

# ECOTROC<sup>®</sup> ET-P

## Operating manual

### Dewpoint control device

Rev. 0616-03



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## 1. General information

Please read this documentation before taking any installation or operational steps.

Having the basic knowledge of this manual is a prerequisite for carrying out programming steps and the daily use of this controller.

Incorrect use or lack of know-how in the *ECOTROConomy*<sup>®</sup> program can cause damage to some parts and affect the operation of the adsorption dryer.

In principle, only instructed personnel or experts should be able to access the password-protected area. This also applies in the event of an alarm. There is a reason why an alarm is triggered and this must be analysed and rectified. Expertise in the field of compressed air is therefore a prerequisite!

Never switch the controller off completely, not even when an alarm is triggered, otherwise the dryer will only pass over a desiccant bed. Over time this has a negative effect on the compressed air values!!!

## 2. Warranties

For the conditions necessary for compliance with the warranty, please refer to our "General Terms of Sale and Delivery"

The warranty shall be void if:

- The controller is used for anything other than its intended use.
- The instructions in this operating manual are not observed.
- External influences (e.g. incorrect supply voltage, short circuit, etc.) cause damage to the controller.
- Damage is caused because an incorrect tool has been used.
- Damage is caused due to incorrect or faulty installation.
- The controller is used even though defects are evident.
- An unfavourable or incorrect installation is selected.
- The performance data on the type plate is disregarded.
- Damage occurs after installation completed by unqualified personnel.

### 3. Safety notes



Failure to observe the safety notes can cause physical injuries and damage to the controller or adsorption dryer. Please observe not only the instructions in this operating manual but also the general applicable safety and accident prevention regulations!

1. The *ECOTROConomy*<sup>®</sup> controller may only be operated and serviced after this operating manual has been read.
2. The *ECOTROConomy*<sup>®</sup> controller may only be used for its intended purpose, as described in this operating manual.
3. The operator must ensure that only instructed and authorized personnel operate the *ECOTROConomy*<sup>®</sup> controller.
4. Only suitably instructed and qualified expert staff may carry out maintenance and repair work.
5. The *ECOTROConomy*<sup>®</sup> controller must only be used in an operationally safe state.
  - a. Operating instructions must be visible on the device.
  - b. Any use of the *ECOTROConomy*<sup>®</sup> controller in conjunction with other system components must comply with the performance data.
  - c. Everyone working with the device must know and observe the safety notes.
6. When disassembling parts of the housing and components of the *ECOTROConomy*<sup>®</sup> controller, make sure
  - a. that the mains power plug is disconnected and is protected from restarting.
  - b. that corresponding and suitable tools are used which are designed to be used for electrical purposes.
7. The *ECOTROConomy*<sup>®</sup> controller may only be operated when all components, e.g. following maintenance work, have been refitted and are complete. The housing must also be closed again. Safety devices on the equipment must not be removed or rendered inoperative!
8. The performance data stipulated in this manual must not be exceeded.
9. Alterations and modifications may only be made with the approval from KSI – Filtertechnik GmbH. Unauthorised modifications excludes all liability of any resulting damage.
10. The *ECOTROConomy*<sup>®</sup> controller must not be used if damage is evident or suspected.
11. If strange noises or odours are detected, switch the *ECOTROConomy*<sup>®</sup> controller off immediately.

## 4. Symbols used

The symbols used in the technical documentation have the following meanings:



### **Important!**

This symbol draws attention to information and tips concerning the correct and economical use of the ETC controller.



### **Electrical hazard!**

This symbol indicates electrical hazards. This work must only be carried out by qualified expert personnel.



### **General Alert**

This symbol marks general safety instructions.



### **Arrow up!**

This symbol is on the "Up" key on the controller.



### **Arrow down!**

This symbol is on the "Down" key on the controller.



### **OK!**

This symbol is on the "Enter" key on the controller.

## 5. Intended purpose

The controller must only be used to control adsorption dryers manufactured by KSI Filtertechnik GmbH in compressed air systems. It needs a supply of electrical energy.

Using the installed pressure dewpoint sensor, the moisture content is measured directly on the adsorption dryer outlet. The controller then automatically switches the adsorption dryer according to the set pressure dewpoint. This means that fewer cycles are needed for the regeneration, unlike when a time controller is used. This saves energy since regeneration stops once the desired pressure dewpoint has been reached and a cycle only starts after a forced changeover time. (2 cycles an hour instead of 6 cycles).

## 5.1 Intended use

The controller is exclusively designed to control adsorption dryers manufactured by KSI Filtertechnik GmbH! If the adsorption dryer is used with other manufacturers, this must be agreed with the manufacturer. Other safety guidelines may apply here!

The controller must only be used in the following areas:



- The controller must be installed in a weatherproof location (exposure to sun should be avoided)
- The location must be dry (safety class IP54)
- The location must be frost-free
- The location must be vibration-free
- The location must not be in a potentially explosive atmosphere
- It must be accessible for settings
- It must at best have little dust exposure
- There must be no risk of lightning or other forms of external energy
- It must be free from aggressive or corrosion-promoting substances.



The controller must only be operated within the allowable operating conditions. These are stipulated on the type plate and in this operating manual. Any other use is considered improper and the manufacturer accepts no liability.

The controller must not be converted in any way and its components must not be modified. The use of components other than the original ones from the manufacturer is not permitted, unless this has been agreed with the manufacturer.

For the nominal performance data of the controller, please refer to the Section "Performance data".

## 6. Technical data

### 6.1 Pressure dewpoint sensor



Type of measurement	Specification
Moisture measuring range	- 100° C to + 20° C pressure dewpoint (4-20 mA)
Moisture range	0 – 100 % rF
Power consumption	20 mA (max.)
Power supply	12 to 28 Vdc
Pressure range	0 to 450 bar
Accuracy	+ - 2%
Application temperature	- 40° C to + 60° C
Flow rate	For direct use: 0-10 m/s For block fit with outflow: 1-5NI/min
Mechanical connection	Screw-in thread 5/8“ UNF with sealing shim
Housing material	Stainless steel
Dimensions	∅ 27mm x 132 mm
Weight	Ca. 150g
Connection	2-wire power source
Protective filter	HDPE filter 10µm
EMC immunity	EN 50081
EMC interference emission	EN 50082
Sensor type	Polymer
Type of protection	IP66 (NEMA 4)

