5. Start up

5.1 Turning on the unit

	Warming chambers may release odors in the first few days after commissioning. This is not a quality defect. To reduce odors quickly we recommend heating up the chamber to its nominal temperature for one day and in a well ventilated location.

1. Insert plug into socket (chap. 4.1).
2. Turn on ED units of sizes 400 and 720 at the main power switch (10)

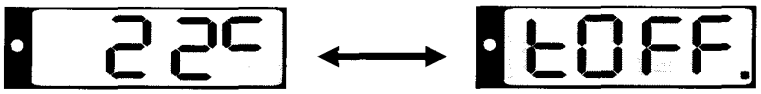
   The green "Standby" LED illuminates

3. Press  until the display lights up.

The controller is now in normal display (actual value display).

If the oven is operating (time functions "Continuous operation", or "Timer operation" with the set time just running down chap. 6.3), the **actual temperature value** (example: 22 °C) is displayed

If the oven is in time function "Timer operation" with no time programmed or the set time run-off (chap. 6.3), the unit is inactive (no heating). The display alternately shows the **actual temperature value** (example: 22 °C) and "**tOff**":



5.2 Heating operation display

The heating and fan (with FD) are active as soon as the red heating control light in the bottom right corner of the display slowly begins to flash depending on the heat requirement (example: 70 °C).

5.3 Air change

Opening the air flap in the outgoing air pipe serves to adjust the air change.

Without connecting a suction plant:

- For BD and ED units fresh air circulation can be elevated using the outgoing air pipe. The air flap in the outgoing air pipe serves to adjust the fresh air entry.
- For FD units with the air flap open and the fan operating, fresh air comes in via aeration gaps.
- If the air flap is completely open, the spatial temperature accuracy can be negatively influenced.

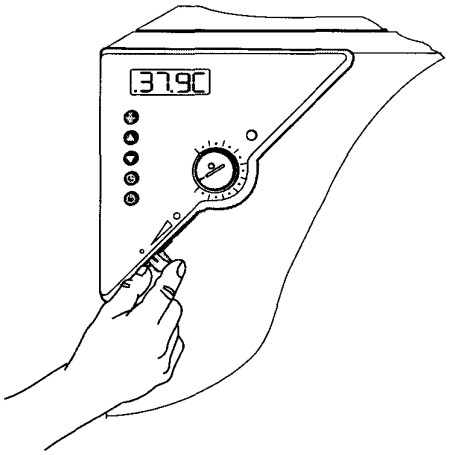


Figure 4: Adjusting the air flap

6. Controller setting

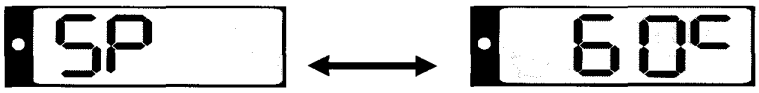
6.1 Display / entry of temperature set-point (without ramp function)

Controller setting is identical on both the ED/FD and the BD. The temperature controllers only differ in their temperature range.

The unit is operating, the controller is in normal display (actual value display). The actual temperature value (example: 22 °C) is displayed:

1. Press X/W button

   The display shows alternately "**SP**" and in the entry level the previous **temperature set-point** (example: 60 °C):



2. With the ▼ ▲ buttons enter a set-point value between 0 and 300.

	The desired temperature set-point can be selected in a temperature range from 5 °C / *9 °F* above room temperature up to 100 °C / *212 °F* (BD) or 300 °C / *572 °F* (ED/FD).

	If you want to frequently operate heating ovens ED and FD at low set-points up to 70 °C, the controller parameters can be optimized accordingly. Please contact BINDER Service to obtain detailed instructions how to change the parameters.

3. Wait 2 seconds until the entered temperature value is taken over (display flashing once).

4. Press X/W button to return to normal display (actual value display) (automatically after 60 seconds).

6.2 Display / entry of temperature set-point (with selected temperature ramp)

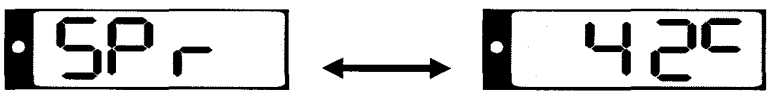
If previously a temperature ramp value has been selected (chap. 6.4.2):

Press button X/W in normal display / actual value display during ramp operation to have displayed the actual temperature set-point changing according to the selected gradient in addition to the entered set-point for temperature.

