NORDMANN
ENGINEERING

Nordmann AT4

Steam air humidifier



OPERATING INSTRUCTIONS

2559416-A EN 1801

Thank you for choosing Nordmann

Installation date (MM/DD/YYYY):
Commissioning date (MM/DD/YYYY):
Site:
Model:
Serial number:

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1 Introduction

1.1 To the very beginning

We thank you for having purchased the **steam humidifier Nordmann AT4**.

The steam humidifier Nordmann AT4 incorporates the latest technical advances and meets all recognized safety standards. Nevertheless, improper use of the Nordmann AT4 may result in danger to the user or third parties and/or impairment of material assets.

To ensure a safe, proper, and economical operation of the steam humidifier Nordmann AT4, please observe and comply with all information and safety instructions contained in the present operating instructions.

If you have questions, which are not or insufficiently answered in this documentation, please contact your Nordmann supplier. They will be glad to assist you.

1.2 Notes on the operating instructions

Limitation

The subject of these operating instructions is the steam humidifier Nordmann AT4. The various accessories are only described insofar as this is necessary for proper operation of the equipment. Further information on accessories can be obtained in the respective instructions.

These operating instructions are restricted to the **commissioning, operation**, **servicing** and **trouble shooting** of the steam humidifier Nordmann AT4 and is meant for **well trained personnel being sufficiently qualified for their respective work**.

These operating instructions are supplemented by various separate items of documentation (installation instructions, spare parts list, manuals for accessories, etc.). Where necessary, appropriate cross-references are made to these publications in the present documentation.

Explanation of the symbols used in this manual

CAUTION!

The catchword “CAUTION” designates notes in this documentation that, if neglected, may cause **damage and/or malfunction of the unit or other material assets**.



WARNING!

The catchword “WARNING” used in conjunction with the general caution symbol designates safety and danger notes in this documentation that, if neglected, may cause to **injury to persons**.



DANGER!

The catchword “DANGER” used in conjunction with the general caution symbol designates safety and danger notes in this documentation that, if neglected, may lead to **severe injury or even death of persons**.

Safekeeping

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

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

Language versions

The present operating instructions are available in various languages. Please contact your Nordmann supplier for information.

Copyright protection

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

2 For your safety

General

Every person working with the Nordmann AT4 must have read and understood the present operating instructions before carrying out any work.
Knowing and understanding the contents of the operating instructions 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.

All ideograms, signs and markings applied to the unit must be observed and kept in readable state.

Qualification of personnel

All actions described in the present operating instructions (operation, maintenance, etc.) must be carried out only by **well trained and sufficiently qualified personnel authorised by the owner**.
For safety and warranty reasons any action beyond the scope of this manuals must be carried out only by qualified personnel authorised by the manufacturer.

It is assumed that all persons working with the Nordmann AT4 are familiar and comply with the appropriate regulations on work safety and the prevention of accidents.

This unit may not be used by persons (including children) with reduced physical, sensory or mental abilities or persons with lacking experience and/or knowledge, unless they are supervised by a person responsible for their safety or they received instructions on how to operate the unit.
Children must be supervised to make sure that they do not play with unit.

Intended use

The steam humidifier Nordmann AT4 is intended exclusively for **air humidification via a steam distributor or a fan unit approved by the manufacturer within the specified operating conditions** (see chapter 9 “Product specifications”). Any other type of application without the express written consent of the manufacturer is considered as not conforming with the intended purpose and may lead to the Nordmann AT4 becoming dangerous.
Operation of the equipment in the intended manner requires **that all the information in these instructions is observed (in particular the safety instructions)**.

Danger that may arise from the unit



DANGER!
Danger of electric hazard!

The Nordmann AT4 is mains powered. One may get in touch with live parts when the unit is open. Touching live parts may cause severe injury or danger to life.

Prevention: Before carrying out any work set the Nordmann AT4 out of operation as described in chapter 4.4 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.



WARNING!
Hot water vapour - Danger of scalding!

The Nordmann AT4 produces hot water vapour. There is danger of scalding when getting in touch with hot water vapour.

Prevention: Do not carry out any work on the steam system during operation (steam lines, steam distributor, fan unit, etc.). If the steam system is leaky set the Nordmann AT4 immediately out of operation as described in chapter 4.4. Correctly seal the steam system before putting the unit into operation again.



WARNING!
Danger of burning!

During operation the components of the steam system (steam cylinder, steam distributor, etc.) get very hot (up to 100 °C). There is danger of burning when touching the hot components.

Prevention: Before carrying out any work on the steam system set the Nordmann AT4 out of operation as described in chapter 4.4, then wait until the components have cooled down sufficiently thus preventing danger of burning.

Behaviour in case of danger

If it is suspected that **safe operation is no longer possible**, then the Nordmann AT4 should immediately **be shut down and secured against accidental power-up according to chapter 4.4**. This can be the case under the following circumstances:

– if the Nordmann AT4 is damaged
– if the electrical installations are damaged
– if the Nordmann AT4 is no longer operating correctly
– if connections and/or piping are not sealed

All persons working with the Nordmann AT4 must report any alterations to the unit that may affect safety to the owner without delay.

Prohibited modifications to the unit

No modifications must be undertaken on the Nordmann AT4 without the express written consent of the manufacturer.

For the replacement of defective components use exclusively **original accessories and spare parts** available from your Nordmann supplier.

3 Product Overview

3.1 Models overview

Steam air humidifiers Nordmann AT4 are available with **different heating voltages** and **steam capacities ranging from 5 kg/h up to a maximum of 130 kg/h**.

Heating voltage **	Max. steam capacity in kg/h	Model Nordmann AT4	Unit size			
			Single unit			Double unit
			small	medium	large	large
400V3 (400 V/3~/50...60 Hz)	5	534	x			
	8	834	x			
	15	1534		x		
	23	2364		x		
	32	3264			x	
	45	4564			x	
	64	6464				x
	65	6564			x	
	90	9064				x
	130	13064				x
400V2 (400 V/2~/50...60 Hz)	5	524	x			
	8	824	x			
230V3 (230 V/3~/50...60 Hz)	5	532	x			
	8	832	x			
	15	1532		x		
	23	2362		x		
	32	3262			x	
	46	4662				x
	64	6462				x
230V1 (230 V/1~/50...60 Hz)	5	522	x			
	8	822	x			

** Other heating voltages on request

Key model designation

Example:
Nordmann AT4 4564 400V3

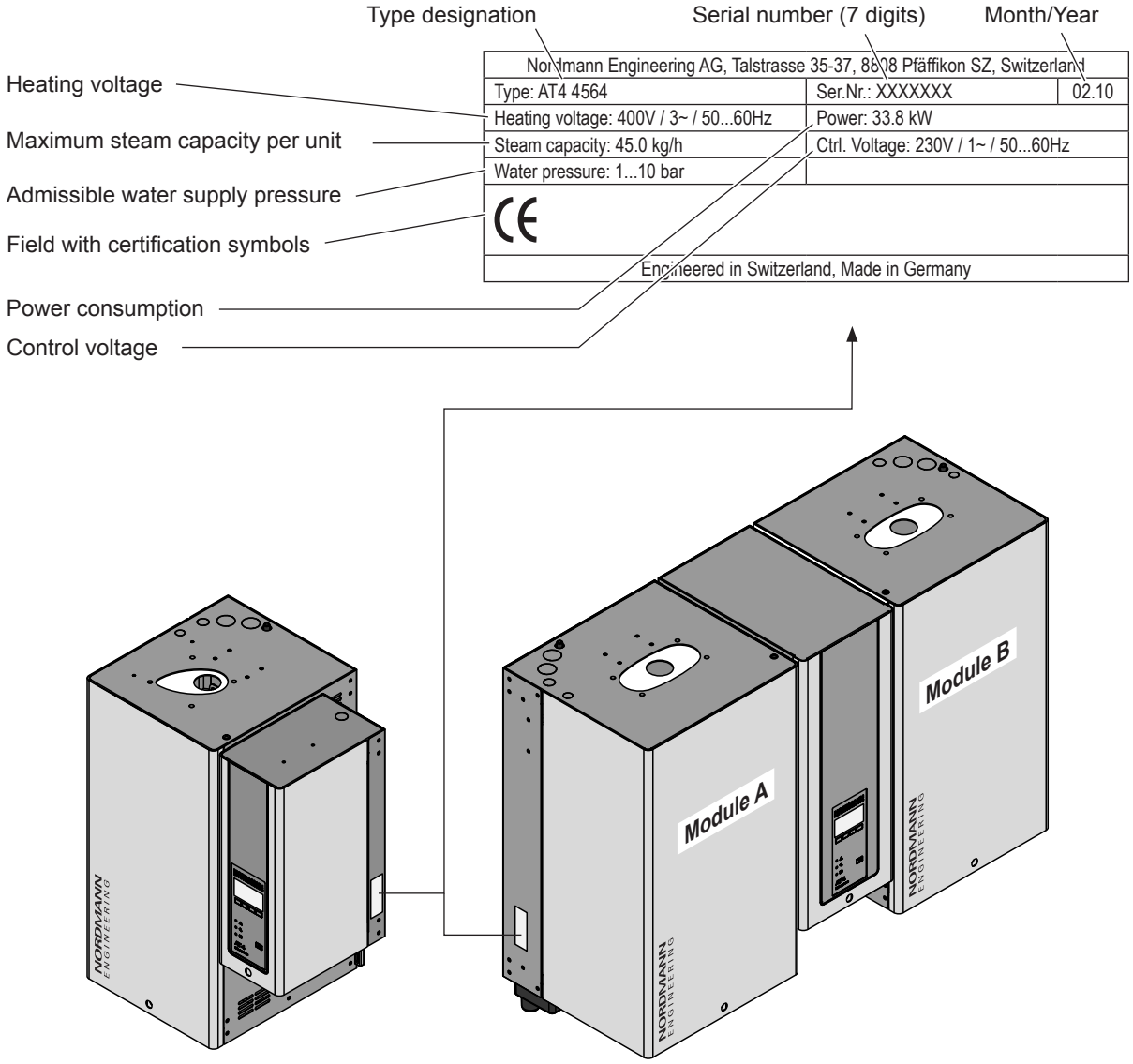
Product designation:

Unit model:

Heating voltage:
400V/3~/50...60Hz: **400V3**
400V/2~/50...60Hz: **400V2**
230V/3~/50...60Hz: **230V3**
230V/1~/50...60Hz: **230V1**

3.2 *Identification of the unit*

The identification of the unit is found on the type plate:



3.3 Steam humidifier construction

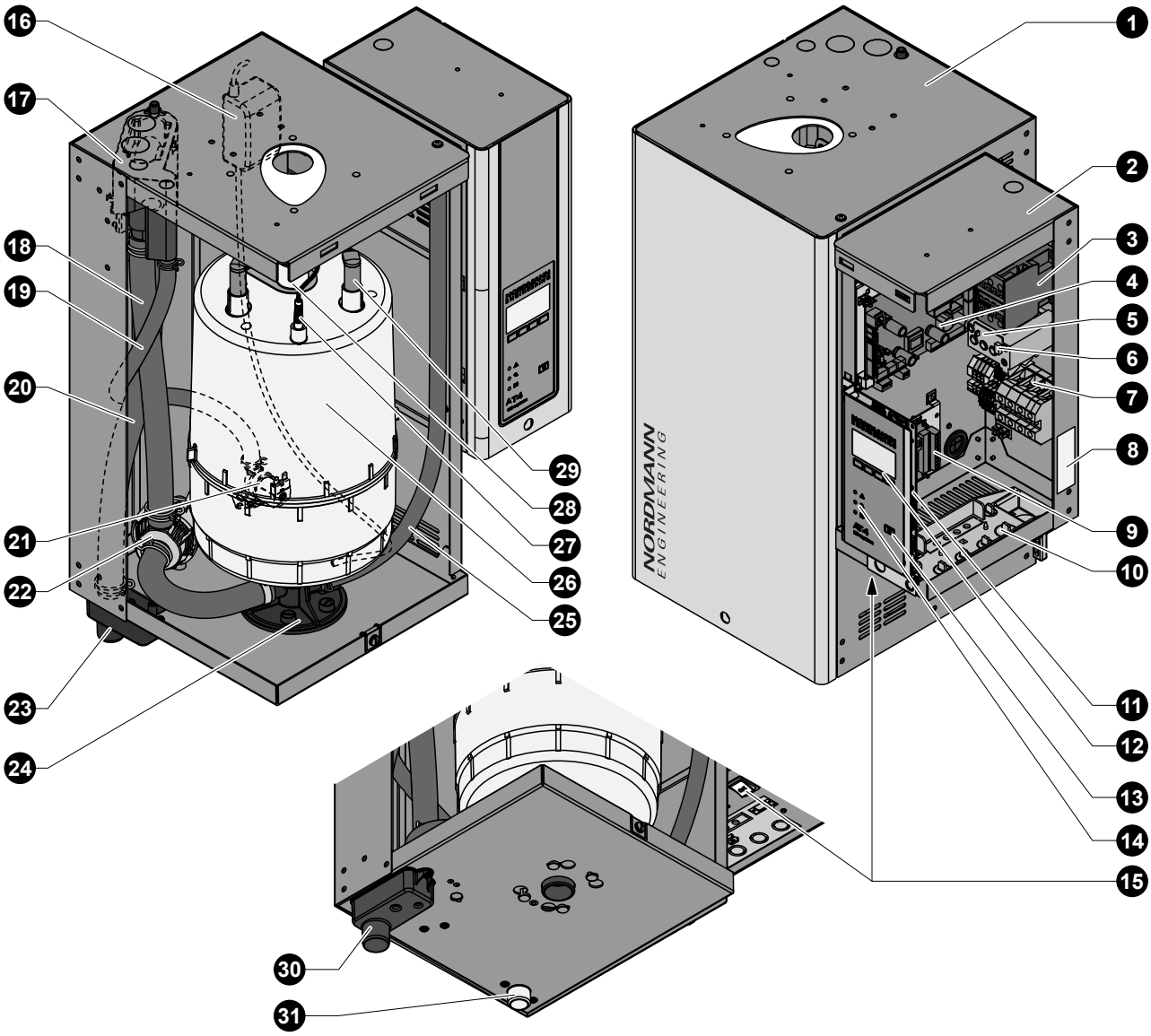
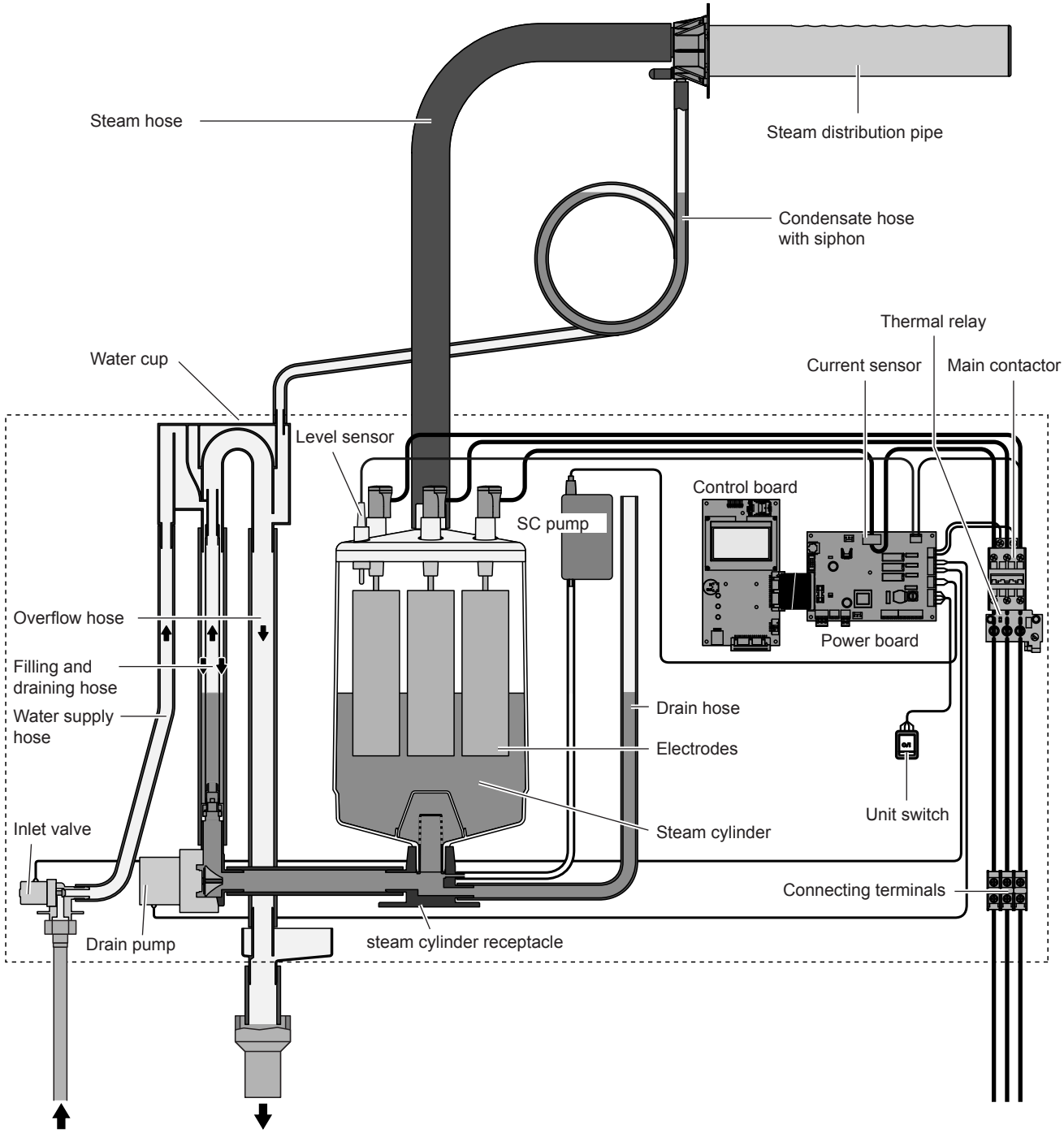


figure shows medium unit

1 Steam cylinder compartment
2 Control compartment
3 Main contactor
4 Power board
5 Thermal relay
Note: on some unit models the thermal relay is not connected directly to the main contactor!
6 Reset key thermal relay
7 Connecting terminals
8 Type plate
9 Remote operating and fault indication board (option)
10 Cable openings
11 Control board with CF Card
12 Display and control unit
13 Drain key
14 Operation status indicators
15 Unit switch
16 SC pump
17 Water cup
18 Filling and draining hose
19 Water supply hose
20 Overflow hose
21 Inlet valve
22 Drain pump
23 Drain cup
24 Steam cylinder receptacle
25 Drain hose (manual drain)
26 Steam cylinder
27 Level sensor
28 Steam outlet
29 Electrode plug
30 Drain connector
31 Water supply connector

3.4 Functional description

The steam humidifier Nordmann AT4 is a pressureless steam generator that utilizes an electrode heating. The steam humidifier Nordmann AT4 is designed for air humidification via a steam distributor (steam distribution pipe, fan unit or steam distribution system MultiPipe).



Steam generation

Any time steam is requested, the electrodes are supplied with voltage via main contactor. Simultaneously, the inlet valve opens and water enters the steam cylinder from the bottom via water cup and supply line. As soon as the electrodes come in contact with the water, current begins to flow between the electrodes, eventually heating and evaporating the water. The more the electrode surface is exposed to water, the higher is the current consumption and thus the steam capacity.

Upon reaching the requested steam capacity, the inlet valve closes. If the steam generation decreases below a certain percentage of the required capacity, due to lowering of the water level (e.g. because of the evaporation process or drainage), the inlet valve opens until the required capacity is available again.
If the required steam capacity is lower than the actual output, the inlet valve is closed until the desired capacity is achieved by lowering of the water level (evaporation process).

Level monitoring
A sensor provided in the steam cylinder cover detects when the water level gets too high. The moment the sensor comes in contact with water, the inlet valve closes.

Drainage
As a result of the evaporation process, the conductivity of the water increases due to an escalating mineral concentration. Eventually, an inadmissibly high current consumption would take place if this concentration process were permitted to continue. To prevent this concentration from reaching a value, unsuitably high for the operation, a certain amount of water is periodically drained from the cylinder and replaced by fresh water.

Lime management

The interval controlled SC pump blows air into the steam cylinder. Thus keeping the solved minerals in the water in motion as a result they are discharged with the automatic drain cycles.

