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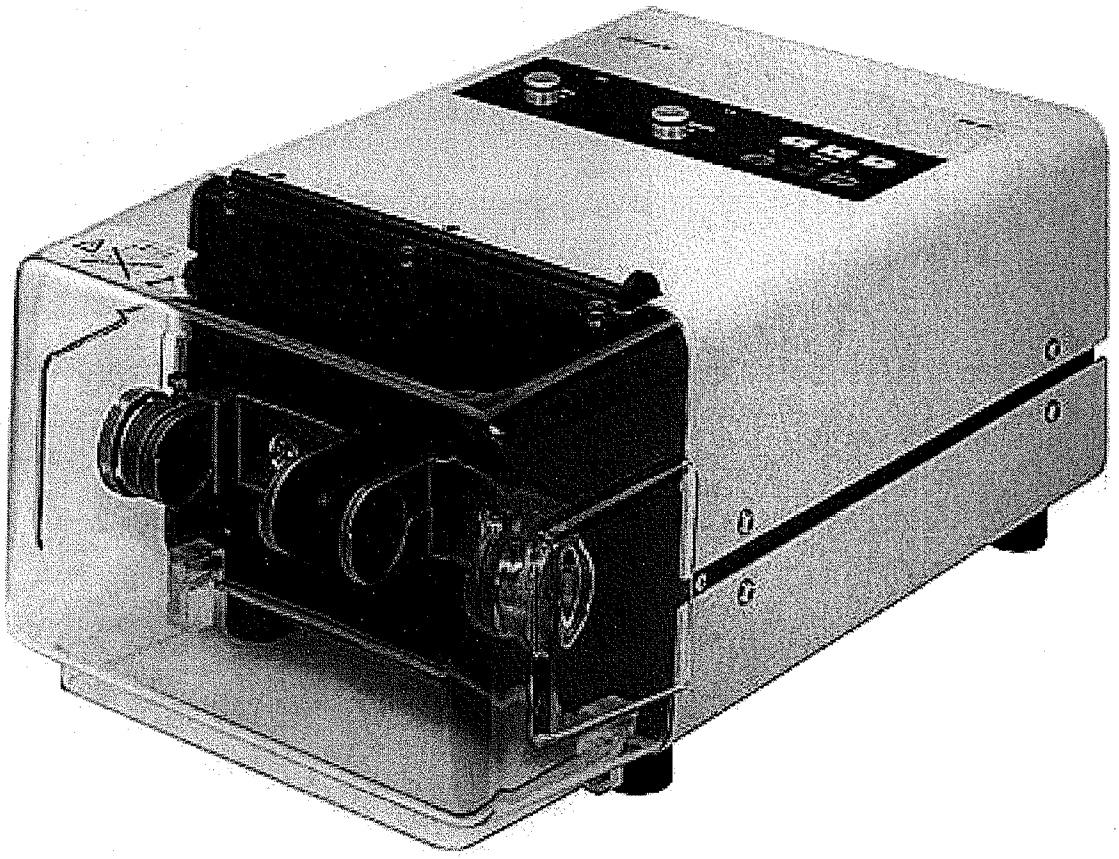
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Retsch GmbH
Rheinische Straße 36
42781 Haan, Germany
www.retsch.com

Type MM301
Produced 2007
Part No. 20.741.0004
Serial No. 127240816D

Power 120V 50/60Hz
184VA/0,5A; 30%ED; 2x Fuse T2A

Operating Instructions
Mixer Mill Type MM 301

© Retsch GmbH, 42781 Haan, Rheinische Str.36, Germany, Doc.no. D 98.741.9999

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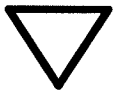
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Warning notes

We use the following signs to warn you against:



Personal injury



Damage to property

Repairs

These operating instructions do not contain any instructions on repairs. For your own safety, only have repairs performed by Retsch GmbH or by an authorised representative (service technicians).