## 6.2 Controller



Type of measurement	Specification
Max. wire cross-section for terminal connections	1,5 <sup>2</sup>
Fuse	T3,15A, 250V
Power consumption	Max. 3.5 A
Power supply	230 V, 50 Hz
Valve outputs	230 V, 50 Hz
Outputs	1 1 x 4-20 mA (pressure dewpoint) 1 x potential-free alarm output (N/C or N/O)
Accuracy	+ - 2%
Application temperature	- 40°C to + 60°C
Flow rate	For direct use: 0-10 m/s For block fit with outflow: 1-5NI/min
Housing type	Bopla RCP 170 F
Dimensions W x H x D	166 x 160 x 100
Weight	Ca. 550g
EMC immunity	EN 50081
EMC interference emission	EN 50082
Type of protection	IP54

## 6.3 Pressure sensor



Type of measurement	Spezifikation
Range	0 bis 16 bar
Connector	DIN 43560
Power supply	10 –30 V DC
Output	1 x 4-20 mA (pressure), two-wire
Accuracy	0,5 % of span
Temperature of Medium	- 30°C bis + 120°C
Thread of connector	1/4"
Material transmitter	Keramik, Viton
Transmitter housing	1.4305
Type of protection	IP65



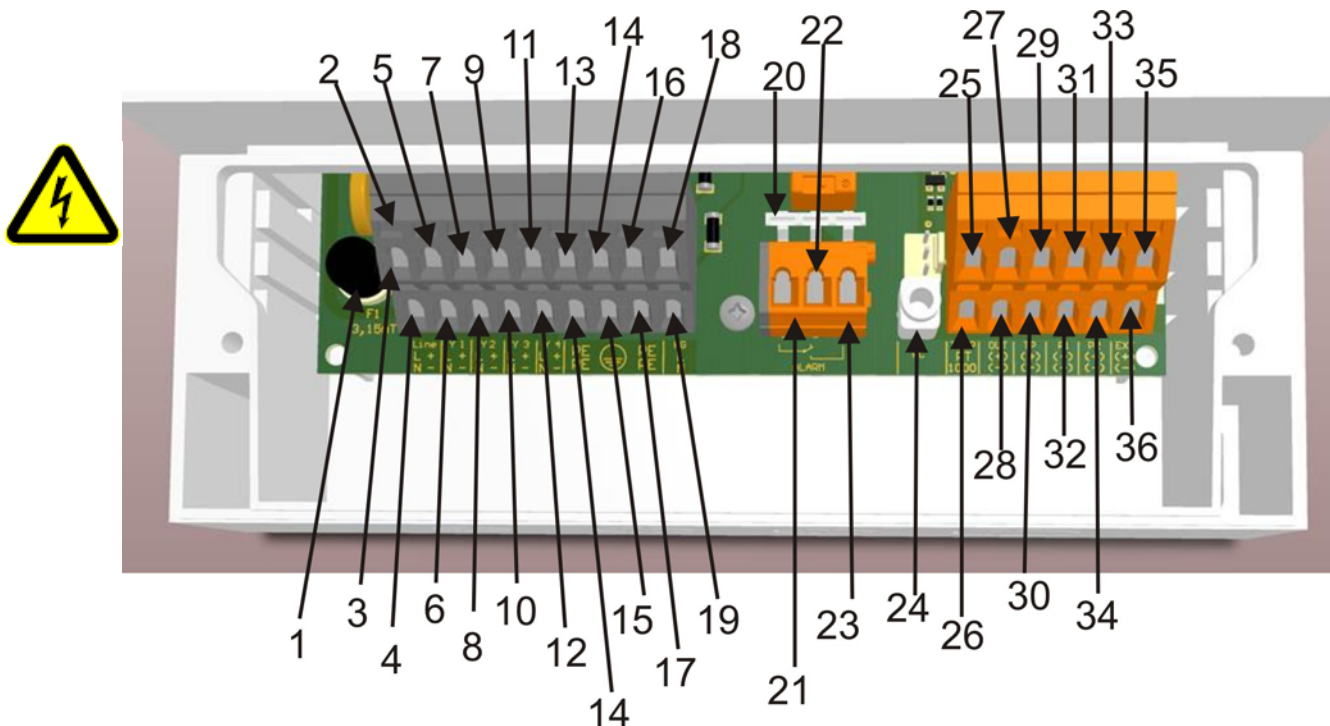
## 6.4 Temperature sensor



Type of measurement	Spezifikation
Range of measurement	- 35 bis + 105 °C
Sensor type	PT1000
Measure current	Ca. 1 mA
Insulation resistance	At 20°C und 500 V DC, typ. 100 MOhm
Connecting cable	2 x 0,25 mm <sup>2</sup>
Temperature Medium	- 35°C bis + 105°C
Thread of connector	1/2"
Electrical connection	Two-wire
Material sensor protection	1.4571
Sensor measurements	Ø 6 x 50 mm
Type of protection	IP65

## 7. Electrical connection

The pin assignment for the controller is as follows:









- |   |                                     |
|---|-------------------------------------|
| 1. Fuse F <sub>3,5A</sub> , 250V        | 2. Socket for terminal opening      |
| 3. Connection control voltage wire 230V | 4. Neutral wire for control voltage |
| 5. Wire, valve 1                        | 6. Neutral wire, valve 1            |
| 7. Wire, valve 2                        | 8. Neutral wire, valve 2            |
| 9. Wire, valve 3                        | 10. Neutral wire, valve 3           |
| 11. Wire, valve 4                       | 12. Wire, valve 4                   |
| 13. Earthing                            | 14. Earthing                        |

- 15. Earthing
- 17. Earthing
- 19. Neutral wire f.compressor synchronisation
- 21. General alarm
- 23. Alarm terminal NO
- 25. Temperature sensor PT1000 (optional)
- 27. 4-20 mA output + (pressure dewpoint)
- 29. Connection, pressure dewpoint sensor +
- 31. Connection, pressure sensor 1 + (optional)
- 33. Connection, pres. sensor 2 + (optional)
- 35. Reserve (optional / not obstructed)

- 16. Earthing
- 18. compressor synchronisation 230V
- 20. Lever, terminal opening, alarm
- 22. Alarm terminal NC
- 24. PC connection, jack plug
- 26. Temp. sensor PT1000 (optional)
- 28. 4-20 mA output - (pressure dewp.)
- 30. Connection, pressure dew. sensor -
- 32. Connection, pres. sensor 1 -
- 34. Connection, pres. sensor 2 -
- 36. Reserve (optional / not obstructed)

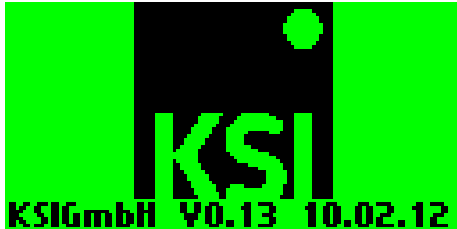
## 8. Explanations of key functions

Image	Designation	Function
	OK key	Use this key to call up the main menu. If you press this key, submenus are displayed. In the Setting menus, this key is used to jump to the next function. When values are changed, press the OK key to confirm them.
	Arrow down key	Use this key to scroll through the menu. Use this key to change values.
	Arrow up key	Use this key to scroll through the menu. Use this key to change values.
	Change values (up or down)	Use this key to change values in both directions
	Power LED	This LED is on when the controller is powered up and is operational.
	Error LED	This LED is on when the controller signals an error (alarm)

