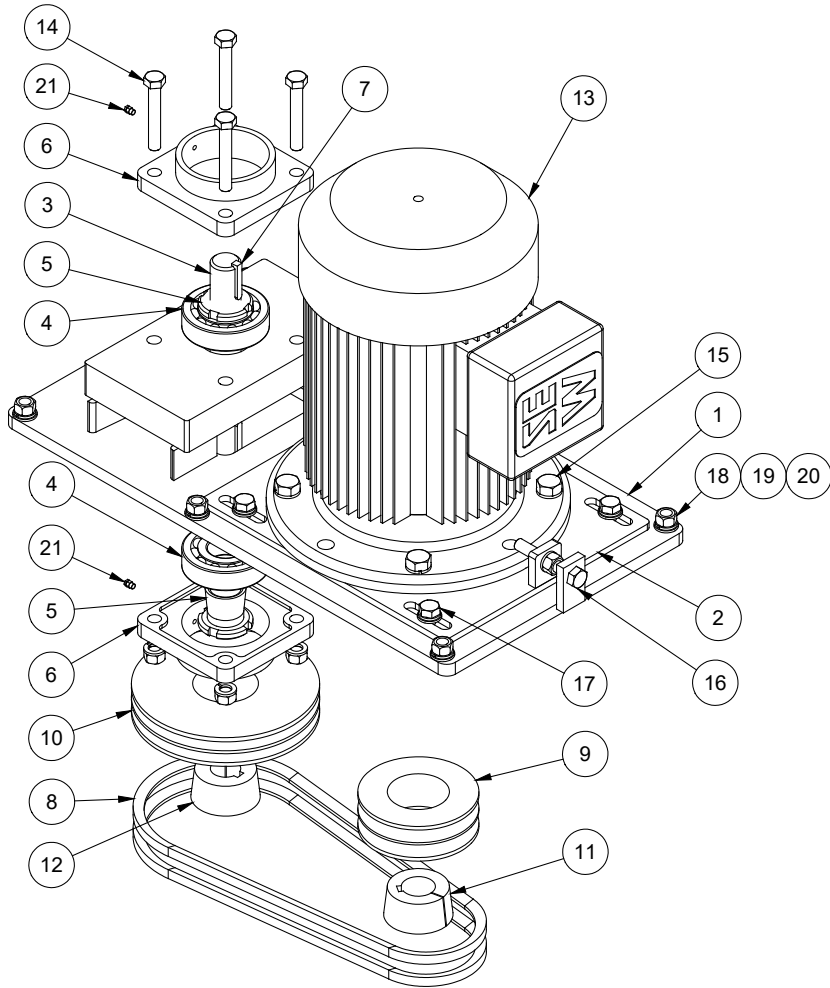


ITEM	PART No*: 220-240V	PART No*: 380-415V	DESCRIPTION	QTY
1	611040	611040	Enclosure	1
2	612000	612000	Transformer	1
3	604059	604059	Contactora	1
4	604252	604250	Overload relay	1
5	605813	605813	Timer	1
6	605911	605911	Hour run meter	1
7	605007	605007	Start switch body	1
8	605008	605008	Stop button (Mushroom head operator)	1
9	340064	340064	Solenoid valve 50/60Hz	1
10	616200	616200	Air pressure switch	1
11	340001	340001	Air clamp bleed control	1
12	340003	340003	Gauge	1
13	340002	340002	Filter regulator	1
14	605009	605009	Start switch actuator	1
15	605010	605010	Stop switch actuator	1
16	340024	340024	Air fitting elbow	1
17	340027	340027	Straight connector	2
18	340040	340040	Special Tee fitting	1
19	340048	340048	Tee Plug	1
20	340096	340096	Swivel elbow	2
21	605814	605814	Timer mounting bracket	1
22	609500	609500	Cable gland 16mm	1
23	609514	609514	Cable gland 25mm	1
24	609521	609521	Cable gland 12mm	2
25	652011	652011	Cable	1
26	652006	652006	Wiring harness	1
27	340039	340039	Air bleed plug	1
28	340035	340035	Bulkhead Connector – 6mm	1
29	340041	340041	Tee	1
30	340026	340026	Straight Connector	1
31	340012	340012	6mm Air hose	2
32	340182	340182	4mm Air hose	2
33	607004	607004	3 Phase plug & lead	1

