REDIES Deutschland GmbH

REDIES

U400

Ultrasound Tooling Machine

This device features an ultrasound tool head and a rotating workpiece platform. Its primary use is shaping and polishing dies made from hard materials such as natural diamond and PCD. The rotating platform can be loaded with counter weights to establish defined and constant pressure against the ultrasound tool.
Ultrasound output can be adjusted continuously and controlled via switch or timer.
The ultrasound head can be used statically or with swivel motion.
Displays show ultrasound output power and frequency.

Technical information:

Power Input:	230V AC 50Hz
Input Fuse:	1x 6,3 A slow
Nominal HF-Power Output:	400 W max.
HF, nominal:	20 kHz | 28 kHz
Size (width x depth x height):	400 x 440 x 1050 mm
Weight:	60 kg (without tools and weights)
Noise:	75 dB(A)

PLEASE READ THE FOLLOWING BEFORE SETUP

Safety

Make sure the electrical input is properly grounded.

Operate in a dry, room temperature environment.

Make sure NOT to pinch or tightly bend cables and the electrical insulation on cables stays intact.

The machine has to be set up on a hard, stable, and level surface.

Clean with a damp cloth and mild detergents only. Make sure the power cable is disconnected before cleaning. Let dry thoroughly before reconnecting the power cable.

In case of malfunction, report to the contacts listed at the end. Do not administer repairs or open the generator without permission – otherwise any warranty is void.

This machine is NOT waterproof, spill proof, or dustproof but it is built to withstand the regular conditions of use.

This machine is not safe for use in EX zones.

Residual risks:

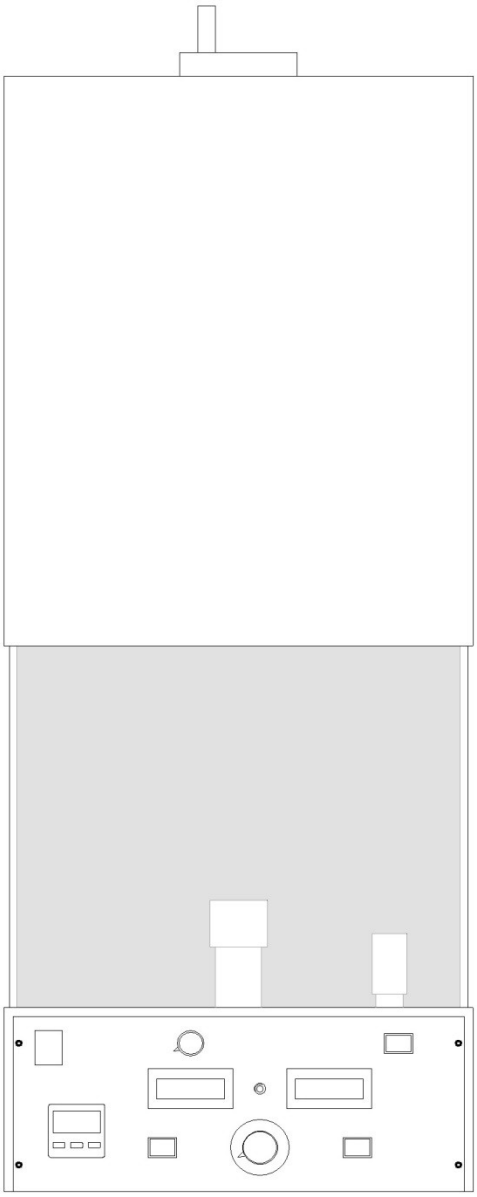
WARNING: keep hands out of work space while machine is in operation. We also strongly advise against wearing long scarves, necklaces or untied long hair near the machine. This applies to anything that could be pulled in by rotating parts.

WARNING: In operation, ultrasound tools may become very hot.
BREAK HAZARD: Due to thermal and dynamic stress tools, esp. needles, may break.
FIRE HAZARD: Other flammable materials, such as paper or wood, may also be heated beyond their ignition temperatures upon contact!

