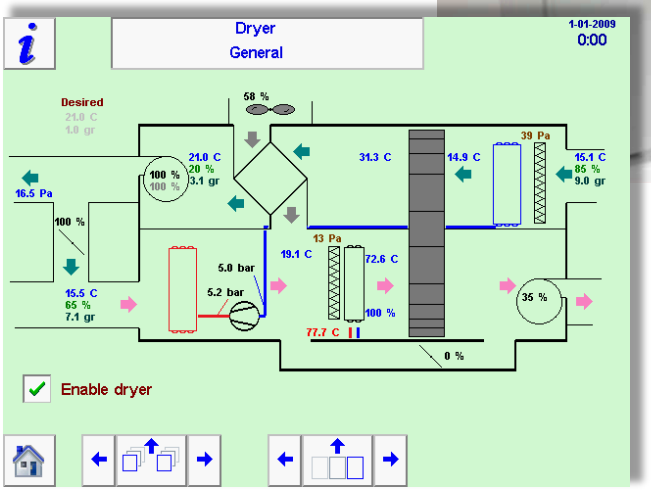
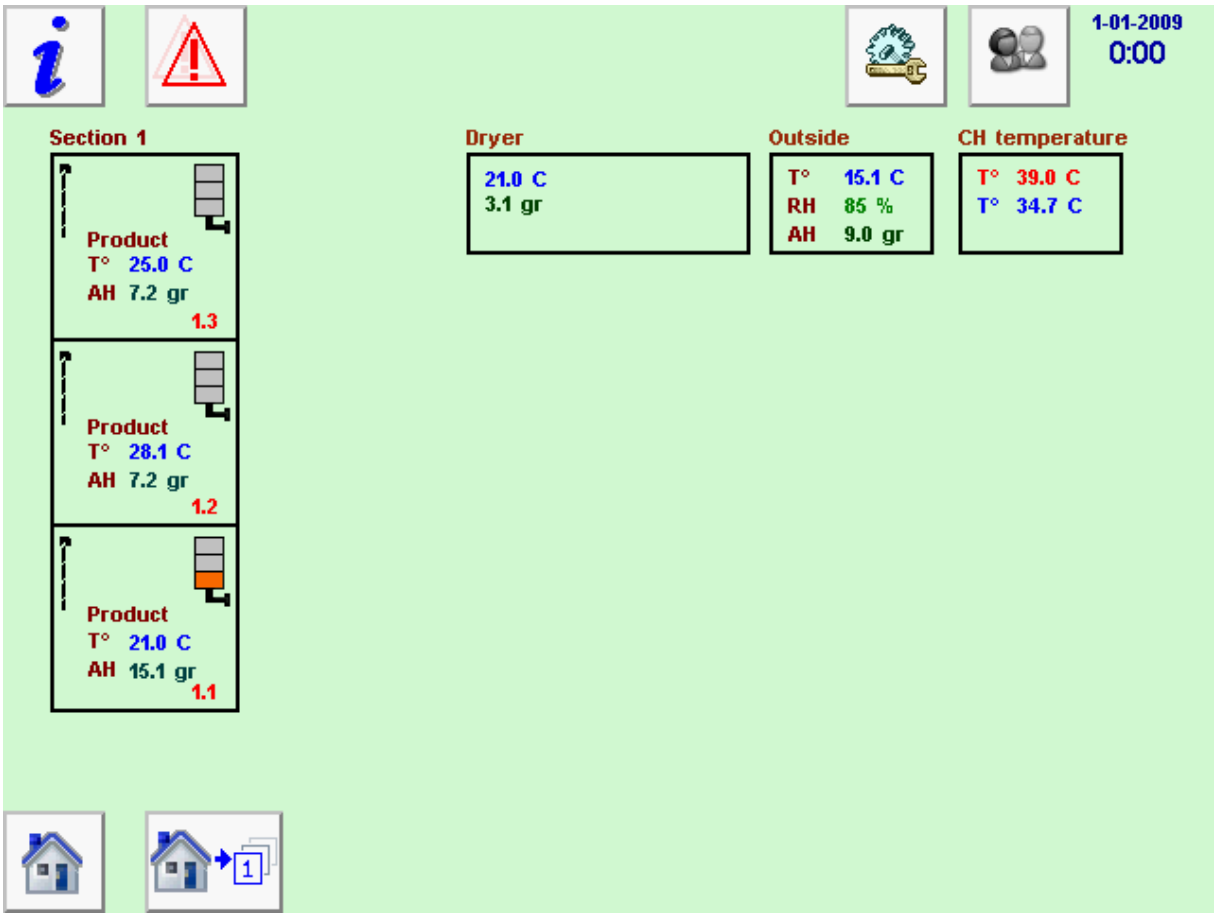
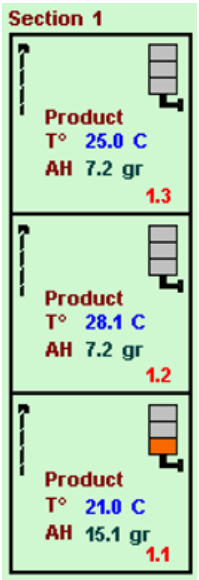
ABC MANUAL



Agratechniek b.v.
Lau Nieuwenhuizen
DRYING INSTALLATIONS & EQUIPMENT



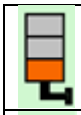
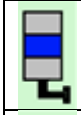
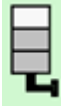
Overview of drying installation



1 section for 3 box positions (1.1, 1.2 and 1.3).

The displayed values are the temperature and AH of the air from the seed of the respective box position.

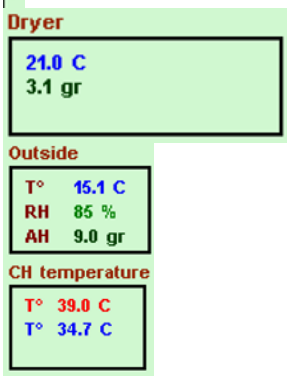
The signal lights indicate the current phase of the process.
Indications of the drying phase

	Box position 1.1: Drying phase 1 to 4
	Box position 1.2: Desired moisture content of the air achieved (phase 5)
	Box position 1.3: Drying process is ready

Other signal light combinations:

Orange + blue = During pause with box present
Blue + white = Restart phase 5
Orange + white = Box present but not started
Orange + blue + white = Manually stopped during phase 1 to 5

This symbol displays the position of the shutters.



An air dryer.

- Temperature and AH of the air to the drying section

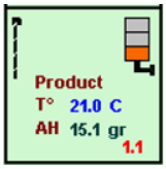
Outside conditions

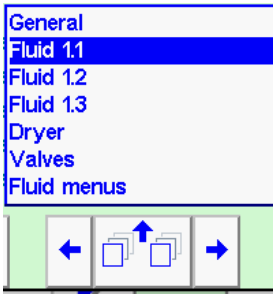
- Temperature, RH and AH of the outside air

Central heating

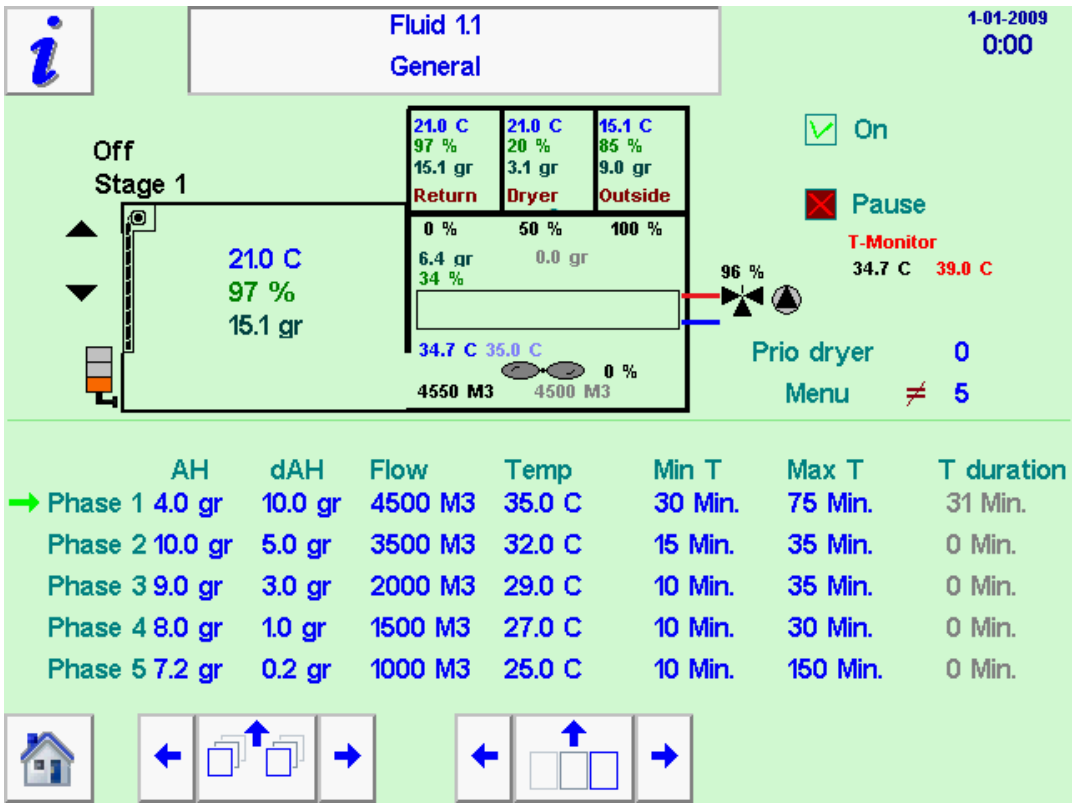
- Temperature of the supplied (red) and returned water (blue).

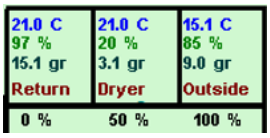
Settings for the drying process of seed in a box

Click directly on 

or on 

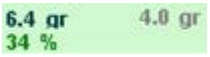
to go to box position 1.1





Information about the air which is supplied or suctioned:

- Recirculation air from the box; 21°C with a RH of 97% and 15.1 grams of moisture. 0% suction.
- Air from the air dryer ; 21°C with a RH of 20% and 3.1 grams of moisture. 50% suction.
- Outside air ; 15,1°C with a RH of 85% and 9 grams of moisture. 100% suction.

Information about the mixed air which goes through the seed: 

and 

Desired moisture content is 4 grams of moisture (configurated as minimum value), which leads to 6.4 grams with outside air and dried air. The air is heated up to 34.7 °C, with a desired temperature of 35°C. The RH is 34%.

Information about the air from the seed; 21°C with a RH of 97% and 15.1 grams of moisture.

The outside air is dryer than the air from the seed, so outside air will be suctioned. The desired moisture content is lower than the outside air, which means dried air is added to decrease the AH of the ingoing air.

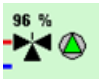
Settings:

- Phase 1 is active
- When the air from the seed reaches a AH of 4 grams, the process transitions to phase 2
    - This value will not be achieved in the 1st phase, so the transition to the 2nd phase will take place after 75 minutes.
    - During the transition, the air quantity and the desired T° are gradually decreased to the value for the next phase.
    - In this case, the desired moisture content at the next phase, should be reached and maintained.
- The goal is to achieve a moisture content of the ingoing air which is 10 grams drier than the desired moisture content of the air from the seed.
    - Practically this is not possible, but it guarantees the drying process takes place with as much drying air as possible, to discharge a lot of moisture.
- The desired air quantity through this box is 4500m³/h.
- The desired ingoing T° is 35°C.
- The minimum time this phase should take is 30 minutes.
- The maximum time this phase can take is 75 minutes.
- This phase is active for 31 minutes.

The drying process is active and started.

Click on the cross to temporarily stop the drying process.

The monitor thermostat has been configurated to 39°C. Above this value the drying process stops. The measured value is 34.7, so still below the maximum accepted value.



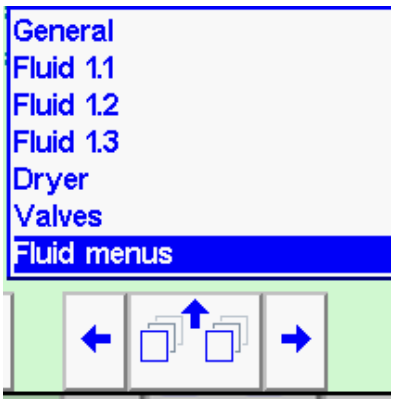
The heating capacity is almost completely utilised with 96%. The pump (green arrow) is active.

This is the setting to configurate which priority this box position has in the distribution of the dryer air. A HIGHER number means more priority. If several box positions have equal priorities, the box position with the LOWEST desired channel AH receives the highest priority.

