FF2 Control

Adiabatic Humidifiers

OPERATING INSTRUCTIONS

≋condair

Contents

1   Introduction

1.1   Notes on the operating instructions

Limitation

These operating instructions are an addendum to the installation and operating instructions for the Condair FF2 and describe the operation of the FF2 control which is used with the FF2 pump station and the FF2 slave control unit.

These operating instructions are meant for well trained personnel being sufficiently qualified.

Safekeeping

Please safeguard these operating instructions in a safe place, where they can be immediately accessed. If the equipment changes hands, the documentation must be passed on to the new operator.

If the documentation gets mislaid, please contact your Condair supplier.

Language versions

These operating instructions are available in various languages. Please contact your Condair supplier for information.

Copyright protection

The present operating instructions are protected under the Copyright Act. Passing-on and reproduction of the manual (or part thereof) as well as exploitation and communication of the contents are prohibited without written permission by the manufacturer. Violation of copyright terms is subject to legal prosecution and arises liability for indemnification.

The manufacturer reserves the right to fully exploit commercial patent rights.

1.2   Safety

Every person operating the FF2 control must have read and understood the operating instructions of the FF2 control as well as the installation and operating instructions of the Condair FF2 (particularly the safety instructions).
Knowing and understanding the contents of the operating instructions of the FF2 control and the installation and operating instructions of the Condair FF2 is a basic requirement for protecting the personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

2   Operating the FF2 control

2.2   Function of the display and operating elements

Display and control unit
Function: Configuration of the Condair FF2.
              Indication of operating parameters.
              Reset of maintenance counter.

red LED "Error"
Function: The LED lights in case of a malfunction of the unit. Further operation is usually not possible any longer. The type of malfunction is shown in the display, see chapter 6).

              The LED flashes in case of a temporary malfunction of the unit. Further operation of the unit is still possible.

              The LED flashes alternately with the red LED if the external safety chain (ventilation interlock has triggered) is open. As soon as the safety chain is closed again, the indication disappears.

yellow LED "Maintenance"
Function: The LED lights if the maintenance is due.

green LED "Humidification"
Function: The LED lights if the unit humidifies.

              The LED flashes alternately with the red LED if the external safety chain (ventilation interlock has triggered) is open. As soon as the safety chain is closed again, the indication disappears.

Drain key
Function: Manual draining of the water supply line. After having pressed the drain key, the draining is controlled via the display and control unit.

Unit switch
Function: Switches the unit on and off. The switch is illuminated when the unit is running.

2.2 Switching on and off the FF2 pump station/FF2 control unit

Note: For putting the Condair FF2 into operation and taking the Condair FF2 out of operation please follow the procedures described in the chapters 7.1 and 7.4 of the installation and operating instructions for the Condair FF2.

• **Switching on the FF2 pump station/FF2 control unit** (the unit switch lights).

```
        FF2
   Startvorgang:
    Modulstart

  ▐████            ▌
```

The control carries out a **system test**, during which all the LEDs light up and the opposite display is shown.

If a failure occurs on the system test, a corresponding error message is shown in the display.

```
FF2 Master
Ready (clean)


05.01.2009 12.00.00
Menu  ◄━  ━►
```

After the system test the control is in **normal operation mode**. The display shows the **standard operating display** (first page of the indication level).
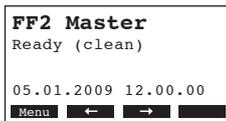
Note: The contents of the standard operating display depends on the actual operating status and on the configuration of the Condair FF2 and can differ from the opposite display.

• **Switching off the FF2 pump station/FF2 control unit**

The display goes out.

Note: Thus the different hygiene functions (flushing of the water supply line, etc.) remain active also in times without humidification demand, the FF2 pump station/FF2 control unit should only be switched off for maintenance or trouble-shooting.

2.3 Remote operating and fault indication

If your control is equipped with a remote indication board (optional) the following operating status are shown remotely:

Activated remote indication relay	When?	Display on unit
"Error"	A malfunction is present, further operation is usually not possible any longer.	Red LED lights An error message is shown in the display
"Service"	Oil change or maintenance of the optional droplet separator is due. The Condair FF2 remains operational for a certain time	Yellow LED lights The service warning message is shown in the display
"Humidification"	Unit is humidifying	Green LED lights
"Unit on"	Unit is switched on	Unit switch lights

2.4 Overview and operating of the menu

Operating

```
FF2 Master
Ready (clean)


01.02.2009 12.00.00
Menu    ←    →
```

The operating and display unit is operated via the four keys located just below the display. The 4 status fields at the bottom of the display show the active keys the functions assigned to them.

actual key setting

keys

Menu overview

─── **Indication level** ───

```
FF2 Master
Demand      :50%


01.02.2009 12.00.00
Menu   ←    →
```

```
FF2 Master
Software   :1.00LA00
Hum.Control :Int.(PI)
Controlsign.:0-10V
Modbus Addr.:1
Menu   ←    →
```

```
FF2 Master
Power Limit :100%
Capacity   :300kg/h
∑ Output   :300kg/h

Menu   ←    →
```

```
FF2 Master
Operating
Hours       :40h


Menu   ←    →
```

```
FF2 Master              **
Pump        :40h
Oil Changes :0
Next oil change
Hours       :10h
Menu   ←    →
```

```
FF2 Master              **
Supply Line :On
Interval    :10.0h
Drain Time  :60s

Menu   ←    →
```

```
FF2 Master              **
µS Mode     :Off



Menu   ←    →
```

** this display is shown with the Master control only

─── **Menu level** ───

```
Main Menu
Info         :Set
User         :Set



Esc         ↓    Set
```

```
Info
Unit Status :Set
ErrorHistory:Set



Esc         ↓    Set
```

Menu **Info**
– Interrogation of unit information
– Interrogation of the malfunction list

```
Main Menu
Info         :Set
User         :Set



Esc    ↑         Set
```

```
User Code

880█

    Enter Number
  Confirm with Set
Esc    ↑    →    Set
```

```
User
Maintenance :Set
Settings    :Set
Modbus      :Set

Esc    ↑    →    Set
```

Menu **User**
– Resetting the maintenance counter
– Unit settings
– Modbus settings

3 Interrogation functions

3.1 Interrogation of the operating information (indication level)

In the normal operating mode the control is in the indication level. The indication level forms a loop that includes several pages holding operating information which can be accessed with the arrow keys. The various displays of the indication level are shown below.

Info page 1: standard operating display

The appearance of the standard operating display depends on the actual operating status and the configuration of the Condair FF2.

```
FF2 Master
Ready (clean)


01.02.2009 12.00.00
Menu   ←    →
```
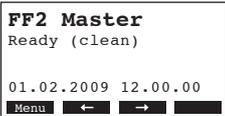
Standard operating display with control via the **external** controller
– no humidity demand: **Ready (clean)** (the supply line was flushed less than 1 hour ago; in case of a humidification request the FF2 starts without delay), or **Ready** (the supply line was flushed more than 1 hour ago; in case of a humidification request the supply line will be flushed first), or
– humidity demand present: Demand in %

```
FF2 Master
Act.Humidity:75%rH
Hum.Setpoint:50%rH

01.02.2009 12.00.00
Menu   ←    →
```
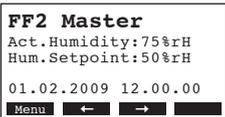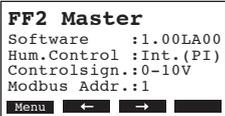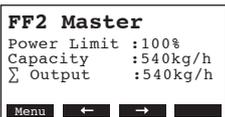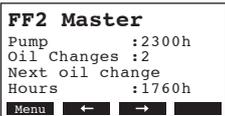
Standard operating display with control via the **internal** controller
– Actual humidity in %rh
– Set nominal humidity %rh

Info page 2: Settings

```
FF2 Master
Software    :1.00LA00
Hum.Control :Int.(PI)
Controlsign.:0-10V
Modbus Addr.:1
Menu   ←    →
```

– Software version
– Selected control signal source
– Set control signal range
– Set Modbus address of the unit

Info page 3: Performance data

```
FF2 Master
Power Limit :100%
Capacity    :540kg/h
∑ Output    :540kg/h

Menu   ←    →
```

– Set power limitation in % of the maximum output
– Actual output of the humidifier in kg/h
– Actual total output in kg/h

Info page: Operating hours

```
FF2 Master
Operating
Hours       :2300h
Next maintenance
Fleece      :1960h
Menu   ←    →
```

– Total operating hours of the Condair FF2
– Remaining operating hours to the next maintenance of the droplet separator (appears only if droplet separator maintenance was activated).