The oven is operating, the controller is in normal display (actual value display). The **actual temperature value** (example: 22 °C) is displayed:

1. Press X/W button

   The display shows alternately "**SPr**" and in the entry level the **actual temperature set-point** changing according to the selected gradient (example: 42 °C):



   This ramp set-point is only displayed, not adjustable.

2. Press (X/W) button

   The display shows alternately "**SP**" and in the entry level the previous **temperature set-point** (example: 60 °C):

3. With the (▼) (▲) buttons enter a set-point value between 0 and 300.

	The desired temperature set-point can be selected in a temperature range from 5 °C / *9 °F* above room temperature up to 100 °C / *212 °F* (BD) or 300 °C / *572 °F* (ED/FD).

	If you want to frequently operate heating ovens ED and FD at low set-points up to 70 °C / *158 °F*, the controller parameters can be optimized accordingly. Please contact BINDER Service to obtain detailed instructions how to change the parameters.

4. Wait 2 seconds until the entered temperature value is taken over (display flashing once).

5. Press (X/W) button to return to normal display / actual value display (automatically after 60 seconds).

6.3 Time functions: Continuous operation and Timer operation

Press the time management button (⏲) .

The timer indicates its current time function. There are two possible time functions:

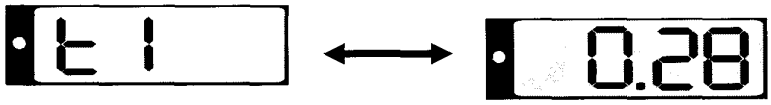
Continuous operation

The display shows alternately "**t1**" (time function) and the time function "Continuous operation" "**t inf**":

The heating and fan (with FD) are permanently active, independent of the timer setting.

Timer operation

The display shows alternately "**t1**" (time function) and the running-down **time** or "**tOff**":



Remaining time (example: 28 Min.) – **Timer running down**

Heating and fan (with FD) are active until the timer has run-down.

or

Timer not programmed or run-down "t off"

If the timer has run-down, heating and fan (with FD) are permanently off.

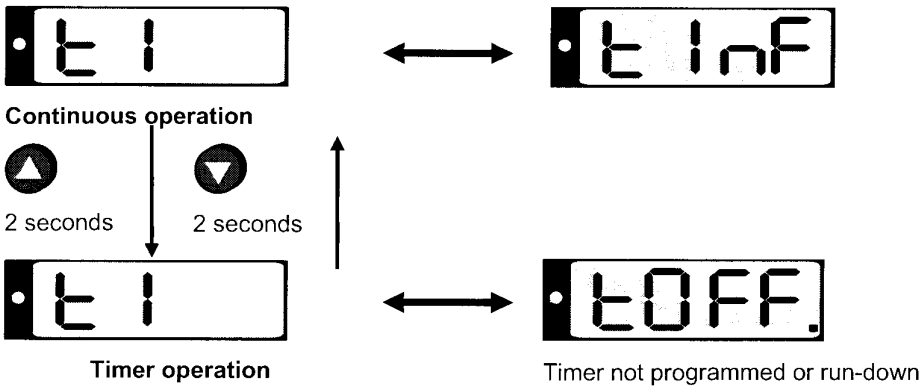
Press (X/W) button to return to normal display (actual value display) (automatically after 60 seconds).

6.3.1 Switching between Continuous operation and Timer operation

Press the time management button .

The controller displays the actual time function. In time function "Continuous operation", "t1" and "t inf" are displayed alternately. In time function "Timer operation", "t1" is displayed alternately with the running-down time or "tOff".

If in time function "Timer operation" the Timer is just running off ("t1"displayed alternately with the running-down time) the timer must first be set to Zero (chap. 6.3.3). Now "t1" is displayed alternately with "tOff", and the controller can be changed to time function "Continuous operation".

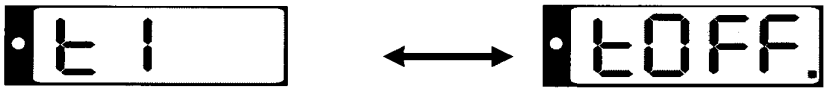


Press button to return to normal display / actual value display (automatically after 60 sec).

