

# JET 34d

## Etching machine

### Operating instructions

operation control by the lid security switch. On the timer front panel, one display and 3 buttons can be identified. The buttons are labelled + , - and MODE.

To adjust the etching time, press either the + or the - button. The display will show the change. Holding the buttons-down makes the setting change faster.

To start the motor, press the MODE button once. The remaining time is displayed continuously on the display. The process is interrupted and restarted with each time the MODE button is pres-

The following instructions summarize how to use the switches, the heating control and the timer. Please also read the chapter 'Set-Up' prior to using the machine.

#### Switches

The main switch (identified by an I/O symbol) enables the electric circuit for both the motor and the heating and is lit when ON.

To activate the thermostate-controlled heating, the switch identified by a thermometer symbol must be turned to the ON position. The lamp in the switch corresponds to the thermostate and is lit during warm-up cycles.

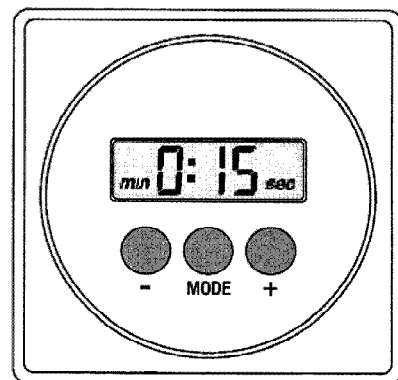
#### Timer

The etching time is controlled by a digital read-out and digitally adjustable timer. The range is from 1 second to 9 minutes, 59 seconds. The device supports easy time preselection and time recall by one hand operation. It can be run in stop-and-go turns and provides

sed. The pump motor stops when the lid is opened. To continue etching, close the lid again. Etching will continue for the remaining time. The timer beeps for three times when the etching process has finished. The display is then turned off.

To redisplay the previous setting, press the MODE button once. You may then use the + and - buttons to change the setting or just restart the machine by pressing the MODE button.

In order to avoid damage to the timer you must not bring it in contact with etchant.



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#### **Board carrier**

The boards are fixed into a carrier that comes with one fixed and one movable horizontal bar. To adjust the setting of the movable bar, just shift it into the desired direction.

Slide the carrier with the board(s) vertically into the etching compartment. Lift the lid towards yourself and drop it into a horizontal position.

The board carrier handle looks out of the etching compartment. To remove the carrier, just pull the handle upwards. The lid will open and slide back as far that you can remove the carrier. Keep the carrier in a slightly slanted position to allow excessive liquid to drop off. Finally, rinse the boards with the holder in the rinse compartment. After the rinse or before feeding new boards you put the carrier into a resting position on the edge of the rinse compartment and on the small horizontal bar inside it.

#### **Rinse compartment**

The water inlet and outlet connections are mounted to the rear of the machine and can be easily accessed through a wide opening in the machine socket.

You may at choice use a flow or stationary rinse. This will depend on the pollution regulations and your in house waste water treatment facilities. If you decide to have a stationary rinse please close the two valves at the rinse - in and outlet. For a flow rinse, open the outlet valve entirely and adjust the flow rate with the inlet valve. The water inlet is equipped with a standard 3/4" threading like for household appliances.

If you use ferric chloride you may recycle the dirty rinse water a) to substitute evaporation losses in the etching compartment and b) for making up fresh etchant.

#### **Thermostate**

The thermostate is located inside the PVC box mounted to the right of the machine. It can be accessed by removing the screws on the front and back of the box and by breaking the silicone sealing on top of the box. The temperature is preset to 45° C, which is the standard setting for use with ferric chloride. You should change the temperature only if your etchant requires so. The range is from 20 to 50° C.

#### **Etchant**

We recommend to use ferric chloride at 30 to 35 % concentration in this machine. Please contact us for details if you consider using a different product. We do not recommend ammonia persulfate or sodium persulfate, since these show very poor performance and are not environmental friendly.

#### **Cleaning**

The used etching medium can be let out from the machine by opening the middle tap mounted under the bottom of the machine body.

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If you use ferric chloride there is a simple but highly efficient method of cleaning the unit from any solid or muddy deposits. Contact us for details.

#### **Safety**

The machine must always be filled with liquid up to the top edge of the intermediate bottom plate. Otherwise the free running heater element can destroy the machine within minutes.

For security reasons, the function of the lid's protective switch should be controlled periodically. Wear protective clothing, glasses and gloves during this check.

Pressing the timer's start button quickly for multiple times will start the built-in self test. During this test, the motor runs for about two seconds, not respecting the lid security switch. For safety reasons, the timer self-test must not be provoked.

#### **Maintenance**

No maintenance is necessary for the JET 34d etching machines

#### **Warranty**

We give a full warranty for one year, either by repairing the unit at our facilities or by sending spare parts for exchange. Damage from misuse, overheating or broken heater quartz tubes are excluded.

#### **Set-up**

1. Check the machine for possible damage occurred during transport. If you encounter any such problem, please instantly inform the transport agent and us so that the facts can be stated.
  2. Carry the machine to the desired location. In any case, it may not be handled at the pump motor.
  3. If the floor of the location is not plain and straight, you have to level out the machine using small sheets of rigid material.
  4. Check that the taps on the bottom are all closed. Install fresh water access (right) and dirt water removal (left) by connecting hoses to the appropriate right and left sockets.
  5. Open the lid, pull it off and put it aside. Fill the machine from the top with water until the intermediate bottom plate is slightly covered. Reinstall the lid.
  6. Plug in the mains connector (230 V, 50 Hz) and turn on the main switch.
  7. Turn on the heater.
  8. Open the lid on top of the machine. Let it slide into the backward hold. Insert the board carrier so that it stands upright with the handle looking out of the machine body.
  9. To start a first run, close the lid, set the timer and start it.
  10. If you try to open the lid before the time is up, the pump motor must instantly come to a stand and can be restarted only by closing the lid and starting the timer again.
  11. If everything was O.K. with this first check, you may switch off the machine, let it cool down for approx. 30 minutes and then let off the water by opening the middle tap on the rear. You may then fill in the prepared etching solution and the machine will be ready for use.
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