Info page 5: Pump
Note: This screen appears with the Master control only

```
FF2 Master
Pump        :2300h
Oil Changes :2
Next oil change
Hours       :1760h
Menu   ←    →
```

– Operating hours of the pump
– Number of oil changes carried out since initial commissioning
– Number of operating hours remaining until next oil change is due

Info page 6: Water supply line flushing
Note: This screen appears with the Master control only.

```
FF2 Master
Drain mode  :On
Interval    :10.0h
Drain Time  :60s

Menu  ←    →
```

– Information displaying whether or not supply line flushing is activated (On/Off).
– Selected flushing interval
– Selected duration of flushing in seconds

Info page 7: Conductivity monitoring (option)
Note: This screen appears with the Master control only.

```
FF2 Master
µS Mode     :On
High Limit  :80µS
Crit. Limit :20µS
Conductivity:8µS

Menu  ←    →
```

– Information displaying whether or not the optional conductivity monitoring device is present (On/Off).
– Upper conductivity threshold. If this value is exceeded an error will occur (appears only if conductivity monitoring is active).
– Lower conductivity threshold. If conductivity exceeds this value an error will occur (appears only if conductivity monitoring is active).
– Current conductivity of supply water (appears only if conductivity monitoring is active).

3.2 Interrogation of unit information

Select the list with the unit information:
Path: *Main menu > Info > Unit Status*

```
FF2 Master          Main Menu            Info                 Unit Status
Ready (clean)       Info      :Set       Unit Status :Set     System Operation Hou ①
                    User      :Set       ErrorHistory:Set     300h
                                                              Relay Humidify       ②
01.02.2009 12.00.00                                          Off
Menu   ←    →       Esc       ↓   Set    Esc       ↓   Set    Esc           ↓
```

```
                                                              Relay Service       ③
                                                              Off
                                                              Relay Service       ④
                                                              Off
                                                              Relay Unit on       ⑤
                                                              Off
                                                              Outlet Valve Y2     ⑥
                                                              Closed
                                                              Inlet Valve         ⑦
                                                              Closed
                                                              FC Power            ⑧
                                                              Off
                                                              FC Enable           ⑨
                                                              Off
                                                              Motor Fan           ⑩
                                                              Off
                                                              Stage 1 Valve       ⑪
                                                              Closed
                                                              Stage 2 Valve       ⑫
                                                              Closed
                                                              Stage 3 Valve       ⑬
                                                              Closed
                                                              Outlet Valve Y6     ⑭
                                                              Closed
                                                              Min Pressure Contact⑮
                                                              On
                                                              FU Error Contact    ⑯
                                                              Off
                                                              Extension Present   ⑰
                                                              On
```

Press **<↓>** and **<↑>** keys, in order to select the unit information available in the list:

1   Total operating hours of the humidifier since the initial commissioning of the unit

2   Actual status of the remote indication relay "Humidification"

3   Actual status of the remote indication relay "Service"

4   Actual status of the remote indication relay "Error"

5   Actual status of the remote indication relay "Unit on"

6   Actual operating status of the supply line flushing valve Y2

7   Actual operating status of the supply valve

8   Actual operating status of the frequency converter contactor

9   Actual operating status of the frequency converter release

10 Actual operating status of the pump motor

11 Actual operating status of the step valve Y3

12 Actual operating status of the step valve Y4

13 Actual operating status of the step valve Y5

14 Actual operating status of the flsuhing valve Y6 (working pressure)

15 Actual operating status of the pressure switch (supply pressure)

16 Actual operating status of the frequency converter error output

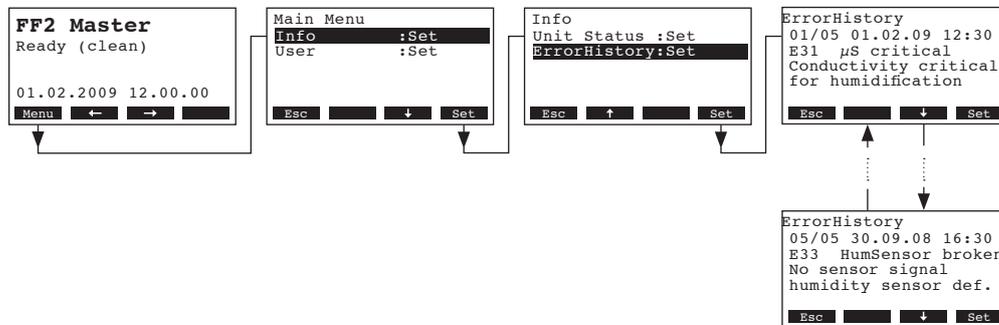17 Informational display showing whether or not conductivity monitoring is present.

Press the **<Esc>** key several times to quit the unit information list and to return to the standard operating display.

3.3   Interrogation of the malfunction list

The last 20 malfunctions that occurred during operation are saved in the error history list and can be interrogated.

Select the error history list:
Path: ***Main menu > Info > ErrorHistory***

```
┌──────────────────────┐    ┌──────────────────────┐    ┌──────────────────────┐    ┌──────────────────────┐
│ FF2 Master           │    │ Main Menu            │    │ Info                 │    │ ErrorHistory         │
│ Ready (clean)        │    │ Info        :Set     │    │ Unit Status :Set     │    │ 01/05 01.02.09 12:30 │
│                      │    │ User        :Set     │    │ ErrorHistory:Set     │    │ E31  µS critical     │
│                      │    │                      │    │                      │    │ Conductivity critical│
│ 01.02.2009 12.00.00  │    │                      │    │                      │    │ for humidification   │
│ Menu   ←    →        │    │ Esc        ↓    Set  │    │ Esc    ↑      Set    │    │ Esc        ↓    Set  │
└──────────────────────┘    └──────────────────────┘    └──────────────────────┘    └──────────────────────┘

                                                                                     ┌──────────────────────┐
                                                                                     │ ErrorHistory         │
                                                                                     │ 05/05 30.09.08 16:30 │
                                                                                     │ E33  HumSensor broken│
                                                                                     │ No sensor signal     │
                                                                                     │ humidity sensor def. │
                                                                                     │ Esc        ↓    Set  │
                                                                                     └──────────────────────┘
```

The last error that occurred is shown with:
– running number of the error / number of errors recorded in the list
– date and time of occurrence
– error code (Warning: W..., Error: E...)
– error message
– additional info text regarding the error

Press **<↓>** and **<↑>** keys, in order to select further error messages in the list.