Maximum current monitoring

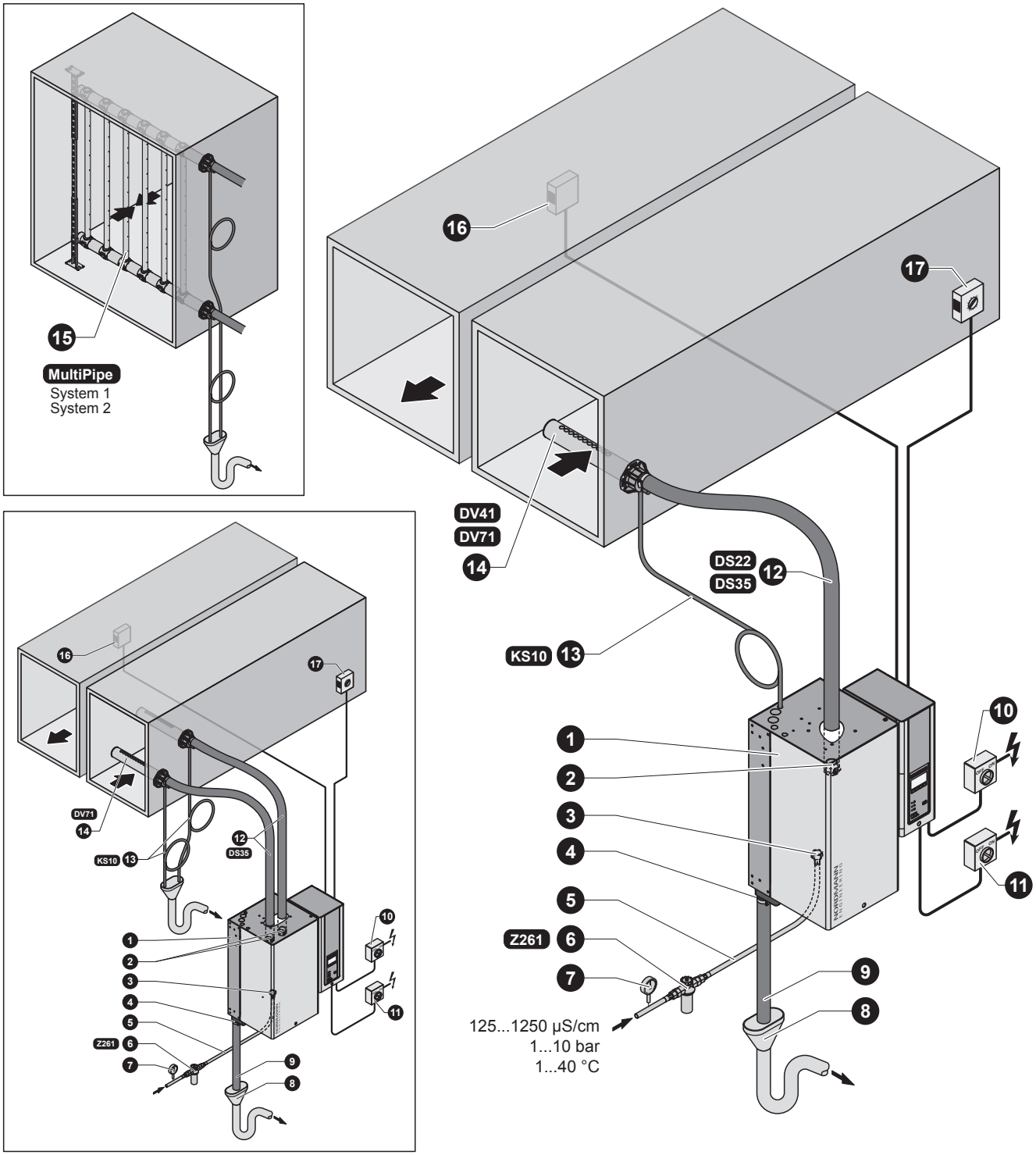
The thermal relay monitors the current flow to the electrodes. If the current exceeds a preset value the thermal relay triggers and interrupts the control voltage supply whereby the Nordmann AT4 is switched off.
When the thermal relay has tiggered it can be reset after a certain period of time via the reset key.

Control

The steam production can be controlled with the internal or an external continuous controller or an external humidistat (24 VDC On/Off control).

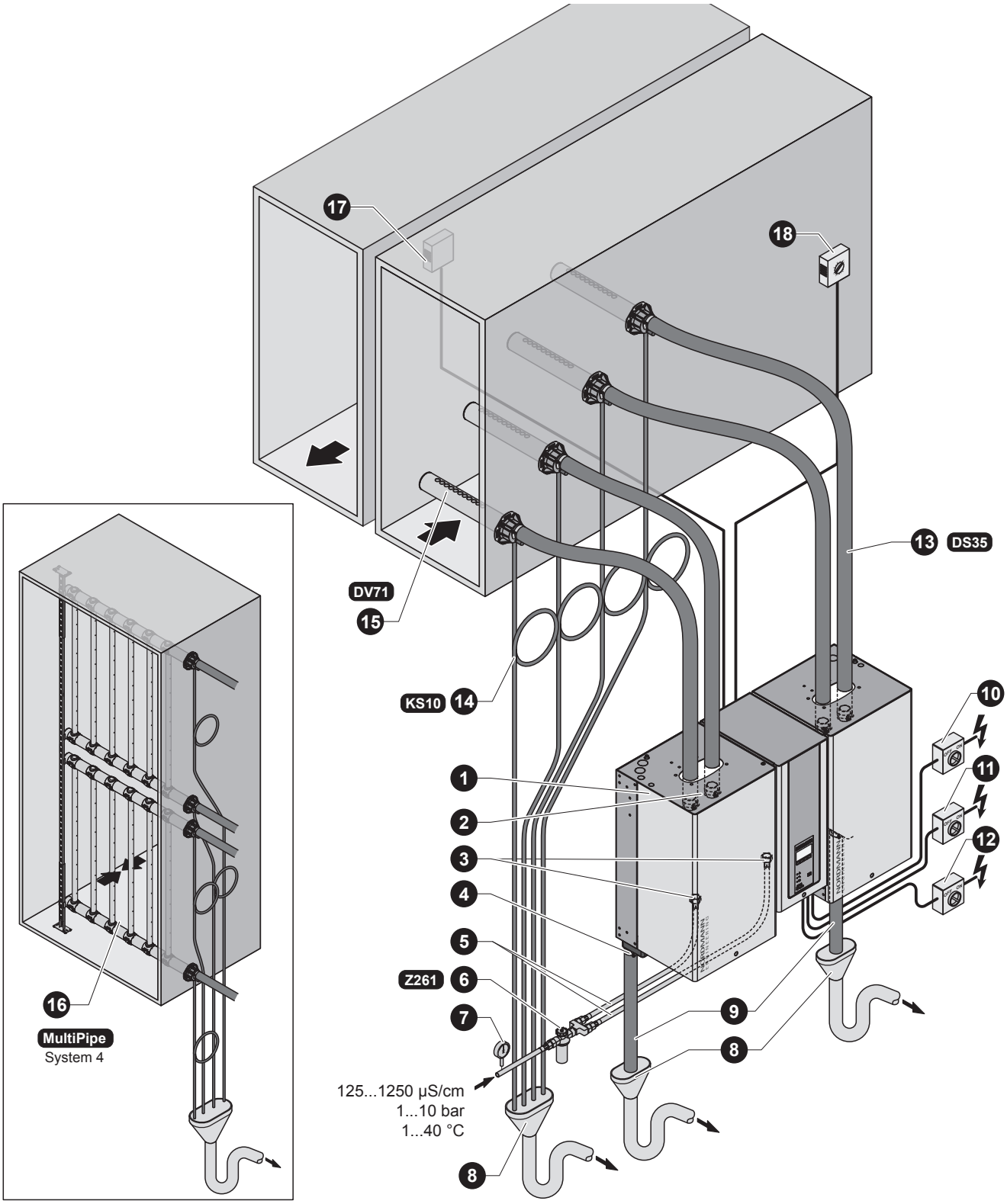
3.5 *Humidification system overview*

System overview duct humidification (single units)



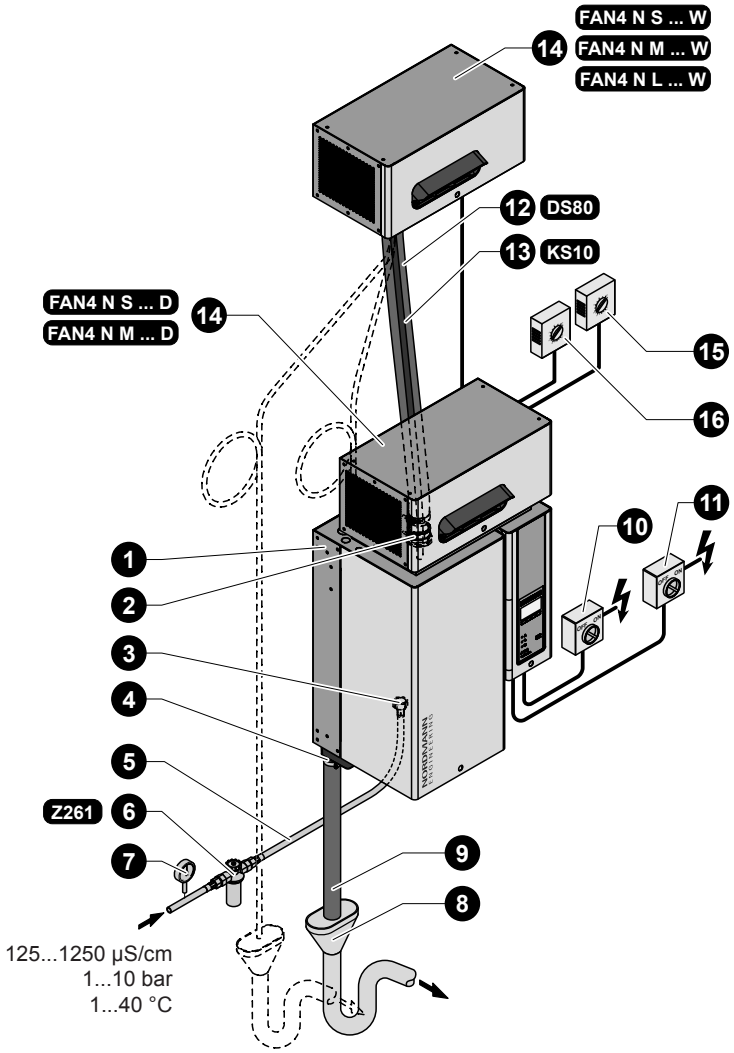
1 Steam humidifier
2 Steam connector
3 Water supply connector
4 Water drain connector
5 Water connection hose G 3/4"- G 3/8" (included in the delivery)
6 Filter valve (accessory “Z261”)
7 Manometer (installation recommended)
8 Funnel with siphon (building side)
9 Water drain hose (included in the delivery)
10 Service switch control voltage supply (building side)
11 Service switch heating voltage supply (building side)
12 Steam hose (accessory “DS22”/“DS35”)
13 Condensate hose (accessory “KS10”)
14 Steam distribution pipe (accessory “DV41-..”/“DV71-..”)
15 Steam distribution system (accessory “MultiPipe”)
16 Continuous humidity controller or humidistat
17 Safety humidistat

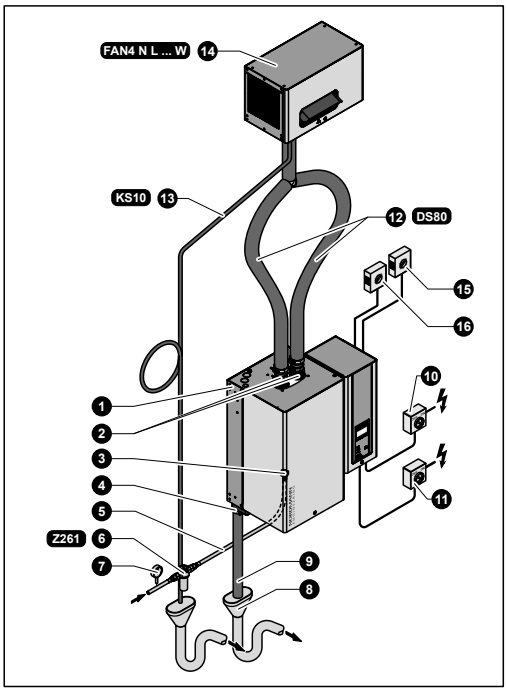
System overview duct humidification (double units)

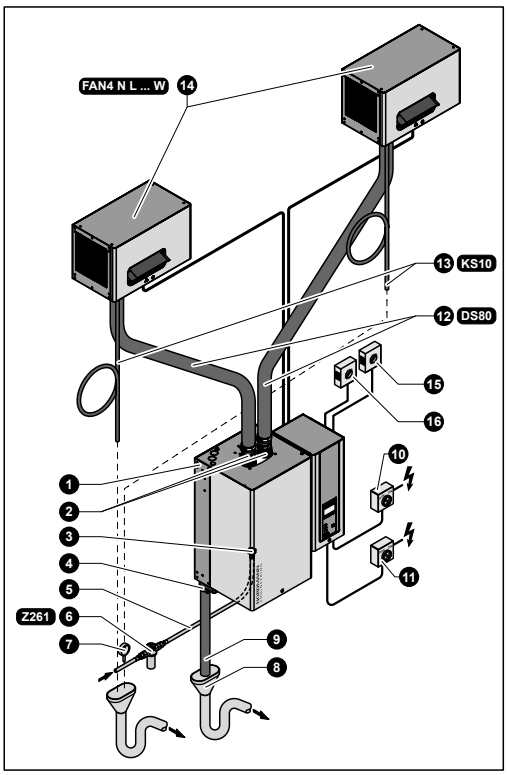


1 Steam humidifier
2 Steam connector
3 Water supply connectors
4 Water drain connector
5 Water connection hose G 3/4"- G 3/8" (included in the delivery)
6 Filter valve (accessory “Z261”)
7 Manometer (installation recommended)
8 Funnel with siphon (building side)
9 Water drain hose (included in the delivery)
10 Service switch control voltage supply (building side)
11 Service switch heating voltage supply module A (building side)
12 Service switch heating voltage supply module B (building side)
13 Steam hose (accessory “DS35”)
14 Condensate hose (accessory “KS10”)
15 Steam distribution pipe (accessory “DV71-..”)
16 Steam distribution system (accessory “MultiPipe”)
17 Continuous humidity controller or humidistat
18 Safety humidistat

System overview room humidification (single units)

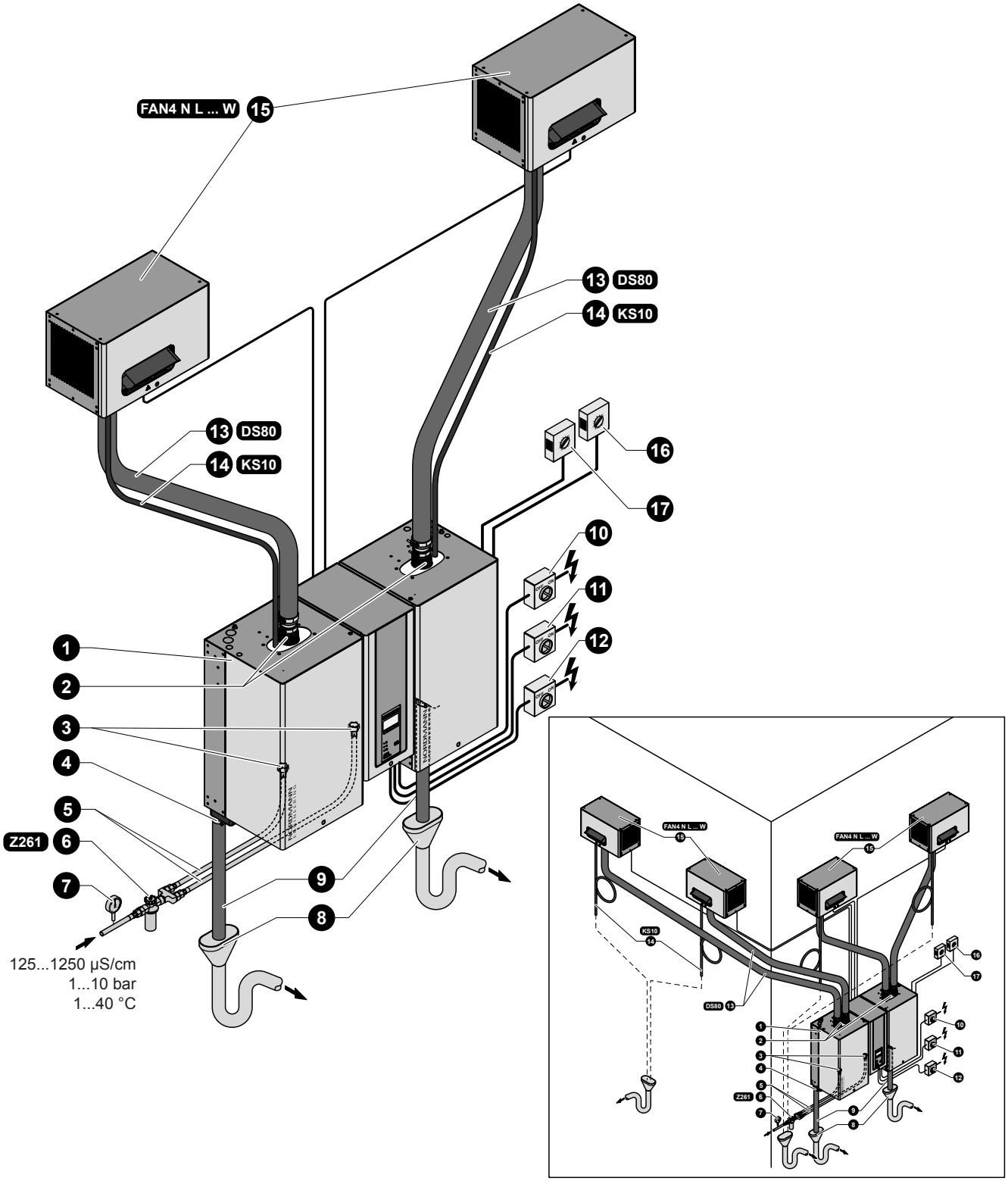






1 Steam humidifier
2 Steam connector
3 Water supply connector
4 Water drain connector
5 Water connection hose G 3/4"- G 3/8" (included in the delivery)
6 Filter valve (accessory “Z261”)
7 Manometer (installation recommended)
8 Funnel with siphon (building side)
9 Water drain hose (included in the delivery)
10 Service switch control voltage supply (building side)
11 Service switch heating voltage supply (building side)
12 Steam hose (accessory “DS80”)
13 Condensate hose (accessory “KS10”)
14 Ventilation unit (accessory “FAN4 N...”)
15 Continuous humidity controller or humidistat
16 Safety humidistat

System overview room humidification (double units)



1 Steam humidifier
2 Steam connector
3 Water supply connectors
4 Water drain connector
5 Water connection hose G 3/4"- G 3/8" (included in the delivery)
6 Filter valve (accessory “Z261”)
7 Manometer (installation recommended)
8 Funnel with siphon (building side)
9 Water drain hose (included in the delivery)
10 Service switch heating voltage supply (building side)
11 Service switch heating voltage supply module A (building side)
12 Service switch heating voltage supply module B (building side)
13 Steam hose (accessory “DS80”)
14 Condensate hose (accessory “KS10”)
15 Ventilation unit (accessory “FAN4 N...”)
16 Continuous humidity controller or humidistat
17 Safety humidistat

4 Operation

4.1 Commissioning

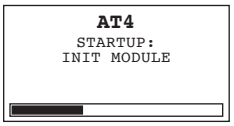
Proceed as follows when putting the steam humidifier into operation:

1. **Examine the steam humidifier and installation for possible damage**.

   DANGER!

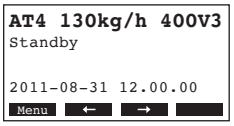
   Damaged devices or devices with damaged installation may present danger to human life or cause severe damage to material assets.
   Damaged units and/or units with damaged or faulty installation must not be operated.

2. Check whether the front panels are mounted and fixed with the screws.
3. Open the shut-off valve in the water supply line.
4. Verify the set humidity value at the humidity controller or at the humidistat, and readjust as required.
5. **Switch on the service switches** for mains supplies (heating and control voltage).
6. **Actuate the unit switch** of the steam humidifier.

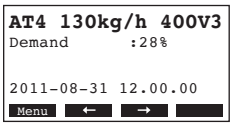


The steam humidifier carries out a **system test**, during which all three LED's light up.

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



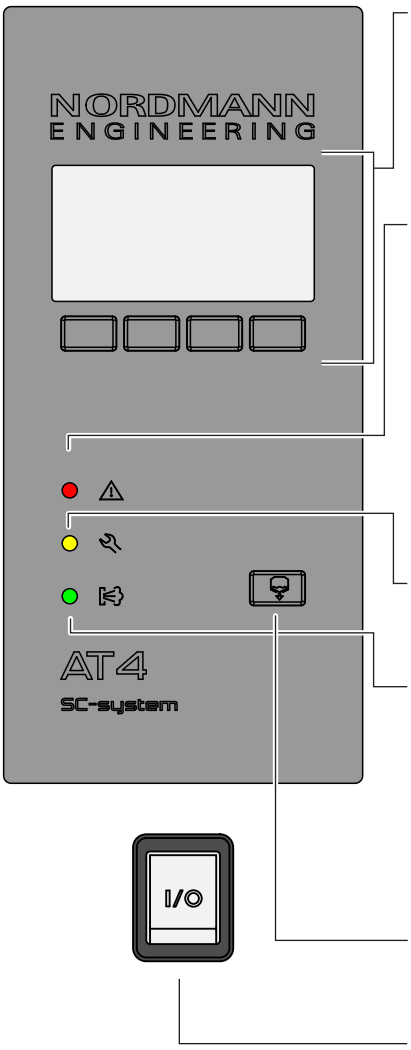
After the system test the unit is in **normal operation mode**. The display shows the **standard operating display** (first page of the indication level). Note: The contents of the standard operating display depends on the actual operating status and on the configuration of the Nordmann AT4 and can differ from the opposite display.



As soon as the humidity controller or the humidistat requires humidity, power is switched on for heating. The inlet valve opens (slight delay) and the steam cylinder fills with water. As soon as the submerged electrodes heat the water up the green LED lights up and after a few minutes (approx. 5–10 minutes, depending on the conductivity of the water) steam is produced.
Note: If the Nordmann AT4 is operated with water of low conductivity it may happen that the maximum steam capacity is not reached in the first few hours of operation. This is normal. As soon as the conductivity has reached a sufficient level (due to the vaporisation process) the humidifier will reach the maximum steam capacity.