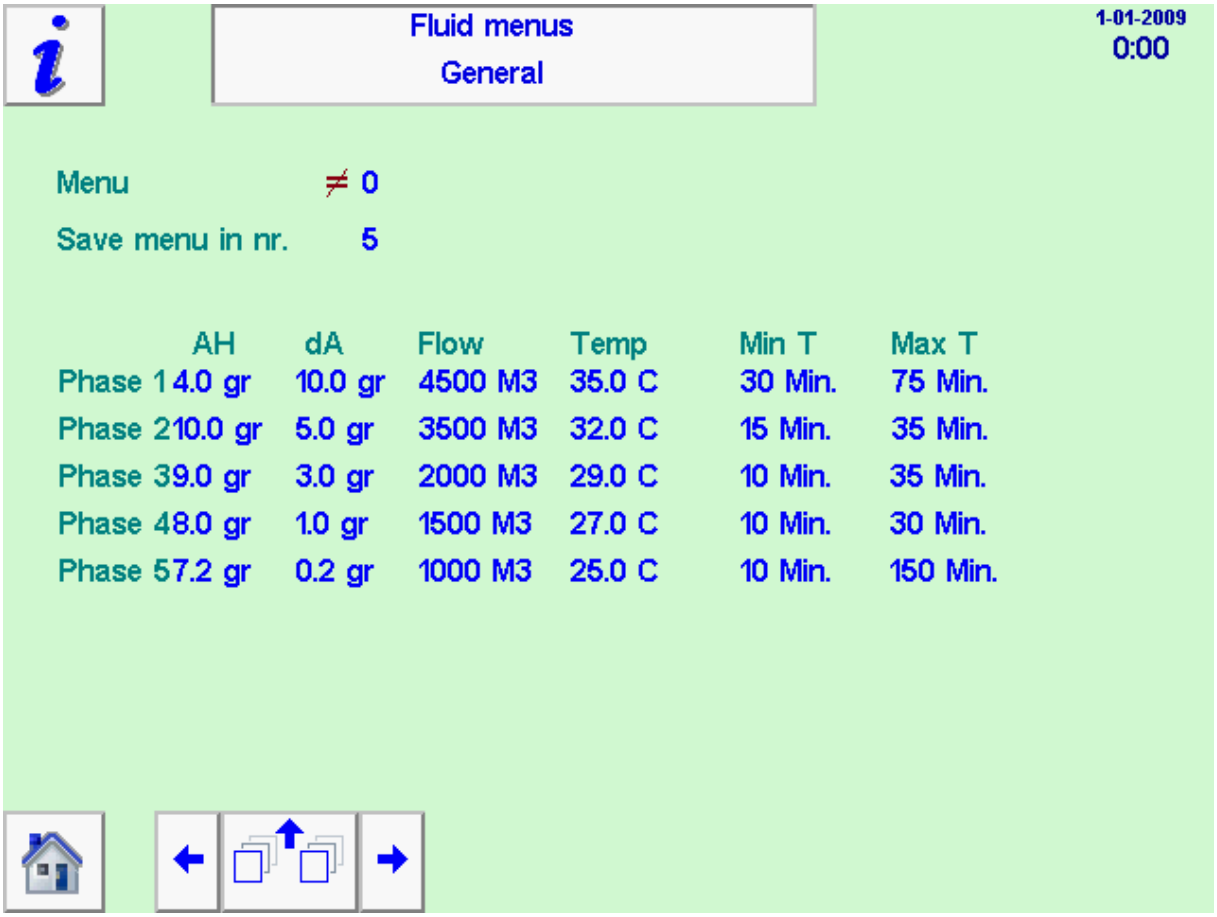
All settings are equal to the preset menu 5. When this  is displayed, at least one of the values is different from the preset values.

The preset menus can be configurated beforehand.

Go to `Menus fluide' in the menu



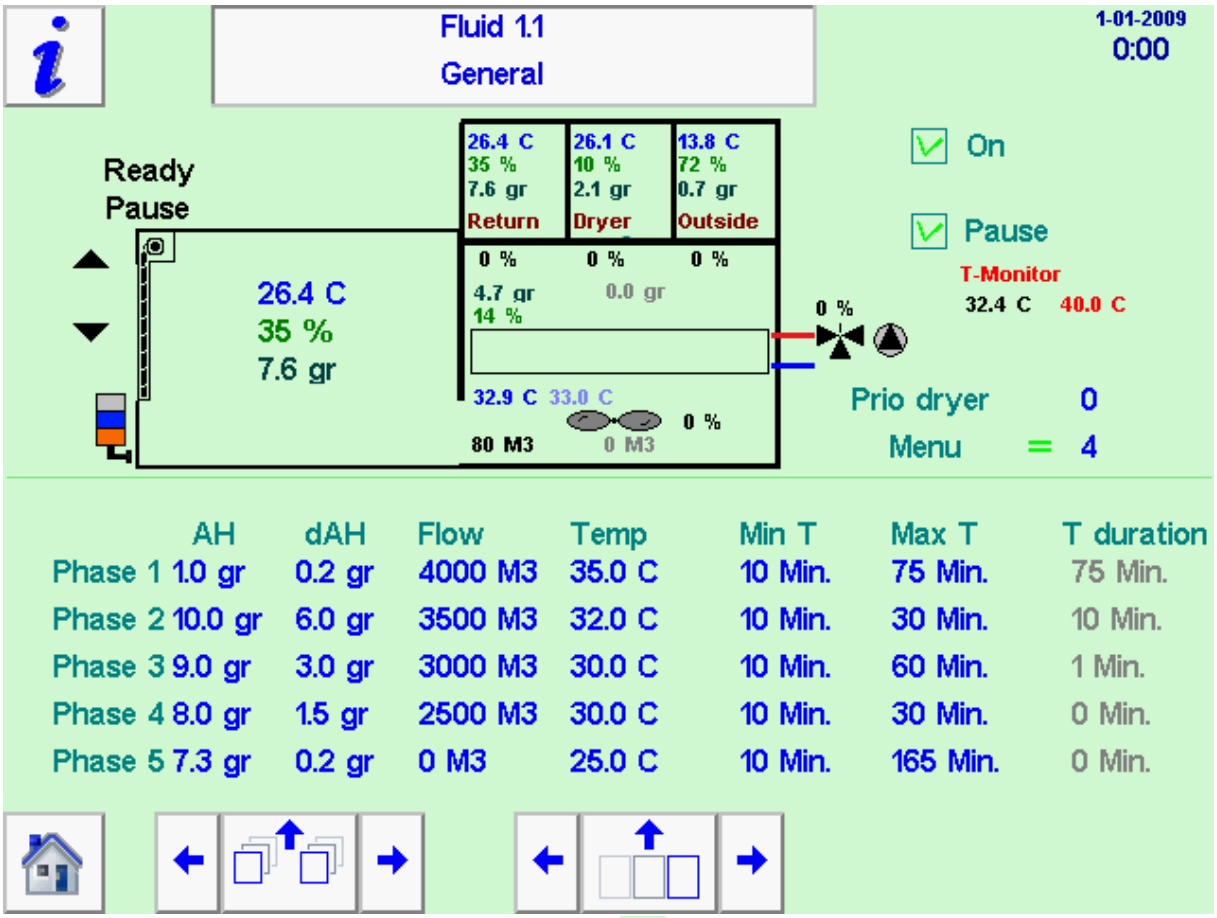
On this page a preset can be defined and logged as a new preset.



Usually an existing menu is opened (enter the number after Menu), after which the adjustments can be made.

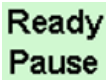
Save menu in nr. 5 The adjusted menu will be saved as menu 5.

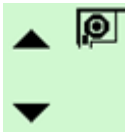
The drying process can be interrupted temporarily by activating the pause button; 

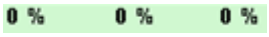


The signal light on the dryer turns blue and orange: 

An hourglass becomes visible: 

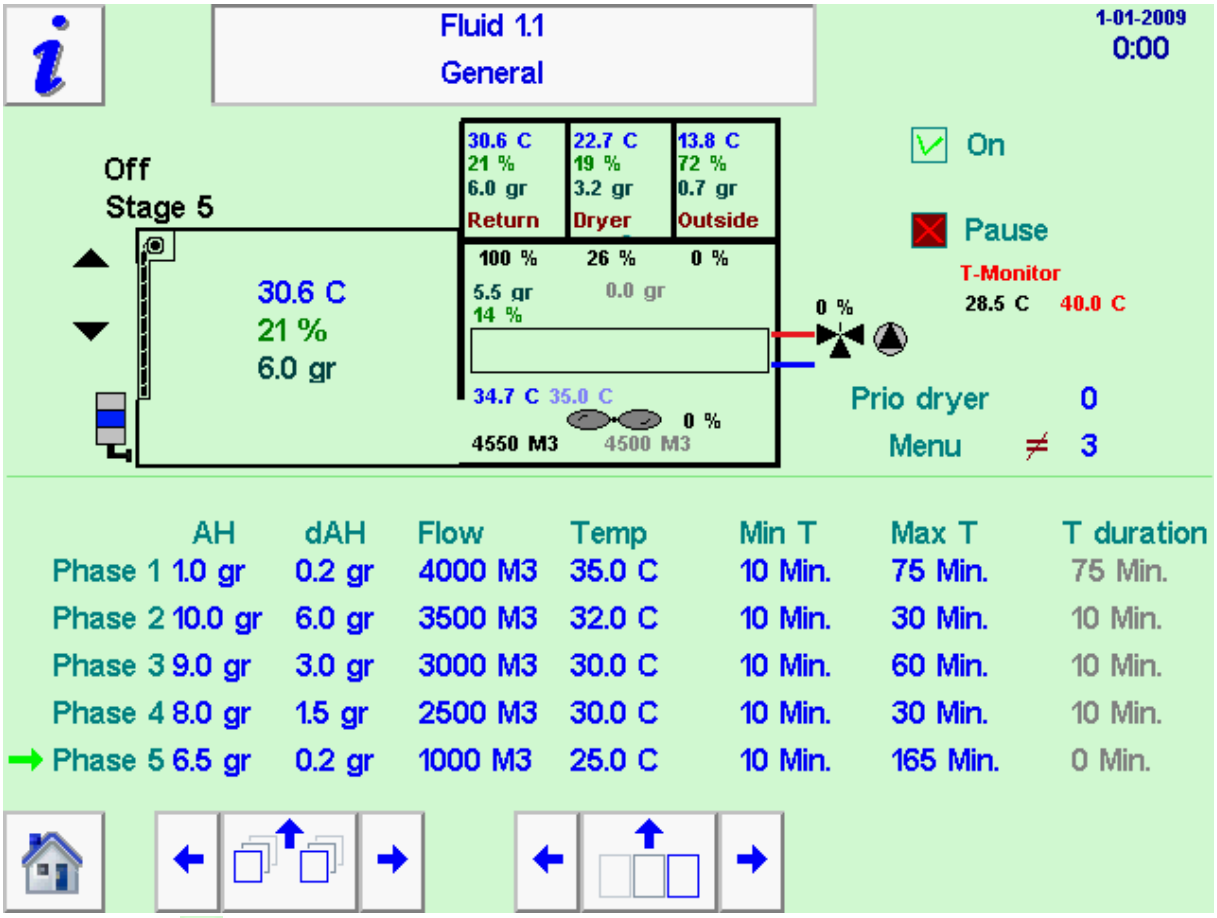
There is a notification that the drying process has stopped because of a pause: 


using the arrow up, the shutter is opened and the box is removed.

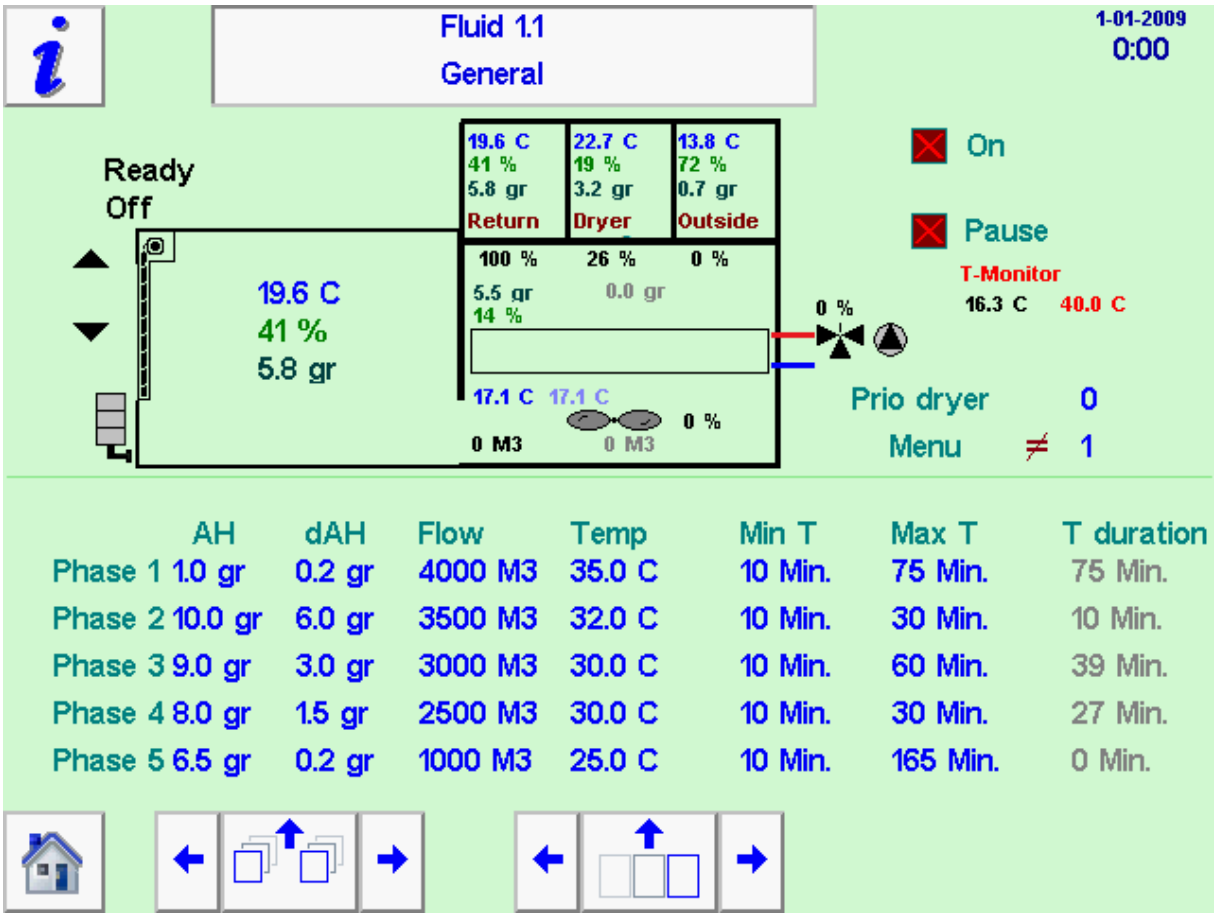


all valves are closed and the fan is off: 

The seed is almost dry when phase 5 has been reached.