Press the **<Esc>** key several times to quit the error history list and to return to the standard operating display.
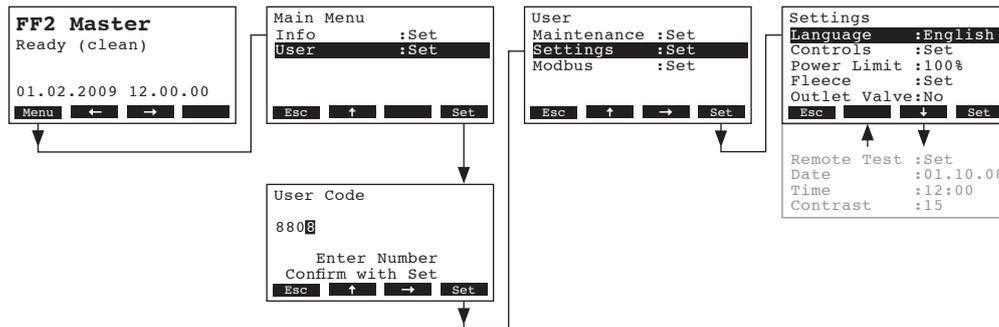
4 Configuration

4.1 Unit settings

4.1.1 Launching the unit settings menu

Select the unit settings menu:
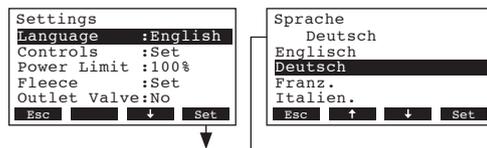Path: *Main menu > User > Password entry: 8808 > Settings*

```
FF2 Master
Ready (clean)


01.02.2009 12.00.00
 Menu   ←    →
```

```
Main Menu
 Info       :Set
 User       :Set
 Maintenance :Set



 Esc    ↑         Set
```

```
User
 Maintenance :Set
 Settings    :Set
 Modbus      :Set


 Esc    ↑    →    Set
```

```
Settings
 Language   :English
 Controls   :Set
 Power Limit :100%
 Fleece     :Set
 Outlet Valve:No
 Esc         ↓    Set
```

```
User Code

8808

     Enter Number
  Confirm with Set
 Esc    ↑    →    Set
```

```
Remote Test :Set
Date        :01.10.08
Time        :12:00
Contrast    :15
```

Press the **<↓>** and **<↑>** keys in order to select the individual settings or sub menus in the in the settings menu. Detailed information on the different settings are found in the following chapters.

4.1.2 Select dialogue language

Select "**Language**" in the settings menu, then press the **<Set>** key.

```
Settings
 Language   :English
 Controls   :Set
 Power Limit :100%
 Fleece     :Set
 Outlet Valve:No
 Esc         ↓    Set
```

```
Sprache
    Deutsch
 Englisch
 Deutsch
 Franz.
 Italien.
 Esc    ↑    ↓    Set
```

In the upcoming modification dialogue select the desired dialogue language. After confirmation, the unit automatically switches to the selected dialogue language.
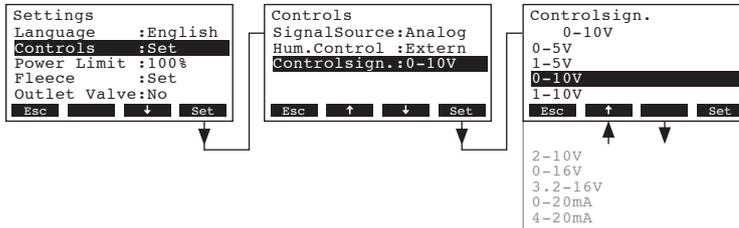
Factory setting: **country specific**

Options: **diverse dialogue languages available**

4.1.3   Control settings

Select "**Controls**" in the settings menu, then press the **<Set>** key.

```
Settings                    Controls
Language    :English        SignalSource:Analog
Controls    :Set            Hum.Control :Int.(PI)
Power Limit :100%           Controlsign.:0-10V
Fleece      :Set            Hum.Setpoint:70%rH
Outlet Valve:No             P-Band      :18%rH
  Esc        ↓    Set         Esc    ↑    ↓    Set


                            Integr.-Time:18min
```

The control settings appear. The settings available depend on the selected signal source and the control type. The above display shows the maximum number of settings available. Detailed information on the individual settings are found in the following chapters.

4.1.3.1   Setting the signal source

Select "**SignalSource**" in the control settings menu, then press the **<Set>** key.

```
Settings                    Controls                    SignalSource
Language    :English        SignalSource:Analog           Analog
Controls    :Set            Hum.Control :Int.(PI)        Analog
Power Limit :100%           Controlsign.:0-10V           Modbus
Fleece      :Set            Hum.Setpoint:70%rH
Outlet Valve:No             P-Band      :18%rH
  Esc        ↓    Set         Esc    ↑    ↓    Set          Esc    ↑    ↓    Set
```

In the upcoming modification dialogue set the desired signal source.

Factory setting: **Analog**

Options: **Analog, Modbus**

4.1.3.2   Select the control type

Select "**Hum.Control**" in the control settings menu, then press the **<Set>** key.

```
Settings                    Controls                    Hum.Control
Language    :English        SignalSource:Analog           External
Controls    :Set            Hum.Control :Extern          External
Power Limit :100%           Controlsign.:0-10V           24VOnOff
Fleece      :Set                                         Int.(P)
Outlet Valve:No                                          Int.(PI)
  Esc        ↓    Set         Esc    ↑    ↓    Set          Esc    ↑         Set
```

In the upcoming modification dialogue set the desired control type.

Factory setting: **External**

Options: **External** (external continuous controller)
                       24VOn/Off (external On/Off humidistat)
                       Int. (P) (Internal P controller)
                       Int. (PI) (Internal PI controller)

4.1.3.3 Select the control signal

Note: This setting is available only if control type "External", "Int. (P)" or "Int. (PI)" is selected.

Select "**Controlsign.**" in the control settings menu, then press the **<Set>** key.

```
Settings              Controls                Controlsign.
Language    :English  SignalSource:Analog       0-10V
Controls    :Set      Hum.Control :Extern     0-5V
Power Limit :100%     Controlsign.:0-10V      1-5V
Fleece      :Set                              0-10V
Outlet Valve:No                               1-10V
 Esc       ↓    Set    Esc    ↑    ↓    Set     Esc    ↑         Set
                                              2-10V
                                              0-16V
                                              3.2-16V
                                              0-20mA
                                              4-20mA
```

In the upcoming modification dialogue select the desired control signal.

Factory setting: **0–10V**

Options: **0–5V**, **1–5V**, **0–10V**, **1-10V**, **2–10V**, **0–16V**, **3.2–16V**, **0–20mA**, **4–20mA**

4.1.3.4 Setting the nominal humidity value

Note: This setting is available only if the internal P or PI controller is activated.

Select "**Hum.Setpoint**" in the control settings menu, then press the **<Set>** key.

```
Settings              Controls                Hum.Setpoint
Language    :English  Hum.Control :Int.(PI)     70 %rH
Controls    :Set      Controlsign.:0-10V      70 %rH
Power Limit :100%     Hum.Setpoint:70%rH
Fleece      :Set      P-Band      :18%rH
Outlet Valve:No       Integr.-Time:8min
 Esc       ↓    Set    Esc    ↑    ↓    Set     Esc    ↑    ↓    Set
```
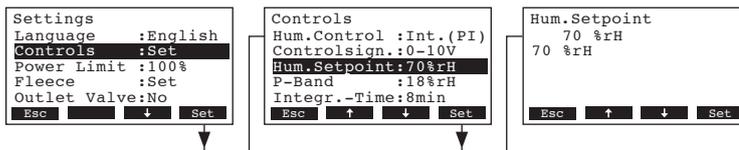
In the upcoming modification dialogue set the desired nominal humidity value in %rh

Factory setting: **50 %rh**

Setting range: **20...98 %rh**

4.1.3.5 Setting the proportional range (P-Band)

Note: This setting is available only if the internal P or PI controller is activated.