## 9. Display layout

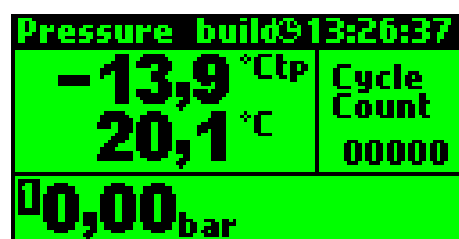
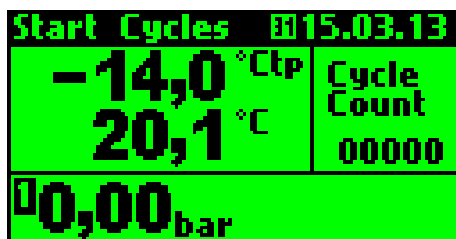
The display of the ET-C controller offers you the following views and setting options without a password:

The controller powers up when the power supply is connected:




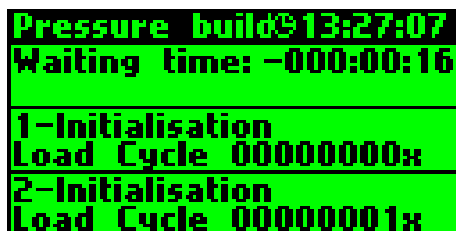
The bottom line shows the software status and the current date.

Once powered up, the measurement of the pressure dewpoint starts. The top line shows the current phase (pressurisation) and time (04:49:42). The time changes with the current date (10.03.00).



Under Cycle Count, all cycles are counted which have been run in the current mode since startup.

Press the  key to go to the second overview page. The first line displays the current phase again and the date changes with the time. Below that, the remaining time of the current status is displayed along with the number of cycles to be completed in the respective mode (in this case, two more cycles in the start cycle). Below the first horizontal line is the current status of the corresponding dryer column.

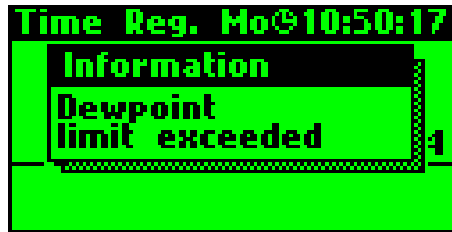


Every 15 minutes the display is restarted. This will protect the display against damages through electrical magnetic fields. This process is realized within a quarter second. This is not a mistake, it is a volitionally process.

Once the controller has started up, it may take some time until the desired pressure dewpoint is reached.

Depending on the pressure dewpoint value which is set, an alarm is triggered after 2 minutes

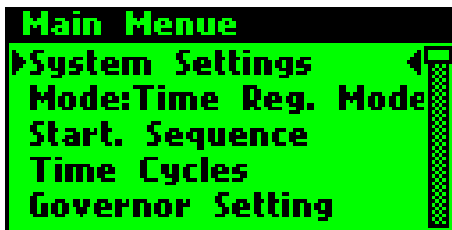
which is shown on the display. The first message appears as a piece of information that an alarm / error has occurred and the second message tells you where the alarm / error has occurred.



By pressing the **OK** key, you can hide the message for 2 minutes, but the alarm remains in the potential-free output and alarm LED.

## 10. Main menu

Press the **OK** key to pull up the main menu. The following submenus then appear:



Both triangles in front of and after the respective menu item show you what you have currently selected. Press the **↓** key several times to go to the other submenus.

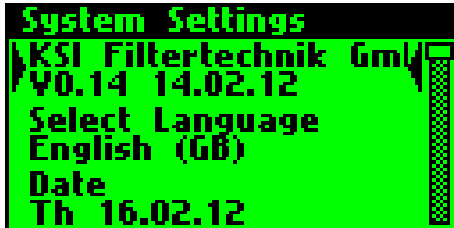


To return to the overview, press the **OK** key when you have selected "Back". This "Back" command is at the end of every menu.

## 11. System settings


In the Systems settings menu, you can configure the following settings:

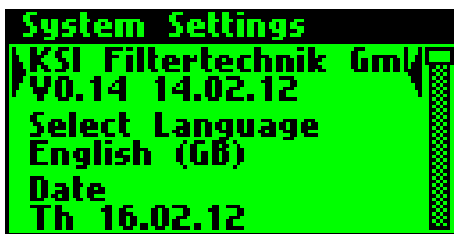
### 11.1 Software version



"KSIGmbH" displays the software version and the date of the software.

### 11.2 Change language

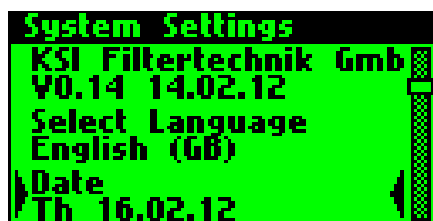
Press the  key to pull up "Select Language".



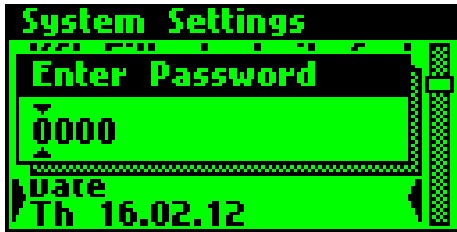
Once these steps have been completed, the language is changed to "English" and you are back in the main menu.

### 11.3 Set date and time

The controller has a realtime clock. It must be checked, and if necessary set, during commissioning. In order for these entries to appear correctly in the logbook, the date and time are password-protected.



You can only set the date using a password.

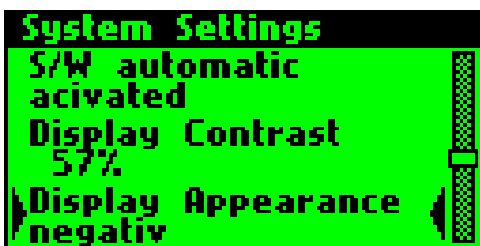
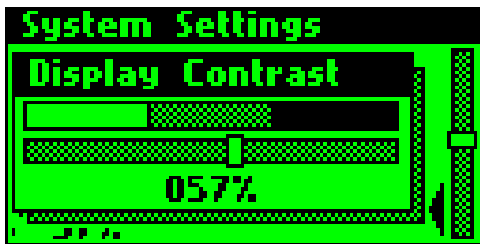
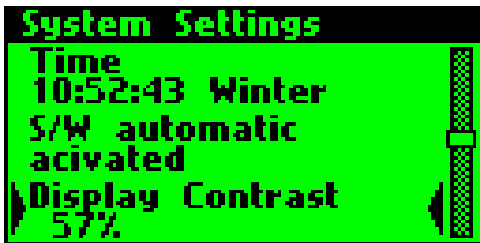


You can only set the time using a password.