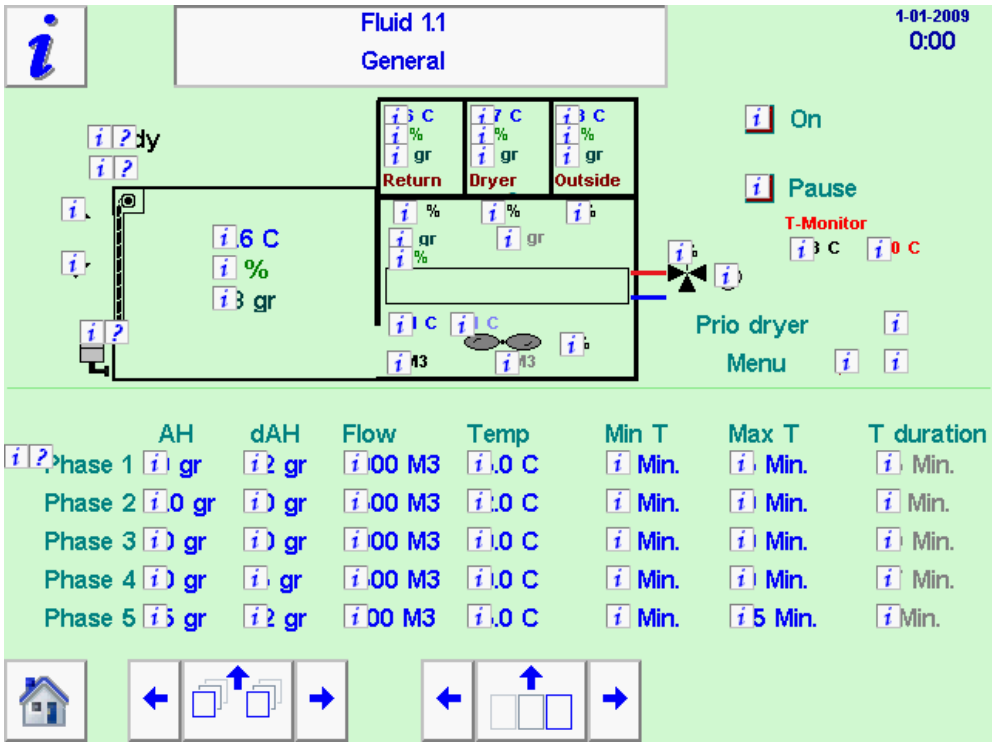


The blue lamp  indicates the last phase has been started; the air from the seed has reached the desired value (6.5 grams) and the air quantity decreases to a minimum value.

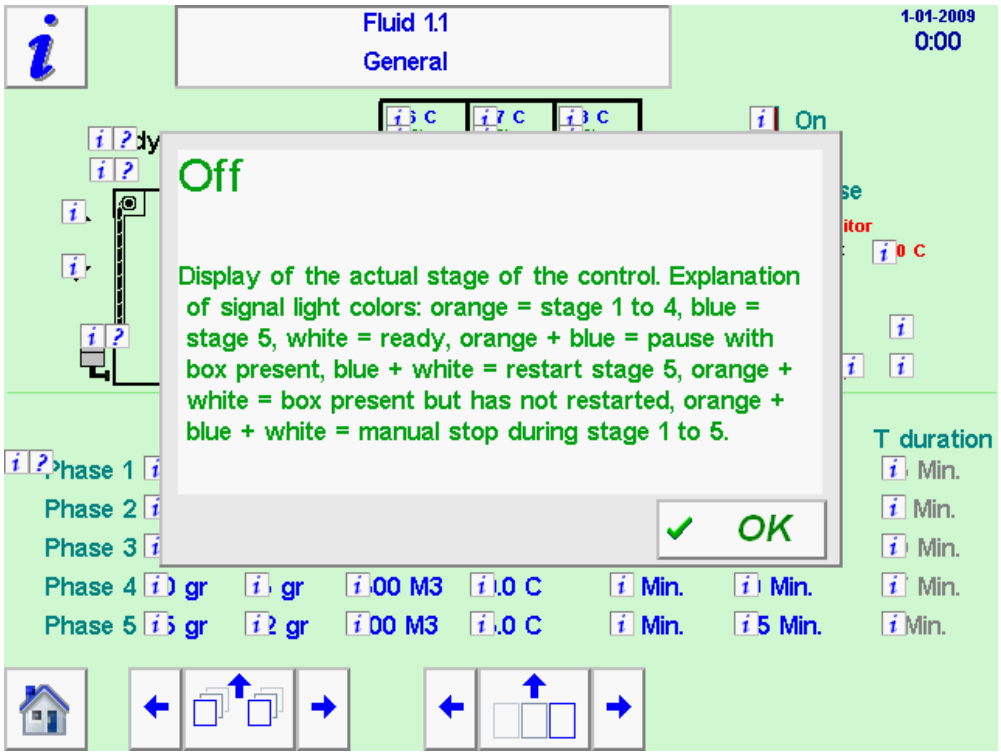

Fluid 1.1
General
1-01-2009
0:00
Ready
Off
19.6 C
41 %
5.8 gr
19.6 C 41 % 5.8 gr Return
22.7 C 19 % 3.2 gr Dryer
13.8 C 72 % 0.7 gr Outside
100 %
26 %
0 %
5.5 gr
14 %
0.0 gr
0 %
17.1 C
17.1 C
0 %
0 M3
0 M3
On
Pause
T-Monitor
16.3 C
40.0 C
Prio dryer 0
Menu 1
AH dAH Flow Temp Min T Max T T duration
Phase 1 1.0 gr 0.2 gr 4000 M3 35.0 C 10 Min. 75 Min. 75 Min.
Phase 2 10.0 gr 6.0 gr 3500 M3 32.0 C 10 Min. 30 Min. 10 Min.
Phase 3 9.0 gr 3.0 gr 3000 M3 30.0 C 10 Min. 60 Min. 39 Min.
Phase 4 8.0 gr 1.5 gr 2500 M3 30.0 C 10 Min. 30 Min. 27 Min.
Phase 5 6.5 gr 0.2 gr 1000 M3 25.0 C 10 Min. 165 Min. 0 Min.

On the touchscreen a help and information feature can be activated;

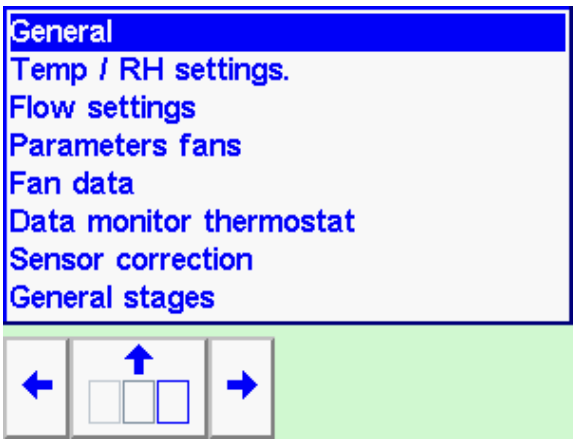
- Click on  and the information items become visible.



When you click on a  , the information becomes visible.

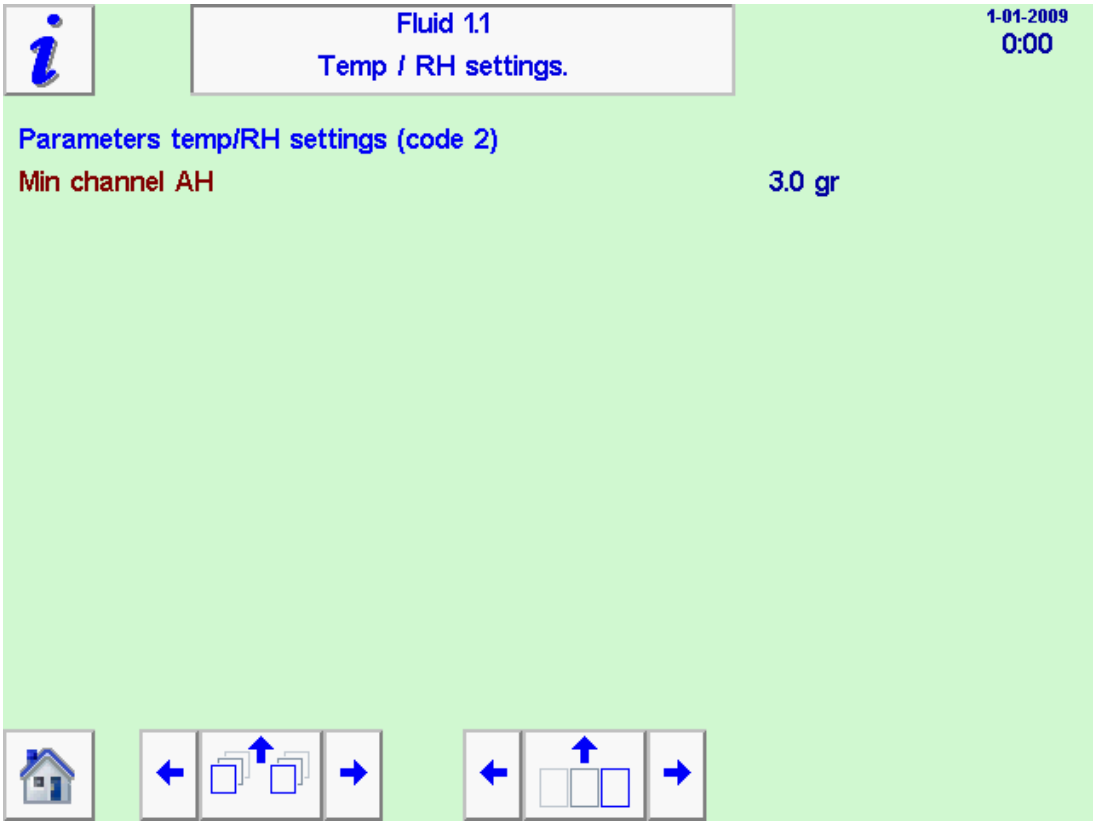


Extra pages can be selected directly, clicking on  . This will open a selection feature.

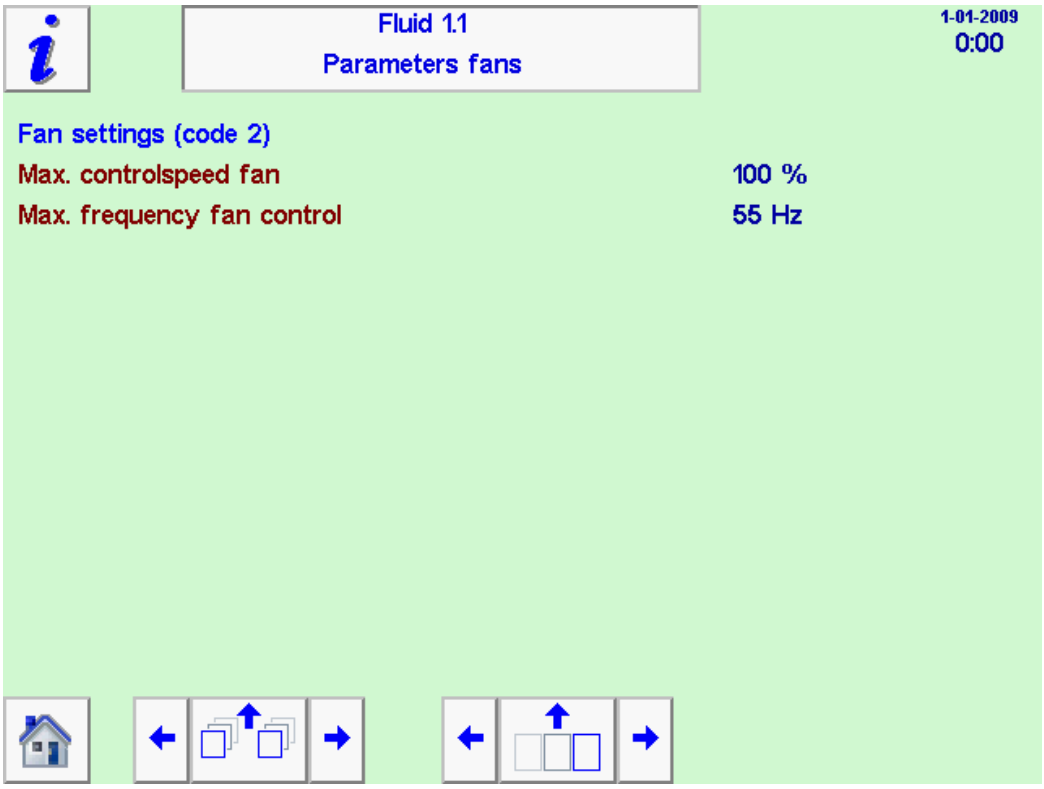


You can also choose successive pages by clicking the arrows  or  .