Select "**P-Band**" in the control settings menu, then press the **<Set>** key.

```
Settings              Controls                P-Band
Language    :English  Hum.Control :Int.(PI)     18 %rH
Controls    :Set      Controlsign.:0-10V      18 %rH
Power Limit :100%     Hum.Setpoint:70%rH
Fleece      :Set      P-Band      :18%rH
Outlet Valve:No       Integr.-Time:8min
 Esc       ↓    Set    Esc    ↑    ↓    Set     Esc    ↑    ↓    Set
```
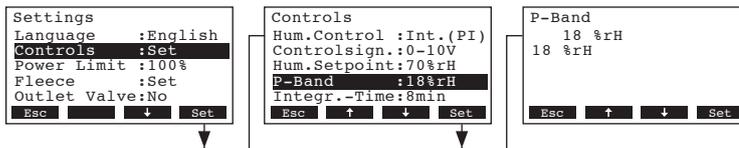
In the upcoming modification dialogue set the desired proportional range in %.

Factory setting: **18 %**

Setting range: **6...100 %**

4.1.3.6 Setting the integral time

Note: This setting is available only if the internal PI controller is activated.

Select "**Integr.-Time**" in the control settings menu, then press the **<Set>** key.

```
Settings                 Controls                    Integr.-Time
Language    :English     Hum.Control :Int.(PI)          8 min
Controls    :Set         Controlsign.:0-10V         8 min
Power Limit :100%        Hum.Setpoint:70%rH
Fleece      :Set         P-Band      :18%rH
Outlet Valve:No          Integr.-Time:8min
 Esc        ↓    Set      Esc    ↑    ↓    Set        Esc    ↑    ↓    Set
```

In the upcoming modification dialogue set the desired integral time in minutes.

Factory setting: **18 minutes**

Setting range: **1...60 minutes**

4.1.4 Setting the capacity limitation

Select "**Power Limit**" in the settings menu, then press the **<Set>** key.

```
Settings                 Power Limit
Language    :English        8 min
Controls    :Set         8 min
Power Limit :100%
Fleece      :Set
Outlet Valve:No
 Esc        ↓    Set      Esc    ↑    ↓    Set
```

In the upcoming modification dialogue set the desired capacity limitation in % of the maximum capacity of the humidifier.

Factory setting: **100 %**

Setting range: **30...100 %**

4.1.5 Activating/setting the maintenance interval of the optional droplet separator

Select "**Fleece**" in the settings menu, then press the **<Set>** key.
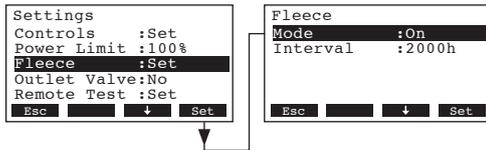
The screen shows the setting parameters of the optional droplet separator. The availability of parameters depends on whether or not the optional droplet separator is active. Information on the available settings is found in the subsequent sections.

4.1.5.1 Enabling/disabling the maintenance interval of the optional droplet separator

Select "**Modus**" in the "**Fleece**" settings menu, then press the **<Set>** key.
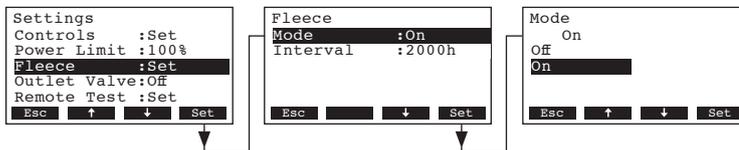
In the setup dialogue you may enable (On) or disable (Off) the maintenance interval of the optional droplet separator.

Factory setting: **Off**

Options: **Off** (maintenance interval disabled), **On** (maintenance interval enabled)

4.1.5.2 Setting the maintenance interval of the optional droplet separator

Note: This parameter is available only if the maintenance interval is enabled (mode = On).

Select "**Interval**" in the "**Fleece**" settings menu, then press the **<Set>** key.
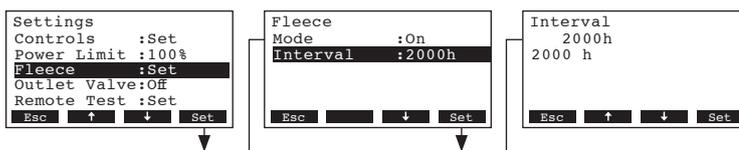
In the setup dialogue you may define the maintenance interval of the optional droplet (in hours).

Factory setting: **2'000 hours**

Options: **100 ... 50'0000 hours**

4.1.6 Enabling/disabling the optional working pressure flushing valve

Use the "**Outlet Valve**" parameter to enable the functions of the optional working pressure flushing valve.

From the settings menu select the "**Outlet Valve**" item, then press the **<Set>** key.

```
Settings                    Outlet Valve
Power Limit :100%               Off
Fleece     :Set
Outlet Valve:Off            Off
Remote Test :Set            On
Date       :01.02.09
 Esc    ↑     ↓    Set        Esc        ↓    Set
```
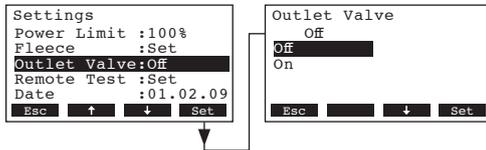
In the setup dialogue you may enable (On) or disable (Off) the functions of the optional working pressure flushing valve.

Factory setting: **Off**

Options: **Off** (functions disabled), **On** (functions enabled)

4.1.7 Performing remote relay tests

With the test functions under "**Remote Test**" you can check the function of the relays "Humidification", "Service", "Error" and "Unit on".

Select "**Remote Test**" in the settings menu, then press the **<Set>** key.

```
Settings                    Remote Test
Fleece     :Set
Outlet Valve:Off
Remote Test :Set            Relay Humidify
Date       :01.02.09        Off
Time       :12:00
 Esc    ↑     ↓    Set        Esc        ↓    Set
```
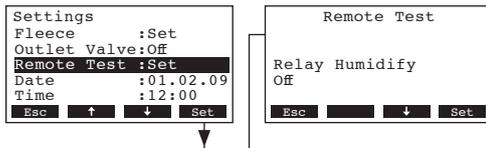
Press the **<↓>** and **<↑>** keys in order to select the relay you want to test and press the **<Set>** key to activate/deactivate the corresponding relay for testing. When switching on a relay, the respective front panel LED lights up.

4.1.8 Setting the date

Select "**Date**" in the settings menu, then press the **<Set>** key.

```
Settings                    Date
Outlet Valve:Off                01.02.09
Remote Test :Set            01.02.09
Date       :01.02.09
Time       :12:00
Contrast   :50
 Esc    ↑     ↓    Set        Esc    ↑     →    Set
```
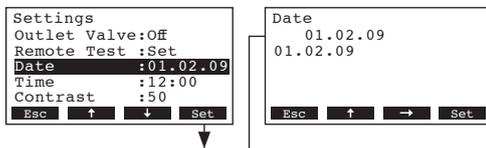
In the upcoming modification dialogue set the actual date (format "tt.mm.jj").

