

JACOBSON SEED TESTING BATH

- *Stainless Steel water bath with high flow capability for fast responsive control of pre-set temperatures.*
- *Programmable temperature and time controller, allowing three user defined programmes or choice from six predefined programmes.*
- *Design optimised to operate at the 20°C and 30°C standard germination cycle.*
- *PTC40 temperature controller with 2000 watt heater and a high flow circulation pump. Standard operating voltage is 220/250 Vac.*
- *Facility to assist water bath cooling with chilled water if ambient is too high*
- *Stainless steel support frame*
- *Focused temperature probe to detect seed bed temperature.*

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This equipment allows setting and maintenance of internationally recognised conditions for seed germination testing, where an eight hour period of operating at 30°C is followed by a sixteen hour period at 20°C. The thermostatically controlled water circulator is intended for use in an environment of 17 to 18°C. This will allow a natural radiation of heat through the bath bottom and a drop to 20°C will take about 2 hours without chilled water assistance. However, the PTC40 temperature controller will accept cooling water into its heat exchanger if there are difficulties in maintaining the lower set point.

The stainless steel water bath is designed to hold 13 glass plates about 25 mm above the water level. Each plate will hold five test pads that are individually protected by a small plastic cover. These covers provide controlled micro environments to each germination test.

A temperature sensing thermistor is bonded to a copper plate and is intended to sit under one of the conical test covers with the copper against the glass. This controls the water bath temperature so that the germination environment is close to the set point at all times. Because there is significant thermal lag between the heater and the micro environment, it may be necessary to set the test temperatures about 1 °C low to limit the overshoot to about 2 °C.

The large thermal lag in the system also means that the water bath can run as hot as 50 °C. to achieve the 30 °C upper test environment. The system is protected against temperatures above 70 °C by a thermostatic cut-out that switches off ALL power in the system .

To START/RESET the temperature controller the blue button on the front of the unit must be pushed . This action will only start/restart the heater and pump if the temperature of the heat exchanger is below 50 °C, therefore in the event of an overheat, the system will take several minutes to cool down. Such an event is only likely if the pump fails or the system is run with no water in it.

Water flow into the bath is via a manifold that promotes multi-directional flows. This ensures an even temperature throughout the bath with no hot or cold spots. There is also a small baffle on the outlet pipe to prevent air being drawn into the system. Ingested air is not harmful to the system but it produces noise in what would otherwise be a virtually silent system.

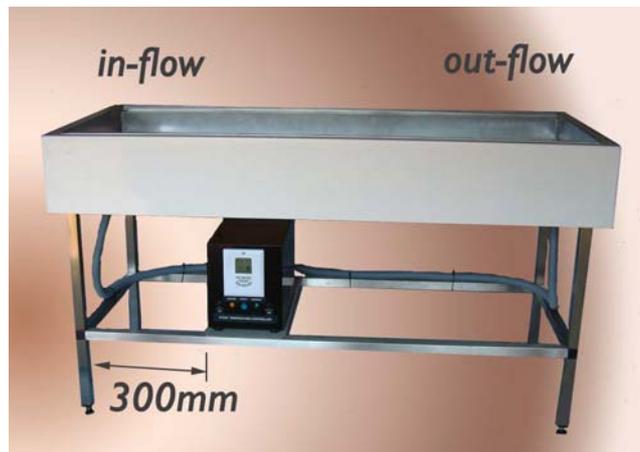
The water level should be checked daily and topped up as necessary. The inflow manifold has been designed as a minimum water level indicator so ensure that this is covered by about 3 to 5mm of water. Draining the system can be done via a small ball valve at the back of the temperature controller.

The bath is supplied with a partially assembled stainless steel tubular frame.



Lay the first frame on a firm flat floor. A sheet of cardboard or similar should be used on the floor to prevent scratches to the frame. Using a soft faced mallet, bang the four long tubes onto the projections as shown above. Place the other end frame on top and align the four tubes/projections. Drive the top frame onto the tubes by banging each corner down in turn about 10mm at a time until all tubes are seated onto the shoulders.