4.2 Notes on operation

4.2.1 Function of the display and operating elements



Display and control unit
Function: Configuration of the Nordmann AT4
Indication of operating parameters
Reset of maintenance counter
Performing diagnostic functions

red LED “Malfunction”
Function: The LED lights in case of a severe malfunction of the unit (Error status). Further operation is not possible any longer. The error message is shown in the display, see chapter 7).

The LED flashes alternately with the green LED if the external safety chain (e.g. 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 steam cylinder must be replaced.

green LED “Humidification”
Function: The LED lights if the unit produces steam.

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

Drain key
Function: Calls up the dialogue for the manual draining

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

4.2.2 Remote operating and fault indication

If your unit is equipped with the optional operating and fault indication PCB (option “RFI”) the following operating status are shown remotely:

Activated remote indication relay	When?	Display on unit
“Error”	A error is present, further operation is normally not possible any longer, the heating voltage is interrupted.	Red LED lights and an error message is shown in the display.
“Service”	The steam cylinder is spent and must be replaced. The unit remains operational for a certain time.	Yellow LED lights and the service message is shown in the display.
“Steam”	Steam demand/Steam production	Green LED lights and the standard operating display is shown.
“Unit on”	Unit is switched on.	Unit switch lights and the standard operating display is shown.

4.2.3 Notes on the operation at ambient temperatures ≤ 0°C

If during operation ambient temperatures ≤ 0°C must be expected (operation of the Nordmann AT4 in a protective housing outside the building), the standby draining function must be set to “Full” and the period of time in standby operation after which an automatic cylinder draining takes place must be set to 1 hour (see chapter 5.4.8.3).

4.2.4 Inspections during operation

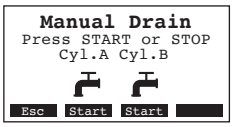
During operation the Nordmann AT4 and the humidification system have to be inspected weekly. On this occasion check the following:

- the water and steam installation for any leakage.
- the steam humidifier and the other system components for correct fixing and any damage.
- the electric installation for any damage.

If the inspection reveals any irregularities (e.g. leakage, error indication) or any damaged components take the Nordmann AT4 out of operation as described in chapter 4.4. Then, contact your Nordmann representative.

4.3 Carrying out manual draining





Proceed as follows to drain the unit manually:

1. **Briefly press the drain key**. The draining dialogue appears in the display.
   Note: With double units both cylinders can be drained separately in the draining dialogue.
2. Press the **<Start>** key. The heating voltage is interrupted and the drain pump starts. The **yellow LED flashes**.
   To stop the drain cycle briefly press the **<Stop>** key.

Note: by pressing the **<Esc>** key the display unit returns to the indication level. A draining cycle in progress is interrupted automatically.

4.4 Taking the unit out of operation

In order to take the steam humidifier out of operation, perform the following steps:

1. If the unit has to be switched off because of a malfunction, please note the error code of the actual error message shown in the display.
2. Close the shut-off valve in the water supply line.
3. Start manual draining (see chapter 4.3) and wait until the steam cylinder(s) is/are empty.
   Note: If the drain pump is defective, the steam cylinder(s) is/are to be emptied manually via the manual draining hose.
4. **Actuate the unit switch.**
5. **Disconnect steam humidifier from the mains**: Switch off all service switches to mains supplies (heating and control voltage) and secure switches in “off” position against accidentally being switched on, or clearly mark the switches.
6. If **ambient temperatures ≤ 0°C** must be expected when the unit is out of operation (operation of the Nordmann AT4 in a protective housing outside the building): drain the water supply pipe and the water filter (filter valve).

WARNING!
Danger of burning!

If steam was produced just before the unit is taken out of operation, wait before opening the unit and let the steam cylinder cool down to prevent danger of burning.

5 Working with the unit control

Note: if you are working with the optional **remote terminal** read **chapter 5.7 "Working with the remote terminal" first**. The operation of the remote terminal deviates in some points from the operation at the humidifier and some adjustments are blocked via the remote terminal for safety reasons.

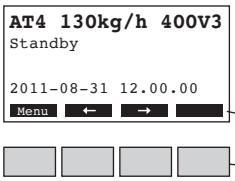
5.1 Factory settings

Ex works the unit control is set to the following standard settings:

Designation	See chapter	Parameter	Factory setting
Dialogue language	**5.4.2**	**Language**	**country specific**
Controller settings	**5.4.3**		
Signal source		**SignalSource**	**Analog**
Control type		**Hum.Control**	**Extern**
Control signal		**Controlsign.**	**0-10V**
Supply air limitation		**Lim. Control**	**Off**
Cylinder type	**5.4.4**	**Cylinder**	**unit specific**
SC system	**5.4.5**		
Status SC pump		**SC-Pump**	**On**
Operating time of the SC pump per hour		**On-Time**	**unit specific**
Capacity limitation	**5.4.6**		
Set capacity limitation		**Power Limit**	**100 %**
Time control capacity limitation		**Timer**	**Off**
Timer controlled operation of the humidifier	**5.4.7**		
Time control operation		**Timer**	**Off**
Water management	**5.4.8**		
Water conductivity		**Conductivity**	**>125 µS/cm**
Drain factor		**Drain Factor**	**1.0**
Operating behaviour in idle mode		**Idle Mode**	**IdleOnly**
Status forced draining function		**Force Drain**	**Off**
Time delay forced draining		**Force Delay**	**72 hours**
Date	**5.4.9**	**Date**	**to be set on site**
Time of day	**5.4.10**	**Time**	**to be set on site**
Display contrast	**5.4.11**	**Contrast**	**50**

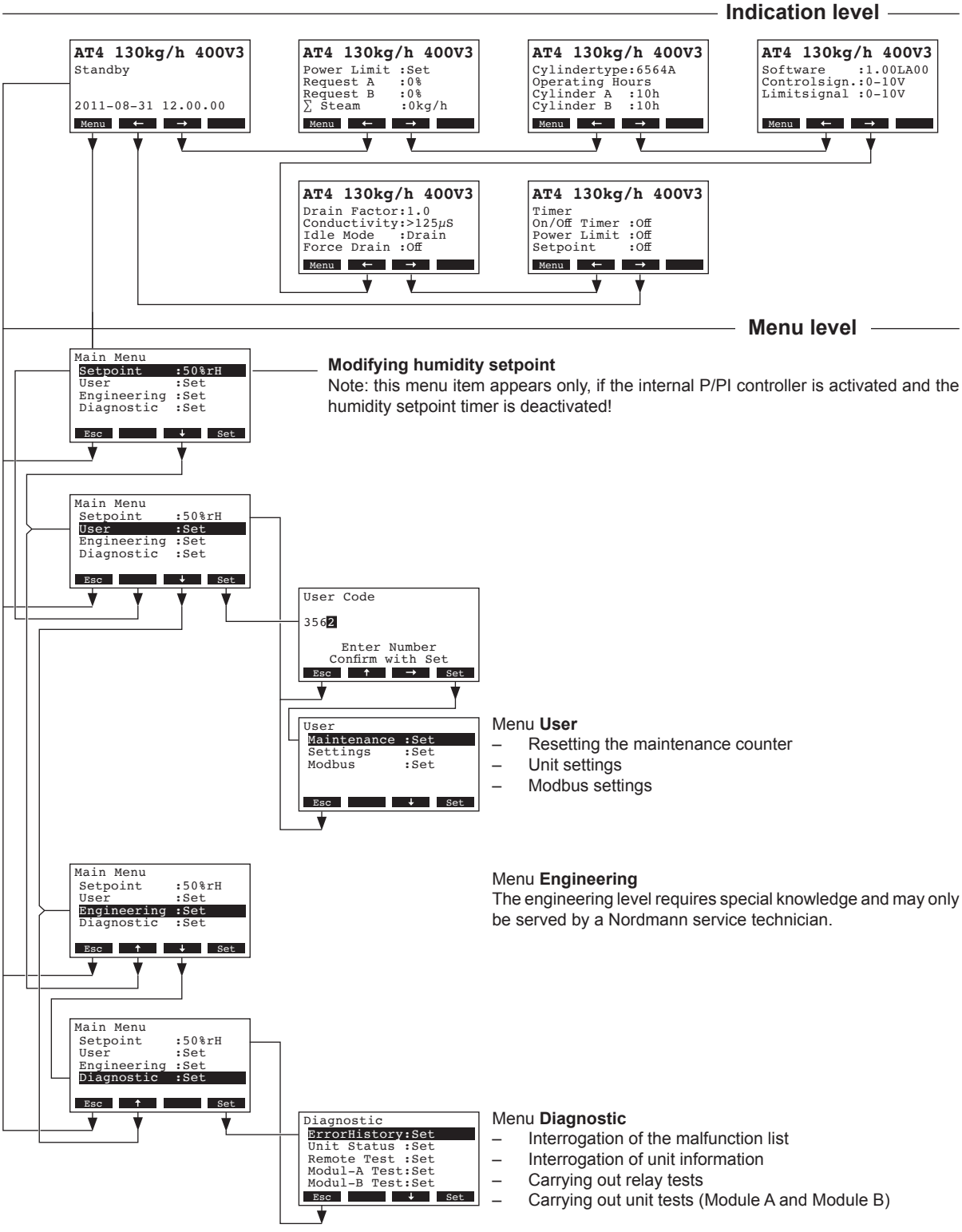
5.2 Operating the control unit and menu overview

Operating



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.

Menu overview

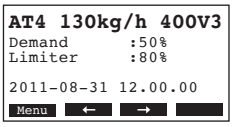


5.3 Interrogation of the operating information in the indication level

In the normal operating mode the operating and display unit 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

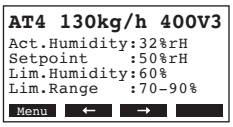
The appearance of the standard operating display depends on the actual operating status and the configuration of the Nordmann AT4. The following display are possible.



Standard operating display with control via the **external** controller

– Standby (no humidity demand) or Demand % (humidity demand present)
– Set supply air limitation in % *

* this parameter appears only if external supply air limitation is activated

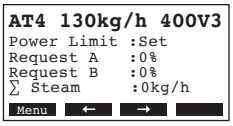


Standard operating display with control via the **internal** controller

– Actual humidity in %rh
– Set nominal humidity %rh
– Set supply air limitation in % **
– Set range for supply air limitation in % **

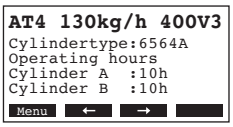
** these parameters appear only if internal supply air limitation is activated

Info page 2: Performance information



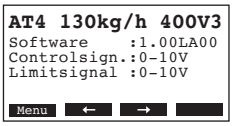
– Set power limitation in % of maximum capacity
– Actual humidity demand unit A in %rh
– Actual humidity demand unit B in %rh (if present)
– Actual steam capacity of the unit in kg/h

Info page 3: Steam cylinder type and operating hours



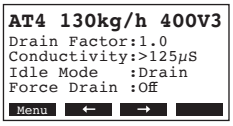
– Steam cylinder type
– Operating hours of the steam cylinder A since the last reset.
– Operating hours of the steam cylinder B since the last reset.

Info page 4: Settings



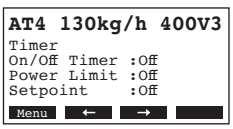
– Software version (1.00)/language version (LA00)
– Set control signal range (signal Y)
– Set control signal range for the supply air limitation (signal Z). Appears only if supply air limitation is activated.

Info page 5: **Drain settings**



– Set drain factor
– Conductivity of the water
– Set draining type in standby operation
– Actual status of forced draining function

Info Page 6: Timer settings

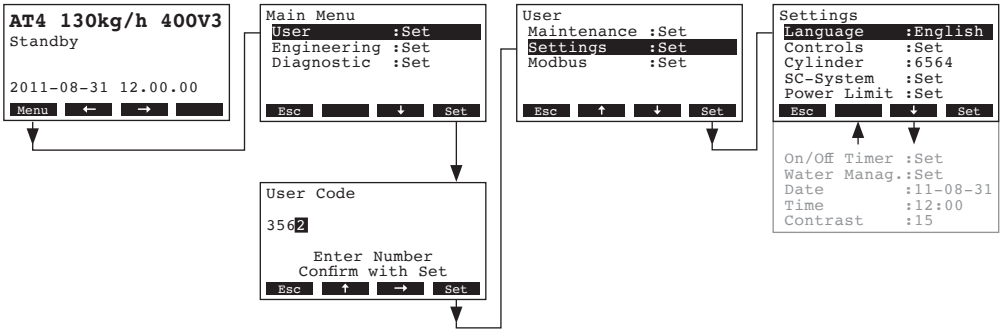


– Actual status of On/Off timer
– Actual status of power limit timer
– Actual status of humidity setpoint timer (appears only if internal P/PI controller is activated)

5.4 Unit settings

5.4.1 Launching the unit settings menu

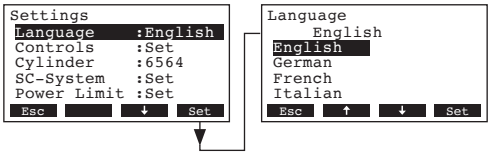
Select the unit settings menu:
Path: ***Main menu > User > Password entry: 3562 > Settings***



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

5.4.2 Selecting the dialogue language

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



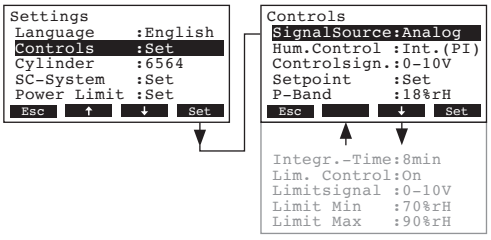
In the upcoming modification dialogue select the desired dialogue language. After confirmation, the unit automatically switches to the selected dialogue language.

Factory setting: **country specific**

Options: **diverse languages**

5.4.3 Control settings

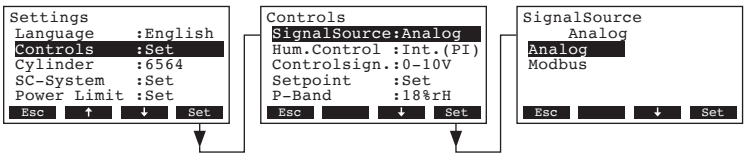
Select "**Controls**" in the unit settings menu, then press the **<Set>** key.



The display with control settings appears. The settings available depend on the selected signal source, the regulation mode and the modulation mode. The display above shows the maximum number of settings available. Please refer to the following chapters for further information on the individual control settings.

5.4.3.1 Selecting the signal source

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



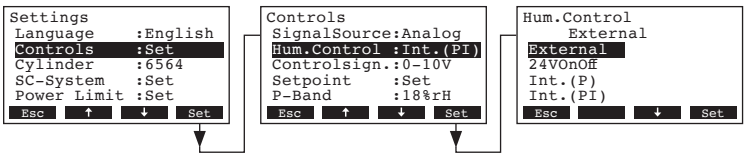
In the upcoming modification dialogue select the desired signal source.

Factory setting: **Analog**

Options: **Analog (internal or external controller)**, **Modbus**

5.4.3.2 Selecting the regulation mode

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



In the upcoming modification dialogue select the desired regulation mode.

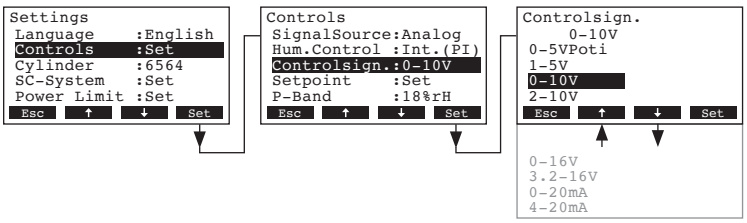
Factory setting: **External**

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

5.4.3.3 Selecting the control signal

Note: This setting is available only if the signal source is set to “Analog” and the control type is set to “External”, “Int. (P)” or “Int. (PI)”.

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



In the upcoming modification dialogue select the desired control signal.

Factory setting: **0–10V**

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

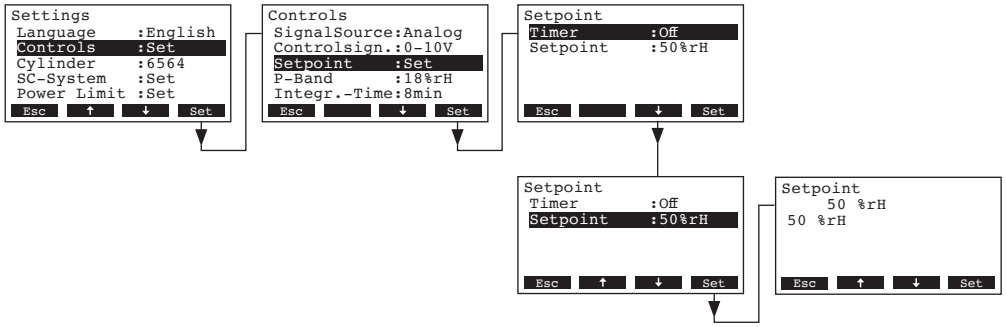
5.4.3.4 Configuring humidity setpoint

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

With the parameters in the “Setpoint” submenu you determine whether the Nordmann AT4 is to be controlled with a fix humidity setpoint (factory setting) or whether it is to be operated timer controlled with different humidity setpoints.

– Control with **fix humidity setpoint**:

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

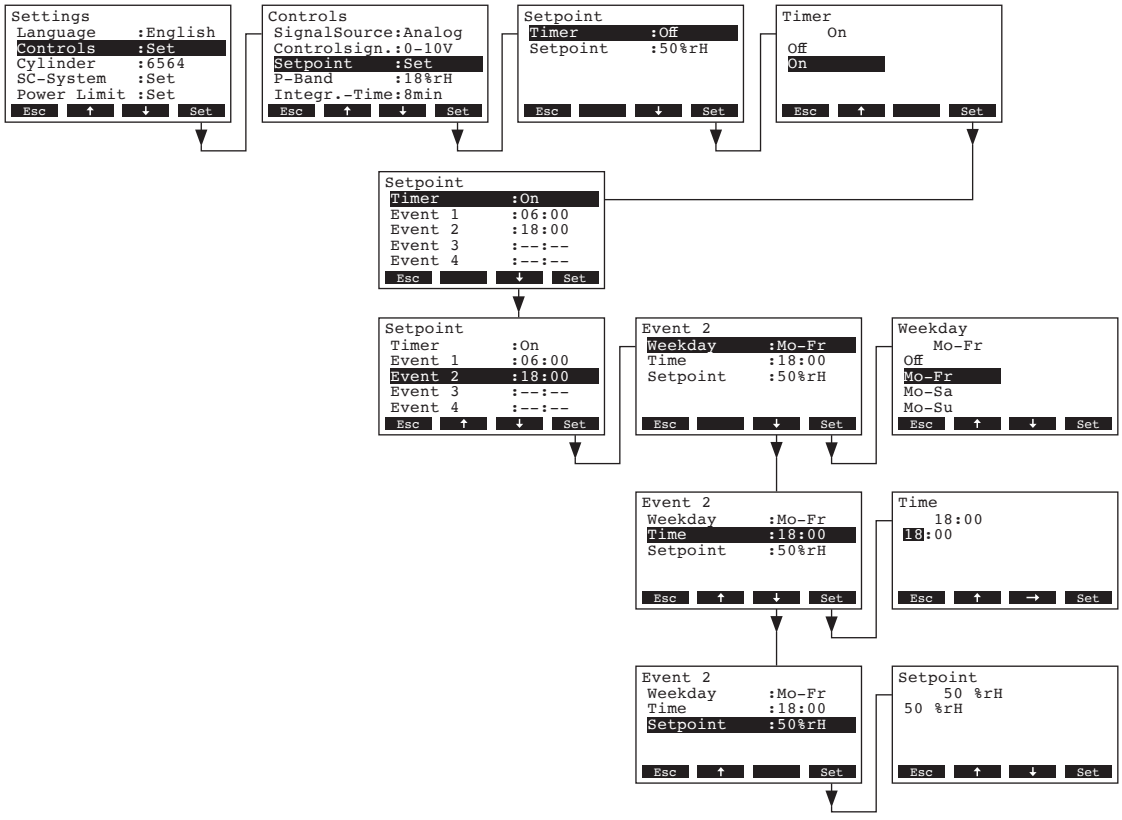


Let the timer deactivated (**Off**) or deactivate the timer if necessary. Select “**Setpoint**”, then press the **<Set>** key. In the upcoming modification dialogue set the desired humidity setpoint value (Factory setting: 50 %rh, Setting range: 15...95 %rh).

Note: If the unit is configured to be controlled with a fix humidity setpoint, the humidity setpoint can be modified also directly in the main menu.

– **Timer controlled with different humidity setpoints**:

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



Select “**Timer**”, then press the **<Set>** key. In the upcoming modification dialogue activate the timer function and confirm the setting with the **<Set>** key.

If the timer is activated, up to eight switching points (events 1 - 8) with different humidity setpoints can be defined. Each switching point is defined by a weekday or weekday range, the switching point and the humidity setpoint.

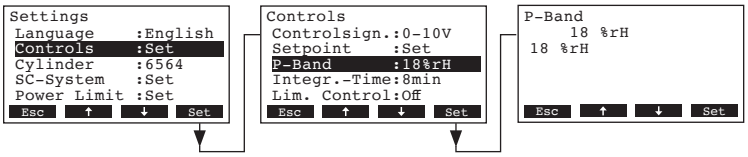
Configuration notes:

– the settings of an event remain active up to the next event.
– the software does not check the plausibility of the timer settings. Therefore, make sure your settings make sense.
– the On/Off timer (see chapter 5.4.7) overrides the humidity setpoint timer.