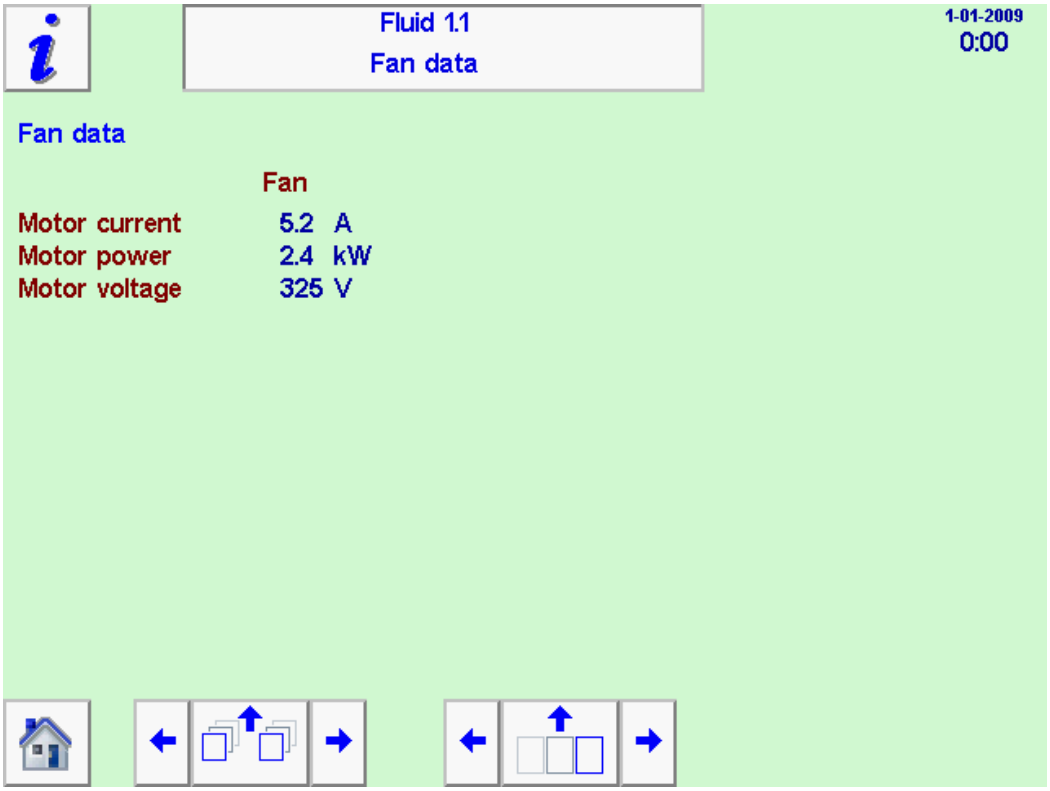
The various screens follow below.



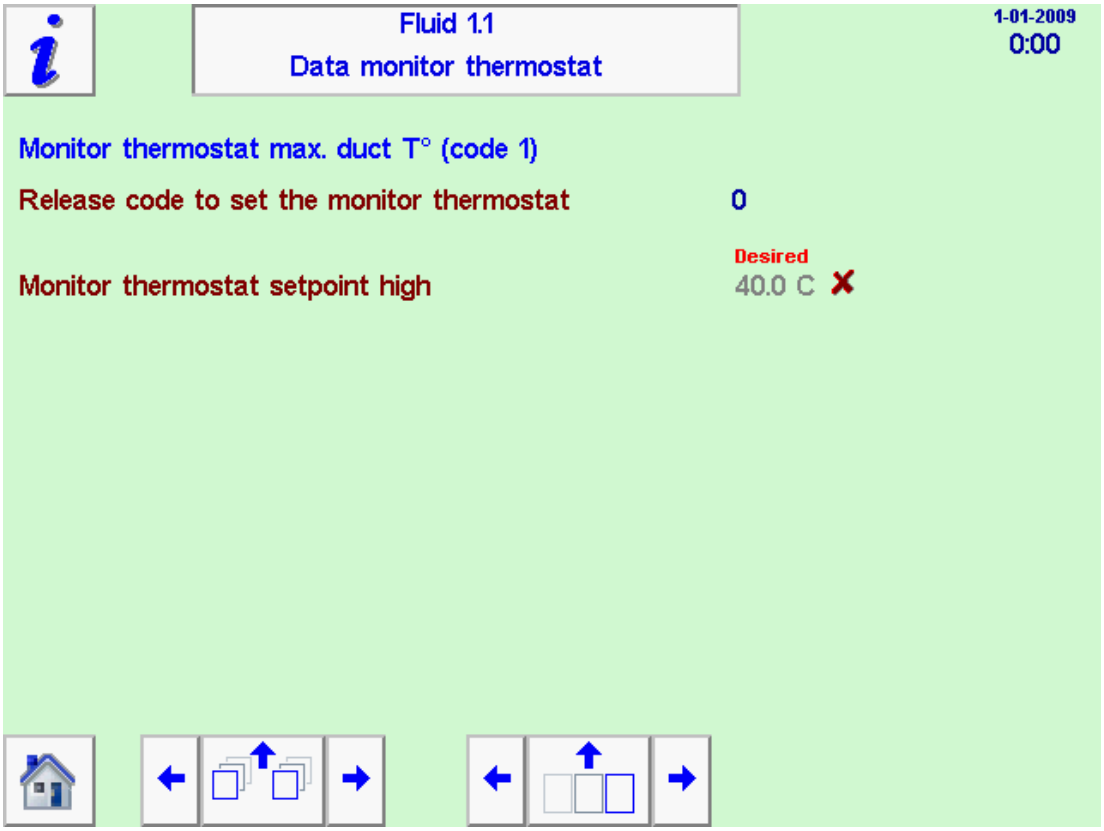
On this page you will find the temperature and RH settings. The desired duct AH cannot be lower than the value configurated for the minimum channel AH, in this example not lower than 3.0 grams.



On this page you will find the fan parameters. The absolute maximum percentage at which the fan can be controlled (in this case 100%) and the maximum frequency (here 55 Hz) can be configurated here.



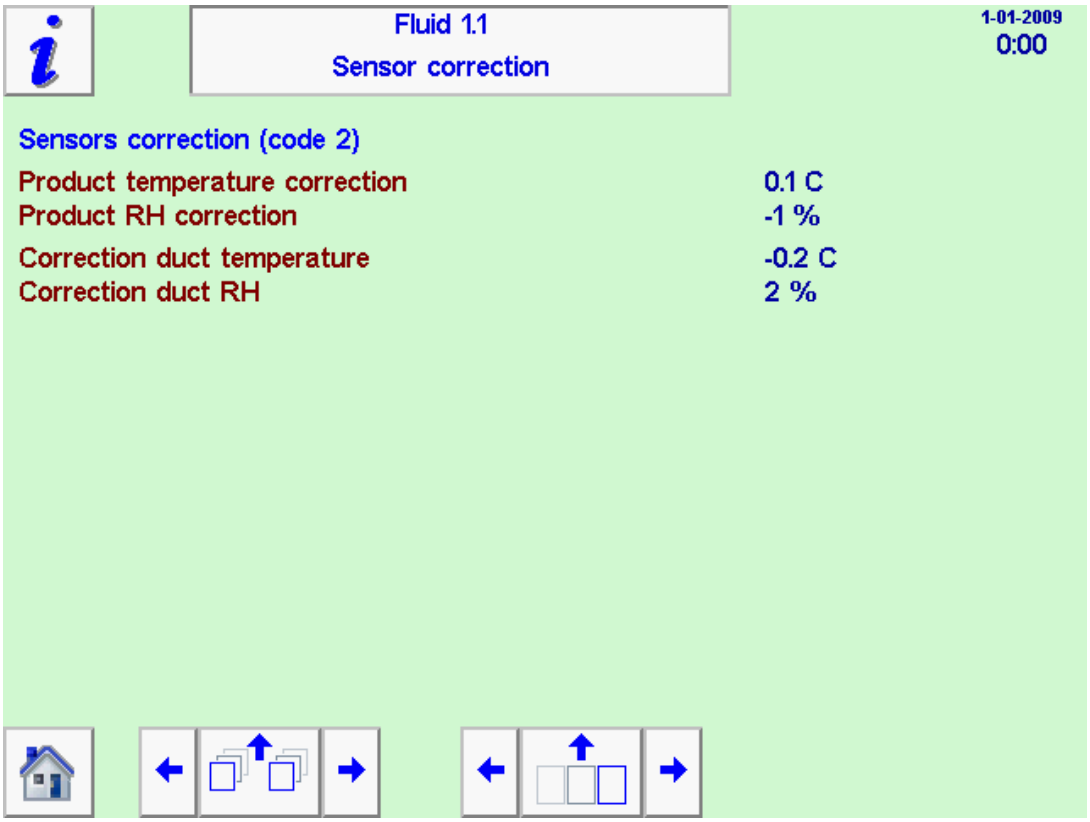
On this page you will find the fan data. The currently controlled power to the fan motor is 5.2 Amp. The motor power is 2.4 kW. And the currently controlled voltage to the fan motor is 325 Volt.



On this page you will find the monitor thermostat data. To enable the configuration of the desired temperature of the monitor thermostat, the release CODE should be entered here. (this code = 11).

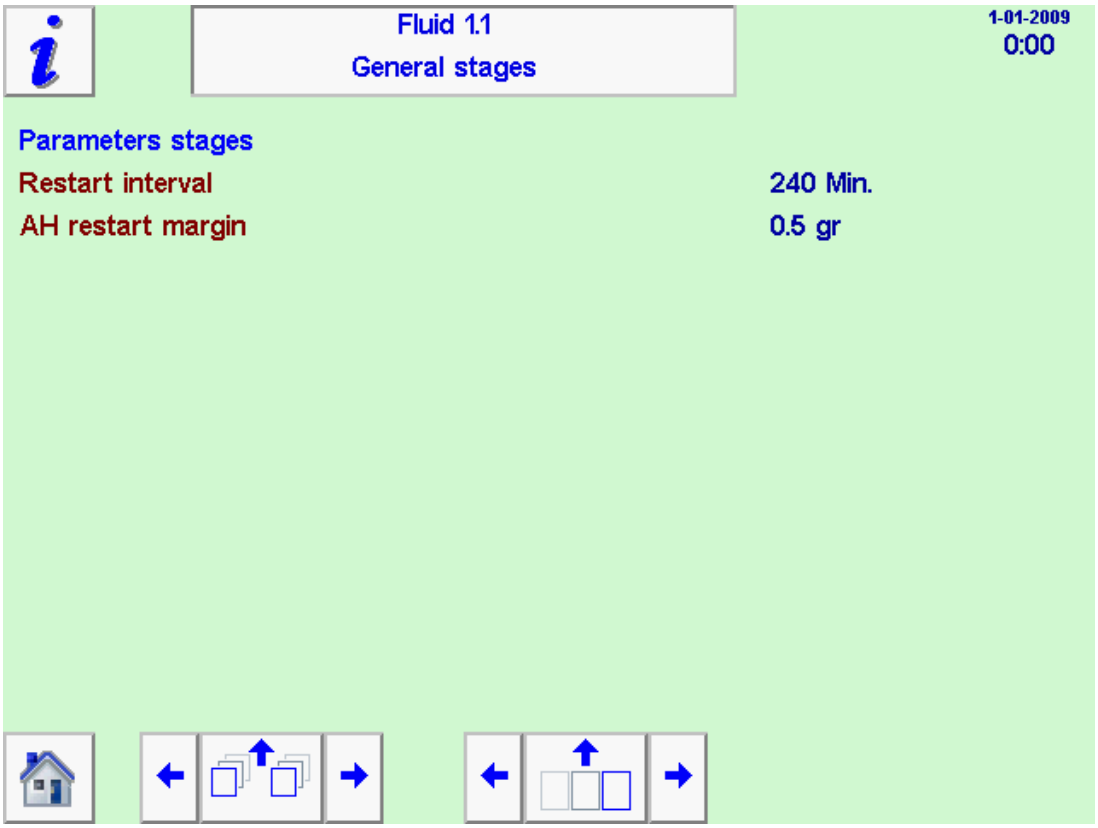
The second line displays the configurated setpoint of the monitor thermostat.

The symbol behind the value indicated if the release code has been entered correctly. Mark = OK, Cross = NOT OK.



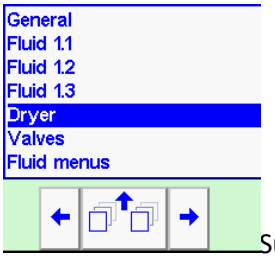
On this page the sensors can be corrected. These are settings to:

- correct the measurement of the product temperature.
- correct the measurement of the relative humidity (RH) of the product.
- correct the measurement of the channel temperature.
- correct the measurement of the relative humidity (RH) of the channel.

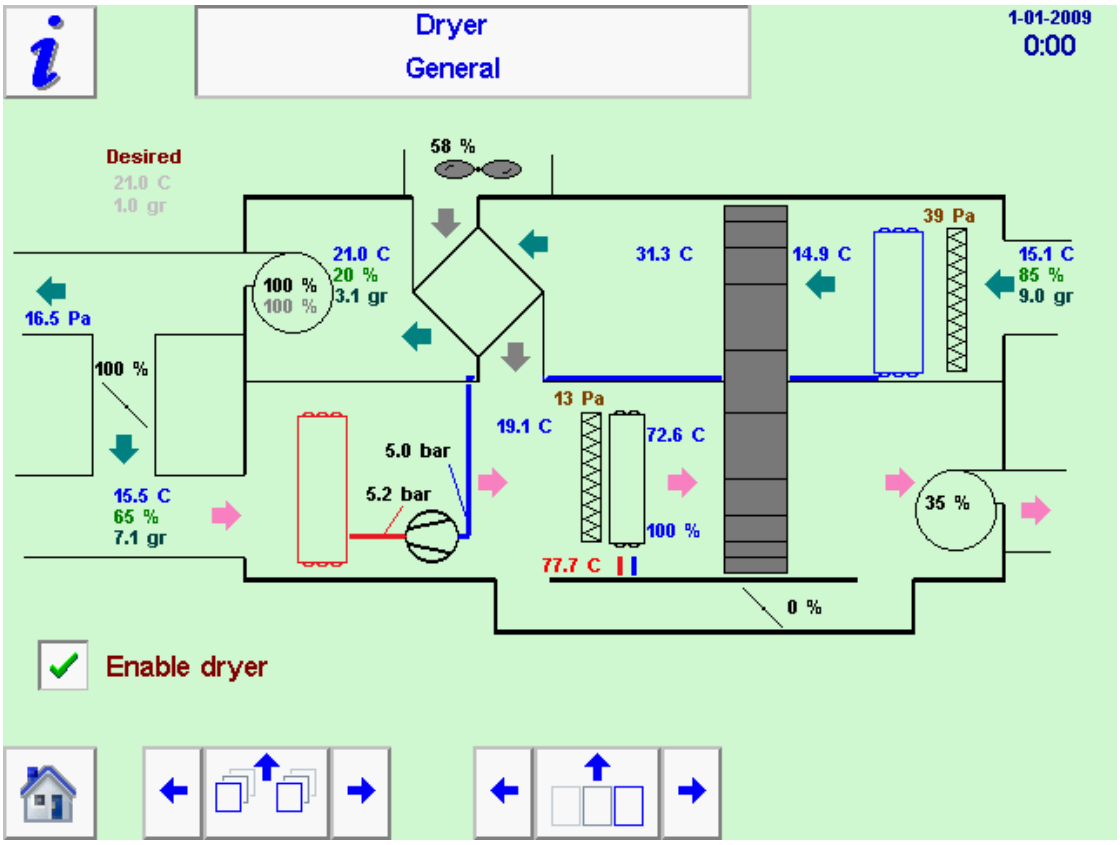


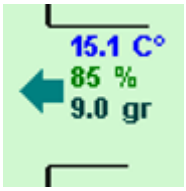
On this page the general stages can be configurated.
The restart interval indicates a time of 240 minutes. If the box is ready during this time, after this time the process will start in phase 5, starting with flow from phase 5, until flow phase 4! When this value is '0 min', no restart will take place.