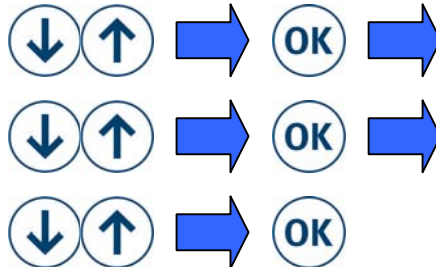
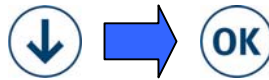
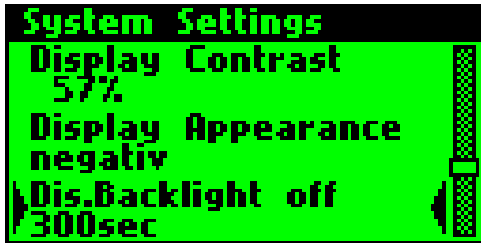


You can only activate / deactivate the automatic changeover of summer to winter time using a password.

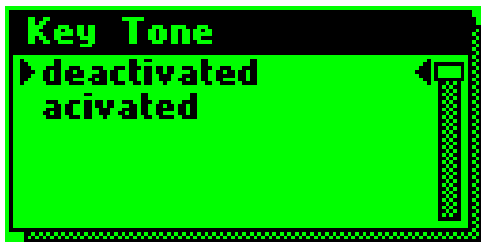
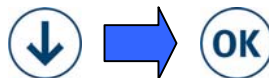
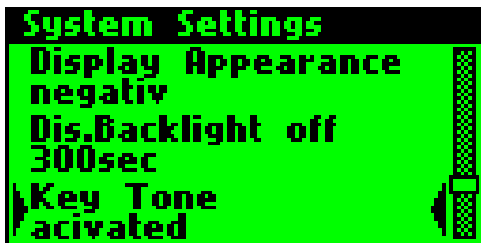
### 11.4 Display settings



Sets the display to Positive. You are back in the main menu.

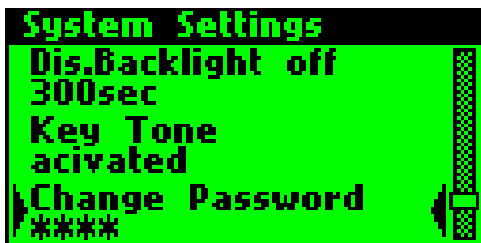


### 11.5 Key sounds



Key sounds are now deactivated. You are back in the Systems settings menu.

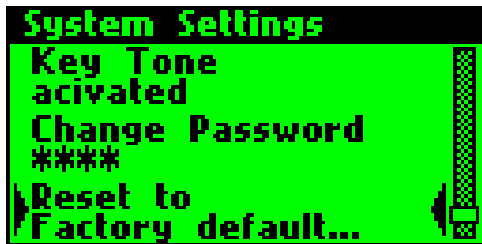
### 11.6 Change password



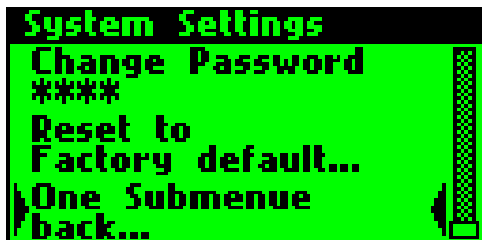
You can only change the password using a password.



## 11.7 Restore factory setting

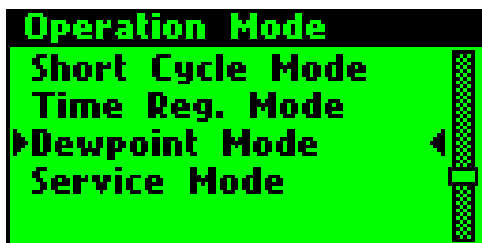
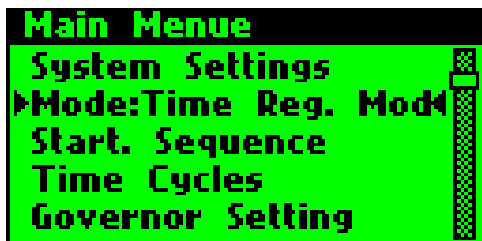


You can only load the factory setting using a password.



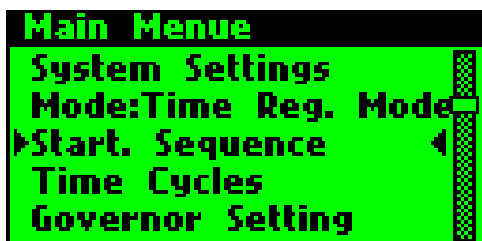
Takes you back to the main menu.

## 12. Operating mode

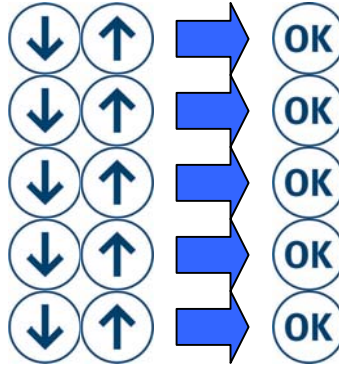
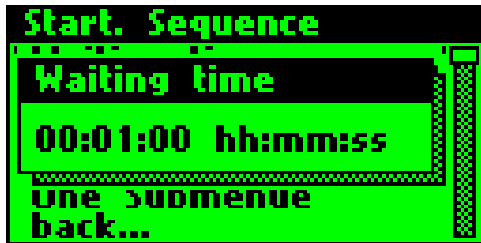
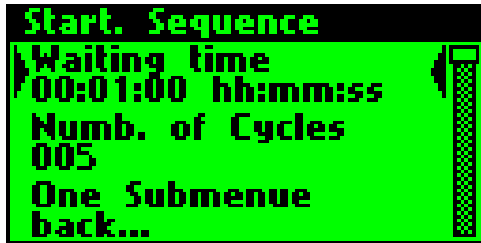


Set the desired operating mode. The password is needed for the Service mode. After you have confirmed the setting, you are taken back to the main menu.