4.1.9 Setting the time

Select "**Time**" in the settings menu, then press the **<Set>** key.

```
Settings
Outlet Valve:Off
Remote Test :Set
Date        :01.02.09
Time        :12:00
Contrast    :50
 Esc    ↑      ↓     Set
```

```
Time
    12:00
12:00


 Esc    ↑      →     Set
```
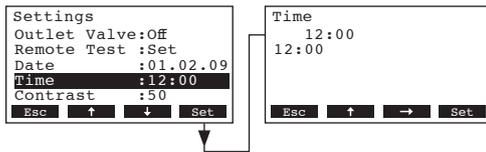
In the upcoming modification dialogue set the actual time (format "hh.mm").

4.1.10 Setting the display contrast

Select "**Contrast**" in the settings menu, then press the **<Set>** key.

```
Settings
Outlet Valve:Off
Remote Test :Set
Date        :01.02.09
Time        :12:00
Contrast    :50
 Esc    ↑      ↓     Set
```

```
Contrast
    50
50


 Esc    ↑      ↓     Set
```
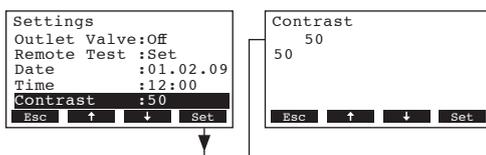
In the upcoming modification dialogue set the desired value for the display contrast.

Factory setting: **50**

Setting range: **0** (no display) **...100** (display turns black)

4.2   Modbus settings

Note: For detailed information on Modbus settings please also consult the separate documentation on Modbus communication of the Condair FF2 (available from you Condair supplier).

Select the Modbus menu:
Path: *Main menu > User > Password entry: 8808 > Modbus*

```
FF2 Master             Main Menu              User                   Modbus
Ready (clean)          Info      :Set         Maintenance :Set       Modbus Addr.:1
                       User      :Set         Settings    :Set       Parity      :None1
                                              Modbus      :Set       Timeout     :5s
01.02.2008 12.00.00
 Menu   ←    →          Esc    ↑       Set     Esc    ↑       Set     Esc        ↓   Set
```

```
User Code

880█

      Enter Number
 Confirm with Set
 Esc    ↑    →    Set
```
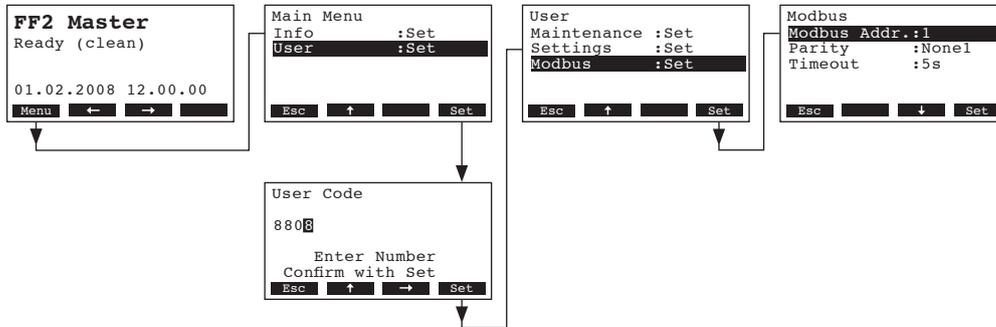
The Modbus settings menu appears. Press the **<↓>** and **<↑>** keys in order to select the individual settings. Please refer to the following chapters for further information on the individual Modbus settings.

4.2.1   Setting the Modbus address

Select "**Modbus Addr.**" in the Modbus settings menu, then press the **<Set>** key.

```
Modbus                 Modbus Addr.
Modbus Addr.:1            1
Parity      :None1     1
Timeout     :5s

 Esc        ↓   Set     Esc    ↑    ↓    Set
```
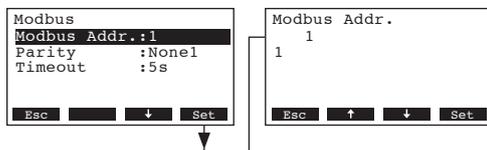
In the upcoming modification dialogue select the desired Modbus address bit for the unit.

Factory setting: **1**

Setting range: **1 .. 247**

4.2.2   Setting the parity

Select "**Parity**" in the Modbus settings menu, then press the **<Set>** key.

```
Modbus                 Parity
Modbus Addr.:1           None1
Parity      :None1     None1
Timeout     :5s        None2
                       Odd
                       Even
 Esc        ↓   Set     Esc        ↓   Set
```
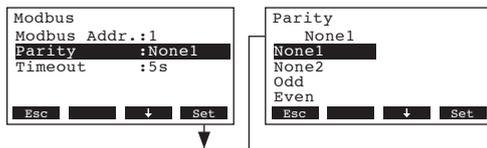
In the upcoming modification dialogue select the desired parity bit for the data transmission.

Factory setting: **None1**

Setting range: **None1, None2, Odd, Even**

4.2.3 Setting the timeout

Select "**Timeout**" in the Modbus settings menu, then press the **<Set>** key.

```
Modbus                          Timeout
Modbus Addr.:1                       5
Parity      :None1              5
Timeout     :5s


 Esc          ↓     Set          Esc    ↑     ↓     Set
```
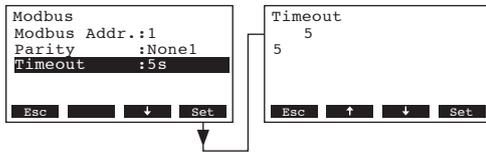
In the upcoming modification dialogue select the desired time out time for the data transmission.

Factory setting: **5 seconds**

Setting range: **1 ... 600 seconds**

5 Operational functions

5.1 Carrying out manual flushing of the water supply line

To carry out a manual flushing of the water supply line proceed as follows:

Briefly press the flushing key.

```
Manual Drain
To Stop Press
Manual Drain Key!
```
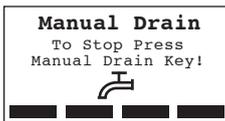
The flushing dialogue appears in the display. The high-pressure pump stops and the flushing valve opens. The **yellow LED flashes**.

To stop the flushing cycle press the **flushing key** once again.

5.2 Resetting the oil change indication (Master only)

After having changed the oil of the high-pressure pump you will need to reset the **oil change indication** (yellow LED is on) as well as the **oil change service hours counter**.
Note: if the oil change indication for the **first oil change** is not reset within 50 hours after the corresponding warning message has appeared an error message is triggered and the pump station is blocked.