The AH restart margin (0.5 grams) related to the AH. If the box AH at restart (after the waiting time) is more than (or equal to) this margin + end AH phase 5, then the restart will actually be performed.



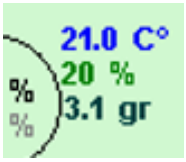
Subsequently, the dryer can be selected in the menu. Here you will find an overview of the drying process and the drying parameters can be configurated.



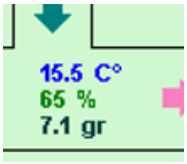


On the right side of this overview, the measured values of the ingoing process air of the air dryer are displayed.

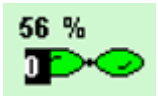
This mark indicates if the air dryer has been released. When released (mark), the air dryer can be switched on if this is demanded by the process.



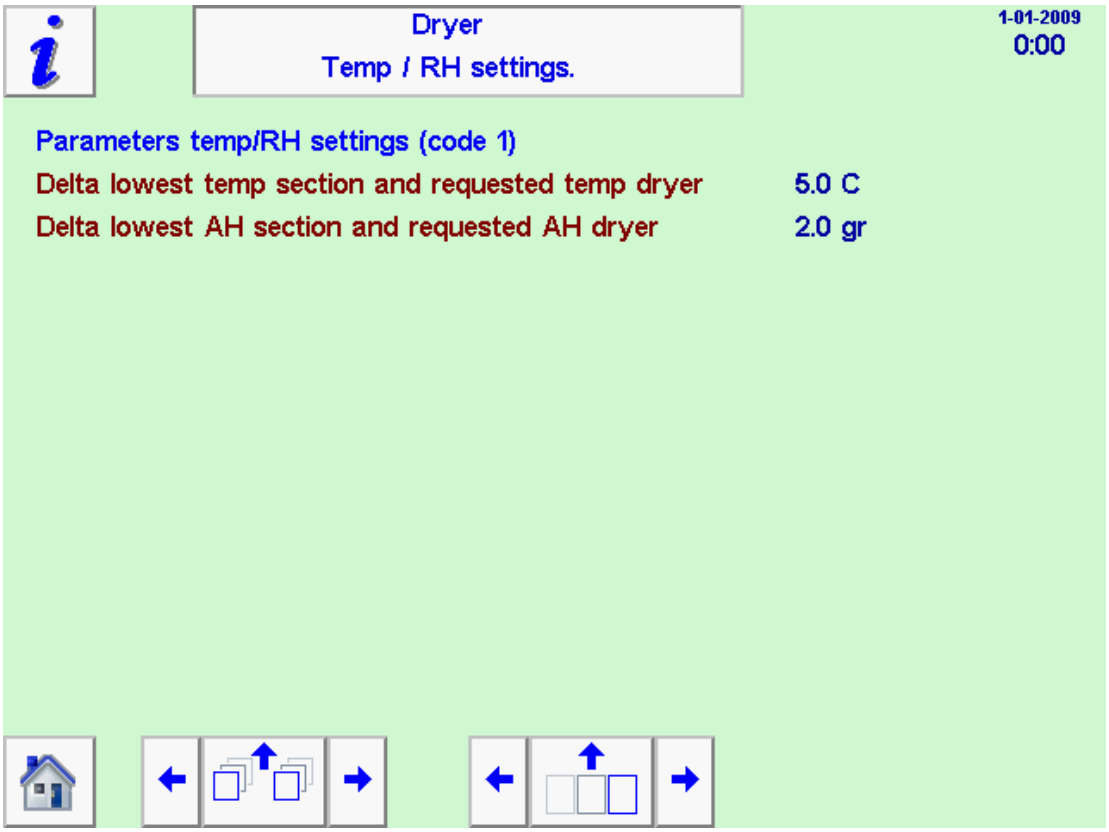
These values represent the measured values of the outgoing process air of the air dryer.



At the bottom left, the measured values of the ingoing regeneration air are displayed.



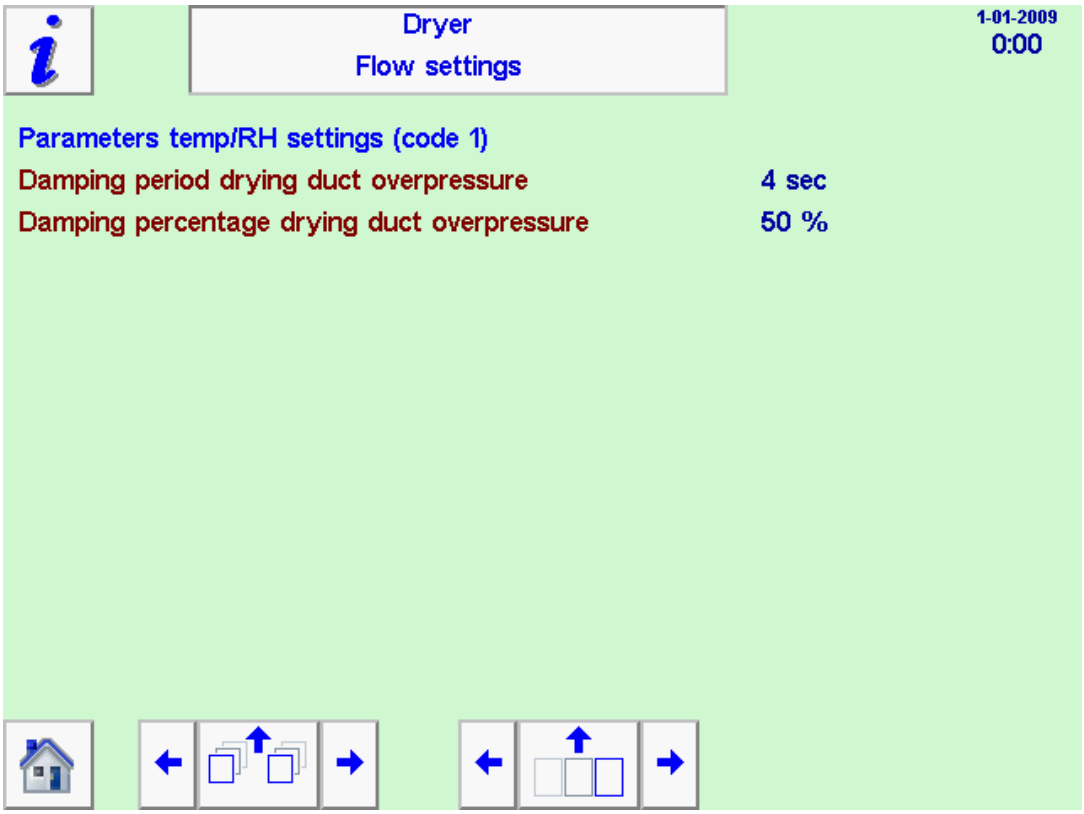
The current control of the cooling air fan is 56%.



For the dryer, the temperature and the RH can also be configurated.

The temperature indicates in this case how much colder the outgoing air of the air dryer can be in degrees (5.0^{o}C), in comparison to the lowest demanding active box position. The desired difference can be adjusted here.

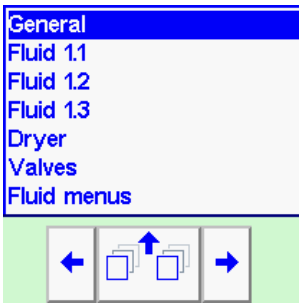
The setting for the AH relates to how much drier the outgoing air of the air dryer should be, in relation to the lowest demanding active box position. This difference should therefore be 2.0 grams.



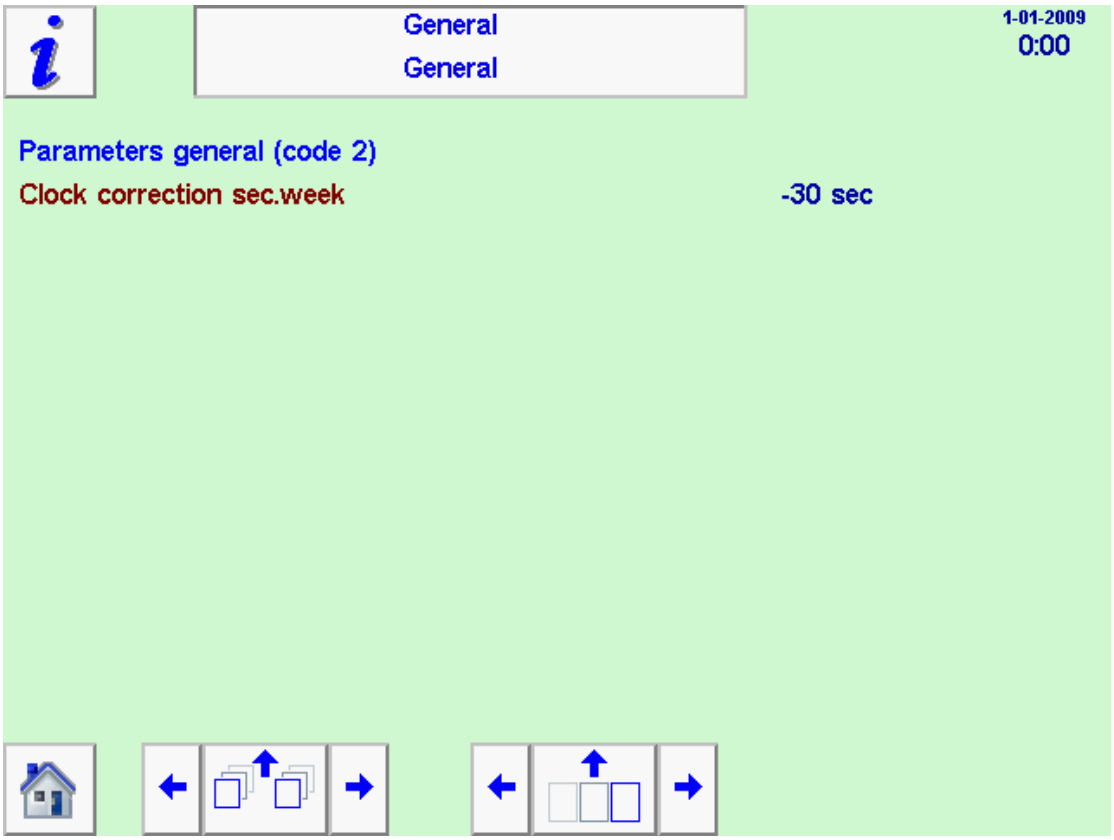
On this page the flow can be configurated.

Setting of the sample time relates to the pressure measurement of the overpressure in the dryer channel. Every four seconds a new value is retrieved from the pressure sensor. This should be configurated in multiples of 2 sec.

The setting of the damping percentage relates to the overpressure of the pressure sensor for the dryer channel (50%). A higher value means more damping.

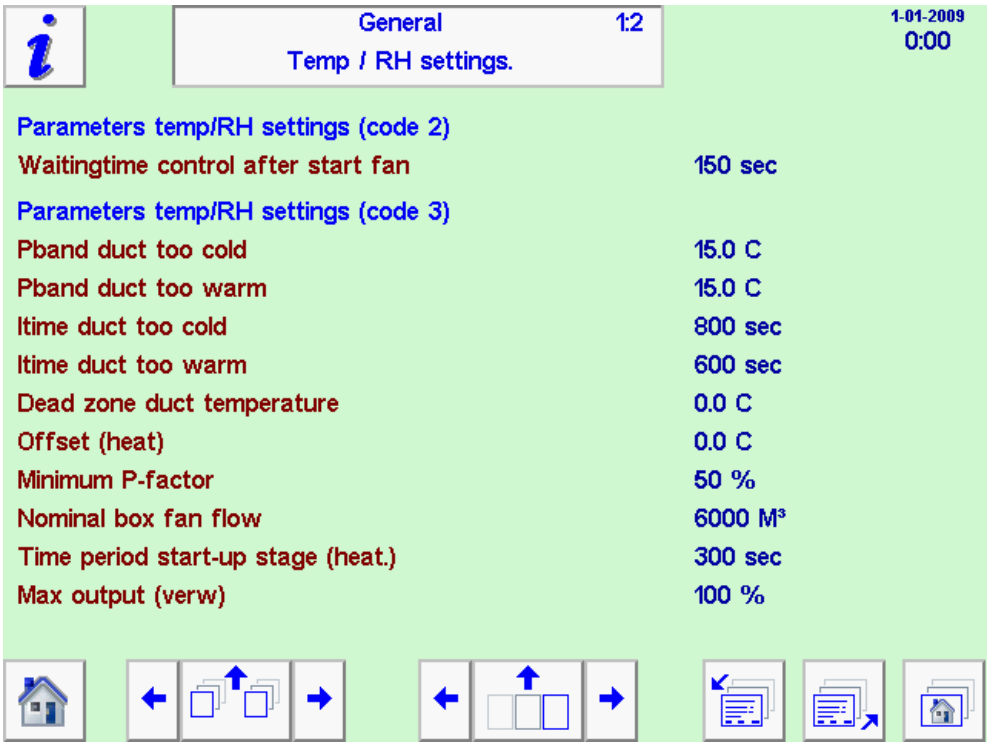


Subsequently, ‘general’ can be selected in the menu. These are the settings for the general process.