In such cases, please notify:

The Retsch agency in your country
Your supplier
Retsch GmbH direct

Your service address:

Confirmation

I have read and noted the chapters entitled Foreword and Safety

_____

Operator's signature

_____

Service technician's signature

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Description of function

The milling process in the MM 301 laboratory mill is performed by the beating effect of the grinding balls on the process material and the friction between the grinding balls and the walls of the grinding jars.

The grinding jars, positioned horizontally, are subjected to radial oscillations which ensure that the grinding balls impact against the material one after the other.

The speed can be set from 3 - 30 Hz (120 - 1800 oscillations/minute) and is kept constant by a speed controller during operation.

The milling and mixing duration can be preset digitally from 10 sec. to 99 min.; the setting is preserved in standby mode for further operations.

Drive

Single phase AC motor

Vibration frequency of the grinding jar fastening

3 - 30 1/s = 180 - 1800 1/min
The maximum frequency cannot be reached with every loading status: e.g. for a 50 ml steel grinding jar with one grinding ball of 30 mm diameter, only approx. 25 1/s or 1500 1/min can be reached.
This overload is indicated by the display alternating between the set and the actually frequency reached.
The MM 301 always operates with the lowest displayed value.

Rated power

Approx. 184 VA

Emissions

Noise measurement to DIN 45635-031-01-KL3
The noise levels are also influenced by the properties of the material to be milled.

Example 1:
Sound power level L_{WA} = 71.4 dB(A)
Workplace related emission level L_{pAeq} = 61 dB(A)
Operating conditions :

Vessels	= 2 steel grinding jars, 25 ml
Milling unit	= 1 steel ball, 20 mm each
Milled material	= crushed quartz approx. 4.0 - 6.0 mm
Milled quantity	= 8 ml

Example 2:
Sound power level L_{WA} = 76 dB(A)
Workplace related emission level L_{pAeq} = 65 dB(A)
Operating conditions:

Vessels	= 2 steel grinding jars 5 ml
Milling unit	= 2 tungstan carbide balls, 8 mm each
Milled material	= crushed quartz approx. 1.0 - 2.0 mm
Milled quantity	= 1.5 ml

IP rating

IP40 or IP20 casing aperture for grinding jar fastening

Dimensions

Height: up to approx. 225 mm, width: 300 mm, depth: 470 mm with cover open
Height: up to approx. 410 mm, width: 300 mm, depth: 470 mm
Weight: approx. 20 kg, without grinding jars

Installation area required

300 mm x 470 mm; no safety clearances are necessary.

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Humidity:
Maximum relative humidity 80% at temperatures up to 31 °C, declining in a straight line to 50% relative humidity at 40 °C

Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent.

Site altitude:
Max. 2000 m above sea level

Installation

Always set the MM 301 on a firm base.

Remove the braces fitted for transport:
Two such braces **P** are located on the bottom of the MM 301. **Fig.1**
They are marked by arrows.

- Loosen bolts **S2**, see **Fig.2**
- Loosen the bolts **S2** of the transport brace **P** with washer **S1** by shifting the slot and removing it
- Keep the braces for use if the machine will have to be transported again.

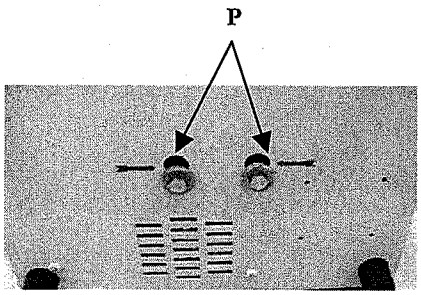


Fig.1

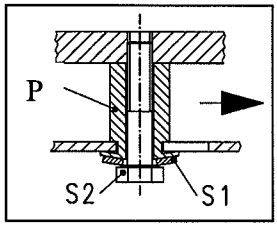
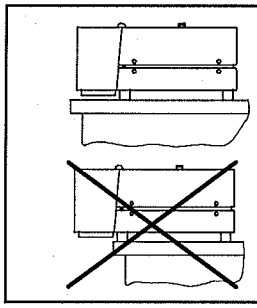


Fig.2

If the machine is operated **with** the transport braces still in place or transported with the braces **not** in place,
mechanical components may be damaged.