5.4.3.5 Setting the proportional range for the internal P/PI controller

Note: This menu item 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.



In the upcoming modification dialogue set the proportional range in %rh for the internal P/PI controller.

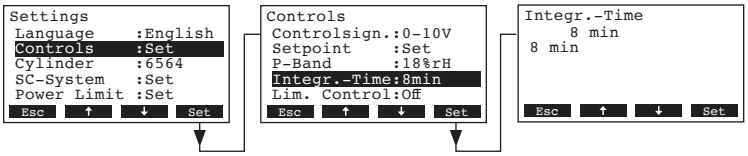
Factory setting: **18 %rh**

Setting range: **6...65 %rh**

5.4.3.6 Setting the integral time for the internal PI controller

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.



In the upcoming modification dialogue set the integral time in minutes for the internal PI controller.

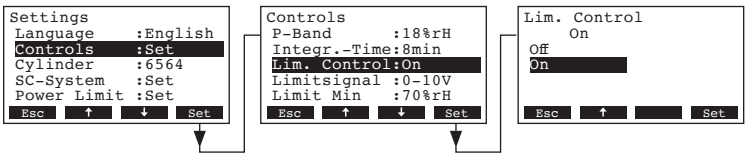
Factory setting: **8 minutes**

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

5.4.3.7 Activating/Deactivating the supply air limitation

Note: This setting is available only if the control type is set to “External”, “Int. (P)” or “Int. (PI)”.

Select “**Lim. Control**” in the control settings menu, then press the **<Set>** key.



In the upcoming modification dialogue activate or deactivate the supply air limitation **(Signal Z)**.

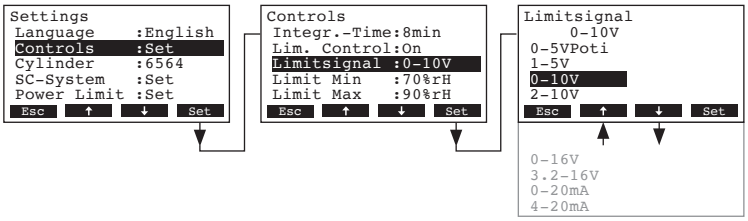
Factory setting: **Off**

Options: **On**, **Off**

5.4.3.8 Selecting the supply air limitation signal

Note: This setting is available only if the external controller or the internal P or PI controller and the supply air limitation are activated.

Select “**Limitsignal**” in the control settings menu, then press the **<Set>** key.



In the upcoming modification dialogue select the desired supply air limitation signal.

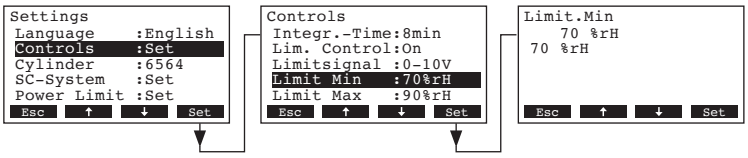
Factory setting: **0–10V**

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

5.4.3.9 Setting the lower limit value for the supply air limitation

Note: This setting is available only if the external controller or the internal P or PI controller and the supply air limitation are activated.

Select “**Limit Min**” in the control settings menu, then press the **<Set>** key.



In the upcoming modification dialogue set the lower limit value in %rH for the supply air limitation.

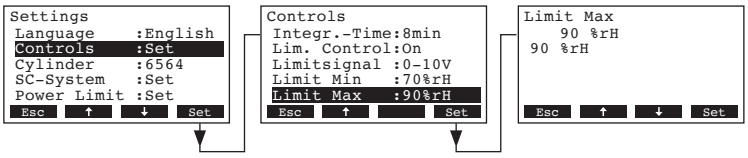
Factory setting: **70 %rH**

Options: **15 ... 95 %rH**

5.4.3.10 Setting the upper limit value for the supply air limitation

Note: This setting is available only if the external controller or the internal P or PI controller and the supply air limitation are activated.

Select “**Limit Max**” in the control settings menu, then press the **<Set>** key.



In the upcoming modification dialogue set the upper limit value in %rH for the supply air limitation.

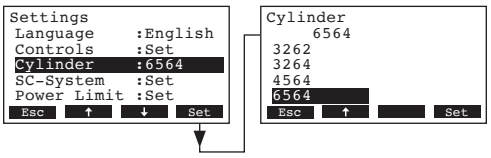
Factory setting: **90 %rH**

Setting range: **15 ... 95 %rH**

5.4.4 Selecting the cylinder type

Note: this function is **not available** via the optional remote terminal.

Select “**Cylinder**” in the settings menu, then press the **<Set>** key.



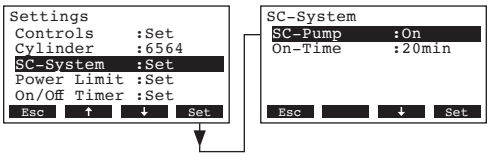
In the upcoming modification dialogue select the steam cylinder type installed in the unit (see type plate on the steam cylinder).

Factory setting: **according to the installed cylinder**

Options: **522**, **524**, **532**, **534**, **822**, **824**, **832**, **834**, **1532**, **1534**, **2362**, **2364**, **3262**, **3264**, **4564**, **6564**

5.4.5 Configuring the SC system

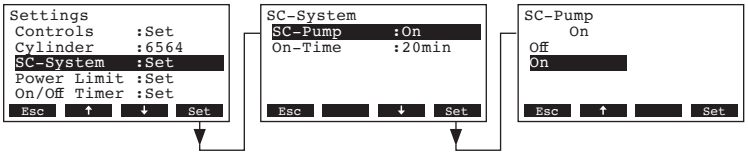
Select “**SC-System**” in the settings menu, then press the **<Set>** key.



The settings parameter for the lime management system appear. Detailed information on the different settings are found in the following chapters.

5.4.5.1 Activating/deactivating the SC system

Select “**SC-Pump**” in the SC system settings menu, then press the **<Set>** key.



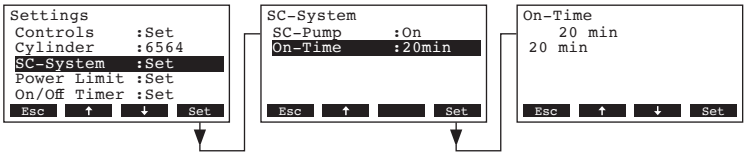
In the upcoming modification dialogue activate or deactivate the SC system.

Factory setting: **On**

Options: **On**, **Off**

5.4.5.2 Setting the operation time of the SC-Pump

Select “**On-Time**” in the SC-System settings menu, then press the **<Set>** key.



In the upcoming modification dialogue set the operating time of the SC-Pump per hour in minutes.

Factory setting: **20 minutes**

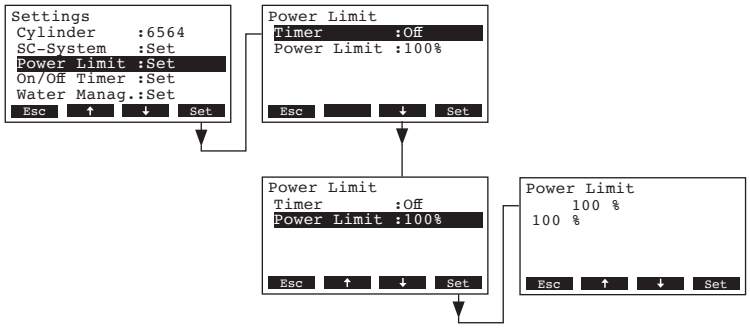
Setting range: **20 ... 60 minutes**

5.4.6 Configuring the capacity limitation

With the parameters in the “Power Limit” submenu you determine whether the Nordmann AT4 is to be operated with a fix capacity limitation (factory setting) or whether it is to be operated with a timer controlled capacity limitation.

– Operation with **fix capacity limitation**:

  Select “**Power Limit**” in the settings menu, then press the **<Set>** key. Let the timer deactivated (Off) or deactivate the timer if necessary.



  Select “**Power Limit**”, then press the **<Set>** key. In the upcoming modification dialogue set the value for the fix capacity limitation in % of the maximum capacity.

  Factory setting: **100 %**

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

– Operation with **timer controlled capacity limitation**:

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



Select “**Timer**”, then press the **<Set>** key. In the upcoming modification dialogue activate the timer function and confirm the setting with the **<Set>** key.

If the timer is activated, up to eight switching points (events 1 - 8) with different capacity limits can be defined. Each switching point is defined by a weekday or weekday range, the switching point and the capacity limitation in % of the maximum capacity.

Configuration notes:

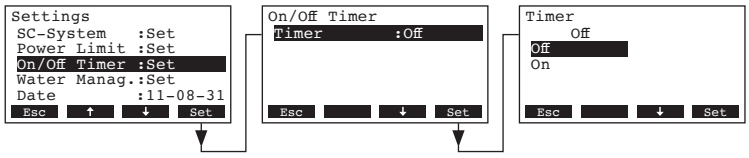
– the settings of an event remain active up to the next event.
– the software does not check the plausibility of the timer settings. Therefore, make sure your settings make sense.
– the On/Off timer (see chapter 5.4.7) overrides the capacity limit timer.

5.4.7 Configuring the On/Off timer

With the parameters in the “On/Off Timer” submenu you determine whether or not (factory setting) the Nordmann AT4 is to be switched on and off timer controlled.

– **Deactivate** On/Off timer:

Select “**On/Off Timer**” in the settings menu, then press the **<Set>** key. Let the timer deactivated (Off) or deactivate the timer if necessary.



– **Activate and configure** On/Off timer:

Select “**On/Off Timer**” in the settings menu, then press the **<Set>** key. Select “**Timer**”, then press the **<Set>** key. In the upcoming modification dialogue activate the timer function and confirm the setting with the **<Set>** key.



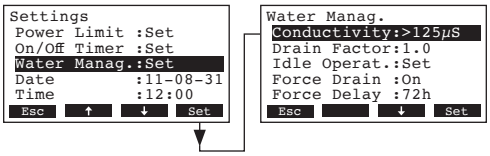
If the timer is activated, up to eight switching points (events 1 - 8) with different On/Off events can be defined. Each switching point is defined by a weekday or weekday range, the switching point and the operating mode.

Configuration notes:

– the settings of an event remain active up to the next event.
– the software does not check the plausibility of the timer settings. Therefore, make sure your settings make sense.
– the On/Off timer overrides all other timers.

5.4.8 Water management settings

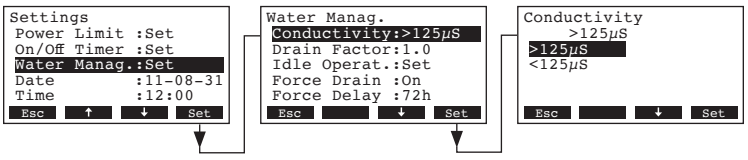
Select “**Water Manag.**” in the settings menu, then press the **<Set>** key.



The water management settings appear. Press the **<↓>** and **<↑>** keys in order to select the individual settings. Detailed information on the different settings are found in the following chapters.

5.4.8.1 Selecting the conductivity range of the supply water

Select “**Conductivity**” in the water management settings submenu, then press the **<Set>** key.



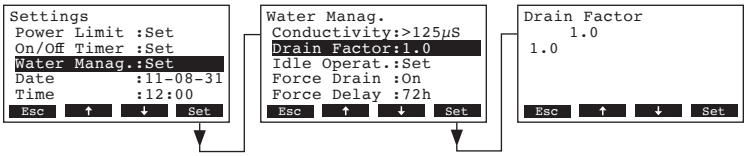
In the upcoming modification dialogue select the conductivity range of the supply water.

Factory setting: **>125 µS/cm**

Options: **>125 µS/cm**, **<125 µS/cm**

5.4.8.2 Setting the drain factor

Select “**Drain Factor**” in the water management settings submenu, then press the **<Set>** key.



In the upcoming modification dialogue set the drain factor in relation to the steam capacity.

Factory setting: **1.0**

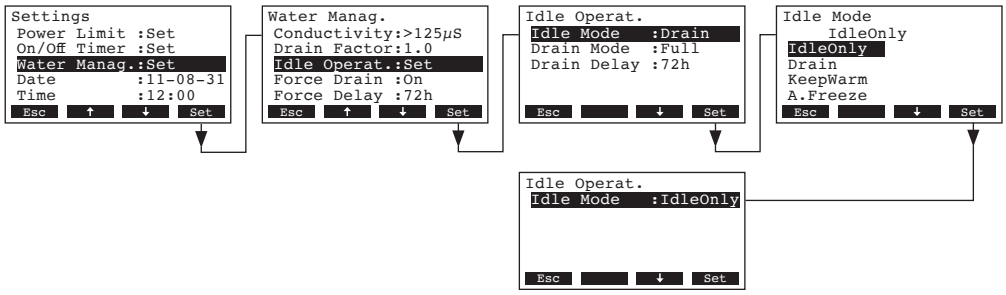
Setting range: **0.5...2.0**

5.4.8.3 Setting the operating mode for standby operation

– **Idle only operation**

In this operating mode the cylinder is not emptied in standby operation.

Select “**Idle Operat.**” in the water management settings submenu, then press the **<Set>** key. In the upcoming submenu select “**Idle Mode**”, then press the **<Set>** key.

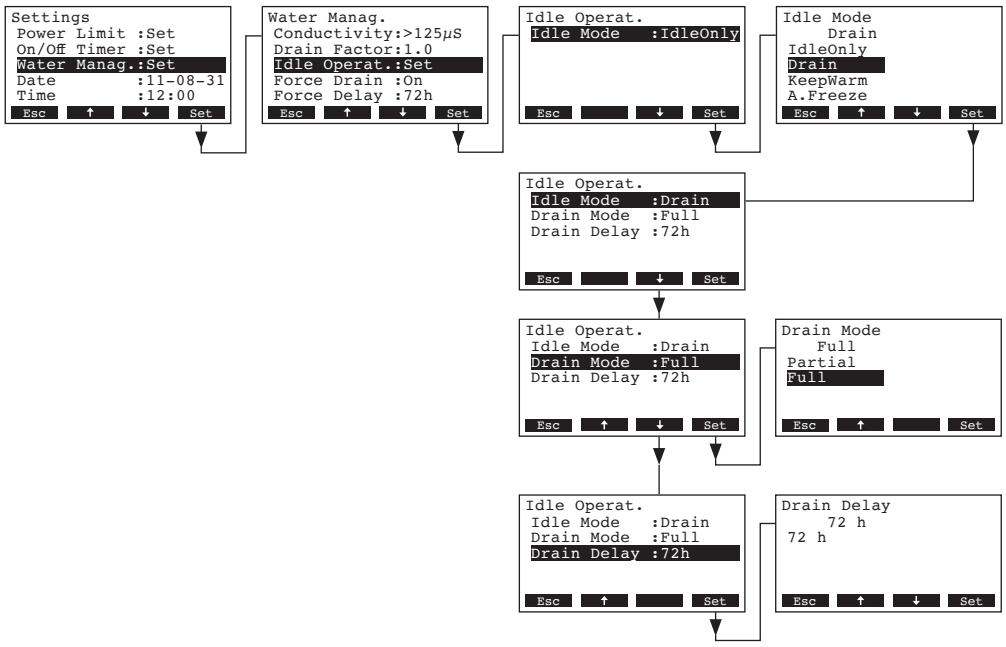


In the upcoming modification dialogue set Idle Mode to “**IdleOnly**”, then press the **<Set>** key.

– **Standby operation with partial or complete draining of the steam cylinder**

In this operating mode the cylinder is partly or fully drained after a certain time in standby operation.

Select “**Idle Operat.**” in the water management settings submenu, then press the **<Set>** key. In the upcoming Idle operation submenu set the parameters for standby operation with partial or complete draining of the steam cylinder.



Settings:

- “**Idle Mode**”: “**Drain**”
- “**Drain Mode**”: “**Full**” (complete draining of the cylinder) or “**Partial**” (cylinder is drained so far that the water does not touch the electrodes any longer)

  Important: with **outdoor operation it is mandatory** to set the drain mode to “**Full**”.

- “**Drain Delay**”: period of time in standby operation after which an automatic cylinder draining (partial or complete) takes place.

  Factory setting: **72 h**

  Setting range: **1...720 h**

  Important: with **outdoor operation it is mandatory** to set the period of time in standby operation after which an automatic cylinder draining takes place to **1 hour**.

– **Standby operation with keep warm function**

In this operating mode the water in the cylinder is kept warm via the electrodes for a certain period of time in standby operation. After the set period of time in standby operation has elapsed the heating is switched off.
Note: the keep warm function works only, if the external safety chain is closed.

Select “**Idle Operat.**” in the water management settings submenu, then press the **<Set>** key. In the upcoming Idle operation submenu set the parameters for standby operation with keep warm function.



Settings:

- “**Idle Mode**”: “**KeepWarm**”
- “**Heat Power**”: heating power during the keep warm period

  Factory setting: **150 W**

  Setting range: **100...500 W**
- “**MaxHeatTime**”: max. keep warm period

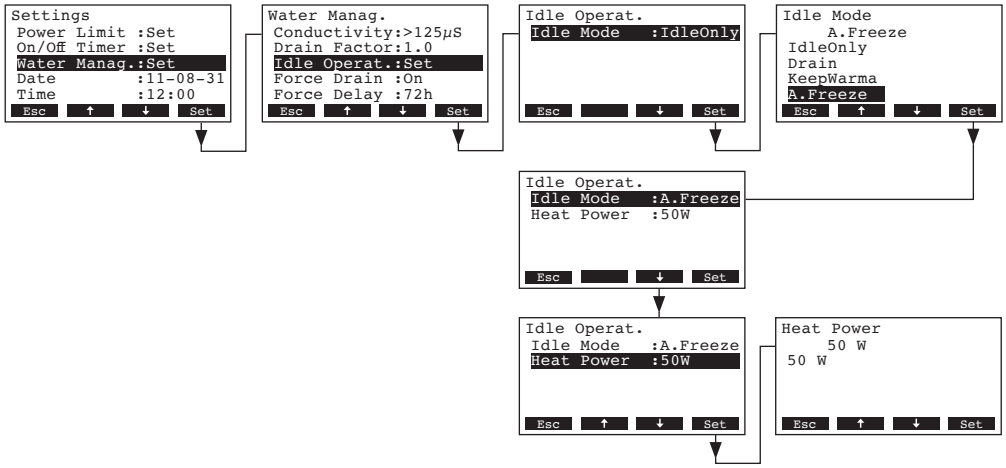
  Factory setting: **72 h**

  Setting range: **1...720 h**

– **Standby operation with anti freeze function**

In this operating mode the water in the cylinder is warmed up so far in standby operation that the water in the cylinder cannot freeze.
Note: the keep warm function works only, if the external safety chain is closed. Therefore this function may not be used for outdoor operation.

Select "**Idle Operat.**" in the water management settings submenu, then press the **<Set>** key. In the upcoming Idle operation submenu set the parameters for standby operation with anti freeze function.



Settings:

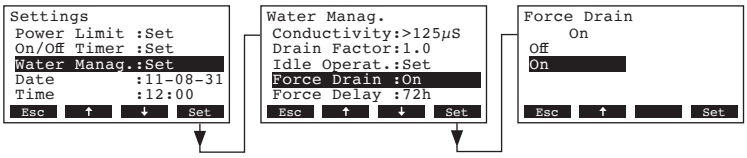
- "**Idle Mode**": "**A.Freeze**"
- "**Heat Power**": heating power for anti freeze function

  Factory setting: **50 W**

  Setting range: **10...200 W**

5.4.8.4 Activating/Deactivating the forced draining

Select "**Force Drain**" in the water management settings submenu, then press the **<Set>** key.



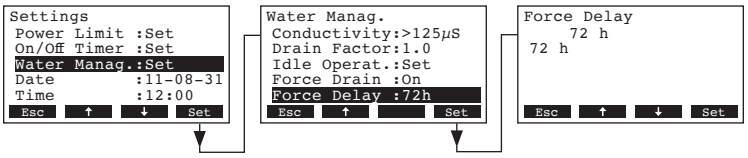
In the upcoming modification dialogue activate/deactivate the forced draining which takes place after a certain time of operation (see following setting).
Note: The forced draining takes place also during steam production.

Factory setting: **Off**

Options: **On** (Forced draining activated)
Off (Forced draining deactivated)

5.4.8.5 Setting the time of operation after which a forced draining takes place

Select “**Force Delay**” in the water management settings submenu, then press the **<Set>** key.



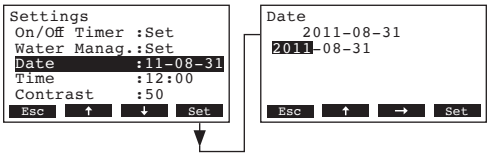
In the upcoming modification dialogue set the time of operation after which a forced draining takes place.

Factory setting: **72 hours**

Setting range: **1...720 hours**

5.4.9 Setting the date

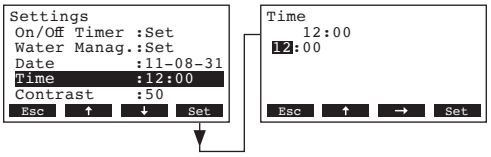
Select “**Date**” in the settings menu, then press the **<Set>** key.



In the upcoming modification dialogue set the actual date (format:“yyyy-mm-dd”).

5.4.10 Setting the time

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

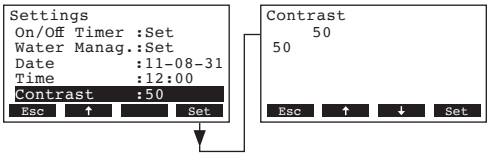


In the upcoming modification dialogue set the actual time (format:“hh:mm”).