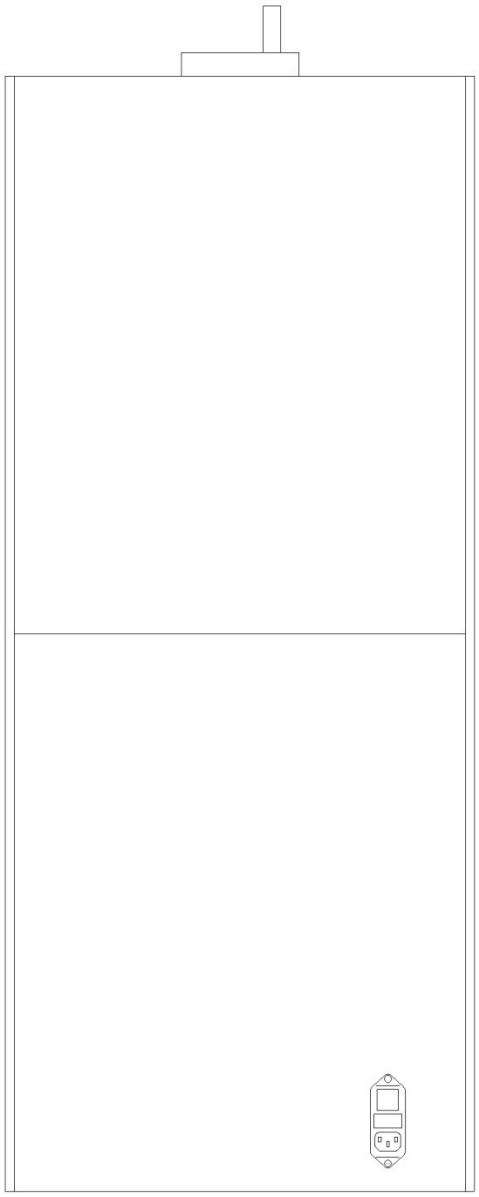
WARNING: It is not recommended to touch the transducer and tool during operation. Soft tissues can be heated uncomfortably. Upon longer exposure, burns and damages to the periosteum may occur because ultrasound is absorbed almost entirely by bone tissue.

WARNING: Use the Plexiglas ® shield to reduce noise and release of dust. Depending on workpieces and use of abrasives, very fine nano-scale dust can be released. For this reason the machine must not be cleaned with compressed air but with a damp cloth or the like.

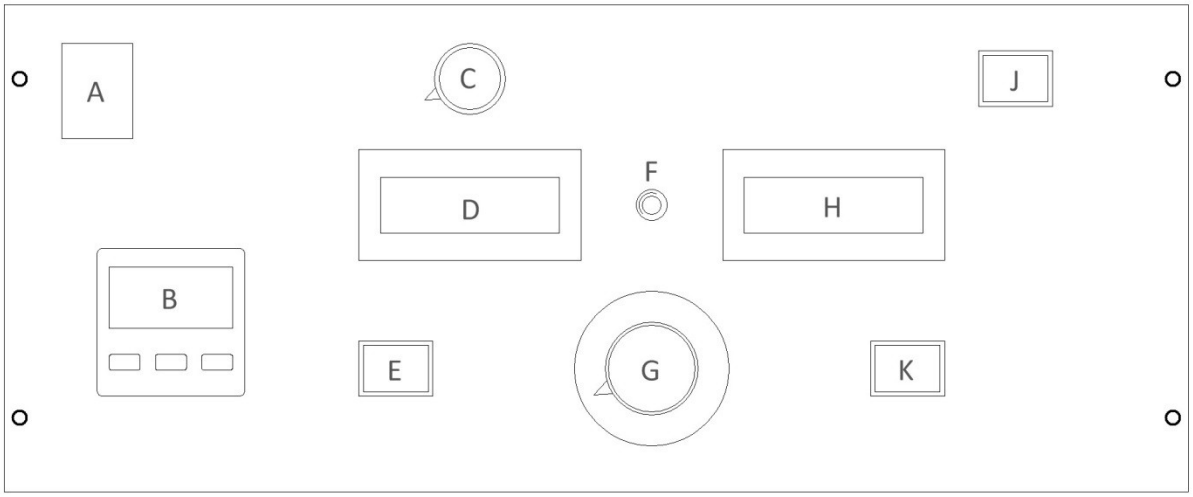
Machine front side view



Machine back side view



Left: On the front you find the control panel beneath the work space. See details below.
Right: Power cable connection and mains AC filter on the lower back side.



A power switch

B timer

C frequency range adjustment

D display power output [W]

E “Start” button

F LED indicator for frequency mismatch

G knob for ultrasound power output

H display resonance frequency [kHz]

J head swivel motion on/off

K “Stop” button

The power switch (A) in the front panel will only work if the main switch on the backside is on.

Please see the separate manual for Mueller TC14.21 timer (B) attached to this manual.

Frequency adjustment (C) may become necessary with changing tool mass or material.

“Start” (E) and “Stop” (K) buttons have the same function as the start and reset buttons on the timer - they will also trigger or stop the programmed time interval.

Maximum ultrasound power output to the tool may vary under certain conditions – such as tool material, quality of contact surface, tool size, and contact pressure among others. For this reason the power output from the HF side of the generator is displayed on display D.

SETUP

Place the machine on a hard, stable and level surface. Use the adjustable foot screws to level out the machine.

Choose your tool, screw it onto the transducer's flat face with the M10 screw and tighten it properly with at least 75Nm (maximum torque depends on screw and tool material). The surface quality and cleanliness of these faces have a substantial effect on power throughput to tool and workpiece. Keep these surfaces clean and smooth. Find more on tool systems in the following section "in operation."

Check if the fuses are intact and then connect the power cable to the power socket (A). Switch on main power on the socket.

The U400 is ready for use.