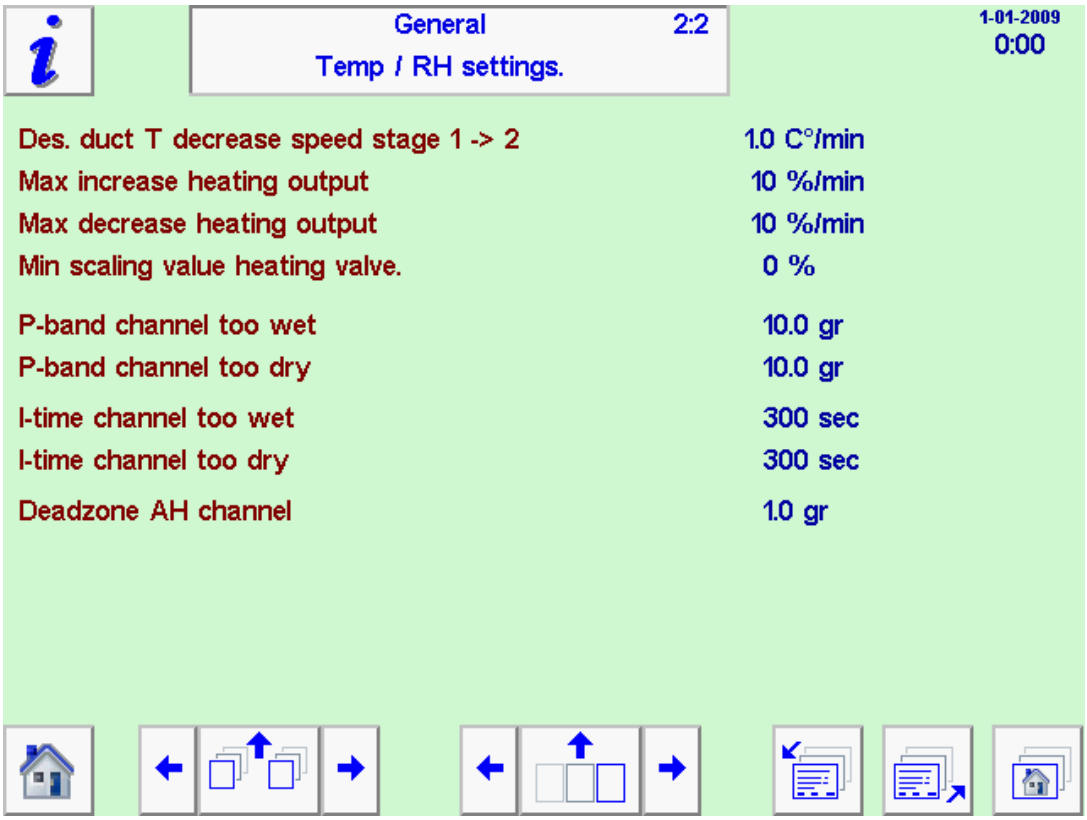
On this page the realtime clock can be corrected in sec/week. Positive means the clock is running too slow, negative means the clock is running too fast. Depending on how the clock is running, the clock will be put X sec forward or backward.

This clock runs 30 seconds per week too fast, and will be readjusted by 30 seconds every week.

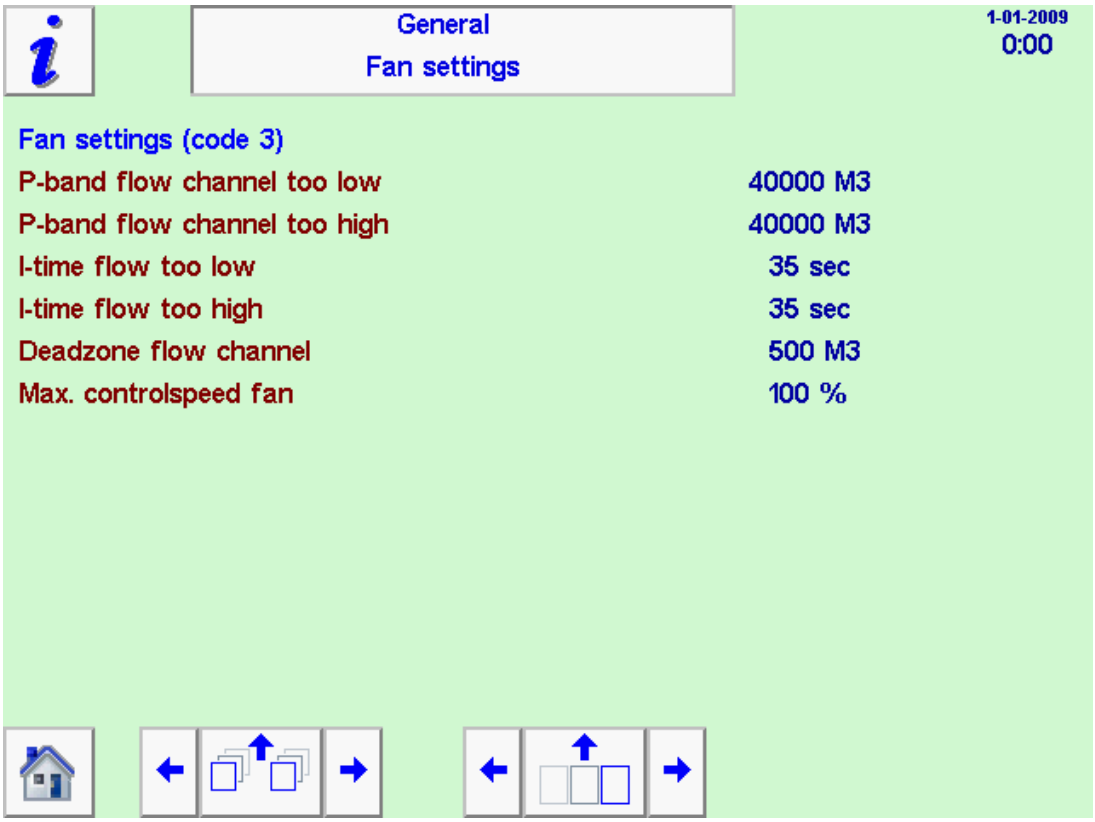


If a page consists of several parts, these buttons can be used to switch between pages.

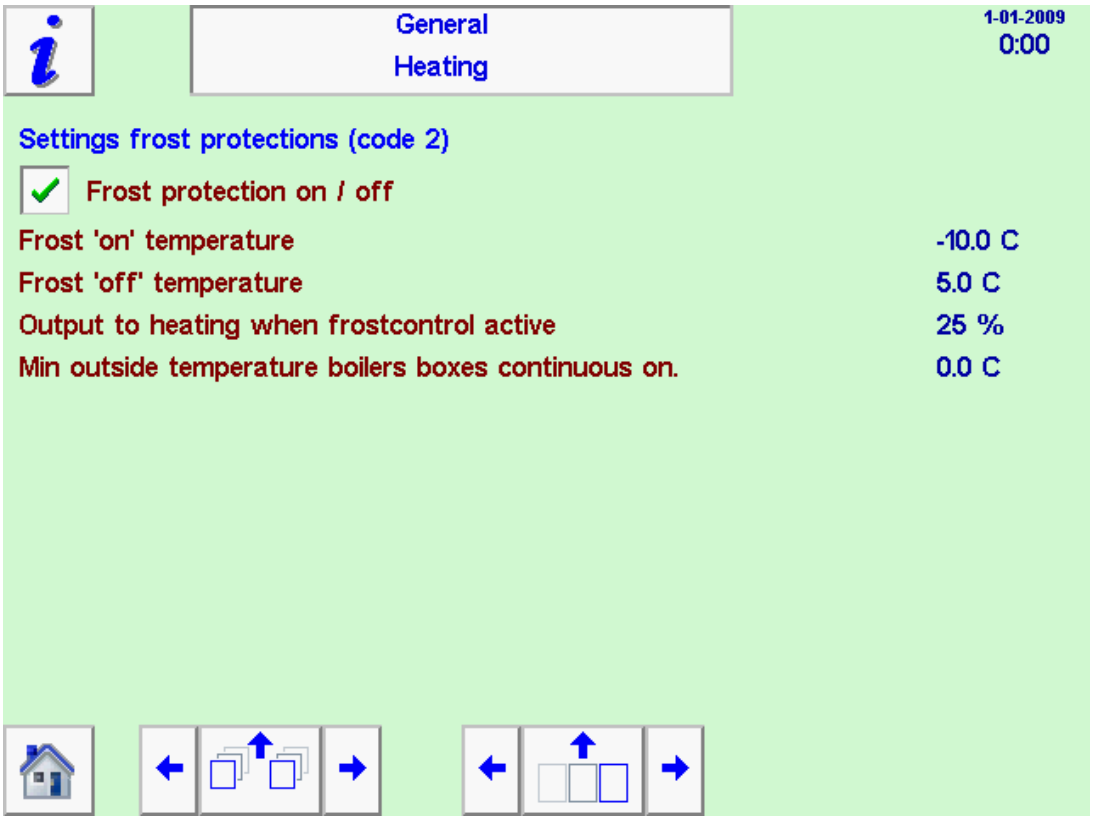
Waitingtime control after start fan	Here the waiting time at the start of the process can be configurated. This is to achieve a correct measurement at the start of the drying process.
Pband duct too cold	Setting for Pband of the air valves process, higher number means slower process.
Pband duct too warm	Setting for Pband of the channel AH process, higher number means slower process.
Itime duct too cold	Setting for the speed of the temperature control at too low temperature values. A higher number means a slower process.
Itime duct too warm	Setting for the speed of the temperature control at too high temperature values. A higher number means a slower process.
Dead zone duct temperature	Setting for the deadzone of the channel temperature (T). The deadzone is symmetrically around the channel T setpoint. If the measured channel T falls within the deadzone, the heating control will not be changed.
Offset (heat)	Setting for the offset of the heating process. It allows you to adjust the temperature setpoint for control. Process setpoint = configurated setpoint + offset.
Minimum P-factor	Minimum P-factor. This factor allows the Pband of the fan to increase at lower desired air flow.
Nominal box fan flow	Nominal max. air quantity which is used for the phases. This setting is used in combination with the P-factor, to adjust the correction of the Pband heating to the air flow.
Time period start-up stage (heat.)	Setting for the time period of the starting phase of the PID heating. During the starting phase, the Pband is adjusted with the minimum P-factor.
Max output (verw)	Setting for the maximum percentage of the heating control.



Des. duct T decrease speed stage 1 -> 2	Setting for the speed at which the desired channel temp is adjusted, when switching from phase 1 to phase 2.
Max increase heating output	Setting for the maximum temperature at which the heating control can increase.
Max decrease heating output	Setting for the maximum temperature at which the heating control can decrease.
Min scaling value heating valve.	Minimum rescaling value heating valve
P-band channel too wet	Setting for Pband of the channel AH process, higher number means slower process.
P-band channel too dry	Setting for Pband of the air valves process, higher number means slower process.
I-time channel too wet	Setting for the speed of the air valves process at too high AH values. A higher number means a slower process.
I-time channel too dry	Setting for the speed of the air valves process at too low AH values. A higher number means a slower process.
Deadzone AH channel	Setting for the deadzone of the channel AH. The deadzone is symmetrical around the channel AH setpoint. If the measured AH falls within the deadzone, the air valve control is not changed.



P-band flow channel too low P-band flow channel too high	Setting for Pband of the air flow process, higher number means slower process.
I-time flow too low	Setting for the speed of the air flow fan process at too low flow values. A higher number is a slower process.
I-time flow too high	Setting for the speed of the air flow fan process at too high flow values. A higher number is a slower process.
Deadzone flow channel	Setting for the deadzone of the air flow measurement of the box fan. The deadzone is symmetrical around the flow setpoint. If the measured flow falls within the deadzone, the fan control is not changed.
Max. controlspeed fan	Setting for the absolute maximum percentage at with the fan can be controlled.