5.4.11 Setting the display contrast

Note: this function is **not available** via the optional **remote terminal**.

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



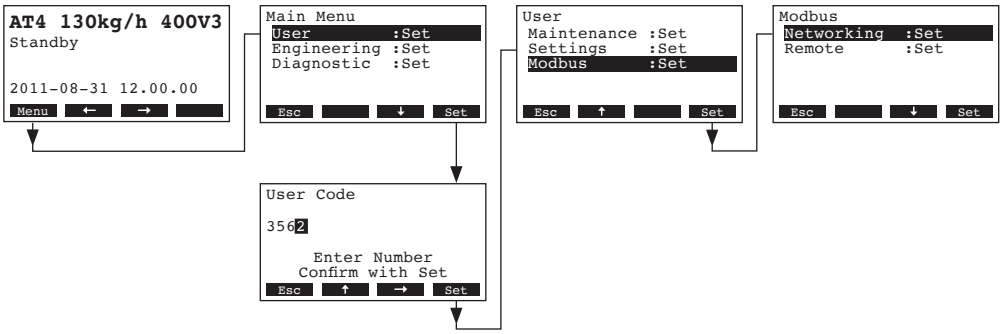
In the upcoming modification dialogue set the desired value for the display contrast.

Factory setting: **50**

Setting range: **25** (light) **...80** (dark)

5.5 Modbus settings

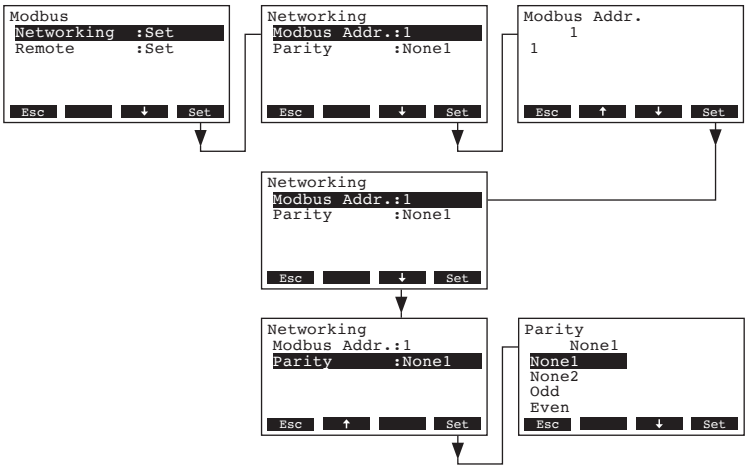
Select the Modbus menu:
Path: ***Main menu > User > Password entry: 3562 > Modbus***



In the Modbus submenu you can set the parameters for Modbus networks or for the communication with the optional remote terminal. Detailed information on the different settings are found in the following chapters.

5.5.1 Settings for Modbus networks

Select "**Networking**" in the Modbus submenu, then press the **<Set>** key. In the upcoming modification dialogue adjust the settings for the Modbus network operation.



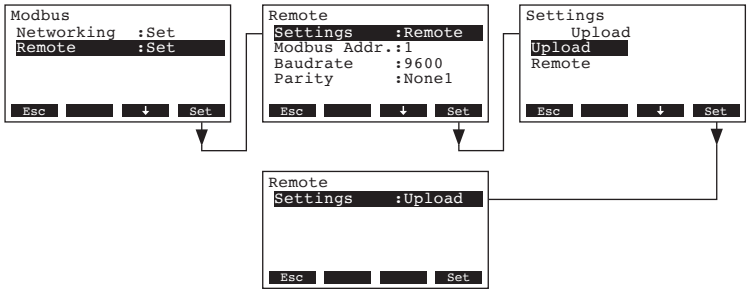
Settings:

- "**Modbus Addr.**": Modbus address of the humidifier
  Factory setting: **1**
  Setting range: **1...247**
- "**Parity**": Parity bit for the data transmission
  Factory setting: **None1**
  Options: **None1, None2, Odd, Even**

Note: for Modbus network operation the baud rate is set to 9600 baud as standard.

5.5.2 Settings for the communication with the optional remote terminal

– Data upload

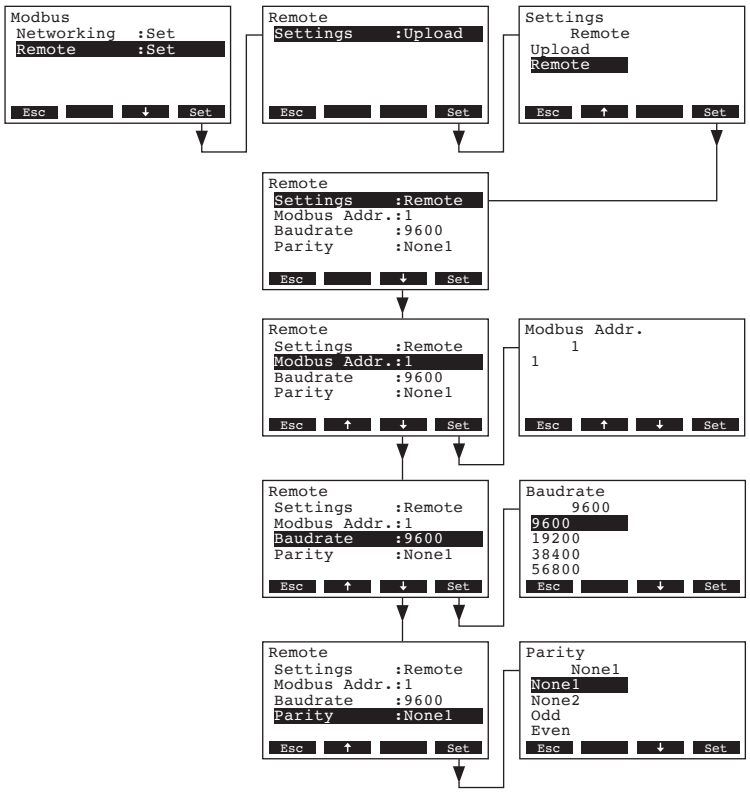


Note: This function is intended only for the service technician of your Nordmann representative.

– Settings for the communication with the optional remote terminal

Note: this function is **not available** via the optional **remote terminal**.

Select "**Remote**" in the Modbus submenu, then press the **<Set>** key. Then, adjust the settings for communication with the optional remote terminal as follows.



Settings:

- "**Settings**": Remote
- "**Modbus Addr.**": Modbus address of the humidifier

  Factory setting: **1**

  Setting range: **1...247**
- "**Baudrate**": Baudrate for the data transmission

  Factory setting: **9600**

  Options: **9600, 19200, 38400, 57600**

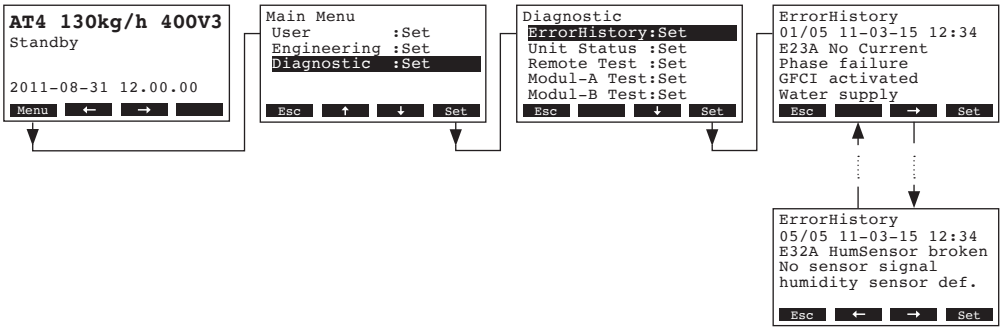
- “**Parity**”: Parity bit for the data transmission
  Factory setting: **None1**
  Options: **None1, None2, Odd, Even**

5.6 Diagnostic functions

5.6.1 Interrogation of the error history

The error messages generated by the last 20 malfunctions that occurred are saved in the error history list of the Nordmann AT4 and can be interrogated.

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



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

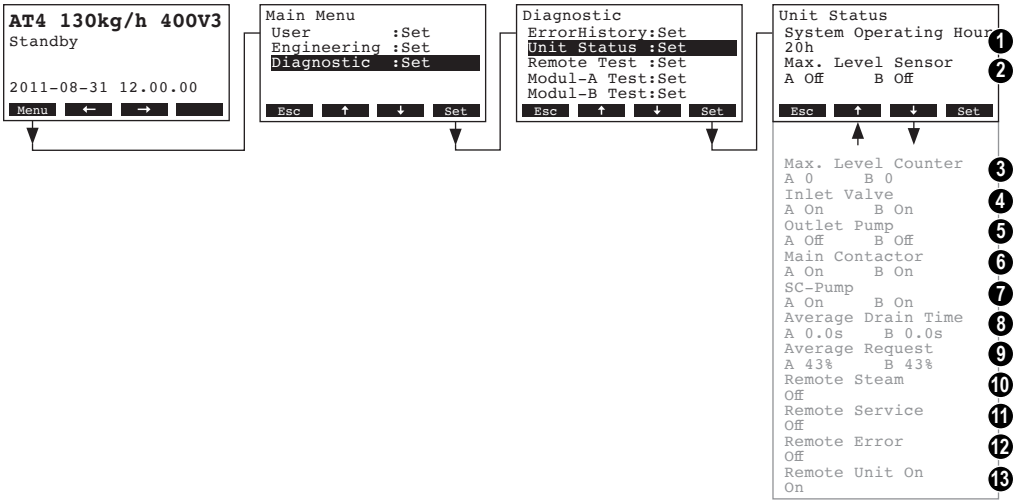
Press **<⟵>** and **<⟶>** keys, in order to select further error messages in the list.

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

5.6.2 Interrogation of unit information

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

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



1 Total operating hours since the initial commissioning

2 Actual status of the maximum level sensor of steam cylinder A (and B)

3 Counter showing the number of times the maximum level in the steam cylinder A (and B) has been reached

4 Actual status of the inlet valve module A (and B)

5 Actual status of the drain pump module A (and B)

6 Actual status of the main contactor module A (and B)

7 Actual status of the SC pump module A (and B)

8 Calculated average drain time in seconds module A (and B)

9 Current average request module A (and B)

10 Actual status of the remote indication relay “Steam”

11 Actual status of the remote indication relay “Service”

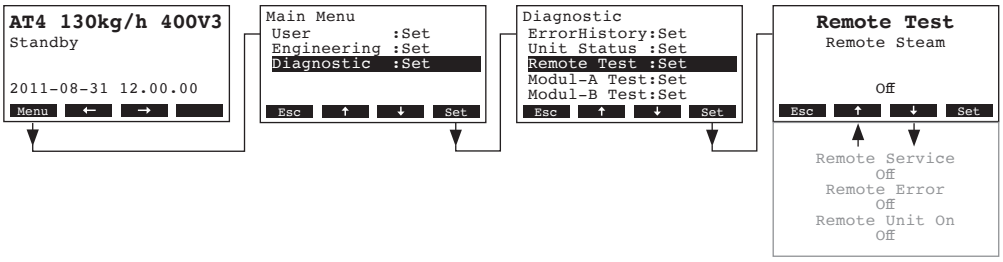
12 Actual status of the remote indication relay “Error”

13 Actual status of the remote indication relay “Unit on”

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

5.6.3 *Performing remote relay tests*

Select the remote test:
Path: ***Main menu > Diagnostic > Remote Test***

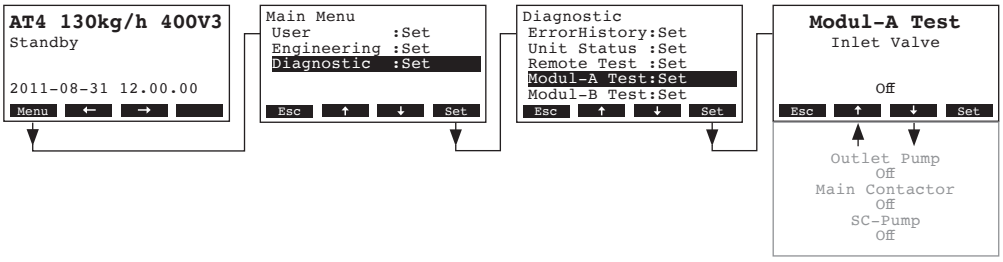


The list with the remote relay tests appears, the first relay test (steam) is shown.
Press the **<↓>** and **<↑>** keys in order to select the further relay tests available and press the **<Set>** key to activate/deactivate the corresponding relay for testing.

5.6.4 *Performing Module tests*

Note: this function is **not available** via the optional **remote terminal**.

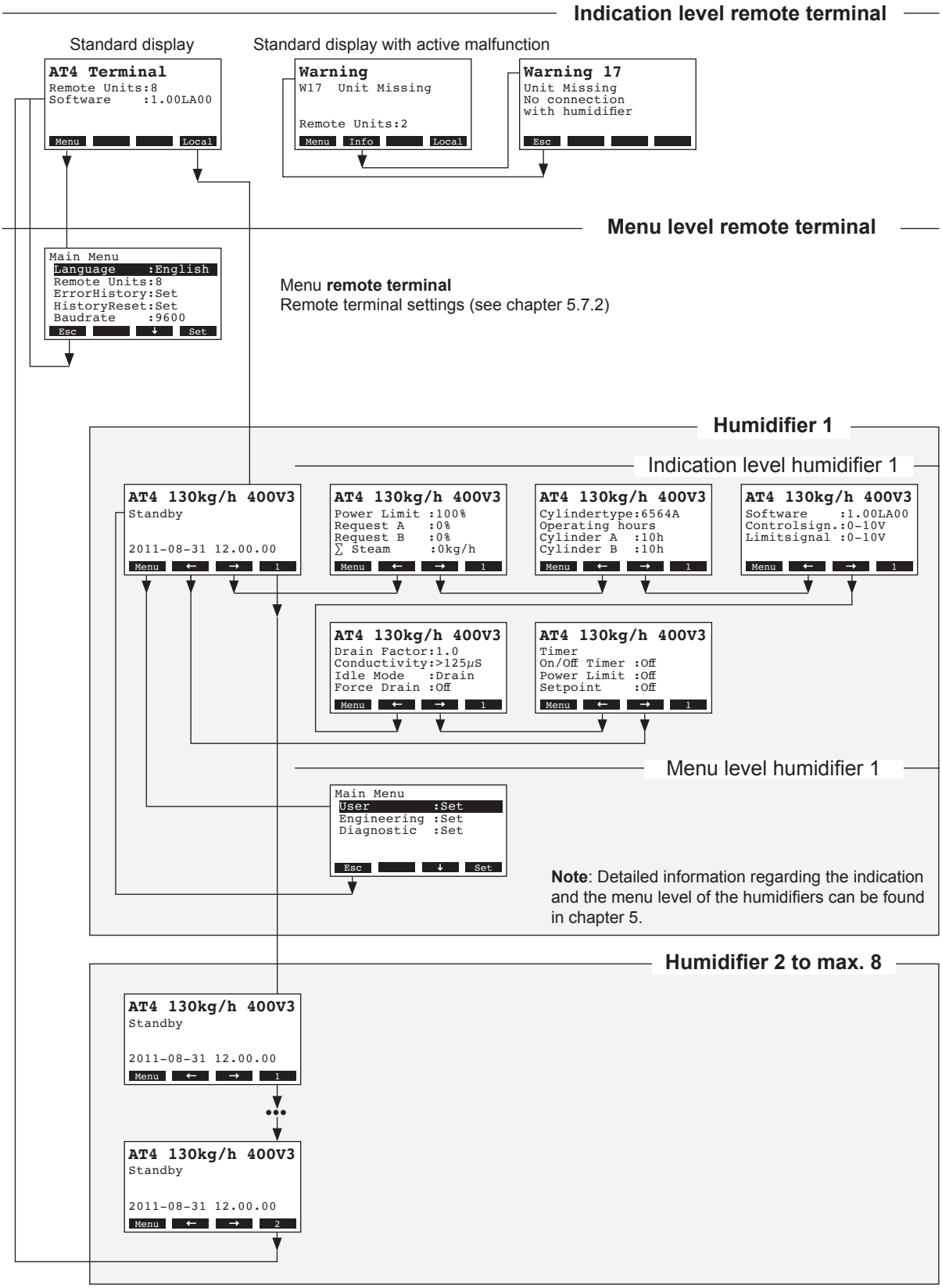
Select the Module tests:
Path: ***Main menu > Diagnostic > Modul-A Test (Modul-B Test)***



The list with the module tests appears, the first test (Inlet Valve) is shown.
Press the **<↓>** and **<↑>** keys in order to select the further tests of the selected module and press the **<Set>** key to activate/deactivate the corresponding component for testing.

5.7 Working with the remote terminal

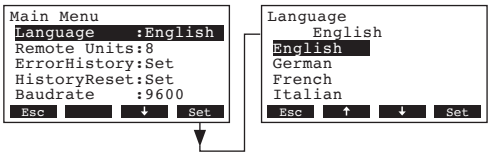
5.7.1 Menu overview remote terminal



5.7.2 Remote terminal settings

5.7.2.1 Selecting the dialogue language

Select “**Language**” in the main menu, then press the **<Set>** key.



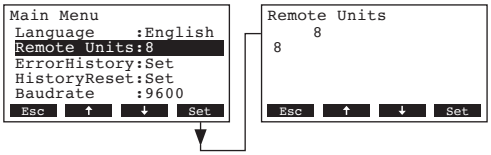
In the upcoming modification dialogue select the desired dialogue language. After confirmation, the unit automatically switches to the selected dialogue language.

Factory setting: **country specific**

Options: **divers languages**

5.7.2.2 Setting the number of humidifiers connected to the remote terminal

Select “**Remote Units**” in the main menu, then press the **<Set>** key.



In the upcoming modification dialogue set the number of humidifiers connected to the remote terminal.

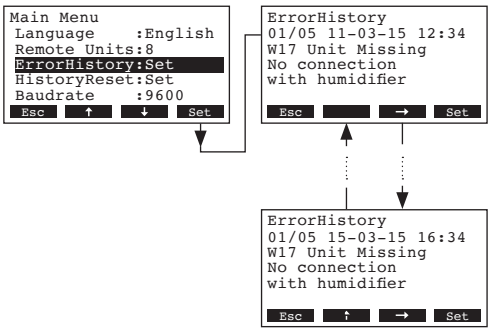
Factory setting: **1**

Setting range: **1...8**

5.7.2.3 Interrogation of the error history of the remote terminal

The error messages generated by the last 20 malfunctions that occurred are saved in the error history list of the remote terminal and can be interrogated.

Select “**ErrorHistory**” in the main menu, then press the **<Set>** key.



The last error that occurred is shown with:

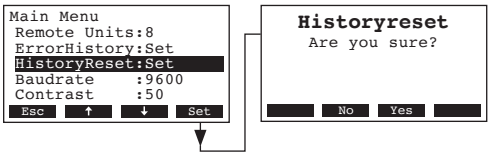
- running number of the error
- date and time of occurrence
- error code (Warning: W..., Error: E...)
- error message
- additional info text regarding the error

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.

5.7.2.4 Resetting the error history list of the remote terminal

Select "**HistoryReset**" in the main menu, then press the **<Set>** key.

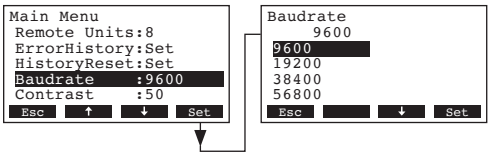


The reset dialogue appears in the display. Press the **<Yes>** key in order to **reset the error history list**.

Note: By pressing the **<No>** key the reset procedure can be aborted. The remote terminal returns to the main menu.

5.7.2.5 Setting the baudrate

Select "**Baudrate**" in the main menu, then press the **<Set>** key.



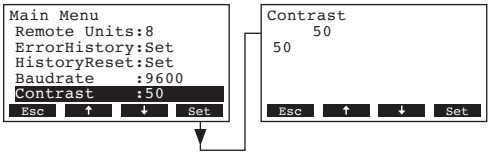
In the upcoming modification dialogue set the baudrate for the communication with the humidifier controls.

Factory setting: **9600**

Options: **9600, 19200, 38400, 57600**

5.7.2.6 Setting the display contrast

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



In the upcoming modification dialogue set the desired value for the display contrast of the remote terminal.

Factory setting: **50**

Setting range: **25** (light) **...80** (dark)

6 Maintenance

6.1 Important notes on maintenance

Qualification of personnel

All maintenance work must be carried out only by **well qualified and trained personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

General note

The instructions and details for maintenance work must be followed and upheld.

Only the maintenance work described in this documentation may be carried out.

Only use original Nordmann spare parts to replace faulty parts.

Safety

Some maintenance work requires removal of the unit cover. Please note the following:

DANGER!
Danger of electric hazard!

You may get in touch with live parts when the unit is open. Touching live parts may cause severe injury or even lethal violation.
Prevention: Before carrying out any maintenance work set the Nordmann AT4 out of operation as described in chapter 4.4 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.

CAUTION!

The electronic components inside the humidifier are very sensitive to electrostatic discharge.
Prevention: Before carrying out any maintenance work to the electrical or electronic equipment of the humidifier, appropriate measures must be taken to protect the respective components against damage caused by electrostatic discharge (ESD protection).