On the Master select the maintenance menu:
Path: *Main menu > User > Password entry: 8808 > Maintenance*

```
FF2 Master
Ready (clean)


01.02.2009 12.00.00
Menu   ←    →
```

```
Main Menu
Info      :Set
User      :Set


Esc    ↑        Set
```

```
User
Maintenance :Set
Settings    :Set
Modbus      :Set

Esc    ↑        Set
```

```
Maintenance
Pump Station:Set
Humidifier  :Set


Esc         ↓   Set
```

```
User Code

8808

    Enter Number
  Confirm with Set
Esc   ↑    →   Set
```
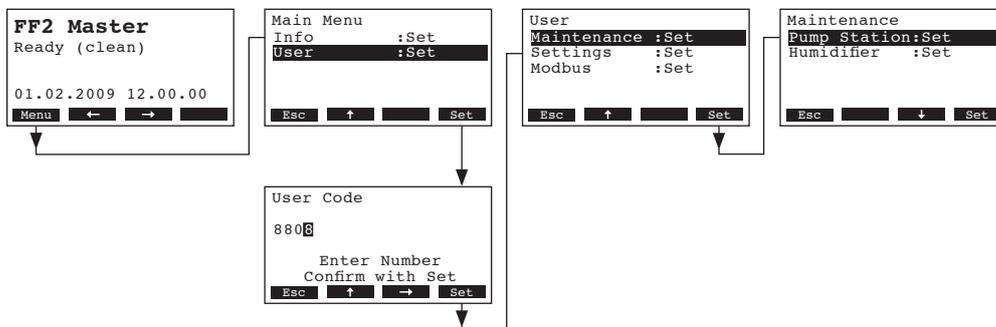
Select **"Pump Station**", then press the **<Set>** key.

```
Pump Station
Oil Changes :Set




Esc             Set
```
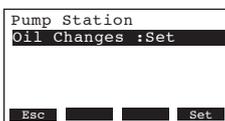
Select **"Oil Change**", then press the **<Set>** key. The reset dialogue shows up in the display.

```
    Oil Change
  are you sure?




       No   Yes
```
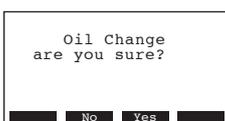
Press the **<Yes>** key to reset the **oil change indication**.
Note: Press the **<No>** key if you wish to abort the reset procedure.

To return to the standard operating display press the **<Esc>** key several times.

5.3   Resetting the service hours counter of the optional droplet separator

After having carried out the maintenance of the optional droplet separator you will need to reset the maintenance hour counter.
Note: If the maintenance hour counter is not reset within 168 hours an error message is triggered.

On the Master select the maintenance menu:
Path: *Main menu > User > Password entry: 8808 > Maintenance*

```
FF2 Master
Ready (clean)


01.02.2009 12.00.00
 Menu    ←     →
```

```
Main Menu
Info       :Set
User       :Set


 Esc     ↑          Set
```

```
User
Maintenance :Set
Settings    :Set
Modbus      :Set

 Esc     ↑          Set
```

```
Maintenance
Pump Station:Set
Humidifier  :Set


 Esc         ↓   Set
```

```
User Code

880 8

      Enter Number
   Confirm with Set
 Esc     ↑     →   Set
```
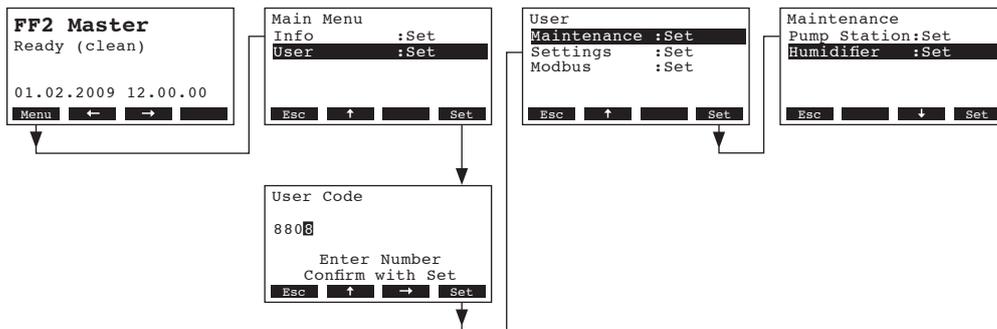
Select **"Humidifier"**, then press the **<Set>** key.

```
Humidifier
Fleece Reset :Set



 Esc              Set
```
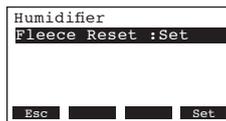
Select **"Fleece Reset"**, then press the **<Set>** key. The reset dialogue shows up in the display.

```
      Fleece Reset
      are you sure?



         No   Yes
```
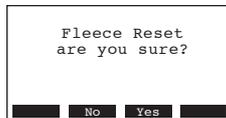
Press the **<Yes>** key to reset the **maintenance counter**.
Note: Press the **<No>** key if you wish to abort the reset procedure.

To return to the standard operating display press the **<Esc>** key several times.

6   Malfunctions

6.1   Fault indication

Malfunctions during operation are indicated by a corresponding warning or error message in the display of the display and control unit:

– **Warning messages** (additionally to the warning message the red LED flashes)

```
Warning
W21  Minimal Pressure

Demand      :49%
 Menu    ←    →    Info
```
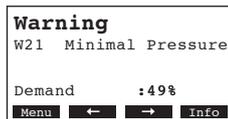
Further operation is still possible. The malfunction is stored in the error list. If the cause of the malfunction disappears of its own accord, the warning message will automatically switch off. If the cause of the malfunction does not disappear even after a longer period of time, an error message is triggered.

– **Error message** (additionally to the warning message the red LED lights)

```
Error
E23  Motor Fan

Demand      :49%
 Menu    ←    →    Info
```
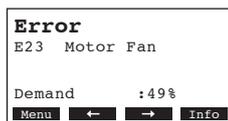
Further operation is usually not possible any longer. The malfunction is stored in the error list.

By pressing the **<Info>** key additional information are displayed for each warning or error message.

```
Error 23
Motor Fan

Check Motor Fan.
No current measured.
 Esc    ←    →    Info
```
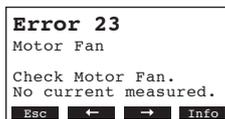
If the cause of the malfunction disappears of its own accord the malfunction indication is reset automatically and the adjacent message appears in the display. By pressing the **<Esc>** the control unit returns to the standard operating display.

```
Exception Gone



 Esc
```

6.2 Malfunction list

6.2.1 System faults

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
FF Card missing (Test run possible)		**FF Card missing**			
red flashes	`Warning` `W1  FF-Card Missing`	red lights	`Error` `E1  FF-Card Missing`	No FF Card installed on the control board.	Install FF Card or start test run.
		FF Card is empty			
—	—	red lights	`Error` `E2  FF-Card Empty`	No data stored on the FF Card.	Install new FF Card.
		FF Card is defective			
—	—	red lights	`Error` `E3  FF-Card Invalid`	Invalid data stored on the FF Card.	Install new FF Card.
		FF Card is incompatible			
—	—	red lights	`Error` `E4 FF-Card Incompat`	The FF Card is not compatible with the hardware or the basic settings on the control board.	Install new FF Card. Modify basic settings.
No connection to Slave		**No connection to Master**			

red flashes	`Warning`
	`W6  Slave Missing`
	
	This warning appears on the Master only
		red lights	`Error`
			`E6  Master Missing`
			
			This error message appears on the Slave only
				No communication between Master and Slave(s).	Check/connect bus cable.

				Master or Slave(s) not switched on.	Switch on Master or Slave(s).
				Flat ribbon cable between control and power board interrupted, defective or not properly connected.	Check, connect or replace flat ribbon cable.
		Slave(s) are incompatible			

—	—	red lights	`Error`
			`E8  Extend.incomp.`
			
			This error message appears on the Master only
				The FF Card of the Master is not compatible with the FF Card of the Slave(s).	Insert appropriate FF cards into the units.

		Wrong parameter settings			
—	—	red lights	`Error` `E9 Illegal Settings`	Data of CPU and FF Card do not match.	Install correct FF Card. Contact your Condair supplier.
		Hardware fault (Flash)			
—	—	red lights	`Error` `E10 Flash R/W Fault`	CPU on control board defective.	Replace control board.
		Hardware fault (Clock)			
—	—	red lights	`Error` `E11 Clock R/W Fault`	CPU on control board defective.	Replace control board.

