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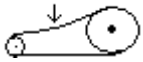
MANUAL FSM-40

This polishing device of type **FSM - 40** is a product of H+B, Germany. It is a very sturdy device for use as a grinding and polishing machine for objects (made of stone, glass, ceramic). It works on a flat lap with a maximum diameter of 40cm. The Motor is a 1/3 PS 0,3 kW 230 V 50 Hz one-phase alternating current motor for connection with a normal 220/230 volt power supply. All ball bearings are greased for the entire service life.

Before installing
First read these instructions carefully and if necessary the additional information sheets from beginning to end, because this is very important for proper use and application of these devices and for the safety of the machine, and your safety as well. Store the documentation in a secure place. The device must only be used for the intended purposes.
To assemble the machine, look for a clean, well-ventilated, and dry spot with good lighting that is not located in direct sunlight or near a heat source. The machine must be placed on a sturdy table in a horizontal position. To prevent the device from falling off the table, wood strip framing should be attached. Please make sure the work height is right for you!
Slide the drain hose well over the visible outlet nozzles on the bottom of the device and guide the hose end into a bucket/tub on the floor.

BELT TENSION: The v-belt must not be stretched to the extreme. About 1.5 cm of play must be possible.



The Motor must not have contact with electricity! The plug must be pulled out of the outlet!

Assembling the switch(if delivered unassembled): The device's main switch is on the outside rear of the machine. You will find pre-drilled holes there. This is where you install the angle bracket with the switch using the included fasteners.
Explanation of switch function(machine must not be connected to the power supply):
On the right you will find a protruding red Off button for switching the machine off (the protruding button is easier to find if there is an emergency). On the left you will find a green On button for powering the machine on.

Inserting the flat lap: (take great care, because it weighs 20kg)
Unscrew the M10x20 countersunk screw (central screw) from the top of the spindle shaft (in the unit tray) using the Allen key (included in the scope of delivery) and clean this as well as the entire small surface of the shaft (= bearing surface of the planer) with a clean/lint-free cloth (a grain of dirt could already cause problems !).
Carefully place the flat plate on the bearing surface of the shaft and make sure that the small elevation on the bearing surface (do not damage it by laying it down hard!) engages exactly in the hole of the flat plate so that it lies flush on the shaft bearing surface at the bottom.
Tighten the flat plate with the countersunk screw using an Allen key.
Now try to rotate the flat plate by hand to see if there are any visible variations in height.
If the face plate wobbles when turning, the contact surface of the shaft and the face plate must be checked again at the bottom for cleanliness. Then carefully put it back in place as described above. Screw in the countersunk screw and tighten it. We recommend greasing the countersunk screw a little so that it can be easily unscrewed later.
Now the machine must be aligned horizontally. Place a small waterscale, 20 to max. 45cm long, on the steel plate (both bearing surfaces cleaned) and level the entire machine by placing plates under one or the other foot (hard rubber would be ideal. If necessary, use thin to thicker hard cardboard) until the steel plate is approximately level.

Insert the finger protective plate!
Take the protector in your hands (the four sides must point downwards), keep it over the tub and determine whether or not everything matches. To do so, lightly press inward on the outside of sides. Move it down until you encounter any resistance (from a pair of screwheads inside the machine's rear wall). You can pass this point by moving the protective guard to the front slightly so that it is lower at the back and can slide past the point of resistance by pushing the entire plate further down until you come up against the tub bottom.
The position of the finger protective plate is only correct when it is a few millimetres under the surface of the large flat lap (*not* above the flat lap, not flush with the surface of the flat lap and not below the flat lap).
Exceptions for cleaning or changing the flat lap, you can remove the protective plate using a hook or with the thin rod. This can also be done with two thin, long wood nails (whose heads measure 5 mm or less and the tips have been ground off) or just with the Allen wrench included.

Installing the water line: Attach to left side of water line. Just place the magnet in the desired position and guide the water hose to the desired position just above the flat lap. Insert the blue high blood pressure tube. On the other end of the hose, attach the water faucet connection or the high pressure pump.

Run machine test/first machine run
If your motor is also equipped with an On- (=I) / Off (=O) –safety-switch (e.g. rocker switch), there are the two following options:

1) You can set it permanently to I (=switched on) and leave it there. From this point, you only activate the main switch described above (which is attached to the right exterior side of the machine).
2) Use the *motor* switch. This then serves as protection/security against unwanted use of the machine by incompetent people (who don't know about this switch!).)
The machine main switch must (still) be set to Off. Make sure that nothing is lying on/in/under/next to the tool/ the machine or motor. Plug the Schuko plug from the engine (with dry hands) into the outlet. Switch the device to On/Off and watch how the facing disc is running. This must be calm, not running out-of-round.

The flat lap runs at about 200 revolutions per minute.