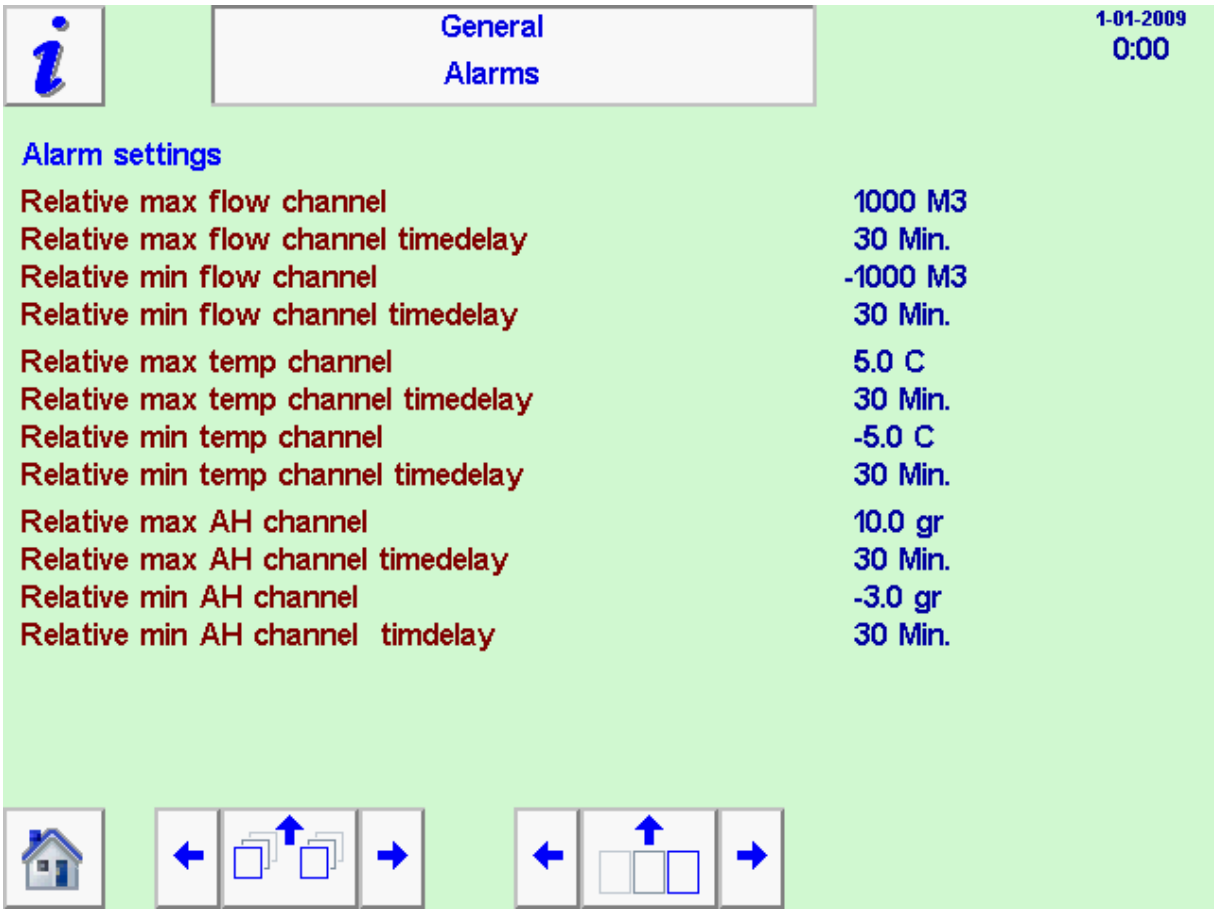
On this page the heating can be controlled.

Frost protection on / off When the frost protection is on (☑), frost protection will actually be switched on and off based on the 'frost temperatures for on and off'. When the frost protection is off (☒), frost protection will never be switched on.

The frost temperatures for on and off, indicate which value the outside temperature should reach for the frost protection to switch on and off. The frost protection in this case will be switched on at -10°C and switched off at 5.0°C (provided that frost protection is 'on').

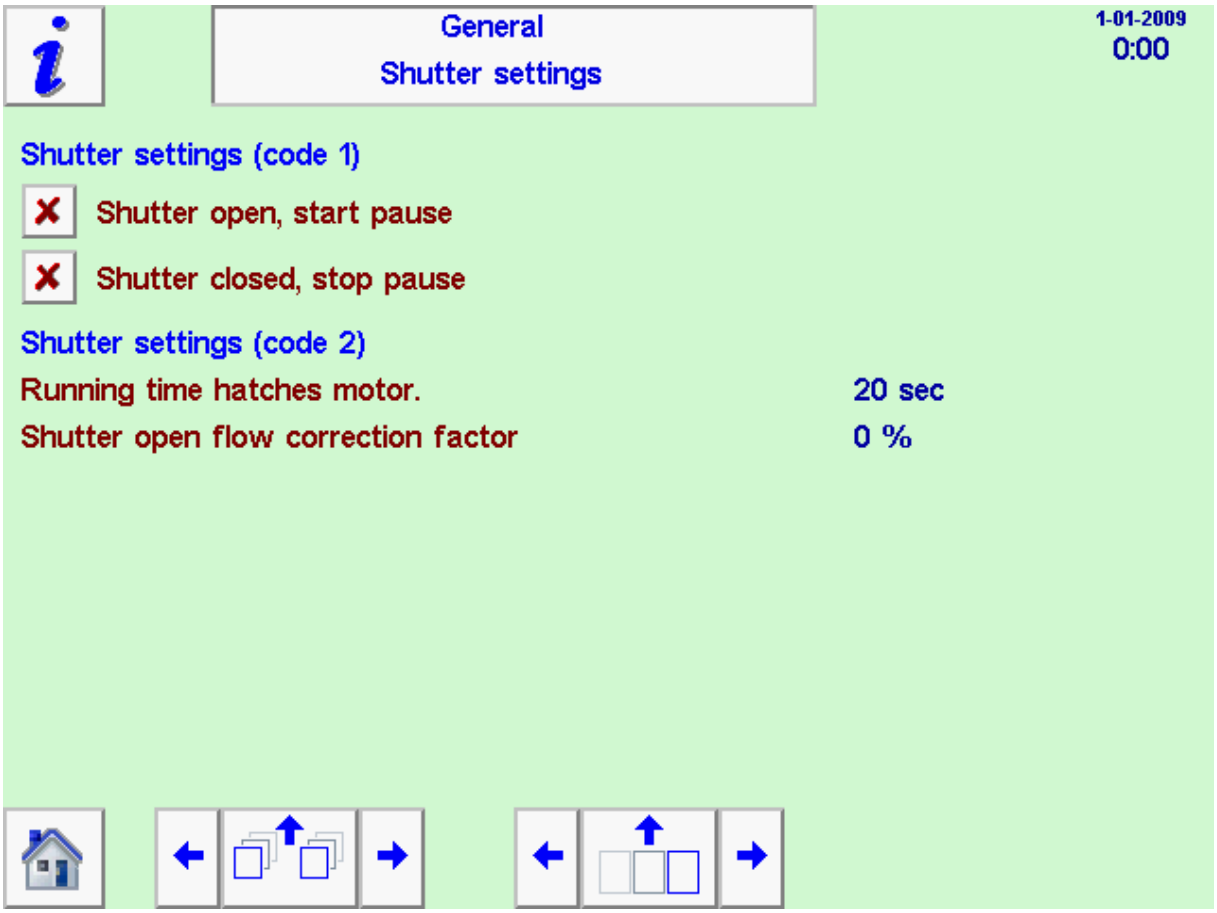
Output to heating when frostcontrol active: This percentage displays the frost control, this is also the minimum control. If the process demands more, the demand of the process is taken over by the heating.

Furthermore, the value of the minimum outside temperature can be configurated, during which the heating pumps on the box sections are switched on continuously. When the outside temperature is below 0.0°C, the pumps are running continuously.



On this page the alarms can be configurated. When a specific value comes above the configurated maximum or below the configurated minimum, after a delay time (which can be configurated manually, and in this case is 30 minutes), an alarm will be activated.

'Relative' in this case means the configurated value will automatically be adjusted to the generally desired values which are configurated by the user. This applies to the desired flow, as well as to the desired temperature and desired absolute moisture content.

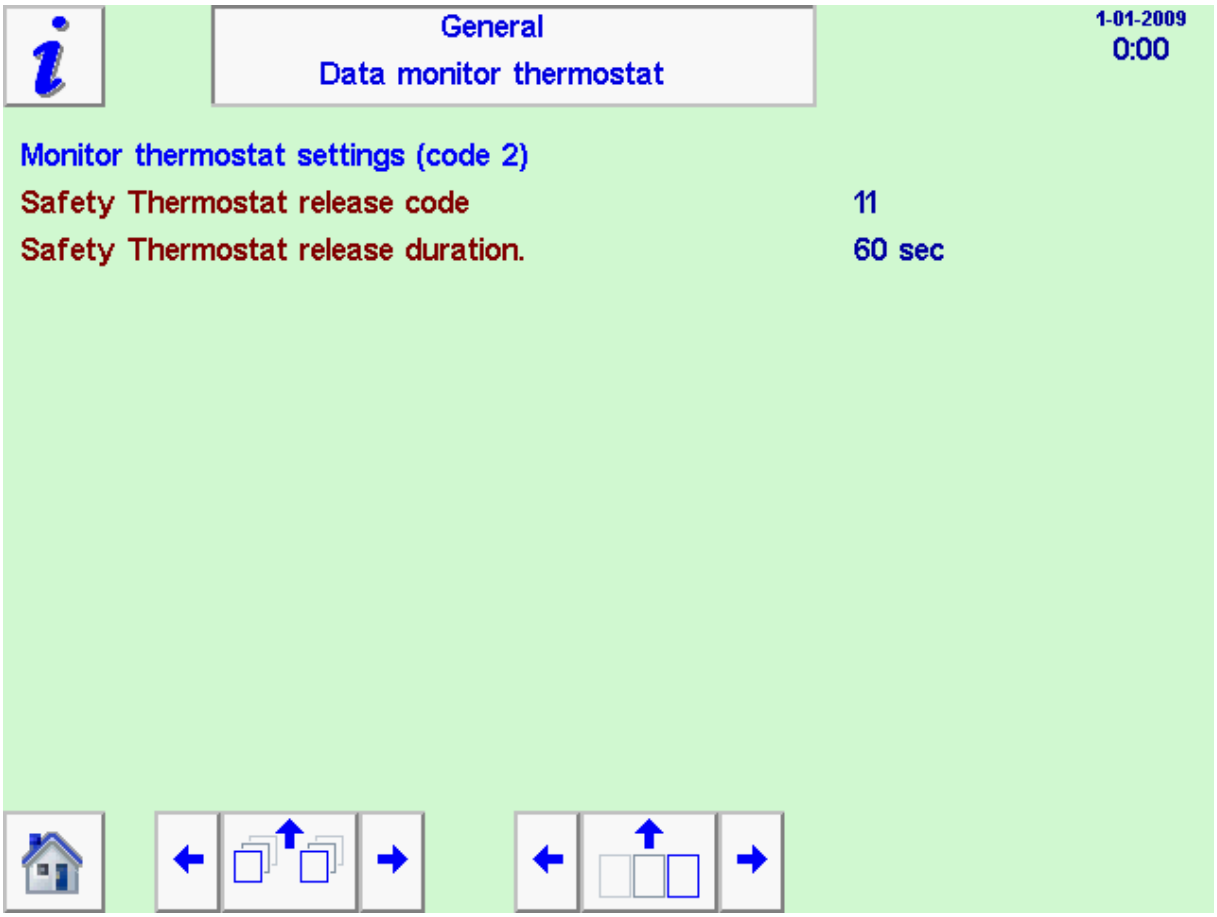


On this page the shutters can be configurated.

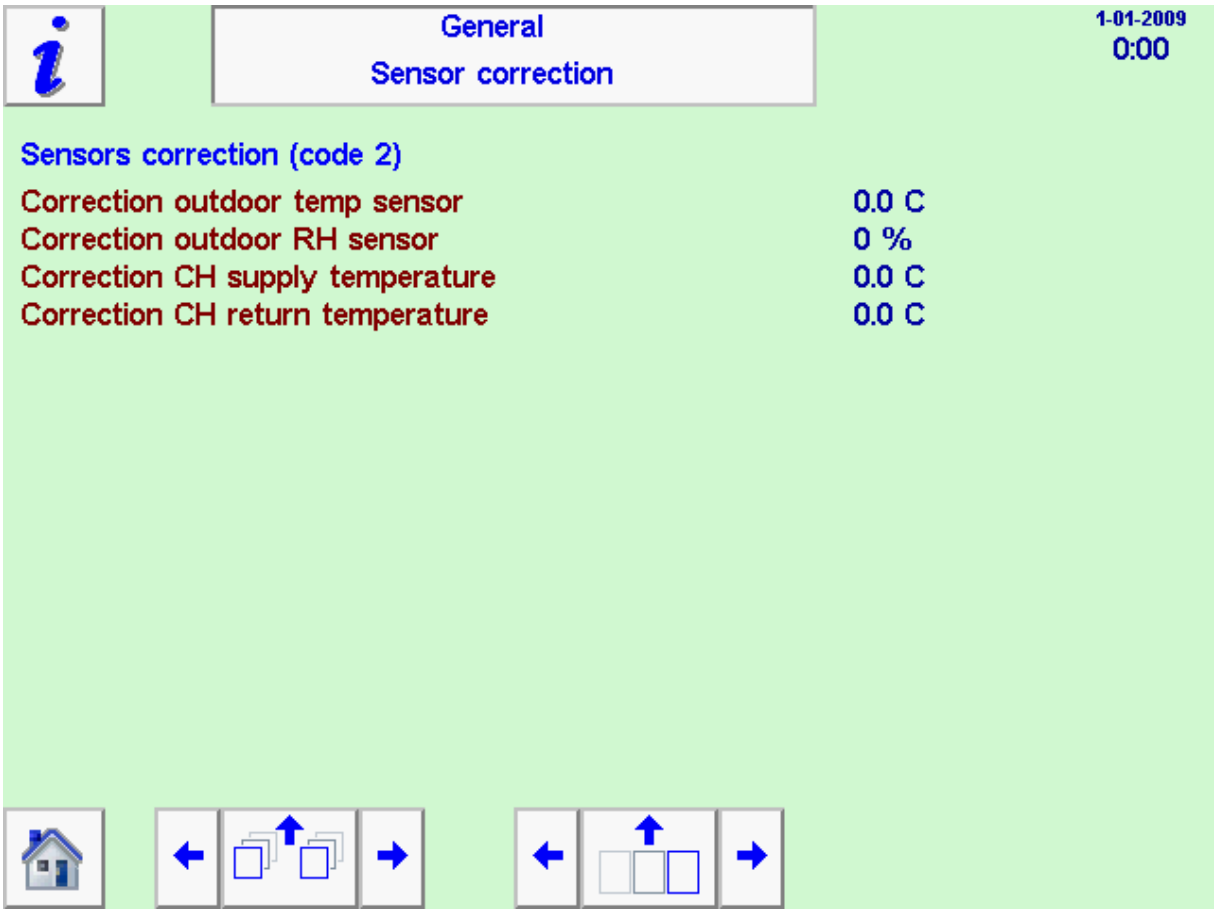
Setting to automatically pause the process when the shutter is opened.