Motor

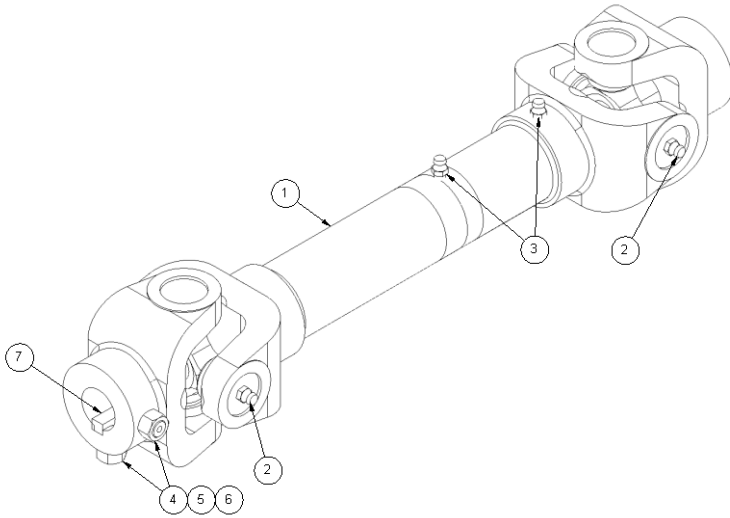
drive

assembly



ITEM	PART No*: 50 Hz 220-415V	PART No*: 60 Hz 254-480V	PART No*: 60 Hz 220V	DESCRIPTION	QTY.
1	115002	115002	115002	Drive plate	1
2	115013	115013	115013	Motor mounting plate	1
3	115049	115049	115049	Pulley shaft	1
4	221005	221005	221005	Bearing	2
5	221006	221006	221006	Adapter sleeve	2
6	221019	221019	221019	Bearing housing	2
7	115076	115076	115076	Key (set of 3)	1
8	225003	225011	225011	Vee belt	2
9	225004	225012	225012	Driving pulley	1
10	225006	225006	225006	Driven pulley	1
11	225005	225010	225010	Taperlock bush, driving pulley	1
12	225007	225007	225007	Taperlock bush, driven pulley	1
13	614007	614007	614211	Electric Motor	1
14	521003	521003	521003	Bearing housing bolt set	1
15	511002	511002	511002	Motor mount bolt set	1
16	521004	521004	521004	Adjustment bolt set	1
17	511023	511023	511023	Drive plate bolt set	1

18	512005	512005	512005	Nut	6
19	512615	512615	512615	Spring washer	6
20	512605	512605	512605	Flat washer	6
21	350543	350543	350543	Connector straight	2



ITEM	PART No:	DESCRIPTION	QTY
1	225031	Drive shaft assembly	1
2	343135	Grease nipple A	2
3	343134	Grease nipple B	2
4	521007	Grub screw	4
5	522005	Nut 3/8"	4
6	522635	Spring Washer	4
7	115076	Key (set of 3)	1

LAARMANN

**Pulveriser  
Type LM5000**



Product Pulveriser  
Model LM5000

Power supply 400V/50Hz

This declaration of conformity confirms compliance of the above mentioned equipment to the relevant sections of the following European Directives:

91/368EWG	European machine guideline
73/23/EWG	EC Low Voltage Guidelines
EN 292, 294, 418	Safety guidelines
VBG 1,4,5 en 22	General electrical facilities
89/336/EEC	Electromagnetic Compatibility Directive (EMC)
EN 5008-1-1992	Emissions
EN 50082-1-1992	Immunity
EN 60204-1 Part 1	Safety of Machinery – Electrical Equipment of Machines

**WARNING:**

This equipment is required to be operated strictly in accordance with the instructions given in the operating manual supplied with the product. All supply voltages and frequencies as stated on the rating plate must be used. External power cables and connectors must be supplied by LAARMANN. Any additional equipment used must be of a type approved by LAARMANN.

**This conformity certificate will lose its validity in case of:**

**Usage of unlicensed spares**

**Usage of unlicensed accessories**

**Any self made modifications of the machine**

LAARMANN GROUP B.V.

Roermond, September 2012

Ing. Rene Locht