To **PROCESS STONES** (gemstones, semi-precious stones or non-gemstones, fossils, glass, ceramic, etc.), we recommend our silicon carbide (abbreviated SiC) powder in various grains as the most affordable abrasive. Possible start from 80 grain (=coarse), if the surface of the object to be polished is not yet entirely flat/cut, otherwise use a grain from 220 to 400 or even 800 (or 1000 = finest). The polishing abrasives that follow are explained further on in the document.
You can work with a grain of the SiC directly on our steel flat lap, meaning 80 grain SiC or even 220 grain SiC. First moisten the flat lap with water using a spray bottle or, even better: Spray the surface of the flat lap with our CC-22 (cooling agent for sawing with diamond circular saw blades) because this will help the abrasive stick to the flat lap better than water, and it makes rinsing/removing easier during cleanup with water.
Scatter some SiC polishing agent on the moistened flat lap. Carefully place the object to be polished with its flat surface more or less in the middle on the running flat lap, and with slight pressure move it slowly over the running disk. Move the object continuously with constant forward and backward movements. Never stop in one spot or scoring could occur.
FIRST WORK with a SMALL object, perhaps the size of a fist, in order to get accustomed to the device.
If needed, spray a bit of moisture, scatter abrasive now and then, or use a plastic slider (e.g. short plastic ruler) to distribute the abrasive that was moved to the edge during polishing back over the disk.
Check the polished surfaces of the object now and then in a dry condition. If you cannot see any improvement in the fineness of the polishing (possibly use a microscope), switch to the next finest abrasive. There should not be any visible scratches, because you can hardly polish them away with the finer polishing abrasive!
In the case of scratches, continue to use the previous abrasive but start again, i.e. remove all of the grinding sludge and dirt (on objects and hands, from the flat lap and from the tub) because it is possible that an impurity from somewhere got on the flat lap and caused the scratches.

When **switching abrasive to a finer grain:**
Cleaning: Everything must be cleaned very well here (stone, steel plate with its countersunk screw, appliance tray), with the machine switched off and the plug unplugged. Before rinsing with water, make sure that the drain hose is open and that the end flows into a collection container.
After cleaning with water, wash the tub, the steel plate and its countersunk screw with a clean sponge and then dry with a clean cloth. Check that the outside of the unit is dry too. We recommend greasing the countersunk screw a little so that it can be easily unscrewed later using an Allen key.
Please note: Do not spray/clean with a water hose attached to the water line as there is a risk of overflowing the tub or unintentional spraying of the electric motor and electrical wires. We recommend a smaller indoor plant watering can that can easily be controlled.
At any rate, if you bought the motor from us, it is protected against splashes!
Starting with **400 grain silicon carbide**, because the grain is almost like dust, we recommend putting a bit in a small bowl with water (or with CC-12) to make a slurry. You can then use a paint brush to spread some of this grinding sludge on the running flat lap. If needed, add a bit of moisture with the spray bottle while polishing or spread new sludge on with the paint brush.
You can continue this way with continually finer SiC polishing abrasive.

Alternatively, instead of working with the abrasive powder directly on the steel plate, it is also possible, for each abrasive to be used, to employ a **Politex mat** on the flat lap. This mat is temporarily "fastened" to the dry flat lap (=with adhesive, but without hardening of the adhesive). This is done by briefly and lightly spraying the upper side of the flat lap with the "adhesive" spray bottle. Don't spray twice! A thin coating is enough! Be careful with the absolute flatness of the Politex mat! There must not be any visible air bubbles or waves on the surface of the Politex mat!!! Otherwise your polishing object would bump and hang/stay hooked and that is dangerous! It is important that you bond the parts together right after a minimum of 20 minutes so that the mat can be detached later; not immediately! If you bond them right away, then they are permanently bonded.
The abrasive scattered and then moistened (only) with water or brushed-on grinding sludge will adhere better to a Politex mat than on a blank steel plate. However, the Politex procedure can result in folds on the object's edges.
ONLY use water for moistening! (Never use CC-12!) The dampness will stay longer on it. The mat should NOT be WET, but only the surface should be DAMP. (Otherwise you will not achieve a finish). Make sure that the (gem)stone does not get hot, otherwise cracking could occur!
Each type of abrasive/grain requires a separate Politex mat! For this reason, you should label the mats.
When **changing abrasive**, the mat must be carefully removed from the flat lap with clean hands. For later re-use, lay it flat to dry, keep it clean and store it protected from contamination with other abrasives/grains and dust.

Cleaning all parts when changing abrasive is also very important **here**,
however it is done a bit differently: First wash your hands and the object being polished, then with dry hands carefully take off the Politex mat and **store** it in the manner described above.
Carefully wipe the end of the flat lap and the interior surface of the container with a dry, clean cloth (machine switched off and unplugged from the outlet).
There may be a bit of visible adhesive residue on the flat lap from previously attached Politex mat. When this remainder is sufficiently distributed across the plate, you can attach a new Politex mat after you have marked this mat on the bottom with

the name of the abrasive to be used now. If the rest of the adhesive on the flat lap is not enough, quickly and lightly spray a bit of adhesive but only on the spots where there isn't any adhesion!

REMOVING the Temporary bond ADHESIVE is possible with cleaning petrol.