The machine must be positioned fully on the laboratory bench. Its cover must not project over the front of the bench.

Otherwise, it may be possible to reach into the machine.

Danger of injury to the hands!

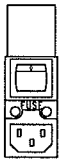
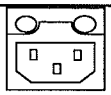
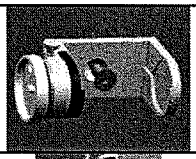
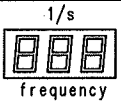
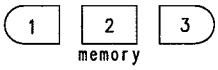
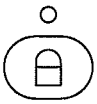
Electrical connection

- See the type plate for the voltage and frequency of the MM 301.
- Ensure that the values agree with those of the available power supply.
- Connect the MM 301 to the power supply using the power cable supplied.

Failure to observe the values on the type plate can lead to damage to electrical and mechanical components.

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Table of controls

Item	Element	Illustration	Function
A **A1**	main switch fuse tray		Connects the MM 301 to, and isolates it from, the mains
B	Power socket		Accommodates the mains cable
C	Ratchet fastening		Accommodates the corresponding grinding jar
D	Hand wheel with compression disk		Clamps the grinding jar
E	Locking bolt		Secures against unintended loosening of the hand wheel
F	START button		Starts the grinding process LED lights up Access to adjustment mode
G	STOP button		Stops the grinding process before the set time has expired. LED lights up Press the STOP button a second time = standby Access to pause function
H	Display of machine running time		Indicates the pre-selected running time from 10 sec. to 99 min
J	Rotary knob for time setting		Facilitates programming of the desired running time.
L	Frequency display		Displays the pre-selected frequency and the operating frequency.
K	Rotary knob for frequency display		Regulates motor speed and accordingly the vibration intensity of the grinding jars.
M	Memory function		Facilitates storage and call-up of up to three times and frequency combinations.
N	Adjustment lockout		Prevents adjustment of time and frequency. Press button **N** to activate the adjustment lockout: the LED will then light up. To deactivate the lockout, press button **N** in standby mode
O	Plexiglas cover	Not shown	Prevents inadvertent reaching into a running machine
P	Transport brace	Not shown	Protects the internal componets of the machine during transport

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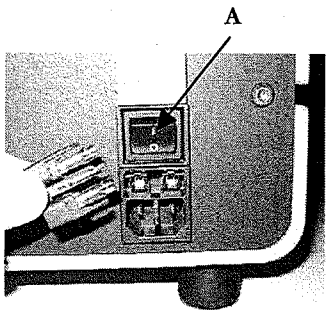


Fig.2

Switching on / off

The main switch **A** is located at the rear of the MM 301 **Fig.2**

- Turn on the main switch **A**.
- The LED above STOP **F** flashes briefly after the machine has been turned on. **Fig.3**
- The **time** display shows the time last set.
- The **frequency** display shows the speed last set.

The MM 301 is now in programming mode.

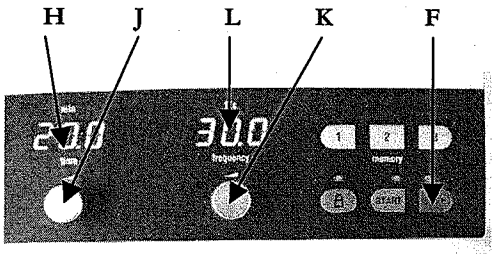


Fig.3

Setting the time

When the MM 301 is switched on it automatically goes into programming mode. The running time last used is shown on display **H**.

Set time to 10 sec - 99 minutes: Fig.3

- By turning knob **J** counterclockwise you can reduce the time set down to 10 seconds.
- By turning knob **J** clockwise you can increase the time set up to 99 minutes.

Running time can be set freely between 10 sec. and 99 min. From 10 min. onwards, the time can only be set in full minutes.
Turn knob slowly to move in steps of 1 sec. / 1 min.
Turn knob rapidly to move in steps of 30 sec. / 5 min.

Setting the frequency

When the MM 301 is switched on it automatically goes into programming mode. The frequency last used is shown on display **L**.