Place the water bath on the frame with the large (in-flow) pipe to the left. Set the



stainless steel shelf about 300mm from the inside end of the frame and place the PTC40 temperature controller about 25mm back from the front edge. The water bath has a large in-flow spout and a smaller drain spout. The hoses from the circulator are also differently sized to ensure correct connection. Two hose clamps are supplied, one at 40mm and one 35mm. Place the clamps over the hose

ends and attach them securely to the bath. Fix the hoses to the lower frame with the electricians tie wraps supplied.

Fill the bath with sufficient water to just cover the bottom and then level the bath with the adjustable feet. Continue filling until the top of the white in-flow manifold is about 3mm below the surface. Connect the unit to the mains electricity using the power cable supplied. . Set the power switch (on the rear of the PTC40) to ON and then press the blue RESET button on the front of the controller. The pump and heater should start. There will be some air pumped into the bath for a short period while the system purges. Make sure that the clear plastic baffle plate is in the mouth of the out-flow. This baffle stops the swirl vortex that forms around the drain. If this vortex forms it allows air to be sucked into the pump. This is not dangerous, just a bit noisy. It may be necessary to rotate the baffle slightly, when the bath is running steadily, to achieve an ideal condition.

Turn the controller OFF with the switch at the rear and set up the rest of the germinator. Place the 13 pieces of glass across the water bath and set up the wicks, growing pads and covers.

One of the covers must be replaced by the special funnel provided to house the temperature sensor. This sensor will ideally occupy a position on the first row but towards the right-hand end of the bath. The probe cable is protected by a tough plastic sheath. Provision for fixing it to the cover has been



provided and two predrilled holes exist.

Before running the water bath, it will be necessary to set the programmer. The programmer has many functions which are not necessary for this application. Only those functions relating to the running of this equipment will be described. It has been pre-set with programme number 7 operative for seven days a week and the Hi and Lo set points are at 29 °C and 19 °C . The switch point timings are only nominal and will need resetting.

SETTING DAY AND TIME

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Look
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along the top of the display and a day of the week number will be flashing. This can be changed with the UP/DOWN arrow buttons. Note: There is no international definition for the first day of the week but for the purpose of this text Monday is day 1 and Sunday day 7.

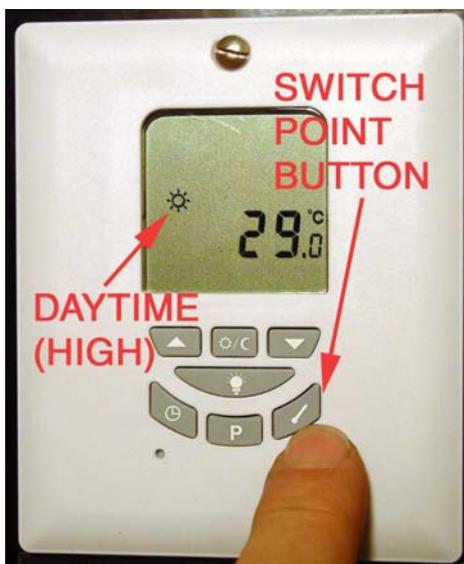
IMPORTANT. You have a maximum of 10 seconds of button inactivity before the set-up display reverts back to normal display mode. In most cases the settings /partially changed settings will be saved and displayed.

When the current day number has been set, pressing the TIME button again will cause the hours to flash. Set the current hour with the

When the current day number has been set, pressing the TIME button again will cause the hours to flash. Set the current hour with the UP/DOWN arrow buttons.

Pressing the TIME button again will cause the minutes to flash. Set the current minute with the UP/DOWN arrow buttons. Either press the TIME button again to restore the normal display, or wait for 10 second and it will restore by default and display the new settings.