6.2.2 Unit faults

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
External safety chain is open					
red and green flash	`Warning` `W20 Safety Loop Open`		—	Ventilation interlock open.	If applicable, check/turn on ventilation system.
				Air flow monitor triggered.	Check ventilator/filter of the ventilation system.
				Safety humidistat triggered.	Wait. If applicable, check safety humidistat
Supply pressure too low		**Supply pressure too low**			

red flashes	`Warning`
	`W21 Minimal Pressure`
	
	This warning appears on the Master only.
		red lights	`Error`
			`E21 Minimal Pressure`
			
			This error message appears on the Master only. It will be cleared automatically as soon as the supply pressure returns to the admissible range.
				Water supply impeded/lock valve closed/ supply pressure too low. Water treatment is regenerating (fully demineralised water).	Check water supply (filter, lines, etc.), Check/open lock valve, check water pressure.

				Supply valve jammed or defect.	Check filter of supply valve and clean, as required. Replace valve.
				Flushing valve Y2 open, jammed in open position or not connected (open in currentless state).	Check/replace or connect flushing valve Y2.
		Frequency converter is in error state			

—	—	red lights	`Error`
			`E22 FC Safety`
			
			This error message appears on the Master only.
				The error output of the frequency converter is active.	Note the error number shown by the frequency converter (see chapter 6.4), then contact your Condair supplier.

				One of the fuses F1 to F5 on the control board of the Master or the Slave is defective.	Check fuses F1 to F5 and replace, as required.
		Current supply to motor of fan for pump cabinet ventilation is too low			

—	—	red lights	`Error`
			`E23 Motor Fan`
			
			This error message appears on the Master only.
				Current supply to motor of fan for pump cabinet ventilation is too low. Connecting cable not plugged in, or fan defective.	Check/plug in connecting cable of fan. Check/replace fan. Contact your Condair supplier.

Humidification not possible		**Humidification not possible**			

red flashes	`Warning`
	`W24 Hum. Failure`
	
	This warning message appears if there is a humidification request but neither the Master nor the Slave can start humidification due to an error in the Master. This message is cleared automatically as soon as the problem with the Master has been remedied.
		red lights	`Error`
			`E24 Hum. Failure`
			
			This error message appears if there is a humidification request but neither the Master nor the Slave can start humidification due to an error in the Master. This message is cleared automatically as soon as the problem with the Master has been remedied.
				Master or Slave cannot start humidification due to an error in the Master.	Remedy the problem on the Master and reset the error display.

Pump requires oil change. Oil change indication not reset after oil change		**Pump requires oil change. Oil change indication not reset within 50 hours after the first oil change**			

red flashes and yellow lights	`Warning`
	`W25 Pump Oil Change`
	
	This warning appears on the Master only.
		red lights	`Error`
			`E25 Pump Oil Change`
			
			This error message appears on the Master only and only, if the warning message for the **first oil** change has not been reset within 50 **hours**.
				Oil change of pump is due, Oil change indication was not reset after oil change,	Carry out oil change according to chapter 8.6 of the Installation and Operating Instructions of the Condair FF2, then reset oil change indication.

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
Pump rotation speed temporarily too low in relation to the working pressure		**Pump rotation speed in relation to the working pressure too low for more than 30 seconds**			

red flashes	`Warning`
	`W27 RPM to low`
	
	This warning appears on the Master only.
		red lights	`Error`
			`E27 RPM to low`
			
			This error message appears on the Master only.
				Step valves Y3, Y4 or Y5 of Master or Slave defective or connecting cable interrupted.	Check/replace step valves. Check/connect cable.

				Nozzles of Master or Slave clogged.	Check, clean or replace nozzles.
				One of the fuses F1 to F5 on the control board of the Master or the Slave is defective.	Check fuses F1 to F5 and replace, as required.
Working pressure temporarily too low in relation to the pump rotation speed		**Working pressure in relation to the pump rotation speed too low for more than 30 seconds**			

red flashes	`Warning`
	`W29 High Pressure`
	
	This warning appears on the Master only.
		red lights	`Error`
			`E29 High Pressure`
			
			This error message appears on the Master only.
				High-pressure hose of Master or Slave defective.	Replace high-pressure hose.

				Pump sealings defective.	Have pump sealings replaced.
				One of the fuses F1 to F5 on the control board of the Master or the Slave is defective.	Check fuses F1 to F5 and replace, as required.
Conductivity of supply water has exceeded the upper threshold		**Conductivity of supply water has exceeded the upper threshold for more than 30 minutes**			

red flashes	`Warning`
	`W30 µS out of Range`
	
	This warning appears on the Master only, assuming the conductivity monitoring option is installed.
		red lights	`Error`
			`E30 µS out of Range`
			
			This error message appears on the Master only, assuming the conductivity monitoring option is installed.
				Error of the reverse osmosis unit, conductivity of supply water >80 µS/cm.	Have the reverse osmosis unit checked, flush the lines.

Conductivity of supply water has exceeded the lower threshold		**Conductivity of supply water has exceeded the lower threshold for more than 30 minutes**			

red flashes	`Warning`
	`W31 µS critical`
	
	This warning appears on the Master only, assuming the conductivity monitoring option is installed.
		red lights	`Error`
			`E31 µS critical`
			
			This error message appears on the Master only, assuming the conductivity monitoring option is installed. It will be reset automatically as soon as the conductivity is within the admissible range again.
				Error of the reverse osmosis unit, conductivity of supply water >20 µS/cm.	Have the reverse osmosis unit checked, flush the lines.

No signal from conductivity sensor		**No signal from conductivity sensor**			

red flashes	`Warning`
	`W32 µS Sens broken`
	
	This warning appears on the Master only, assuming the conductivity monitoring option is installed.
		red lights	`Error`
			`E32 µS Sens broken`
			
			This error message appears on the Master only, assuming the conductivity monitoring option is installed.
				Sensor cable not connected or broken.	Connect/replace sensor cable.

				Conductivity transmitter defective or wrong type (conductivity constant).	Replace conductivity transmitter.
				Wrong setup of conductivity transmitter.	Contact your Condair supplier.
				Conductivity sensor defective.	Replace conductivity sensor.
No signal from humidity sensor		**No signal from humidity sensor**			
red flashes	`Warning` `W33 HumSensor broken`	red lights	`Error` `E33 HumSensor broken`	Sensor cable not connected or sensor cable interrupted.	Connect/replace sensor cable.
				Humidity sensor defective.	Replace humidity sensor.

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
			Working pressure transmitter defective		
—	—	red lights	Error E34 Pressure Sensor This error message appears on the Master only.	Sensor cable not connected or broken.	Connect/replace sensor cable.
				Pressure transmitter defective.	Replace pressure transmitter.
				Fuse F5 on the control board of the Master or the Slave is defective.	Replace fuse F5.
			Minimum pressure switch		
—	—	red lights	Error E35 Min. Pressure This error message appears on the Master only.	Minimum pressure switch jammed or defective.	Check/replace minimum pressure switch.
				Minimum pressure bypassed.	Remove bypass.
Maintenance of optional droplet separator is due, maintenance indication was not reset after maintenance					
red flashes and yellow lights	Warning W36 Fleece Service	—	—	Maintenance of optional droplet separator is due, the maintenance indication has not been not reset after maintenance has been carried out.	Carry out maintenance of the droplet separator according to the instructions found in the Installation an Operating Instructions of the droplet separator, then reset the maintenance indication.
			Water supply pressure unstable		
—	—	red lights	Error E42 Supply Instable This error message appears on the Master only.	Flow pressure too low.	Check water supply system.
				Water supply line undersized.	Check water supply system.
			Timeout Modebus		
—	—	red lights	Error E44 Modbus Timeout This error message appears on the Master only.	No inquiry from Modbus	Activate Modbus system
Master is in error state (warning)		**Master is in error state (error)**			
red flashes	Warning W45 Pump Station This warning appears on the Slave if there is a problem with the Master (warning). It will be reset automatically as soon as the problem on the Master has been remedied.	red lights	Error E45 Pump Station This error message appears on the Slave if there is a problem with the Master (error). It will be reset automatically as soon as the problem on the Master has been remedied.	There is a problem with the Master.	Remedy the problem on the Master and reset the error indication on the Master, if required.
Not sufficient water pressure available for flushing the high pressure pipe					
red flashes	Warnung W39 Hygiene This warning message appears on the Master only. The message will be reset automatically as soon as sufficient water pressure is available again.	—	—	Water supply blocked/stop valve closed/ water pressure to low. Water treatment device (fully demineralised water) is regenerating.	Check water supply (filter, piping, etc.), check/open stop valve, check water pressure.
				Inlet valve blocked or defective.	Check strainer insert in the inlet valve, clean strainer insert as required. Replace valve.
				Flushing valve Y2 open, blocked in open position or electrically not connected (normally open).	Check, connect or replace flushing valve Y2.