6.2 *Maintenance list*

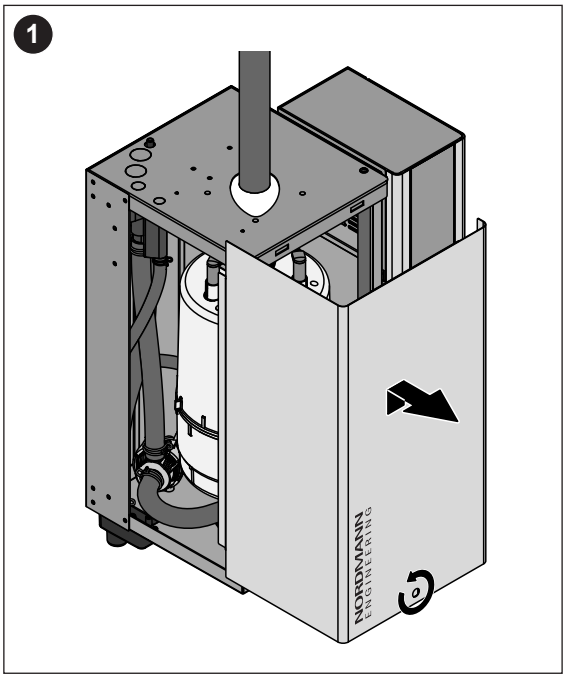
To maintain operational safety the Nordmann AT4 steam humidifier must be maintained at regular intervals. This is differentiated between the f**irst maintenance after approx. 500 operating hours (I)**, **steam cylinder replacement after the yellow LED lights (II)** and **annual maintenance (III)**.

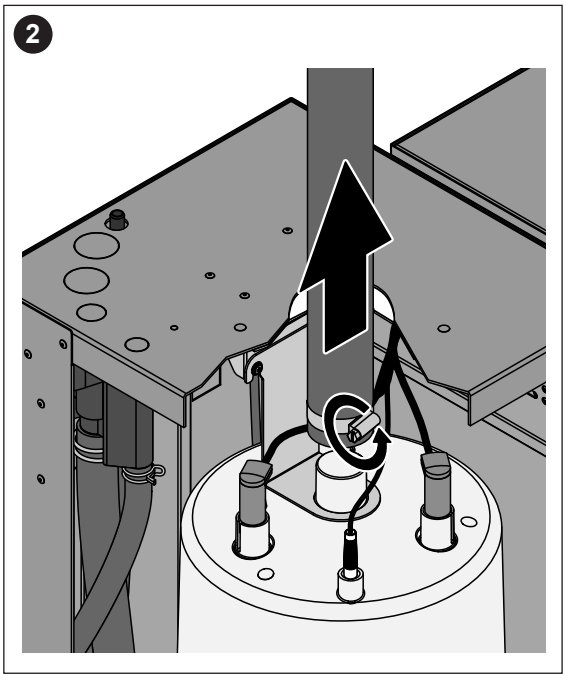
Below you will find a summary of the work to be carried out for each of the three maintenance stages.

Components	**Interval**			**Work to be done**
	I	**II**	**III**	
Steam cylinder		X		Remove and replace.
Drain pump			X	Remove, disassemble and clean, replace if necessary.
Steam cylinder receptacle			X	Inspect, clean if necessary.
Inlet valve			X	Remove and clean filter insert, replace if necessary.
Drain cup			X	Remove and clean if necessary
Drain pipe and siphon			X	Inspect, clean if necessary (decalcify and rinse out).
Steam installation	X		X	Inspect steam and condensate hoses for cracks and to see that they are correctly attached, replace faulty hoses.
Water installation	X		X	Inspect water hoses in the unit for cracks and to see that they are correctly attached, replace faulty hoses. Check supply pipe is tight, make tight if necessary. Clean water filter, if available.
Electrical installation	X		X	Check all cables in the unit are firmly positioned and examine status of insulation.

6.3 Removing and installing parts for maintenance

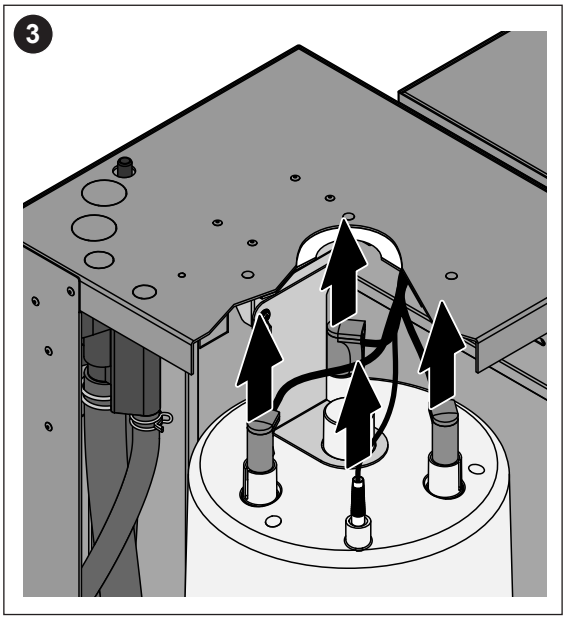
6.3.1 Removal and installation of the steam cylinder

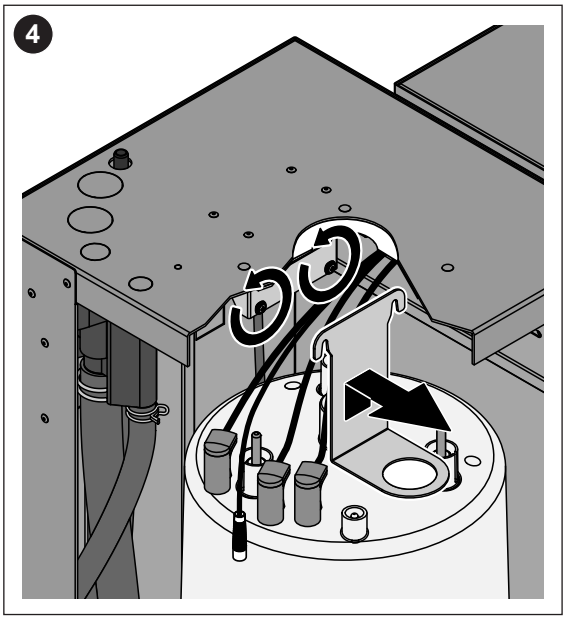




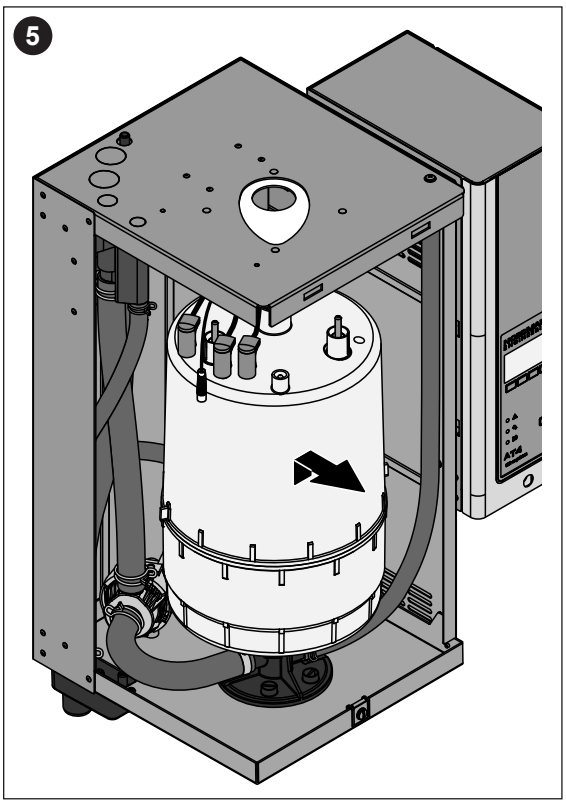
1. Undo the screw fixing the front panel to the unit using a screwdriver, then remove the front panel.
2. Release the hose clamp on the steam hose using a screwdriver, then detach the steam hose from the steam outlet connection of the steam cylinder.

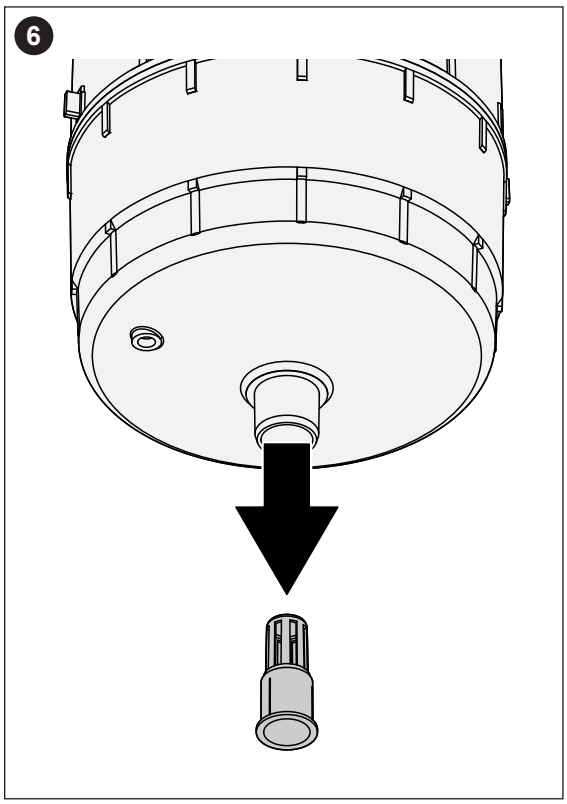
   Units with steam hose connector with condensate trap (option CT..., not shown): release the two hose clamps on the rubber sleeve using a screwdriver, then detach the rubber sleeve from the connection in the unit cover and from the steam outlet connection of the steam cylinder.





3. Remove all plugs from the electrodes and from the level sensor.
4. Loosen the screws of the steam cylinder fixing device by a few turns, then push the fixing device upwards until it comes loose and remove it.





5. Carefully lift steam cylinder away from the cylinder receptacle, then remove it to the front.

CAUTION!

Put steam cylinder down carefully to avoid damage to the lower connection piece!

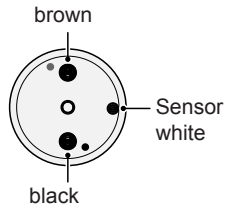
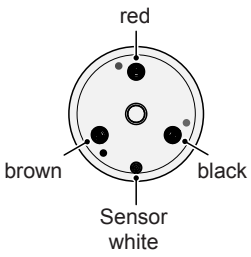
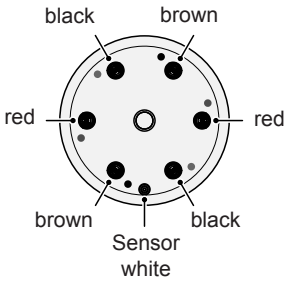
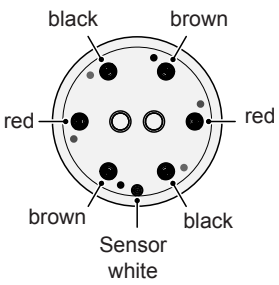
6. Carefully pull the drain screen out of the drain outlet of the steam cylinder. **Note**: this step must only be carried out if the drain screen is clogged (see chapter 7.2.2 “Unit faults”) and the steam cylinder can still be used.

Installation of the steam cylinder follows the reverse sequence. **Observe the following**:

– Before installing the steam cylinder in the unit, check the O-ring of the cylinder receptacle for damage and replace if necessary.

– Moisten the O-ring of the cylinder receptacle with water (do not use grease or oil), then insert steam cylinder into the socket and push it down to the stop.

– Attach the electrode plugs and the level sensor plug to the respective electrode and sensor connections in accordance with colour code (see table below).

Steam cylinder type			
522A **822A**	**532A / 534A** **832A / 834A** **1532A / 1534A**	**2362A / 2364A** **3262A / 3264A**	**4564A / 6564A**
			

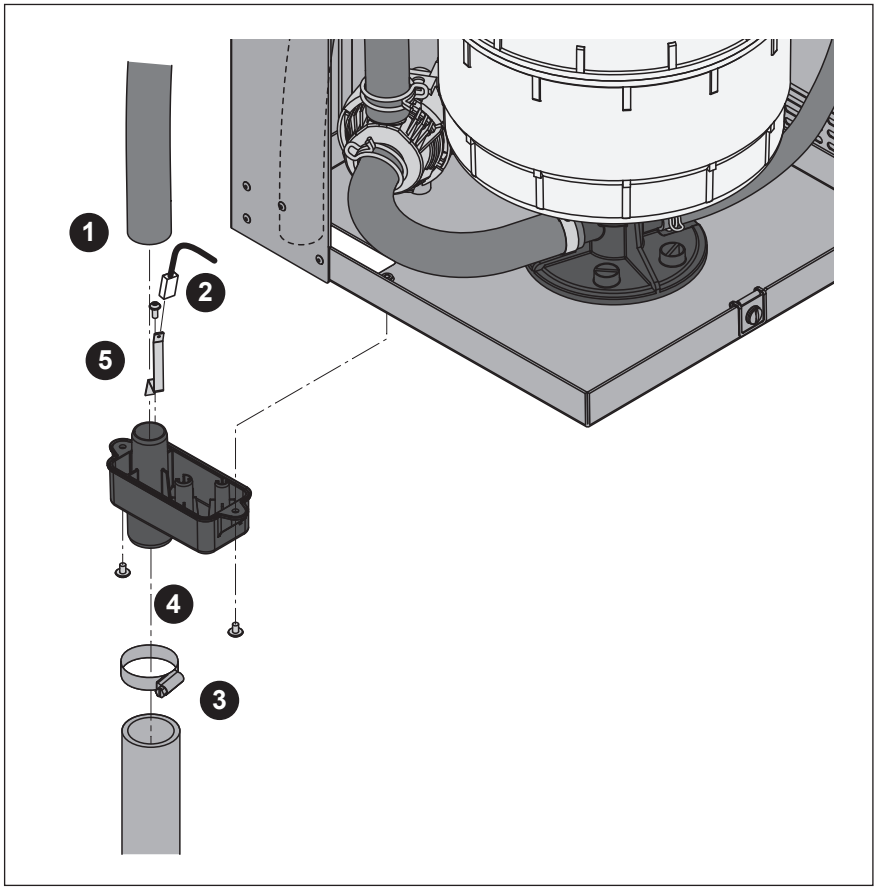
– Fasten steam hose on the connector of the steam cylinder with hose clamps.

CAUTION!

– A leaky steam hose can cause damage due to moisture inside the unit.

– The outlet connector of the steam cylinder is made of plastic. **Do not overtighten** the hose clamp on the steam connector of the steam cylinder.

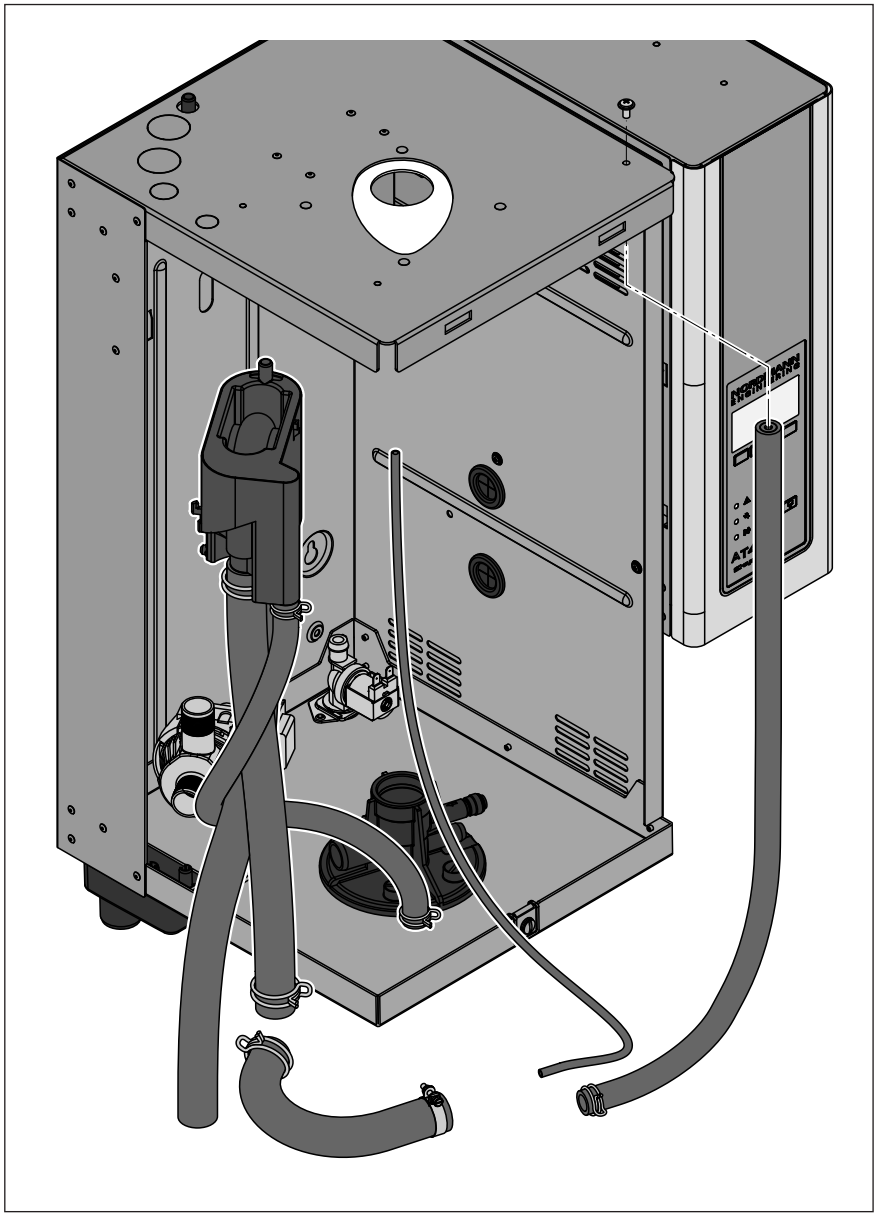
6.3.2 Removal and installation of the drain cup



1. Remove overflow hose from the connector on the water cup.
2. Remove grounding cable from the grounding lance.
3. Release the hose clamp, then remove water drain hose from the connector on the water cup.
4. Undo the two screws fixing the drain cup to the unit using a screwdriver, then remove the drain cup downwards.
5. Undo the screw, then remove grounding lance.

Installation of the drain cup follows the reverse sequence.
Important: reattach grounding cable to grounding lance.

6.3.3 Removal and installation of the water cup and the water hoses

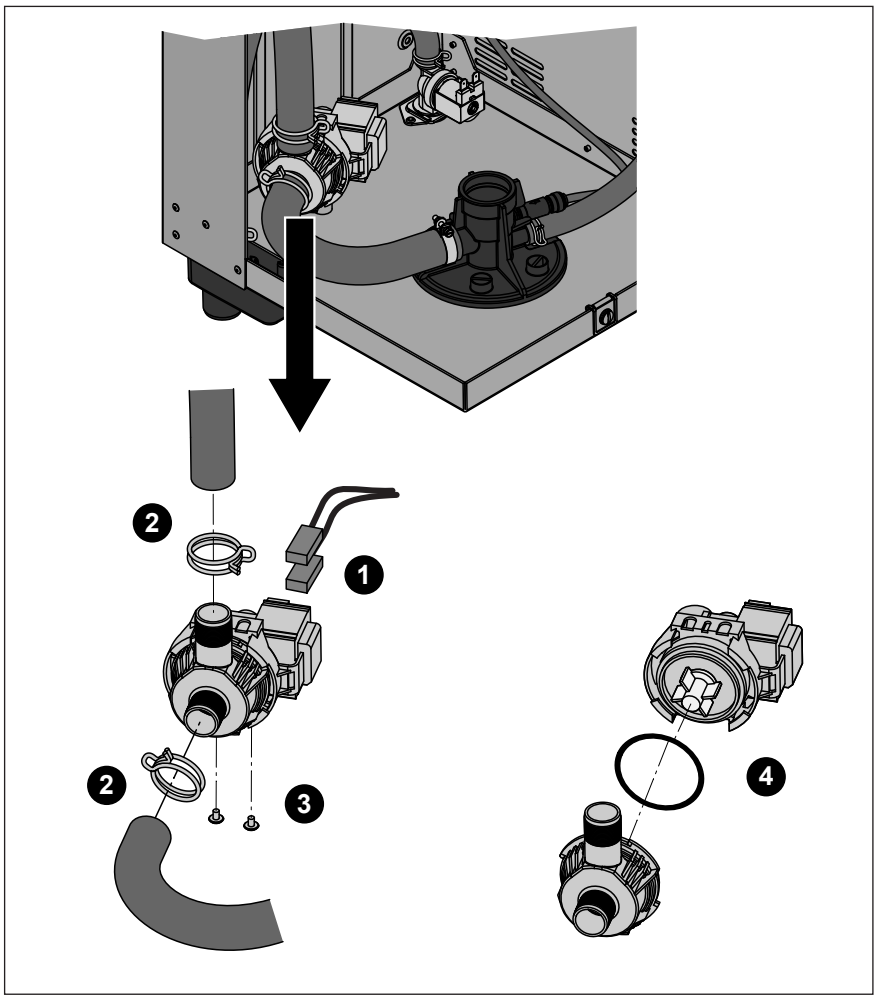


For removing the water cup and the water hoses the steam cylinder must be removed first (see chapter 6.3.1).

1. Release hose clamps, then disconnect all hoses from the corresponding connectors and remove the hoses.
   Note: The hoses connected to the water cup may also be removed together with the water cup (see illustration) and then disconnected from the connectors of the water cup outside the unit.
2. **Carefully** pull fixing clip of the water cup to the front, then push water cup down from the holding device and remove it to the front.