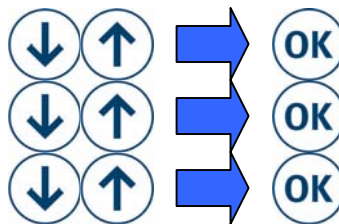
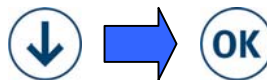
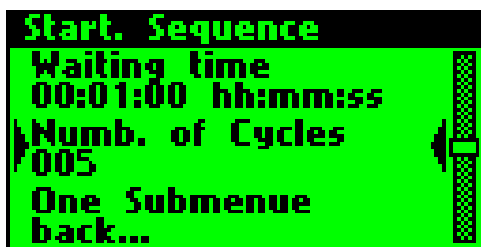
## 13. Settings after a restart



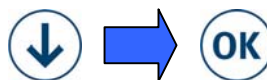
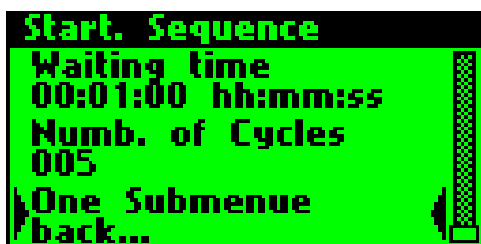




Set the waiting time. After you have entered the last digit, press OK and this takes you back to the "Start sequence" menu.

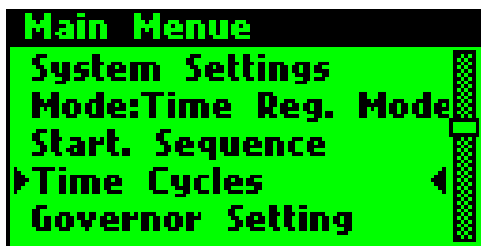


Set the number of short cycles which should be run when the controller is started up.

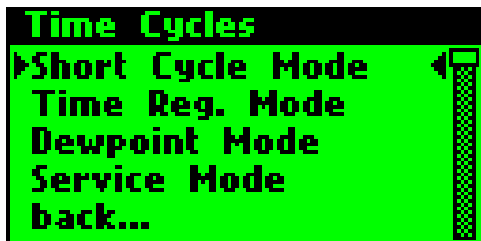


You are back in the main menu again.

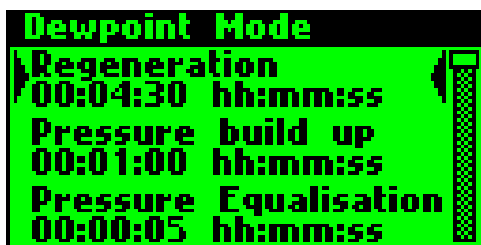
## 14. Cycle times



OK

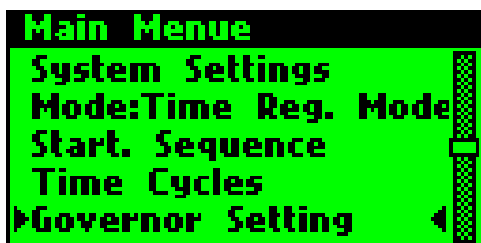


OK



You can only change the cycle times using a password. This applies to all cycle times of the individual operating modes.

## 15. Setting the pressure dewpoint

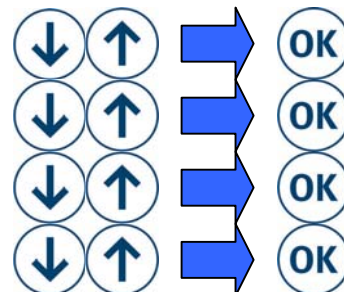
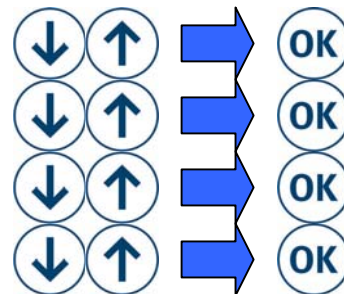
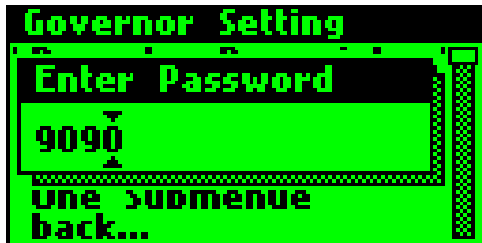


OK



OK

Starting with the software version 1.08 you now can only change this with a password. This is shown below and has to be entered before changing the setting.

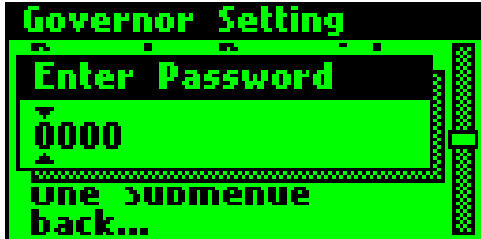
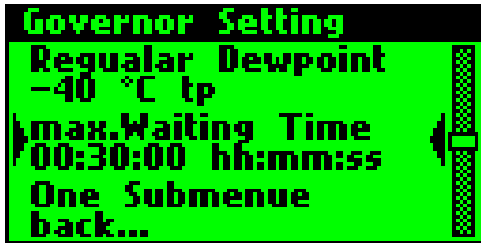


Here, set the pressure dewpoint after which the adsorption dryer should switch to energy saving mode. Please note that the minus can also be converted to plus. Once you have set the last digit and have confirmed the setting by pressing the OK key, you are back in the Control setting menu.

The standard alarm settings will automatically be adjusted to the set “Regular Dewpoint”. This applies to the PDP release and the PDP reversal under the menu point “Limit Dewpoint”. PDP release will be 2°C and PDP reversal will be 1°C under the set “Regular Dewpoint”.

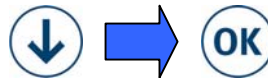
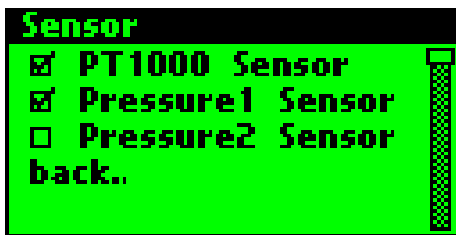
If you wish a different PDP release, for example regular dewpoint –35°C and a DPD release of –20°C this can only be done by your supplier. For this it need the Service-Password.

Please make sure, that by all changes, that are made in the “Governor Setting” you still go conform with the dryer performance. It is not possible to pull down the dewpoint very much, if the dryer was not built for this. If you are not sure, please ask your service partner.

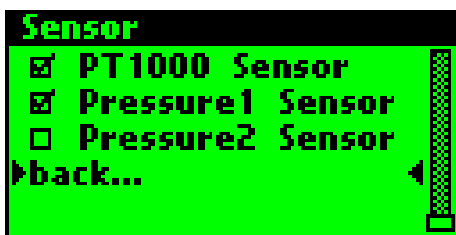


You can only change the stand-by time using a password.