Setting to resume the process from pause when the shutter is closed.

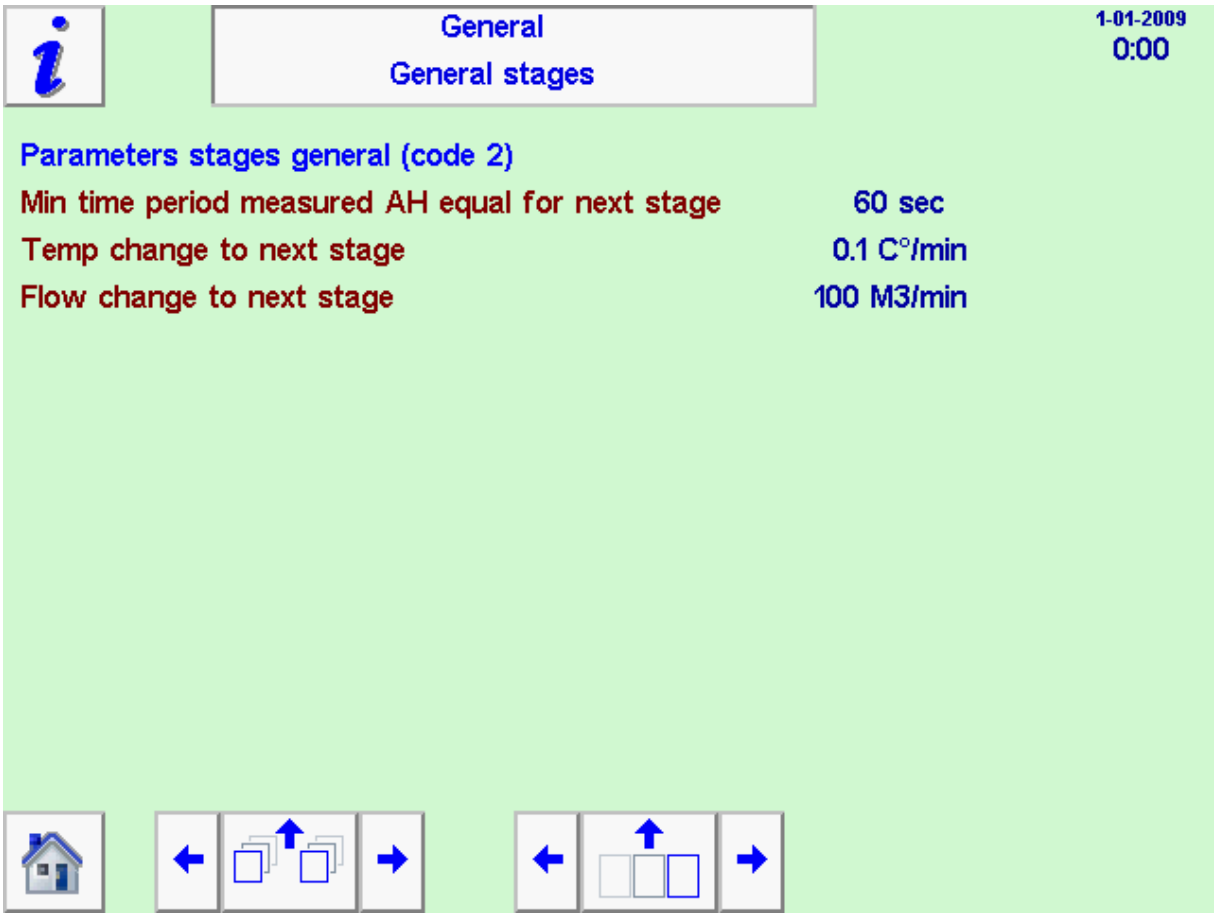
The runtime of the shutter can also be configurated here. The time it takes from a completely closed to completely opened position. The correction factor in this case, is the factor at which the air flow automatically can be adjusted, when the shutter is opened. A positive number means more flow, a negative number means less flow.



On this page the monitor thermostat data can be found.
Here the release code can be configurated (CODE=11) as well as the time frame in which the monitor thermostat release code is active. Within a time frame of 60 seconds, the settings of the monitor thermostat can then be adjusted.



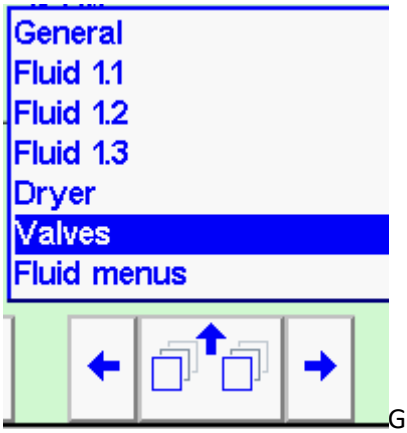
On this page the sensors can be configurated.
For instance, to correct the measurement of the outside temperature as well as the outside RH.
Furthermore, the supplied and returned temperature of the CH can be corrected.



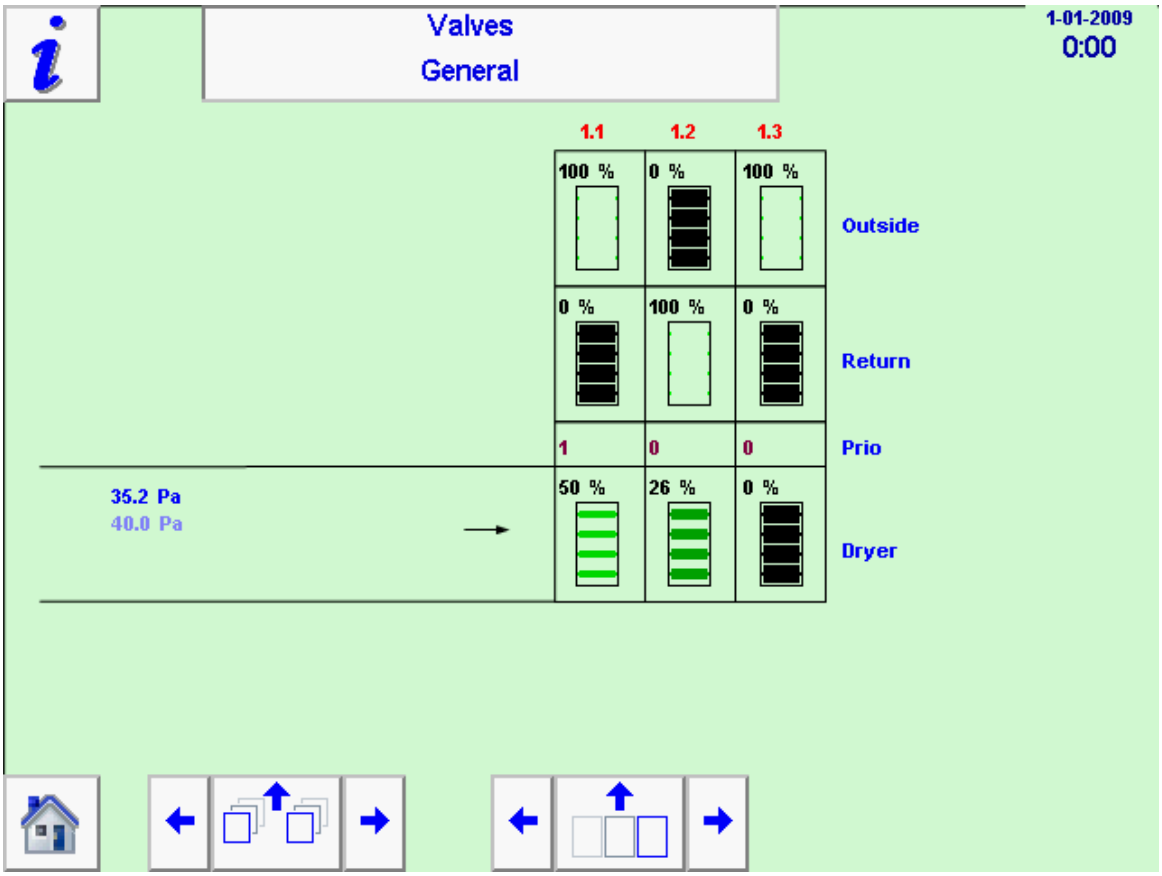
Before going to the next phase, the measured absolute moisture content should be equal to or lower than the desired value for a longer period. The minimum time here is 60 seconds and this can be configurated. It is the time the desired value should be measured (or should remain below this value) before it is possible to switch to the next phase.

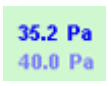
Settings to gradually change the temperature when the phases switch, based on equal or decreasing absolute moisture content of the product. The temperature changes 0.1°C per minute.

100 m3/min is the maximum speed of the air flow change, when switching between the phases 2, 3, 4, 5.

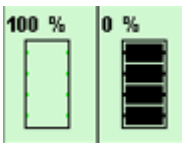


Go to 'Valves' in the menu to get an overview and parameters of the valves.

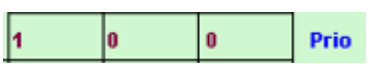




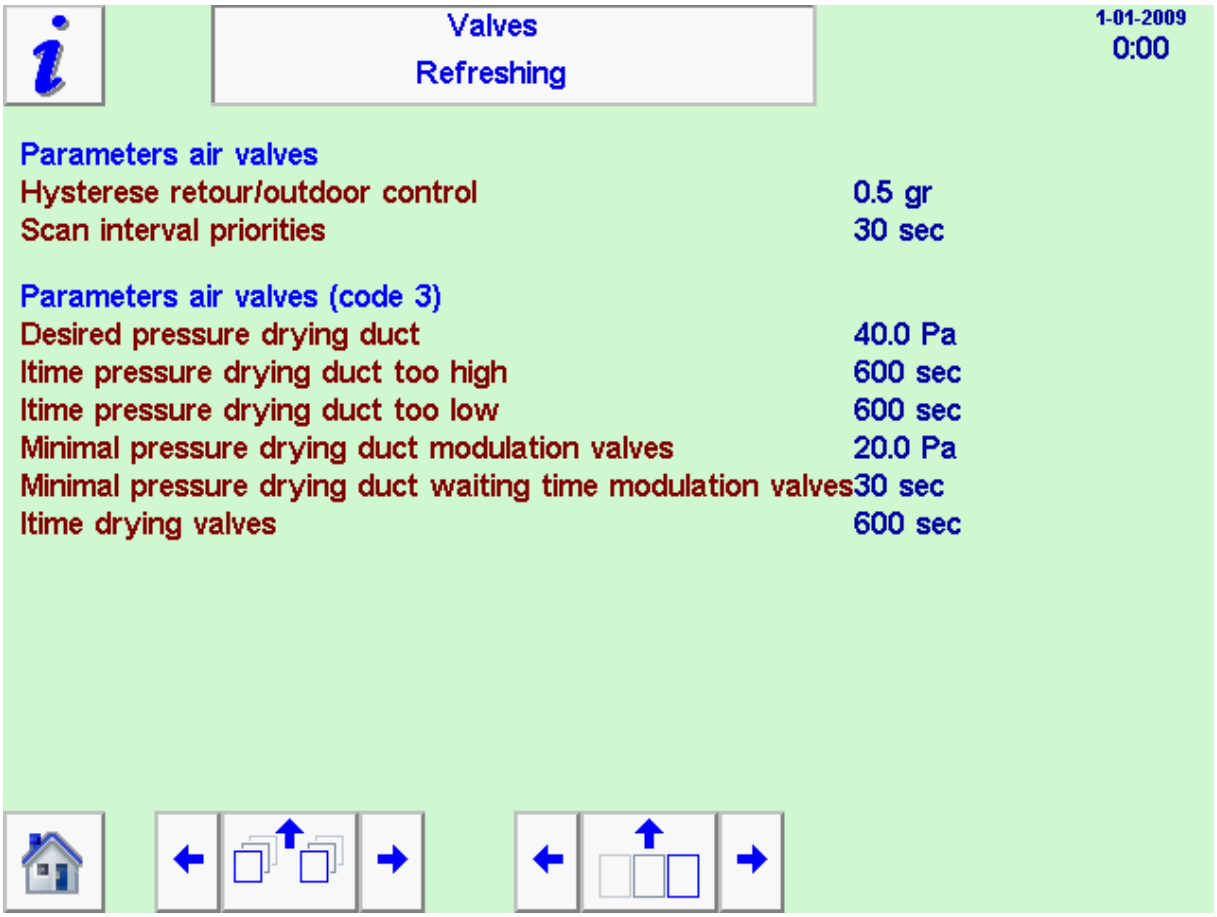
These values left in the screen indicate the desired and measured overpressure in the dryer channel. 35.2 Pa is the measured value in this example, and 40.0 Pa the desired value.



In the overview the current controls can be read from the outside valves, the return air valves and the dryer air valves.



You can also read the assigned priority which is provided to the box position by the process. In this case, the priority lies with box position 1.1.



The various parameters of the valves can be configurated on this page.

Differential to switch dryer from outside to inside air.

Furthermore, every 30 seconds the priority of the box positions is determined.

- Display of the desired overpressure in the dryer channel is 40.0 Pa.
- The speed at which the control of the overpressure is adjusted is at 600 seconds. A higher number will subsequently lead to a slower process.
- Minimum overpressure is 20.0 Pa. When there is less overpressure, the drying valves are controlled closed after a waiting time, in order of priority. With more overpressure, the drying valves can be controlled open more, in order of priority.
- The waiting time after which the valves are controlled back to their position is 30 seconds. The valves are controlled back to their position when the overpressure becomes less than the configurated minimum (20.0 Pa)
- Setting for the speed of the dryer air valves process. A higher number means a slower process.