Set frequency to 3 - 30 Hz: Fig.3

- By turning knob **K** counterclockwise you can reduce the frequency set down to 3 Hz.
- By turning knob **K** clockwise you can increase the frequency set up to 30 Hz.

The frequency can be set freely between 3 and 30 Hz [1/s].
Turn knob slowly to move in steps of 0.1 Hz [1/s].
Turn knob rapidly to move in steps of 5 Hz [1/s].

The MM 301 is equipped with an electronic overload indicator.
If there is an overload, the frequency display changes back and forth between the frequency that you have set and the maximum frequency reached.

Lower the frequency to the maximum frequency reached!

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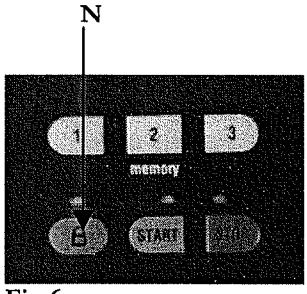


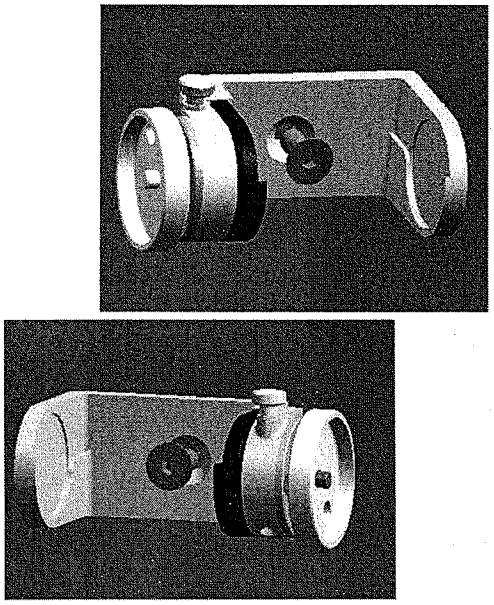
Fig.6

Adjustment lockout

The MM 301 has an adjustment lockout **N**.
Button **N** can be pressed when programming or during operation of the machine. **Fig.6**

- Press the adjustment lockout **N**.
- The LED lights up.

It is now impossible to change the time or frequency settings and no values saved to memory can be called up.
The lockout can only be deactivated by pressing button **N** in standby mode.


Fig.7

The grinding process

Clamp your grinding jars filled with the process material and the grinding ball/s into the grinding jar fastening. **Fig.7**

- Close the Plexiglas cover.
- Set the grinding parameters.

Start the MM 301.

Do not open the Plexiglas cover during the grinding process.

Although the grinding jars are brought to a standstill immediately by the built-in brake, the grinding process cannot be continued for the remaining time.

The MM 301 has to be restarted. The initial parameters are then once again available.

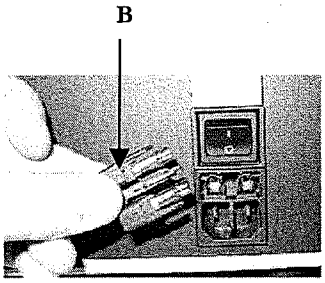


Fig.8

Changing fuses

Two glass fuses (5x20 mm) are required.
2 fuses mT 0.63 A 220-240V/50-60Hz
2 fuses F 1.6 A 100 / 110 and 120V 50-60Hz

Changing fuses: Fig.8

- Disconnect the mains plug
- Pull out fuse tray **B**
- Replace the fuses
- Slide the fuse tray back in

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Cleaning



Do not clean the MM 301 under running water. **Danger of fatality from electric shock.** Use a moist cloth only. Use no organic solvents.
The ingress protection rating of the MM 301 is IP40 / IP20 (casing aperture for grinding jar fastening).

Maintenance

The MM 301 is to the greatest possible extent maintenance-free. When used in accordance with the manufacturer's instructions the machine requires no maintenance or adjustment.

Necessary safety tests

The limit switch and the brake must be checked for correct functioning every six months.