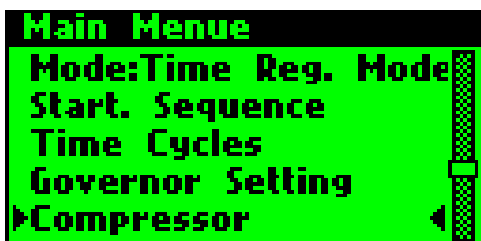
## 16. Enable or disable the Sensors

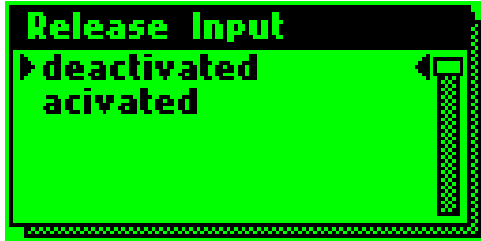
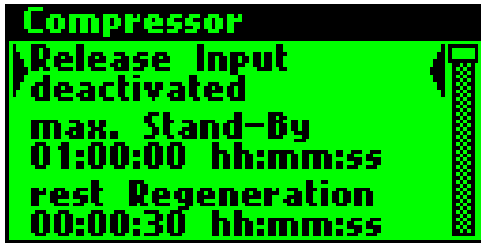


The on- and deselection of the Sensors is possible only with password.

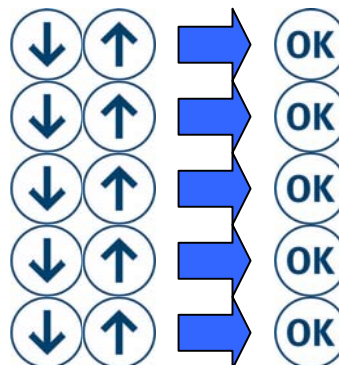
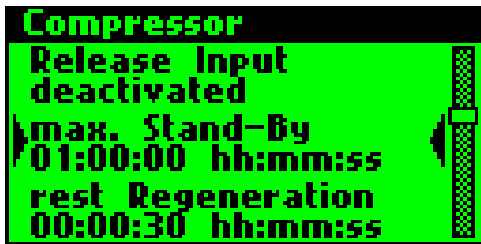


## 17. Compressor synchronisation






Activate the release input if the controller is to run in the compressor synchronisation. This needs the electrical connection of the compressor to the corresponding control terminal.

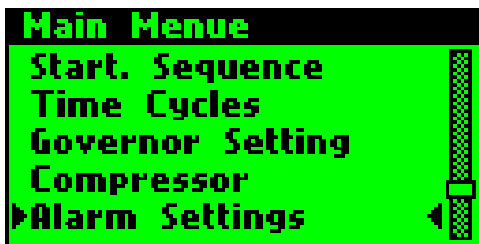


Define the downtime period before a forced changeover takes place. In the example here, the adsorption dryer does not switch for an hour as long as the compressor has not been running during this time. After an hour, the adsorption dryer runs a cycle.

## 18. Alarm reaction

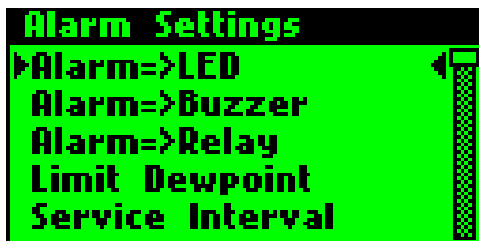
Error messages can be issued in different ways on the controller. These alarms can be issued as:

- optical signal on the controller via LED 
- acoustic signal from the controller via a buzzer
  - switched to an N/C or N/O alarm contact

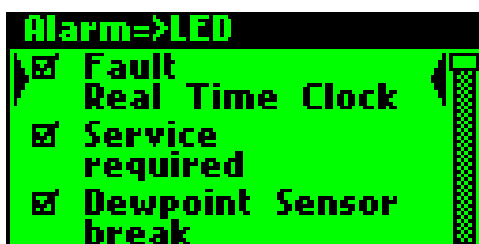


OK

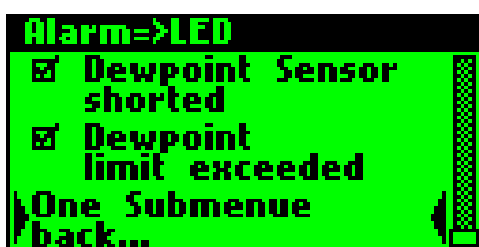
### 18.1 Optical alarm release (LED)



OK



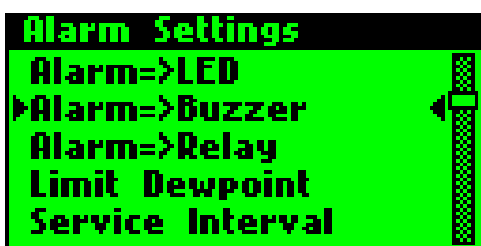
Select the errors for which the LED should light up on the front of the device. The checkmark in front of the error shows the activation of the alarm.



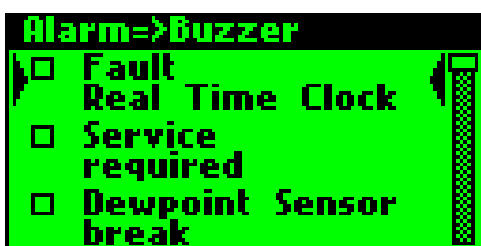
OK

Once you have set all the alarms you want to set, use the arrow keys to return to the displayed menu items. Confirm with OK and this takes you back to the Alarm reaction menu.

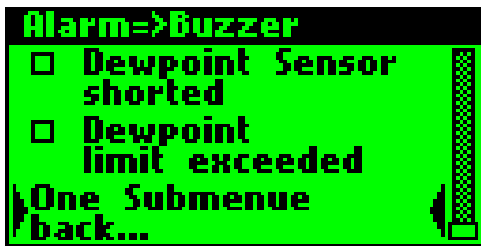
### 18.2 Acoustic alarm release (buzzer)



OK

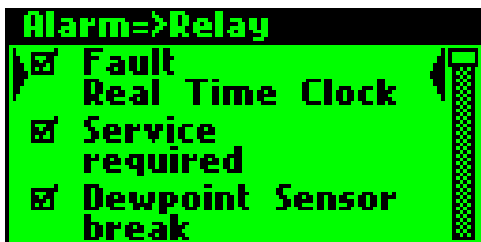
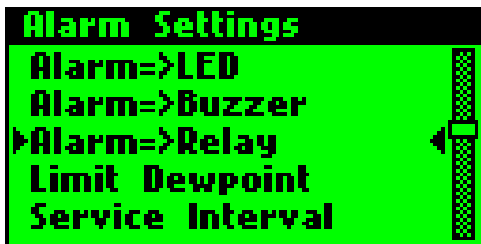


Select the errors for which an acoustic alarm should be emitted. The checkmark in front of the error shows the activation of the alarm.