The **installation** of the water cup and the water hoses follows the reverse sequence. Before fixing the water hoses to the connector using the hose clamps, align the hoses in a way that they are not twisted.

6.3.4 Removal and installation of the drain pump

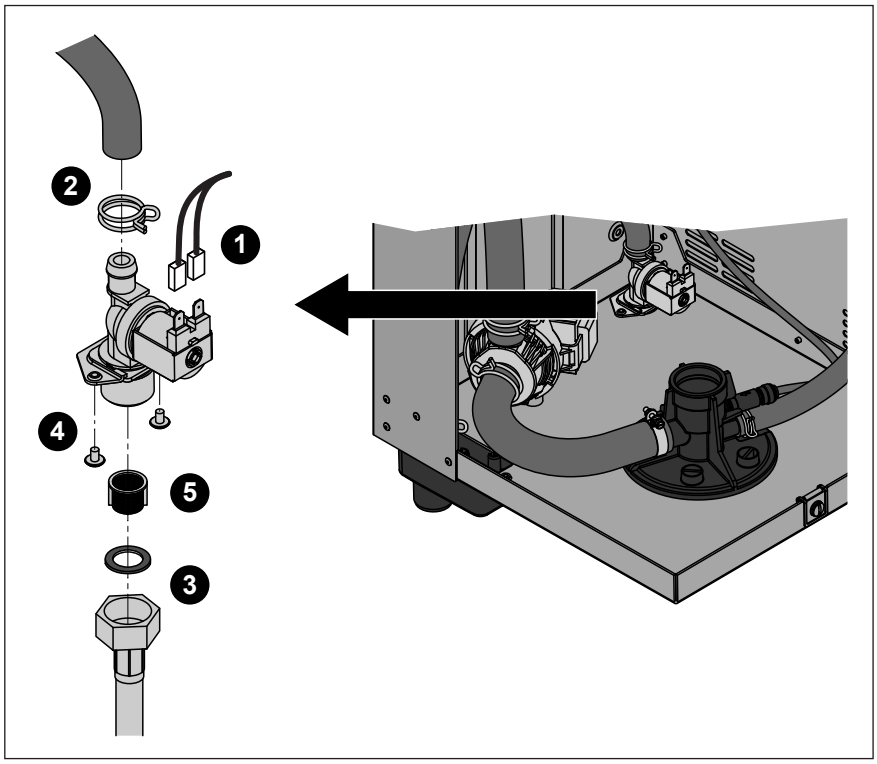


For removing the drain pump the steam cylinder must be removed first (see chapter 6.3.1).

1. Detach electric cables (polarity of the cables must not be observed).
2. Release hose clamps and remove the hoses from the connectors.
3. Undo the two screws on the bottom of the housing with Phillips screw-driver, then remove drain pump.
4. Separate the electric motor from the pump body: release the lock on the bayonet catch, then counter-rotate the electric motor and the pump body.

The **assembly** and the **installation** of the drain pump follows the reverse sequence. Before assembling the pump, check O-ring for damage and replace if necessary. Then, place the O-ring on the centering collar and moisten the O-ring with water.

6.3.5 Removal and installation of the inlet valve

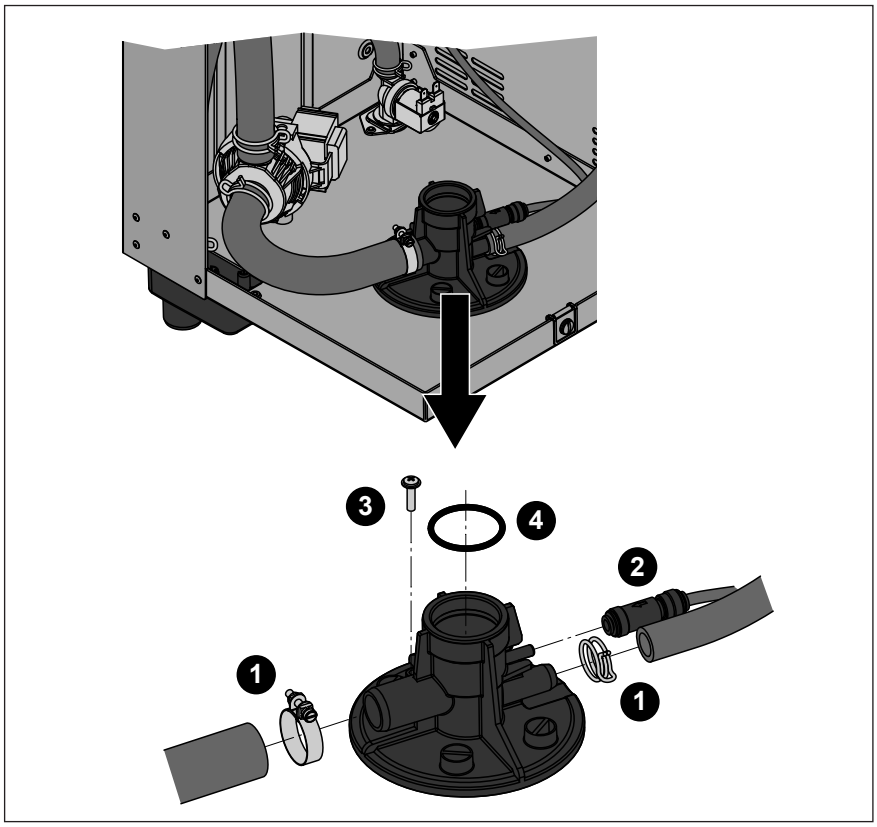


For removing the inlet valve the steam cylinder must be removed first (see chapter 6.3.1).

1. Detach electric cables (polarity of the cables must not be observed).
2. Release hose clamp and remove the hose from the connector.
3. Unlock union nut of the water pipe and remove water pipe.
4. Undo the two screws on the bottom of the housing with Phillips screwdriver, then remove inlet valve.
5. Remove strainer insert with pointed pliers.

The **installation** of the inlet valve follows the reverse sequence. The union nut of the water pipe must be tightened by hand only.

6.3.6 Removal and installation of the cylinder receptacle

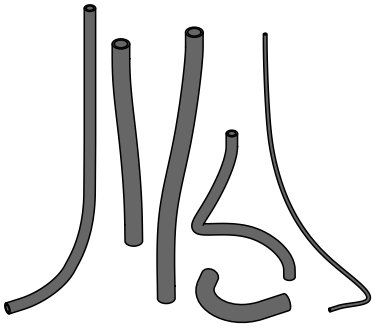
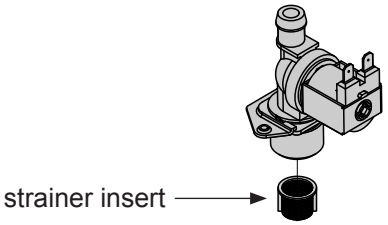
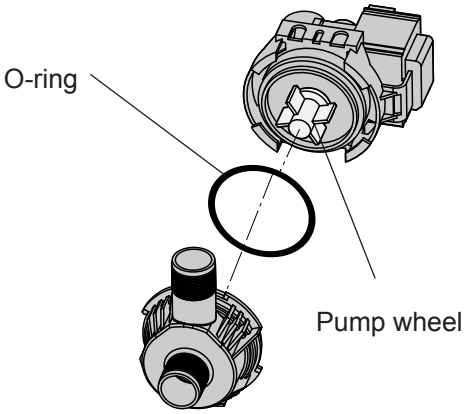
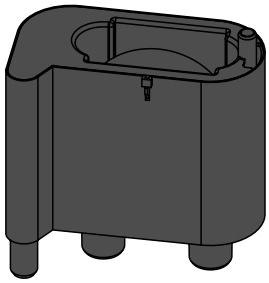


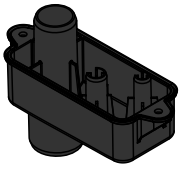
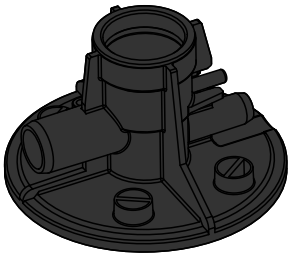
For removing the cylinder receptacle the steam cylinder must be removed first (see chapter 6.3.1).

1. Release hose clamps and remove hoses from the connectors.
2. Press-in the locking ring on the end of the check valve, then remove check valve together with the hose from the corresponding connector on the cylinder receptacle.
3. Undo the screw fixing cylinder receptacle to the bottom of the housing with Phillips screwdriver. Then, turn cylinder receptacle counter clockwise to the stop and remove cylinder receptacle upwards.
4. Remove O-ring from the cylinder receptacle.

The **installation** of the cylinder receptacle follows the reverse sequence. Before mounting the cylinder receptacle, check O-ring for damage and replace if necessary.

6.4 Notes on cleaning the unit components

Unit component	What to clean and how to clean
Water hoses 	• Remove any limescale by slightly knocking on the tubes using a rubber hammer. Then, rinse the tubes well with hot tap water.
Inlet valve 	• Use a brush (do not use a wire brush) to remove any limescale inside the inlet valve and on the strainer. • Wash inlet valve and strainer insert with a lukewarm soap solution, then rinse well with tap water. **Let the inlet valve dry before reinstallation!**
Drain pump 	• Use a brush to remove any limescale from the pump housing and the pump wheel (do not use a wire brush). • Then, wipe pump wheel with a damp cloth. Wash the pump housing with a lukewarm soap solution and rinse well with tap water. **Let the drain pump dry before reinstallation!**
Water cup 	• Remove any limescale from the water cup and its connectors using a brush (do not use a wire brush). If the water cup is heavily calcified, place it in an 8% formic acid solution (**observe safety notes in chapter 6.5**), until the limescale comes off. • Wash the water cup with a lukewarm soap solution and rinse well with tap water.

Unit component	What to clean and how to clean
Drain screen of the steam cylinder 	• Remove any limescale from the drain screen using a brush (do not use a wire brush) and remove loose limescale inside the drain connector of the steam cylinder. If the drain screen is heavily calcified, place it in an 8% formic acid solution (**observe safety notes in chapter 6.5**), until the limescale comes off. • Wash the drain screen with a lukewarm soap solution and rinse well with tap water.
Drain cup 	• Use a brush to remove any limescale from the drain cup and the receptacle on the bottom side of the unit (do not use a wire brush). If the drain cup is heavily calcified, place it in an 8% formic acid solution (**observe safety notes in chapter 6.5**), until the limescale comes off. • Wash the drain cup and the receptacle on the bottom side of the unit with a lukewarm soap solution, rinse the parts well with tap water.
Cylinder receptacle 	• Remove any limescale from the cylinder receptacle and its connectors using a brush (do not use a wire brush). If the cylinder receptacle is heavily calcified, place it in an 8% formic acid solution (**observe safety notes in chapter 6.5**), until the limescale comes off. • Wash the cylinder receptacle with a lukewarm soap solution and rinse well with tap water.
Interior of the unit (water side only)	Wipe the interior of the unit with a damp cloth without using any cleaning agent. **CAUTION**: Take care that the electrical connections and the electronic components remain dry!

6.5 Notes on cleaning agents

Only use cleaning agents stated in the table above. The use of disinfectants is only permitted if they do not leave any toxic residues. In any case the parts must be thoroughly rinsed with water after cleaning.

WARNING!

Formic acid is indeed harmless to the skin, but it attacks the mucous membranes. Therefore prevent your eyes and respiratory tracts from getting in touch with the acid and its vapours (wear goggles and work in a well ventilated room or outside).

CAUTION!

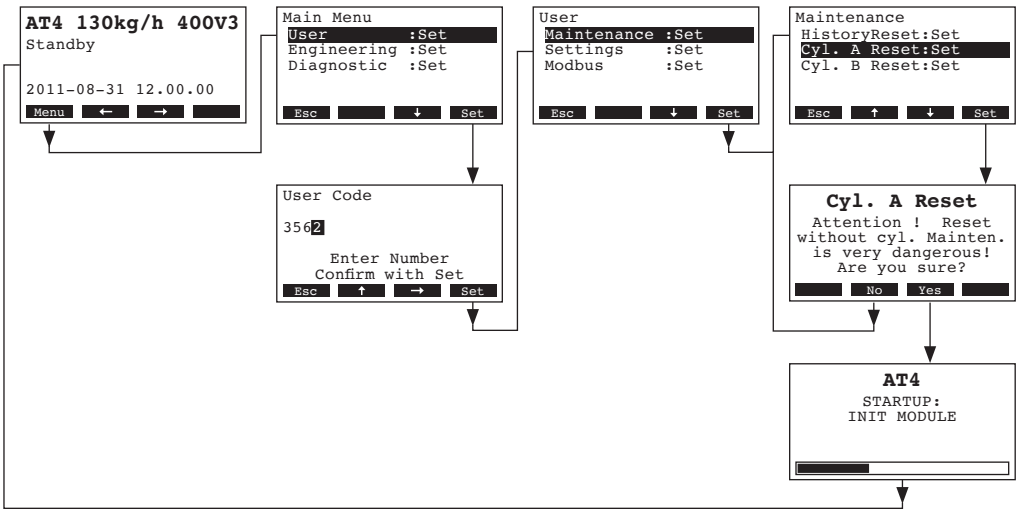
Do not use any solvents, aromatized or halogenized hydrocarbons or other aggressive substances as they may cause damage to the components of the unit.

It is mandatory to observe and comply with the information and instructions regarding cleaning agents. Observe in particular: all information relating to the protection of personnel, environmental protection and restrictions regarding usage.

6.6 Resetting the maintenance indication

After completing maintenance work, the **maintenance indication** (yellow LED lights) must be reset:

1. Select the maintenance menu:
   Path: ***Main menu > User > Password: 3562 > Maintenance***



2. Select "**Cyl. A Reset**" (or "**Cyl. B Reset**"), then press the **<Set>** key.
3. The reset dialogue appears in the display. Press the **<Yes>** key to reset the **maintenance counter** or the **maintenance indication** respectively. The **maintenance counter** and the **maintenance indication are reset and the control unit** is restarted.

   Note: by pressing the **<No>** key the reset procedure can be aborted and the display and control unit returns to the maintenance menu. To return to the standard operating display press the **<Esc>** key several times.

7 Fault elimination

7.1 Fault indication

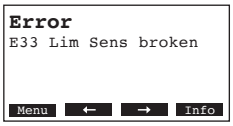
Malfunctions during operation are indicated by a corresponding **Warning** or **Error** message in the display of the control unit:

– **Warning messages**



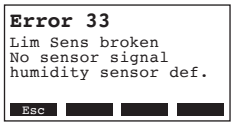
The control of the Nordmann AT4 checks whether there is a temporary problem (e.g. water supply interrupted for a short time) or whether it can resolve the problem by taking necessary measures. If the cause of the malfunction disappears of its own accord or if the control can repair the malfunction, the alarm message will automatically switch off. If the cause of the malfunction does not disappear even after a longer period of time, a error message is triggered.

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

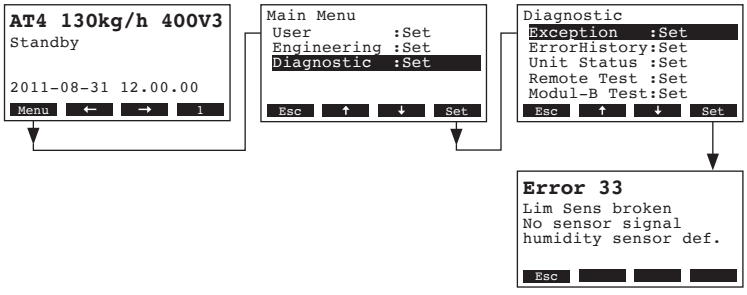


Further operation is normally not possible any longer, the unit is blocked. To eliminate the malfunction see chapter 7.2 and 7.3.
Note: After eliminating the malfunction the error message must be reset (see chapter 7.4).

By pressing the **<Info>** key additional information can be displayed for each warning and/or error message.



Note: if you want to see further information of an active warning or error message of a humidifier on the **optional remote terminal**, select "Exception" in the diagnostic menu of the appropriate steam humidifier (appears only on the remote terminal), then press **<Set>** key:



7.2 Malfunction lists

Important! Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregarding of planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system. Often, the steam hose connection has not been properly executed, or the fault lies with the humidity control system.

7.2.1 System faults

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
CF card missing (Test run possible)		**CF card missing**			
—	Warning W1: CF-Card Missing	red lights	Error E1: CF-Card Missing	No CF card installed on the control board.	Install CF card or start test run.
		CF card is empty			
—	—	red lights	Error E2: CF-Card Empty	No data stored on the CF card.	Install new CF card.
		CF card is defective			
—	—	red lights	Error E3: CF-Card Invalid	Invalid data stored on the CF card.	Install new CF card.
		CF card is incompatible			
—	—	red lights	Error E4: CF-Card Incompat	The installed CF card is not compatible with the hardware of the unit or with the basic settings of the control electronics.	Install correct CF card. Let your Nordmann service technician adjust the basic settings.
		Module B missing			
—	—	red lights	Error E5: Module B missing	Module B not correctly connected or defective.	Check module B and connecting cables between module A and module B.
		Wrong hardware settings			
—	—	red lights	Error E9: Illegal Settings	False test run parameters.	Let your Nordmann service technician adjust the test run parameters (heating voltage, Cylinder-No.).
		Hardware fault			
—	—	red lights	Error E10: Flash R/W Fault	Control board defective.	Replace control board.
—	—		Error E11: Clock R/W Fault	Backup battery on control board discharged.	Let have the backup battery be replaced (see chapter 7.5).
On/Off timer active					
—	Warning W12: Timer Disable	—	—	The system is deactivated via the On/Off-Timer.	None. If necessary adjust On/Off timer settings.
Test Mode active					
—	Warning W16: Test Mode Active	—	—	Diagnostic mode active (Remote Test, Module Test etc.)	Quit diagnostic mode.
Humidifier missing					
—	Warning W17: Unit Missing	—	—	The optional remote terminal does not have connection to one or more units.	Check connecting cable. Check/correctly set Modbus settings (modbus address, interface parameters).

7.2.2 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
Max. filling level of steam cylinder reached		**Max. filling level of steam cylinder reached but no heating current for more than 30 minutes**			
—	Warning W21: Cyl.Max.Level	red lights	Error E21: Cyl.Max. & NoCurr	Water conductivity too low (after initial operation).	Wait until the mineral content of the cylinder has increased
				Water conductivity too low for the selected steam cylinder type.	Select correct steam cylinder type.
				Phase failure heating voltage.	Check service switch in the mains supply line and switch on if applicable. Check mains fuse(s) and replace if applicable.
Permissible filling time exceeded (20 minutes)		**Permissible filling time exceeded (more than 4 hours)**			
—	Warning W22: Max. Filltime	red lights	Error E22: Max. Filltime	Water supply obstructed/shut-off valve closed/water pressure too low.	Inspect water supply (filter, water piping, etc.), check/open shut-off valve, check water pressure.
				Inlet valve blocked or defective.	Inspect strainer insert in the inlet valve, if applicable clean strainer insert or replace inlet valve.
				Excessive back pressure in the steam line (duct pressure too high, steam line too long or kinked), causing water loss via filling cup.	Check duct pressure, inspect steam installation. If applicable install pressure compensation kit (see options).
				Leakage in the water system.	Inspect water system and seal if necessary.
No electrode current for more than 20 minutes		**No electrode current for more than 4 hours**			
—	Warning W23: No Current	red lights	Error E23: No Current	Phase failure heating voltage.	Inspect/turn on service switch of the mains supply line. Inspect the fuses of the mains supply, replace if necessary. Check/repalce main contactor.
				Water supply obstructed/shut-off valve closed/water pressure too low.	Inspect water supply (filter, water piping, etc.), check/open shut-off valve, check water pressure.
				Inlet valve blocked or defective.	Inspect strainer insert of the inlet valve, if applicable clean strainer insert or replace inlet valve.
				Excessive back pressure in the steam line (duct pressure too high, steam line too long or kinked), causing water loss via filling cup.	Check duct pressure, inspect steam installation. If applicable install pressure compensation kit (see options).
				Leakage in the water system.	Inspect water system and seal if necessary.
Electrode current in relation to the steam demand too high		**Electrode current in relation to the steam demand too high**			
—	Warning W24: Over Current	red lights	Error E24: Over Current	Humidity demand has decreased too fast.	Automatic adaptation of the operating point.
				Drain pump defective.	Inspect drain pump, replace if necessary.
				Drain in steam cylinder blocked.	Replace steam cylinder.
				Water conductivity too high for the selected steam cylinder type.	Select correct steam cylinder type.