SETTING CONTROL TEMPERATURE



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Press-
the

SWITCH POINT button once will cause display to go into a setting mode. The display shows a sun icon to indicate the daytime or the high switch point. This temperature can be changed with the UP/DOWN arrow buttons. Note: The maximum setting is 30°C . When the temperature reaches the set point PLUS 0.5°C the heating is turned off. The temperature then has to drop to the set point MINUS 0.5°C before it switches on again The maximum display for the probe temperature is 40°C



To view
set the
(or low)
switch

and
night

the high
point, set
point must be on-screen. Immediately pressing the DAY/NIGHT button once will display the current night or low set point temperature. This can be changed with the UP/DOWN arrow buttons. When the switch temperatures have been set, pressing the SWITCH button again will cause return to normal display.

SETTING PROGRAMMES



The pro-

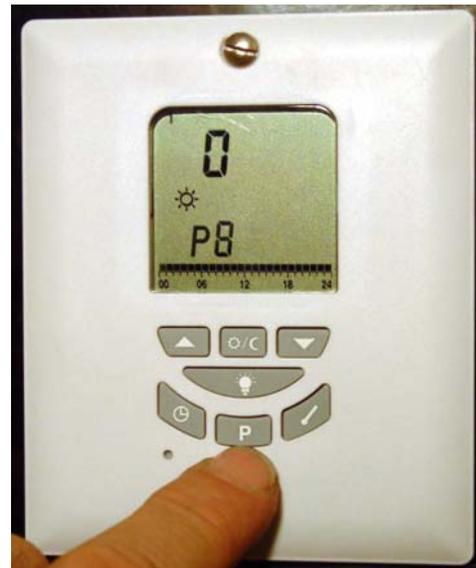
grammer has 6 fixed switching profiles built into it. Pressing the PROGRAM button twice will make the programme number flash. Use the UP/DOWN arrow buttons to step through all the profiles.

The display bar along the bottom shows a 24 hour day broken into one hour blocks. If a block is present , it means that the daytime/high

switch point is operative and if a block is absent then the night/low temperature switch point is in effect.

Programmes P1 to P6 are NOT editable. Programmes P7 to P9 are fully user definable.

By way of an example that relates to this equipment, a description follows on how to set an 8 hour high temperature period for every day of the week. At all other times, the low temperature phase will be selected.



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Press
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again
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editing of the user defined programme. The sun icon will show, along with the hour that's being set (in this case midnight to 01:00 hrs) and the first block on the bar graph will be flashing. The sun icon shows that the first hour is currently using the high set point. Press the DAY/NIGHT button once to change it to the low (night) set point.

Notice that the sun icon is still on. At first this may be confusing because it has just been changed. Closer inspection reveals that the SECOND block is now flashing and this icon represents the current set point for the SECOND hour. Again, press the DAY/NIGHT button once to set block two low and advance to block three. Repeat this until 9 blocks have been set low. Then, starting at 9:00hrs, use the UP arrow to advance to 17:00hrs, leaving 8 blocks high. From 17:00hrs to midnight press the DAY/NIGHT button to set them all low.



once
then
UP/

arrow buttons until ALL 7 days are displayed. This is the simple way to ensure the programme runs exactly the same for EVERY day of the week. Press the P button again and the programme number will flash. Use the UP arrow to select P8 and then

Press P
and
use the
DOWN

CHANGING THE BATTERY

There is a battery low display that will appear about a week before total battery failure. It is important to replace the batteries at this point so that the little emergency hold up voltage will retain the programmed settings during change-over.

The batteries for the controller are behind the display. Remove the single retaining screw and carefully open the fascia. Take care not to strain the purple lead for the temperature probe. Change the two AA batteries and carefully close the lid.



When the display has returned to normal press the P button three times to access the P8 program. Now use the UP arrow button to step through the program. The moon icon will appear wherever there is a blank block and the sun icon will be on where there is a solid block.

Once P8 has been satisfactorily set it can be left as THE programme for this germination cycle.



Note hooks two

that it onto teeth along the bottom edge and then rotates closed. Take care that the purple wire is not trapped and that the two projecting contacts on the rear of the display panel, engage cleanly with two slots on the back plate.