6.3   Resetting the error indication

To reset the error indication:

Disconnect the FF2 pump station/the FF2 control unit from the mains. Wait approx. 5 seconds, then reconnect the unit to the mains.
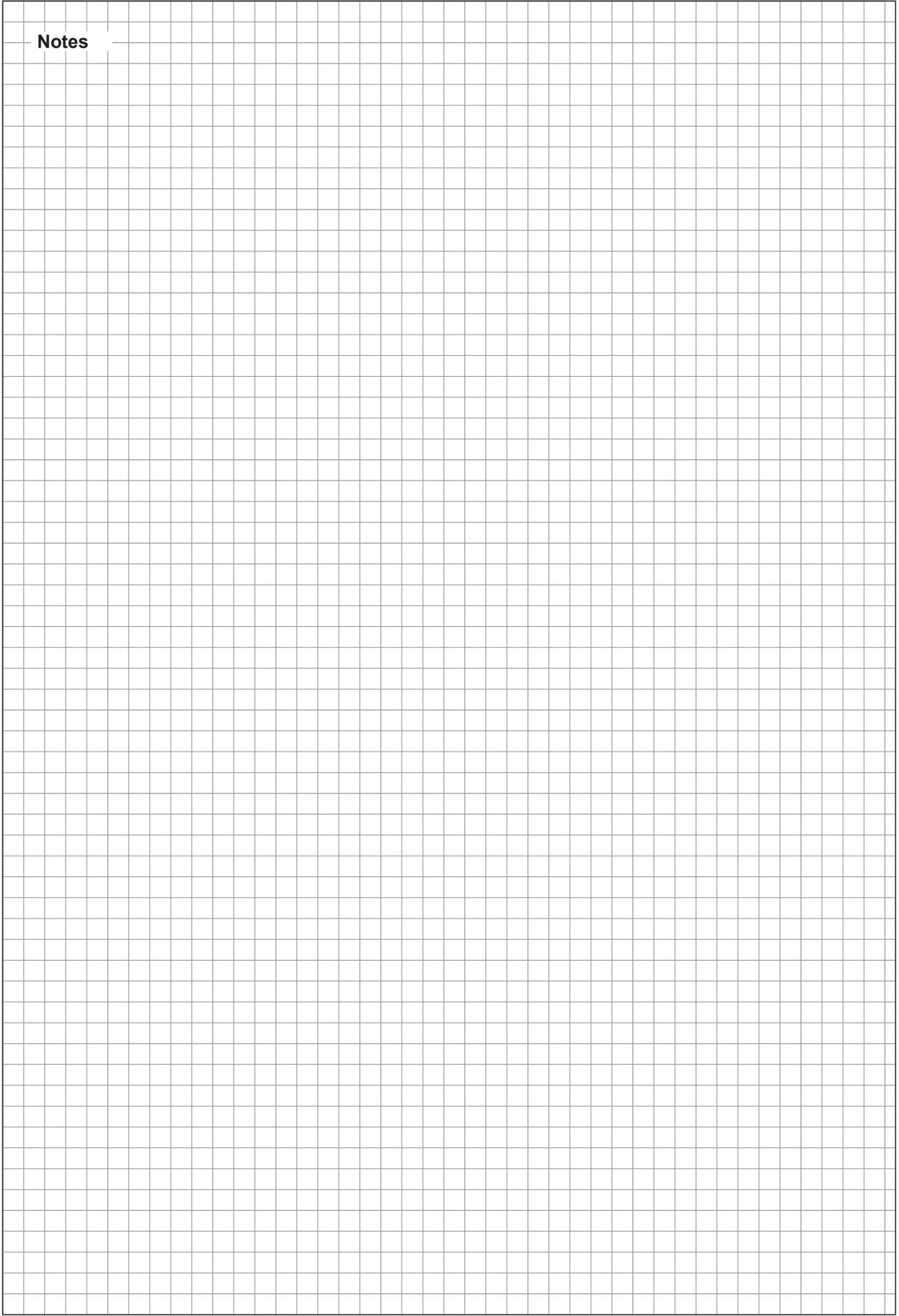
Note: If the fault has not been eliminated, the error indication reappears after a short while.

6.4 Error codes of the frequency converter

Malfunctions on the frequency converter may be resolved only by a service technician of your Condair supplier.

Error Code	Status	Cause
UV	DC bus under voltage	Low AC supply voltage Low DC bus voltage when supplied by an external DC power supply
OI.AC	Drive output instantaneous over current	Insufficient ramp times Short circuit on the drives output (between phase and phase or phase and ground)
It.AC	I²t on drive output current	Excessive mechanical load High impedance phase to phase or phase to ground short circuit at drive output. One of the fuses F1 to F5 on the control board of the Master or the Slave is defective.
O.ht1	IGB transistor over heat based on drives thermal model	Over heat software thermal model
O.ht2	Over heat based on drives heatsink	Heat sink temperature exceeds allowable maximum.
th	Motor thermistor trip	Excessive motor temperature
O.Ld1	User +24 V or digital output overload	Excessive load or short circuit on +24 V output
O.ht3	Drive excess temperature based on thermal model	Over heat software thermal model
EEF	Internal drive EEPROM trip	Possible loss of parameter values (set default parameter)
PH	Input phase imbalance or input phase loss	One of the input phases has become disconnected from the drive (applies to 200/240 V three phase drives only, not dual rated drives)
O.ht4	Power module rectifier over temperature	Power module rectifier temperature exceeds allowable maximum
C.Err	SmartStick data error	Bad connection or memory corrupt within SmartStick
C.dAt	SmartStick data does not exist	New or empty SmartStick is being read
C.Acc	SmartStick read/write fail	Bad connection or faulty SmartStick
C.rtg	SmartStick/drive rating changed	Already programmed SmartStick read by a drive with different rating
HFxx	Hardware faults	Internal drive hardware fault
OVL.d	I x t overload (I= current, t= time)	Reduce motor current (load)
hot	Heatsink/IGB transistor temperature high	Reduce ambient temperature or reduce motor current
AC.Lt	Drive is in current limit	Correctly configure current limit
FAIL	Failed attempt to read stick	An attempt has been made to read the stick when the drive was not disabled or tripped, or the stick is read-only.

Notes

FSC

Solutions for Indoor Climate

ISO 9001:2000 SGS
SYSTEM CERTIFICATION
Reg.No. 40002-2

walter meier