1. Limit switch

- Remove the analysis sets or grinding jars from their fastenings.
- Switch the MM 301 vibration mill on.
- Set the frequency to 30Hz.
- Start the MM 301.
- Open the Plexiglas cover.
- When the Plexiglas cover has been opened by max. 8 mm, measured from the bottom edge of the housing, the motor brake must be activated.
- The motor must not restart when the Plexiglas cover is closed.

2. Brake

- Switch on the MM 301 vibration mill.
- Set the frequency to 30Hz.
- Switch the MM 301 vibration mill on.
- Open the Plexiglas cover.
- The brake must act within 1 second.

If the machine fails to behave as described in points **1** and **2** above, contact our service technicians.

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Modifications

The right is reserved to modify any specification without notice.

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Safety regulations (table) for the MM 301 from the individual chapters

Subject	Action	Hazard
Safety	Failure to observe the notes on safety can lead to damage to property and personal injury.	We accept no liability whatsoever for any damage or injury in this case.
Use for the intended purpose	The sample quantity should not fall below 25 % of the grinding jar volume	Otherwise the grinding balls could damage the grinding jar.
	The materials used for the grinding jar and grinding balls must always be identical.	Otherwise the grinding balls could damage the grinding jar.
	Do not modify the machine in any way, and use only spare parts and accessories approved by Retsch.	Otherwise the conformity with European Directives declared by Retsch will be invalidated. Furthermore, this will lead to all warranty claims being rendered null and void.
	Do not clamp ceramic grinding jars for the MM 2/200 or jars without complete steel jacket.	If clamped in the grinding jar holder of the MM 301, the metallic parts can cause damage to the ceramic parts.
Packaging	Please keep the packaging for the duration of the guarantee period.	Your guarantee claim may be invalidated if there is a complaint and the unit is returned in inadequate packaging.
Transport	The MM 301 must not be jarred, shaken or thrown during transport.	This could damage the electronic and mechanical components..
Temperature fluctuations	When subjected to major temperature fluctuations, the MM 301 is to be protected from condensation.	Damage to the electronic components may otherwise result.
Scope of supply	In cases of incomplete delivery and/or transport damage, you must notify the forwarding agent and Retsch GmbH without delay (within 24 hours).	It may not be possible to accept later complaints.
Ambient temperature	Not below 5 °C. Not above 40 °C.	Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent..
Humidity	Do not exceed a maximum relative humidity of 80% at temperatures up to 31 °C, declining in a straight line to 50% relative humidity at 40 °C.	Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent.
Transport braces	Remove the transport braces before commissioning. Secure the machine with transport braces when it is to be transported.	If the machine is operated **with** the transport braces still in place or transported with the braces **not** in place, mechanical components may be damaged.
Setting up the MM 301	The machine must be positioned fully on the laboratory bench. Its cover must not project over the front of the bench.	**Otherwise, it many be possible to reach into the machine.** **Danger of injury to the hands!**
Electrical connection	Ensure that the values on the type plate agree with those of the available power supply.	Electronic components could otherwise be damaged
Clamping the grinding jar	Do not load the MM 301 unequally.	In order to ensure smooth running of the MM 301, both milling points must be loaded with the same mass.
	Do not clamp grinding jars from the MM 2/200 or without complete steel jacket.	If clamped in the grinding jar holder of the MM 301, the metallic parts can cause damage to the ceramic parts.
Setting the frequency (vibration intensity)	If overloaded by a too high frequency setting, the display will alternate between the max. reached and the frequency set by you. Reduce the frequency setting to the max. value reached.	The MM 301 does not run at the set frequency.
Grinding process	Do not open the Plexiglas cover during the grinding process.	The analysis sets or grinding jars are brought to a standstill immediately by the built-in brake, but the grinding process cannot be continued for the remaining time. The MM 301 has to be restarted. The initial parameters are then once again available
	Do not load the MM 301 unequally.	In order to ensure smooth running of the MM 301, both milling points must be loaded with the same mass.
Cleaning	Disconnect the mains plug before every cleaning operation.	**Danger of fatality from electric shock!**
	Do not clean the under running water	**Danger of fatality from electric shock!**

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