(**polishing with SiC paper** is also possible, again with our adhesive. Possible sizes are 15 or 20 cm diameter.

Lastly, **POLISH** ON A POLISHING MAT (Politex mat) with brushed-on polishing abrasive sludge. You will definitely need a Politex mat for this. First, we recommend the well-known polishing abrasive **X-3**. Good for most types of stones. Additional types of abrasive powder that we offer include Ceroxid, Zinnoxid, Titanium 2//7. . . See price list. We are happy to advise you on this.

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Another option is professional GRINDING on DIAMOND sanding paper or disks:
In terms of expectations, these require a larger investment, but the benefits of the service life and the easy and significantly faster and cleaner working methods can sometimes be crucial for this decision. The sandpaper is attached using temporary bond adhesive. It is also possible (for an additional charge), to provide the diamond disks with a magnetic backing.

The revolutions of the flat lap must be increased somewhat when working with diamond.
With diamond tools, you should always make sure you perform plenty of cooling/rinsing with running water so that the polisher is constantly being rinsed and the diamond surface always maintains its full polishing effect. It must first be broken in by processing good stones. The grain information HB80 means very coarse. HB220 = coarse and HB600 = medium, and the grain continues to get finer as the designation gets closer to HB1.

An **alternative** to diamond sandpapers is grinding with **diamond pastes** directly on the steel disc.

Do not leave the device without cleaning and drying it!

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Disposal
The device is long life. If the motor is defective, it can be replaced.
Disposal of electronic devices.
(Remove the motor from the device by loosening the four M8 nuts and bolts that hold the motor to the back of the clamp rail (optional)).

We hope you have a lot of fun working with this device!
Your H+B –Team

Warnings:

- Read the operating instructions carefully and observe all safety instructions!
- Check that the information on the label matches your power supply.
- The machine / equipment must not be exposed to the weather or stand in a damp room and must not stand/run with flammable liquids or gases.
- Do not place the device and cable on heat sources (e.g. stove, heater).
- Before using the machine, make sure that there are no loose items on or in the machine.
- The finger guard must always be used in the machine. Never try to grab or search for anything from the equipment tray while the machine is running.
- Remove the plug from the socket when the machine is not in use, also before mounting plates or discs on the machine and before cleaning.
- Only remove the plug from the socket with dry hands. Also keep this in mind when plugging the plug into the socket.
- If it smells burnt, unplug it immediately. Determine if the smell comes from this device or if it is due to the socket. Have it checked by a specialist (electrician).
- Do not use multiple sockets.
- Do not use extension cables.
- Plug into grounded socket only.
- Do not pull the machine by the cable, never unplug the plug from the socket by the cable.
- Do not use the machine if the power cord or plug is damaged, the machine is not working properly, has fallen or is otherwise damaged.
- Do not leave the running machine unattended.
- Keep your workplace clean

- Never operate the machine if the electric cable or plug is damaged, the machine malfunctions, has been dropped or in any other way is damaged.
- Wear tight-fitting clothing. Remove loose clothing, ties, rings, bracelets or anything else
- Do not wear jewelry as it may get caught in the moving parts of the machine.
- Sturdy shoes with non-slip soles are required.
- A hair band or hair net is recommended for long hair.
- Use safety goggles. Note: Everyday glasses with non-impact resistant glass are not suitable as protective goggles.
- Do not cut dry.
- Wear hearing protection while cutting.
- Set up the machine so that it is upright and cannot tip over.
- Only use quality diamond cutting discs.
- Do not modify the machine and only use it for the recommended objects, such as semi-precious stones.
- This machine is not suitable for construction work
- Use the machine out of the reach of pets.
- Do not allow minors, course participants or groups to work on the machine unsupervise
- Since you are working with water and electricity, we recommend to use a Personal Protection Safety interconnector DI. It plugs directly into the wall outlet and protects the grinder additionally.
- Never attempt to get something out of the tub or search there while the machine is running. With dry hands, move the switch on the machine to OFF and then pull the plug out of the outlet.
- For all work that has nothing to do with grinding (e.g. cleaning), do not only switch off the switch on the machine, but also unplug it from the socket. (Do not pull the power cable, just pull directly on the plug!)
- In case of unknown / disturbing noises that you cannot assign: Switch off the machine and use it again only after clarification.
- Use only suitable tools and do not make do with unsuitable or sharp aids. These could cause accidents or injuries.

CE– Certificate Of Conformity

H+B Homberg + Brusius e.K.

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FSM– 40

Flat lapping machine for gemstones, semi-precious-stones

with asynchronous single phase motor,

KW 0,3. 4 Poles V.230/50Hz, frame size 71.

65db

2014/30/EU on the approximation of the laws of Member States relating to electromagnetic compatibility.

2014/35/EU on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, RoHS

The machine is herewith declared to conform with the following guidelines:
Machine guidelines 98/37/EWG, 2006/42/EU

Safety of machinery– General principles for design– Risk assessment and risk reduction EN ISO 12100:2011-03

Kirschweiler, 2018

Kitty Homberg, Owner