6.3.2 Continuous operation

1. Press the time management button .The timer indicates its current time function.
2. If necessary, switch to timer operation by button .

   The display shows alternately "**t1**" and the time function "Continuous operation" "**t inf**":



3. Press button to return to normal display (actual value display) (automatically after 60 seconds).

The **actual temperature value** (example: 22 °C) is displayed:

Now the controller operates with the entered set-point (chap. 6.1) in continuous operation. The heating and fan (for FD) are permanently active, independent of the timer setting.

To cancel Continuous operation, proceed accordingly:

1. Press the time management button .
2. Switch to Timer operation by pressing down button for 2 seconds (chap. 6.3.1).

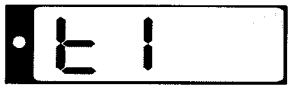
6.3.3 Timer operation: Setting the tempering time

1. Press the time management button . The controller indicates its current time function.
2. If necessary, switch to timer operation by button .

   The display alternately shows"**t1**" and in the entry level the running-down **time** or "**tOff**":

or

Remaining time (example: 28 minutes) – Timer running down



Timer not programmed or run-off "t off"

3. Set the desired time [hh.mm] with buttons in the entry level.
4. Wait 2 seconds until the entered temperature value is taken over (display flashing once).

   The display alternately shows "**t1**" and the set time now running down.

The time directly begins to run off after taking-over of the entered value. Heating and fan (with FD) are active until the timer has run-down.

5. Press button to return to normal display (actual value display) (automatically after 60 seconds).

The **actual temperature value** is displayed (example: 22 °C):

The controller operates with the entered set-points (chap. 6.1) until run-down of the set time. Heating and fan (with FD) are active until the timer has run-down.

To know the remaining timer time or, if appropriate, to modify it, press the time management button in normal display (actual value display).

The display alternately shows "**t1**" and in the entry level running-down **time**:

After the set time has run down the display alternately shows the **actual temperature value** (example: 22 °C) and "**tOff**":

Now the heating and fan (with FD) are inactive.

6.4 User level settings

By pressing down button (X/W) in normal display (actual value display) for 5 sec, you enter the user menu. Settings in this menu affect controller operation.

User level overview:

Press down button (X/W) for approx. 5 seconds

↓

Select the **temperature unit** (chap. 6.4.1)

↓

Press (X/W) button

↓

Ramp function (chap. 6.4.2)

↓

Press (X/W) button

↓

Setting the **unit address** (chap. 6.4.3)

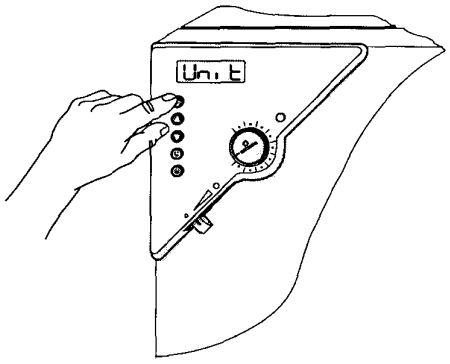


Figure 5: Press down (X/W) button for approx. 5 seconds

Press button (X/W) to return to normal display with display of the temperature set-point. **Or:**

After 60 seconds the controller automatically returns to normal display / actual value display.

All settings can be carried out independently (as described in he individuel sections) or one after the other during one single process.

☞	The defined parameters are not deleted when the main power switch is turned off or in case of power failure.

6.4.1 Temperature unit change between degrees Celsius °C and degrees Fahrenheit °F

If required, the temperature display can be changed as follows:

1. Press down (X/W) button for approx. 5 seconds.

The display alternately shows "**unit**" and in the entry level the actual setting of the **temperature unit**:

2. Use the (▼) (▲) buttons to set the required unit.
3. The set unit is automatically adopted after 2 seconds.

☞	C = degrees Celsius	0 °C = 31 °F	Conversion:
	F= degrees Fahrenheit	100 °C = 212 °F	[Value in °F] = [Value in °C] * 1.8 + 32

When specifying the set point ramp (see chap. 6.4.2) this setting is accordingly taken as the basis.

☞	If the unit is changed, the temperature set-point and limits are converted accordingly.

6.4.2 Enter a temperature ramp

Temperature ramps can be programmed in order to extend heating up times. This may be necessary in some cases, in order to prevent temperature stresses in the material during the heating up phase. Temperature ramps should only be used if required. The use of temperature ramps may result in the heating up times being considerably slowed down.