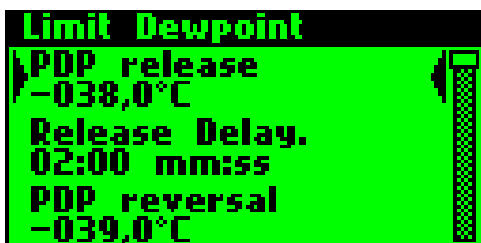
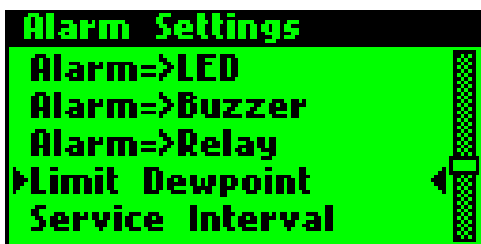
Once you have set all the alarms you want to set, use the arrow keys to return to the displayed menu items. Confirm with OK and this takes you back to the Alarm reaction menu.

### 18.3 Potential-free alarm release (relay)

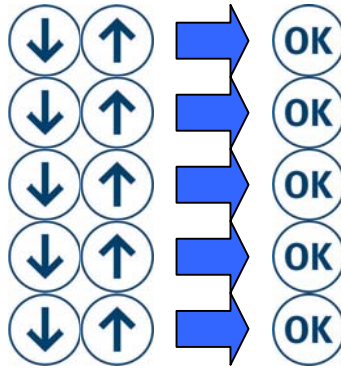
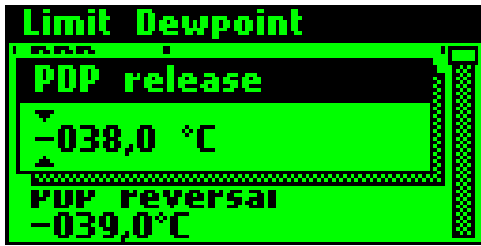


Once you've set all the alarms you want, use the arrow keys to return to the displayed menu items. Confirm with OK and this takes you back to the Alarm reaction menu.

## 19. Alarm values and times for pressure dewpoint



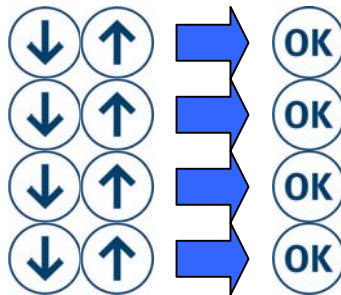
Here, define the pressure dewpoint after which the controller should emit an alarm.



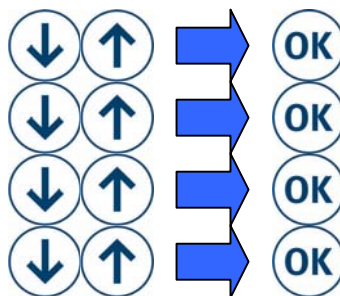
When setting the desired pressure dewpoint alarm value, make sure that the first digit remains a minus. Otherwise the alarm is only triggered at +38°C pressure dewpoint.



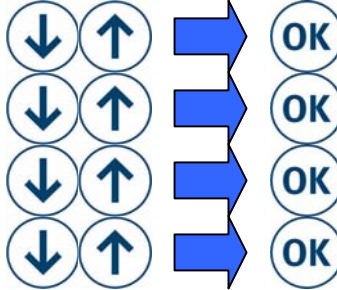
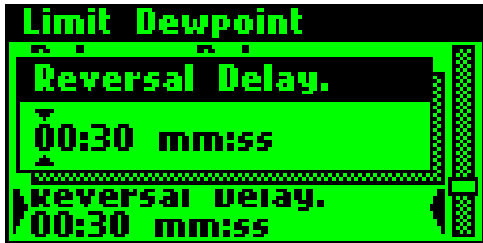
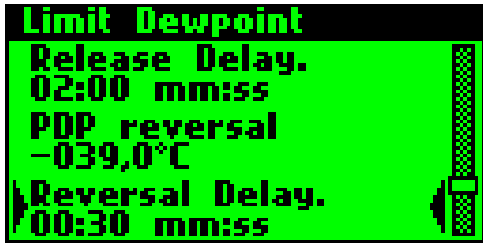
To buffer any possible dewpoints peaks, you have the option here to set an alarm delay. The alarm is then only triggered if it is present for longer than the set time.



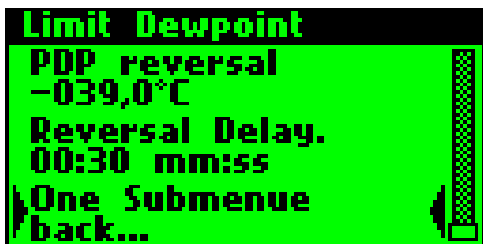
This value must always be higher than the value of the TP trigger. It defines the value when the triggered alarm is automatically reset.







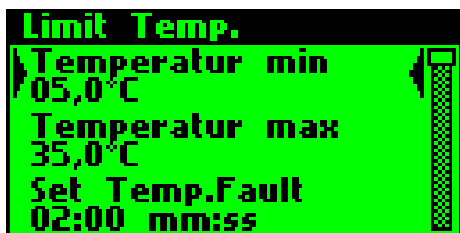
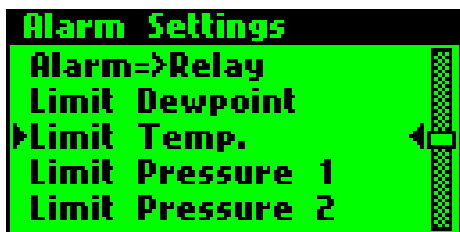
This time defines the period during which the alarm may still be present, after which the values are better again than had been set for the TP cancellation.



Once you have set all the settings you want, use the arrow keys to return to the displayed menu items. Confirm with OK and this takes you back to the Alarm reaction menu.

### 19.1 Alarm temperature values

The requirement for the alarm for over-temperature or under-range is the activation of the temperature sensor in the chapter “Sensors”.