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
Max. admissible electrode current exceeded		**Max. admissible electrode current exceeded**			
—	Warning W25: Excess Current	red lights	Error E25: Excess Current	Drain pump defective.	Inspect drain pump, replace if necessary.
				Drain in steam cylinder blocked.	Replace the steam cylinder.
				Water conductivity too high for the selected steam cylinder type.	Select correct steam cylinder type.
		Relay heating voltage jammed			
—	—	red lights	Error E26: Req.Off Current	Relay heating voltage jammed in activated position.	Inspect relay, replace if necessary.
Foam detection		**Foam detection (4 automatic drainings within 24 hours)**			
—	Warning W27: Foam	red lights	Error E27: Foam	Foaming in steam cylinder.	Drain steam cylinder via drain key (several times, if necessary). Check quality of the supply water.
Steam cylinder needs service		**Service interval for steam cylinder exceeded**			
yellow lights	Warning W28: Cyl. Maintenance	red and yellow flash	Error E28: Cyl. Maintenance	Mineral deposits and/or electrodes spent.	Replace steam cylinder. Important: After replacement of the steam cylinder, reset the maintenance counter (see chapter 6.6).
Steam cylinder needs service		**Max. operating hours of the steam cylinder reached**			
yellow lights	Warning W29: Cyl. Maintenance	red and yellow flash	Error E29: Cyl. Maintenance	Maximum operating hours of the steam cylinder reached.	Replace steam cylinder. Important: After replacement of the steam cylinder, reset the maintenance counter (see chapter 6.6).
Humidity sensor signal (signal Y) missing		**Humidity sensor signal (signal Y) missing for more than 1 minute**			
—	Warning W32: HumSensor broken	red lights	Error E32: HumSensor broken	No sensor signal present at signal input (Signal Y).	Check humidity sensor (signal Y) , replace if necessary. Inspect wiring.
Signal of humidity limitation sensor (signal Z) missing		**Signal of humidity limitation sensor (signal Z) missing for more than 1 minute**			
—	Warning W33: Lim Sens broken	red lights	Error E33: Lim Sens broken	No sensor signal present at signal input (signal Z).	Check humidity sensor (signal Z) , replace if necessary. Inspect wiring.
Module A (B) locked via Modbus					
—	Warning W34A: Module disable	—		Module A (B) locked because the corresponding Modbus register is deactivated.	Activate the corresponding Modbus register.
		Modbus Timeout (5 s)			
—	—	red lights	Error E35A: Modbus Timeout	No actual demand or humidity signal received via Modbus.	Send actual demand or humidity signal.
Standby mode of steam cylinder active		**Standby mode of steam cylinder failed**			
—	Warning W36: Idle Mode active	red lights	Error W36: Idle Mode Failed	Automatic standby operation (Stand-by-Drain, AntiFreeze, KeepWarm) of steam cylinder active or failed.	Warning status: No measures must be taken. Error status: Check water supply, heating voltage supply, main contactor.
Forced draining of steam cylinder active					
—	Warning E37: Forced Drain	—	—	Forced draining of steam cylinder active.	No measures must be taken.

Warning		Error		Cause	Remedy
LED	Display	LED	Display		
Safety chain instable					
—	Warning W38: Safety Loop Inst	—	—	Safety chain opens and closes in short intervals.	Check/replace safety humidistat, ventilation interlock and air flow monitor.
Control signal instable					
—	Warning W39: Control Instable	—	—	The signal at the control signal input fluctuates strongly in short intervals.	Check/replace humidity sensor or external humidity controller.
Limit humidity signal instable					
—	Warning W40: Limit Instable	—	—	The signal at the limit signal input fluctuates strongly in short intervals.	Check/replace humidity sensor or external humidity controller.

7.3 Faults without fault indication

Fault	Cause	Remedy
The display is dark and the unit switch is not illuminated though it is is switched on.	The external service switch of the control voltage supply not switched on.	Switch on the external service switch of the control voltage supply.
	Thermal relay has triggered. The red reset key on the thermal relay protrudes.	Check thermal relay in the control compartment. Before pushing in the reset key (reset) at the thermal relay let have the relay settings and the system be checked by a trained service technician.

7.4 Notes on fault elimination

DANGER!
Danger of electric hazard!

For the elimination of faults **set the steam humidifier out of operation** as described in chapter 4.4, **separate the unit from the mains** and **secure it against inadvertent power-up**.

The elimination of faults must be carried out by qualified and well trained professionals only.
Malfunctions relating to the electrical installation (e.g. replacement of the backup battery, replacement of fuses) must be repaired by authorized personnel or by your Nordmann representative's service technician only.

Repair work and the replacement of faulty components must be carried out by your Nordmann representative's service technician only!

7.5 Resetting the error indication (red LED lights)

To reset the error indication:

Disconnect the steam air humidifier 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.

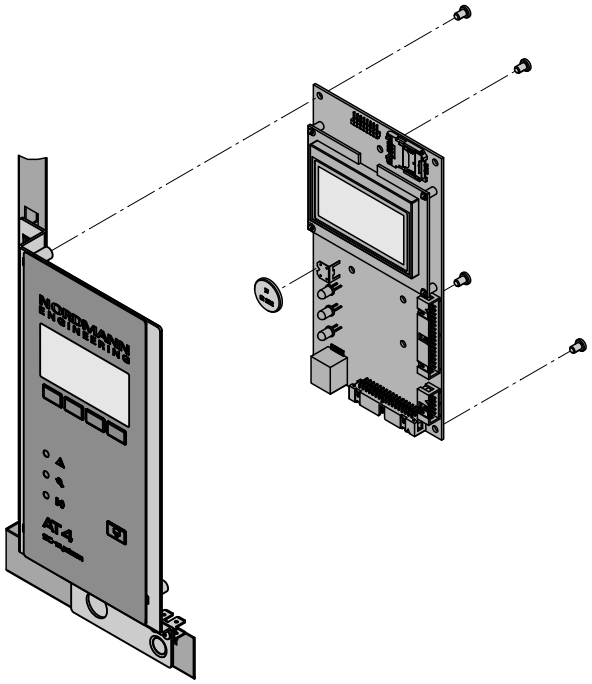
7.6 Replacing the backup battery on the control board

1. **Set the Nordmann AT4 out of operation as described in chapter 4.4, disconnect it from the mains and secure the unit against inadvertent power-up**.
2. Undo the screw of the front cover of the control compartment, then remove the front cover.

CAUTION!

The **electronic components** inside the humidifier are **very sensitive to electrostatic discharge.** Before carrying out the next step, appropriate **measures must be taken to protect the electronic components against damage caused by electrostatic discharge (ESD protection).**

3. Carefully lift-off the display and control unit from the housing frame, swivel it 90° to the left, then fix it to the unit frame again.
4. Undo the fastening screws of the control board, then carefully pull-off the control board from the control unit assembly.



5. Replace the backup battery (CR2032, Lithium 3V).
6. Reassemble the unit in reverse order.
7. If necessary set date and time (see chapter 5.4.9 and 5.4.10).

WARNING!
Environmental hazard!

The old battery must be returned to an authorised collecting point for correct disposal/recycling in accordance with local regulations. In no case the old battery must be disposed of in the domestic waste or into the environment.

8 Taking out of service/Disposal

8.1 Taking out of service

If the Nordmann AT4 must be replaced or if the humidification system is not needed any more, proceed as follows:

1. Take the unit out of operation as described in chapter 4.4.
2. Have the unit (and all other system components, if necessary) unmounted by a qualified service technician.

8.2 Disposal/Recycling



Components not used any more must not be disposed of in the domestic waste. Please dispose of the unit or the individual components in accordance with local regulations at the authorised collecting point.

If you have any questions, please contact the responsible authority or your local Nordmann representative.

Thank you for your contribution to environmental protection.

9 Product specifications

9.1 Technical data

Steam capacity in kg/h	5	8	15	23	32	45	46	64	65	90	130
Capacity range in kg/h	1...5	1.6...8	3...15	4.6...23	6.4...32	9...45	9.2...46	12.8...64	13...65	18...90	26...130
Nominal power in kW	3.8	6.0	11.3	17.3	24.0	33.8	2x 17.3	2x 24.0	48.8	2x 33.8	2x 48.8
Number of steam cylinder	1	1	1	1	1	1	2	2	1	2	2

Heating voltage 230V/1~/50..60Hz *		
Unit model	522	822
Nominal current in A	16.3	26.1
Steam cylinder type **	522A	822A
Heating voltage 400V/2~/50..60Hz *		
Unit model	524	824
Nominal current in A	9.4	15.0
Steam cylinder type **	524A	824A

Heating voltage 230V/3~/50..60Hz *								
Unit model	532	832	1532	2362	3262		4662	6462
Nominal current in A	9.4	15.1	28.2	43.3	60.2		2x 43.3	2x 60.2
Steam cylinder type **	532A	832A	1532A	2362A	3262A		2x 2362A	2x 3262A

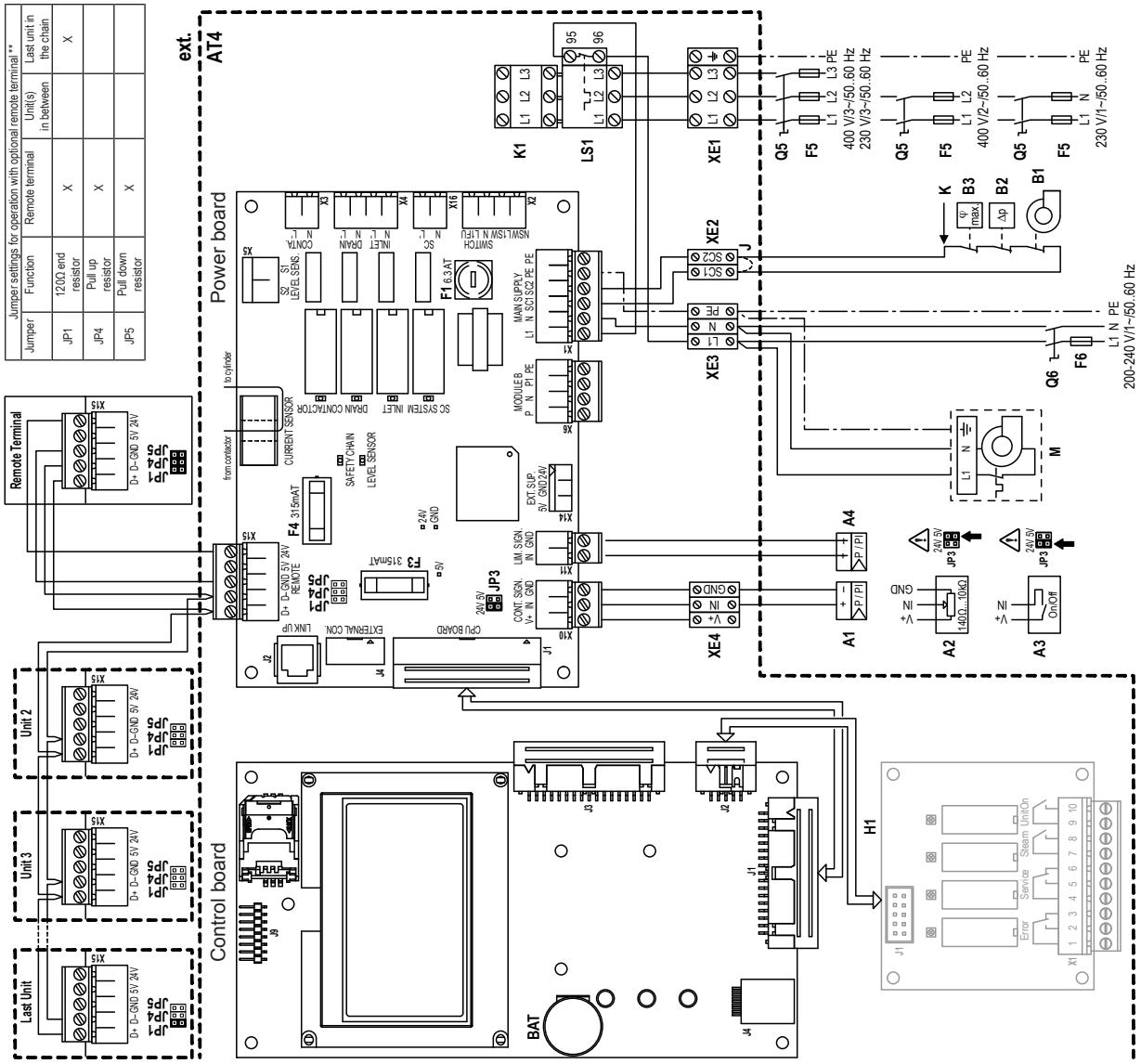
Heating voltage 400V/3~/50..60Hz *											
Unit model	534	834	1534	2364	3264	4564		6464	6564	9064	13064
Nominal current in A	5.4	8.7	16.2	24.9	34.6	48.7		2x 34.6	70.4	2x 48.7	2x 70.4
Steam cylinder type **	534A	834A	1534A	2364A	3264A	4564A		2x 3264A	6564A	2x 4564A	2x 6564A
Steam cylinder type ***	534A-L	834A-L	1534A-L	2364A-L	3264A-L	4564A-L		2x 3264A-L	---	2x 4564A-L	---

Control voltage	200-240 V/1~/50..60 Hz										
Operating conditions											
Admissible water pressure	1...10 bar										
Water quality	Untreated drinking water with a conductivity of 125...1250 µS/cm										
Admissible water temperature	1...40 °C										
Admissible ambient temperature	1...40 °C										
Admissible ambient humidity	max. 75 %rH (non-condensing)										
Admissible duct air pressure	-0.8 kPa...1.5 kPa; overpressure kit (option) up to 10.0 kPa										
Type of protection	IP21										
Conformity	CE, VDE, GOST										
Dimensions/Weights											
Width in mm	388	388	468	468	563	563	966	966	563	966	966
Height in mm	575	575	620	620	640	640	640	640	640	640	640
Depth in mm	255	255	345	345	354	354	354	354	354	354	354
Net weight in kg	12		19		28		62		30	64	
Operating weight in kg	17		29		65		116		67	116	
Water supply connector	G 3/4" (male thread)										
Water drain connector	ø 31 mm (outside diameter)										
Steam connector	1xø 22		1xø 35			2x ø 35				4xø 35	
Options											
Cable gland	1xCG						2xCG		1xCG	2xCG	
Overpressure set	1xOPS						2xOPS		1xOPS	2xOPS	
Remote operating and fault indication	1xRFI										
Steam hose connector with condensate trap	1xCT..					2xCT..				4xCT..	
Internal control voltage supply	1xS-CVI		1xM-CVI						1xL-CVI		
Transformer 400V/230V	Trafo										
@Link AT4	@Link AT4										
Accessories											
Filter valve	1x Z261										
Nordmann AT4 Remote Terminal	RP										
Steam distribution pipe	1xDV41-...		1xDV71-...			2xDV71-...				4xDV71-...	
Steam distribution system MultiPipe	—		System 1			System 2				System 4	
Fan unit	1x FAN4 N S D or FAN4 N S W		1x FAN4 N M D or FAN4 N M W		1x FAN4 N L W	1x or 2x FAN4 N L W	2x FAN4 N L W			4x FAN4 N L W	
Steam hose / meter	DS22 or DS80 (FAN4 N...)		DS35 or DS80 (FAN4 N...)								
Condensate hose / meter	KS10										
EcoTherm insulation hose	ECT22 (DS22) or ECT80 (DS80)		ECT60 (DS35) or ECT80 (DS80)								
Duct humidistat	NHD										
Room humidistat	NHR										
Humidity sensor for duct mounting	NDC										
Humidity sensor for room mounting	NRC										

* Other heating voltages on request
** Steam cylinder for water conductivity from 125 to 1250 µS/cm (standard version)
*** Steam cylinder for low water conductivity from 80 to 125 µS/cm

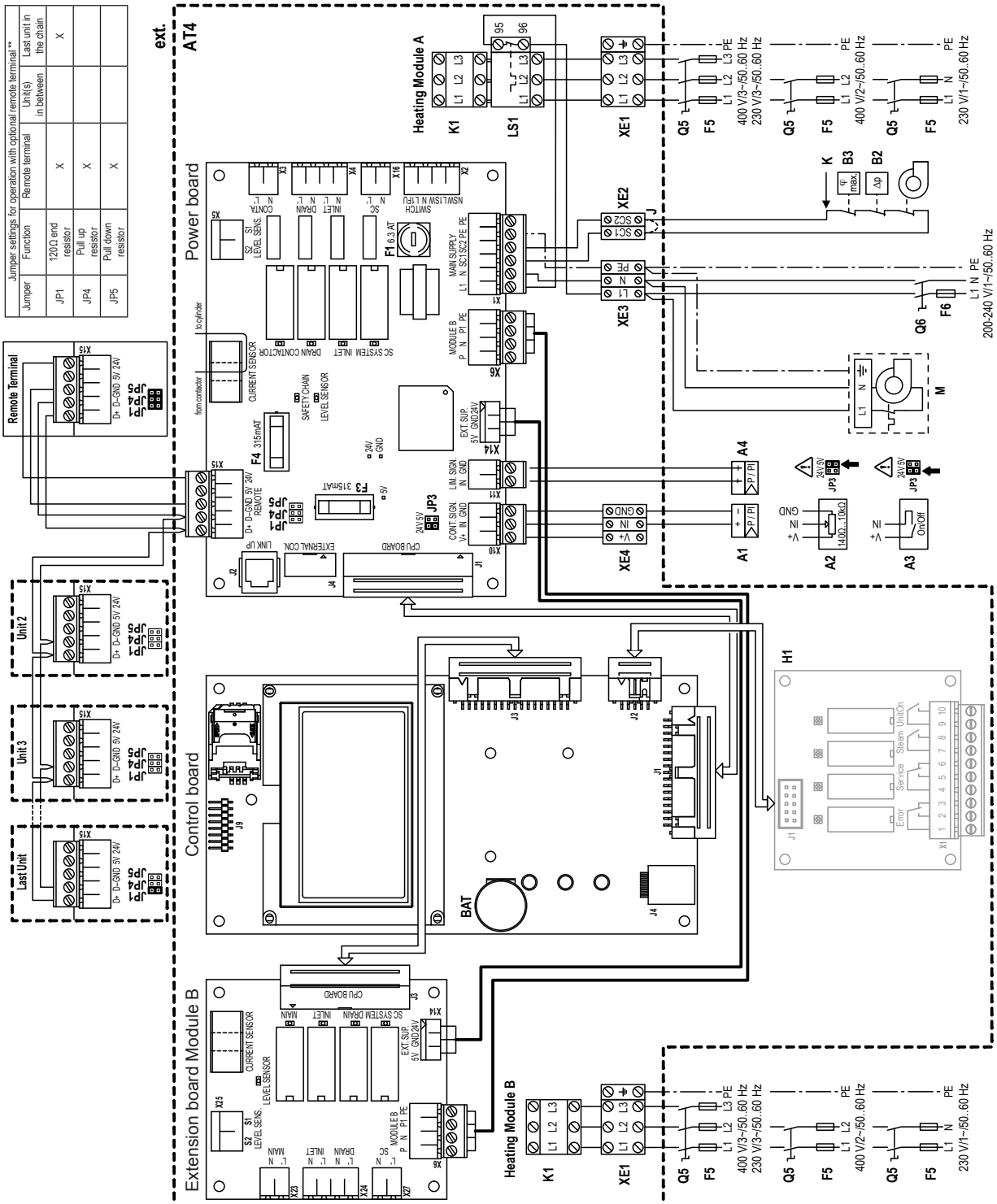
9.2 Wiring diagram Nordmann AT4

9.2.1 Wiring diagram Nordmann AT4 single units



A1 Continuous controller (active) or humidity sensor
A2 Controller (passive), set jumper on JP3-5V
A3 On/Off controller, set jumper on JP3-24V
A4 Limitation signal
BAT Backup battery (CR2032, Lithium 3V)
B1 Ventilation interlock
B2 Safety humidistat
B3 Airflow monitor
F1 Internal fuse "Power board" (6.3 A, slow acting)
F3 Internal fuse "Power board" control signal (315 mA, slow acting)
F4 Internal fuse "Power board" 24 VDC supply (V+) (315 mA, slow acting)
F5 External fuse heating voltage supply
F6 External fuse control voltage supply
H1 Remote operating and fault indication (option "RFI")
J Short circuited, if no external monitoring devices are connected
J2 Link Up system "Power board"
JP1 End resistor Remote Terminal **
JP3 Jumper control signal
JP4 Pull up resistor Remote Terminal **
JP5 Pull down resistor Remote Terminal **
K External safety chain (230V/5A)
K1 Main contactor
LS1 Thermal relay
M Fan unit
Q5 External service switch heating voltage supply
Q6 External service switch control voltage supply
XE1 Connection terminal heating voltage
XE2 Connection terminal safety chain
XE3 Connection terminal control voltage
XE4 Connection terminal control signal Y
X15 Connection terminal remote panel

9.2.2 Wiring diagram Nordmann AT4 double units



A1 Continuous controller (active) or humidity sensor
A2 Controller (passive), set jumper on JP3-5V
A3 On/Off controller, set jumper on JP3-24V
A4 Limitation signal
BAT Backup battery (CR2032, Lithium 3V)
B1 Ventilation interlock
B2 Safety humidistat
B3 Airflow monitor
F1 Internal fuse "Power board" (6.3 A, slow acting)
F3 Internal fuse "Power board" control signal (315 mA, slow acting)
F4 Internal fuse "Power board"
24 VDC supply (V+) (315 mA, slow acting)
F5 External fuse heating voltage supply
F6 External fuse control voltage supply
H1 Remote operating and fault indication (option "RFI")
J Short circuited, if no external monitoring devices are connected
J2 Link Up system "Power board"
JP1 End resistor Remote Terminal **
JP3 Jumper control signal
JP4 Pull up resistor Remote Terminal **
JP5 Pull down resistor Remote Terminal **
K External safety chain (230V/5A)
K1 Main contactor
LS1 Thermal relay
M Fan unit
Q5 External service switch heating voltage supply
Q6 External service switch control voltage supply
XE1 Connection terminal heating voltage
XE2 Connection terminal safety chain
XE3 Connection terminal control voltage
XE4 Connection terminal control signal Y
X6 Connection to extension board Module B
X14 Voltage supply extension board
X15 Connection terminal remote panel

Notes



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Nordmann Engineering AG
Lindenhofstrasse 28, 4052 Basel, Switzerland
Phone +41 61 404 46 50, Fax +41 61 404 46 79
www.nordmann-engineering.com,
info@nordmann-engineering.com

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