The entry in °C/min or in °F/min meaning the nominal value gradient and limits the maximum temperature increase to this value. Due to the heat and evaporation energy assumed by the drying material, smaller temperature gradients may also result.

A temperature ramp proceeds from the previously entered to a new set-point. The temperature must have adjusted to the start set-point. Enter settings in 3 steps:

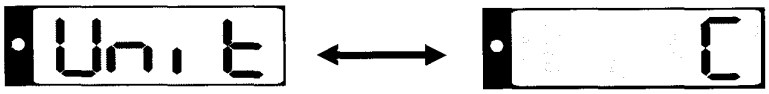
1. Enter set-point of ramp start temperature. Let temperature adjust to this set-point temperature.
2. Set ramp to the desired gradient. You can set the gradient from 0.0 °C/min up to 1.0 °C/min (BD), resp. from 1 °C/min up to 10 °C/min (ED, FD).

   A heat-up rate of 0.4°/min (BD) resp. 4 °C/min. (ED, FD) can be regarded as a realistic maximum.
3. Enter set-point (final ramp temperature).

The ramp should only be set if required. The setting "0" means ramp function turned off. The unit is being heated at maximum heat output.

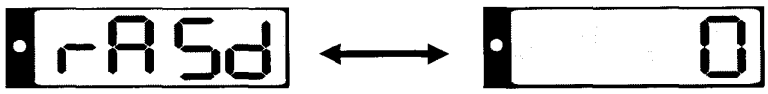
1. Press down  button for approx. 5 seconds.

The display alternately shows "unit" and in the entry level the temperature unit:



2. Press again button  .

The display alternately shows "**rASd**" and in the entry level the actual setting of the **set-point gradient**:



3. Set the desired ramp gradient with buttons  (set-point gradient in °F or °C acc. to setting in chap. 6.4.1).
4. The set value is automatically adopted after 2 seconds.

During ramp operation the actual set-point (SPr) continually rises in accordance to the entered gradient from the previously entered set-point to the new one (SP). The actual value follows he set-point value.

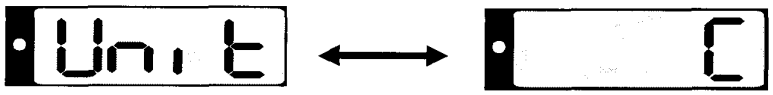
About set-point display during ramp operation see chap. 6.2.

6.4.3 Chamber addressing

If several incubators BD or heating ovens ED (option) are networked with a PC via the APT-COM communication software (option, chap. 8.2), each unit must be allocated a unique address. Addressing takes place on the R 3 controller as follows:

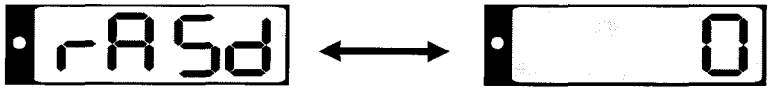
1. Press down (X/w) button for approx. 5 seconds.

   The display alternately shows "unit" and in the entry level the temperature unit:



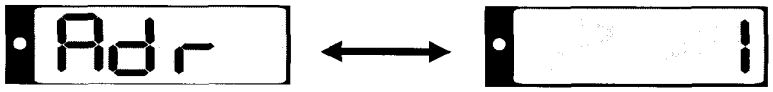
2. Press again button (X/w).

   The display alternately shows "rASd" and in the entry level the set-point gradient:



3. Press again button (X/w).

   The display alternately shows "**Adr**" and in the entry level the actual setting of the **unit address**:



4. Set the required address with buttons (▼) (▲).

	You can enter address values between 1 and 30.

5. The set value is automatically adopted after 2 seconds.

6.5 General notes

	60 sec. after the last entry the controller returns to normal display (actual value display).

	The functions set-point entry (chap. 6.1), time functions (chap. 6.3), and calling up the user menu (chap. 6.4) can only be selected from normal display (actual value display).

	When selecting the functions set-point entry and time functions, and when selecting the user menu functions, the respective button (X/w) or (◷) must be pressed down for a about 1 sec. Shorter pressing will be ignored by the controller.

	After a power failure, the timer returns to the previous status. A remaining time, if any, will continue running down.