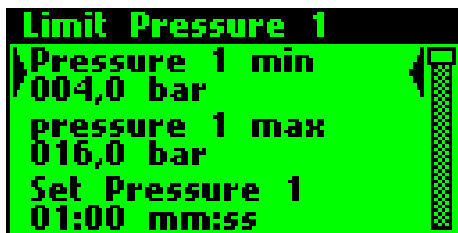
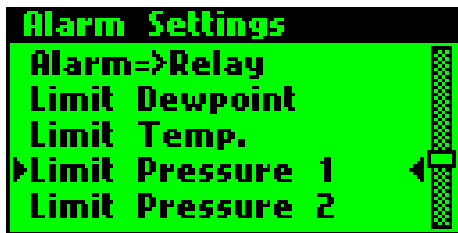




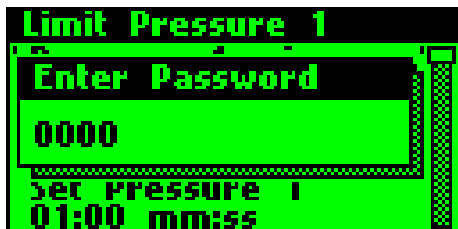
The change from the set is only possible with password.

## 19.2 Alarm values Pressure 1

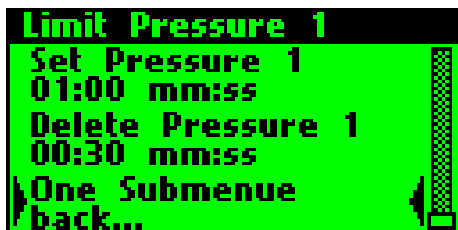
The requirement for the alarm for over-temperature or under-range is the activation of the temperature sensor in the chapter “Sensors”.



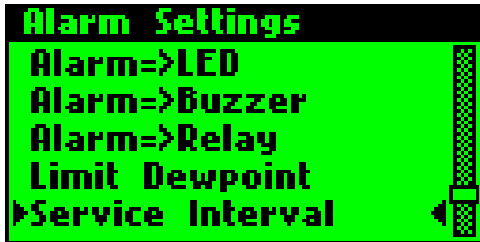
If the operating pressure is below the value set here, both exhaust valves are closed .



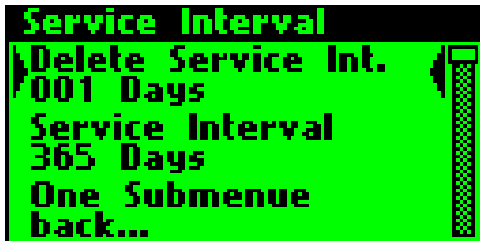
The change from the set is only possible with password.



## 20. Maintenance settings

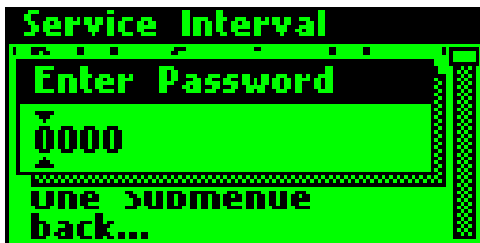


OK



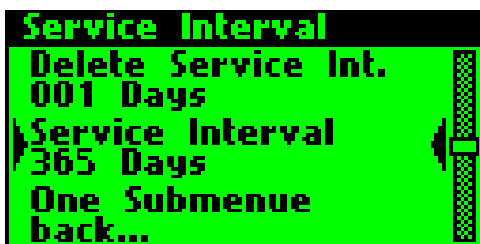
OK

The operating hours are displayed here. The screen on the left shows that there are still 364 days left until the next maintenance.



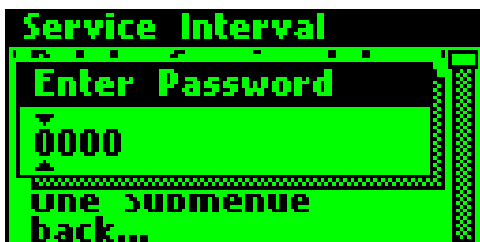
OK OK OK OK

You can only reset it after the maintenance using a password.



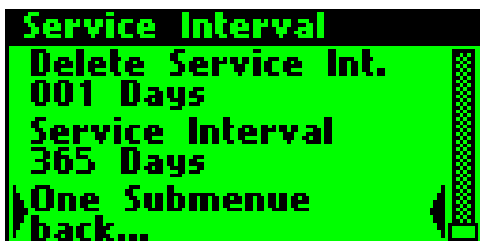
OK

Here, define the time until the maintenance alarm is triggered.



OK OK OK OK

These settings can only be made using a password.

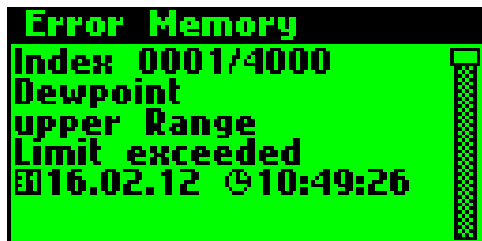


OK

Once you have configured all the settings, use the arrow keys to return to the displayed menu item. Confirm with OK and this takes you back to the Alarm reaction menu.

## 21. Reading out errors

The ET-C controller records all error values. It also records changes to the settings. This error memory can hold 4000 entries. If all 4000 entries are logged, the oldest entry is overwritten.



Press the OK key to return to the "Main menu".



Press the OK key to return to the overview.

## 22. Using password-protected areas



In principle, all changes to the controller settings should be carefully considered. If setting values are incorrectly interpreted or if changes are made without considering the changeover effect, this may cause damage to the adsorption dryer, downstream system components, or products.

The most relevant menu items here are protected by a password and can only be changed by the service technician.

This also protects publicly accessible systems against settings being changed on purpose and thereby causing damage.

If your service technician gives you the password, make sure you use it wisely. Also remember this when you then want to change the password.

If you have changed the password and forgotten it, you have the option to send this controller back to the manufacturer. The manufacturer has a master password which he can use to make the controller accessible again.

## 23. EC Declaration of conformity

### EC Declaration of conformity

We, the authorised representative,

KSI Filtertechnik GmbH  
Siemensring 54-56  
D-47877 Willich

hereby declare that for the products listed below:

ET-C (ECOTROconomy Comfort) and ET-P (ECOTROconomy Premium)

in accordance with the requirements of the guideline

EMC Guideline 89/336/EEC

conforms to the essential protection requirements which are determined in the Council Directive on the approximation of the laws of the Member States relating to the electromagnetic compatibility (89/336/EEC). This declaration applies to all samples which are produced according to the respective production documents.

To assess the product with regard to electromagnetic compatibility, the following standards have been consulted:

EN 61000-6-3 Electromagnetic compatibility; Generic standard. Emission standard for residential, commercial and light-industrial environments

EN 61000-6-1 Electromagnetic compatibility; Immunity for residential, commercial and light-industrial environments

Any modifications made to the equipment which have not been approved by the manufacturer will annul this declaration.

Signed:



Holger Krebs,  
Managing Director