IN OPERATION

Use power switch (A) on front panel.

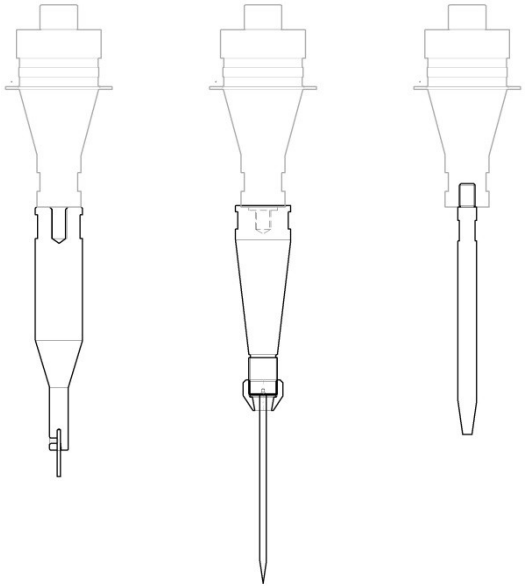
Now the right display shows resonance frequency of the whole oscillating system, including transducer, sonotrode, and needle in units of Kilohertz.

Left display shows power output from generator board in units of Watts. Please note: without load the maximum output is between 60W and 100W. This is normal. Output will rise while drilling/polishing up to an effective maximum of 400W.

Large knob (G) sets HF signal output power level.

(Section continues on next page)

Tool systems (examples):



Overview:
Left: Sonotrode with ready-made needles (compound tool system)
Center: Sonotrode with grindable needle (compound tool system)
Right: single tool system with big tool that acts as a fusion of sonotrode and needle
[in grey: U400 ultrasound transducer]

Resonance:

The ultrasound generator will search for resonance within a 4kHz window. If the oscillating system including head, tool, and workpiece resonates outside this 4kHz interval the generator will register a frequency mismatch. Power output is stalled and the indicator LED (F) lights up. You can adjust the frequency range with the tuning knob (C).
In general: heavy sonotrodes and needles have lower resonance frequencies than lightweight combinations.

Weight restriction for single and compound tools:	50 - 550g
Length restriction for sonotrode:	80 - 150 mm
Length restriction for needles:	30 - 140 mm
Size restriction for needles:	6 mm diameter

The machine is not suitable for use with tools or their respective weights that exceed these limitations.

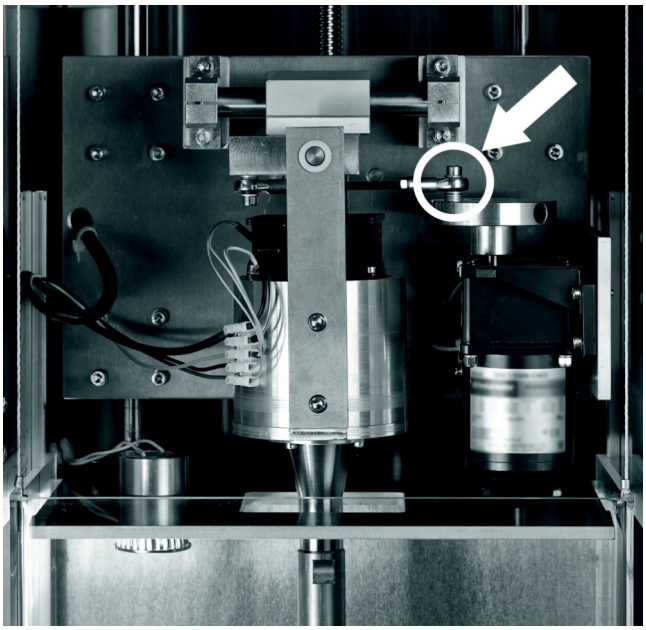
We strongly recommend using Titanium tools for their superior sound properties over steel. Titanium will convert less sound energy into heat, thus, Titanium tools have a longer service life and are more energy efficient. For the same reason we recommend needles made of spring steel.

If your case of use requires tool diameters >6 mm, consider using needles with an M10 thread at the end and connecting them directly to the transducer (single tool system).

Head swivel motion:

Switch “J” switches the swivel motion on and off. When switched on, the swivel motion will also start and stop with the timer or your direct input using buttons “E” and “K.” The oscillating movement will repeat 16 times per minute.

The stride of this movement can be adjusted. Please see the following picture for detail. On the excenter you will find an M6 screw. With this screw you can adjust the stride from 0 to ±34 mm at the head. Depending on your choice of tool this will result in an angular deviation of several degrees towards the workpiece.



view inside head compartment

REDIES cannot be held accountable for any damage to machine, operator or product that resulted from misuse.

STANDARDS | CONFORMITY STATEMENT

This device is manufactured to standards of 2006/42/EG as well as 9.ProdSV and has passed electromagnetic compatibility tests according to EN 55011A and EN 61000-6-2. Test reports are attached.

CE

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