

Nordmann econoVap

Steam Humidifier



OPERATING INSTRUCTIONS

Introduction

You have purchased a NORDMANN steam humidifier which, provided you observe the operating instructions, will ensure fully automatic operation and reliable, low-maintenance service. Therefore, read these operating instructions carefully and pay particular attention to the safety instructions and warnings.

Should you have any queries that go beyond the scope of these operating instructions, please contact the company from which you have purchased the humidifier or which has installed it. As the manufacturers, we are, of course, always ready to be of assistance, since we want all our customers to be completely satisfied with our products.

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1 Safety Instructions

General Safety Instructions

The econoVap steam humidifier has been designed and constructed in accordance with the latest technology and the accepted safety regulations. The user is obliged to pay attention to these safety instructions as well as the specific regulations for installation and the safety and accident prevention regulations in the country of operation. The operating instructions should always be readily available at the place of operation of the humidifier. All installation and service work must be done only by persons qualified to perform such work.

Proper use

The steam humidifier econoVap is intended solely for indirect or direct air humidification according to this manual. Used in any other way beyond this description is contrary to its intended usage. The manufacturer/supplier cannot be held responsible for any damage resulting there from.

Alterations to the humidifier

Without NORDMANN's written approval, no alterations must be made to the humidifier. Only original spare parts and options are allowed to be used.

Safety signs



Attention, Warning, Danger:

This sign warns of a possible dangerous situation. Disregarding this warning can lead to an injury of the operator or to a damage to the instrument.



Attention, Voltage:

This sign warns of dangerous electrical voltage. Disregarding this warning can lead to danger or injury of the user.

2 How the humidifier works

NORDMANN humidifiers use ordinary tap water to produce steam. The water is converted directly into steam in a steam cylinder by electrode heating using electrical energy. In so doing, the water acts as the electrical resistance. Vaporisation occurs at atmospheric pressure (non-pressurised).

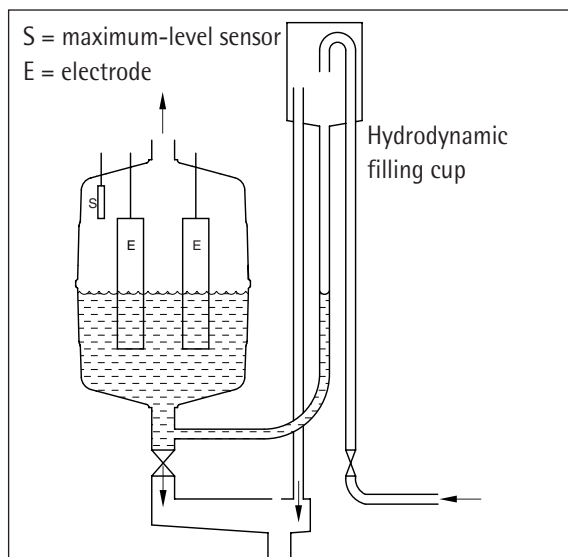


Fig. 2.1

The electronic control system, with its microcontroller, regulates the vaporisation process in accordance with the reliable principle developed by NORDMANN, which allows rapid output changes. The humidifier adapts itself automatically to the quality of the water used. Due to this ability to set the optimum water concentration in the steam cylinder, changes in the steam output are effected by minimal adjustments of the water level, allowing the unit to react quickly and accurately to any set point change. The use of fuzzy logic technology improves controllability. The adaptive control technique regulates the conductivity/mineral concentration in the steam cylinder achieving ideal operating conditions while maximising operational reliability. The output fluctuations, which occur during normal operation, are kept to a minimum by the automatic water-intake and drainage functions.

3.1 Dimensions

Dimensions of the units

Type	Dimensions	Fixing holes	Steam outlet	Drainage
4–8 kg/h	Fig. 3.1	Fig. 3.2	1 x Ø 22	1 x Ø 22
15–32 kg/h	Fig. 3.3	Fig. 3.4	1 x Ø 35	1 x Ø 22
45–65 kg/h	Fig. 3.3	Fig. 3.4	2 x Ø 35	1 x Ø 22

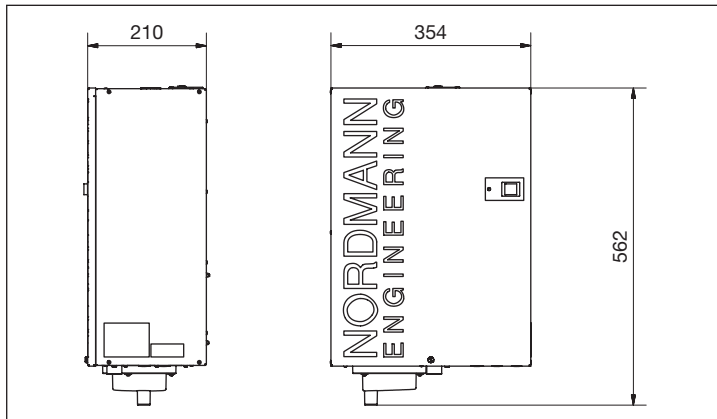


Fig. 3.1

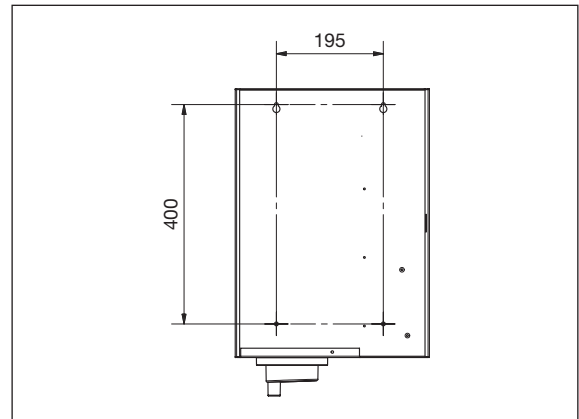


Fig. 3.2

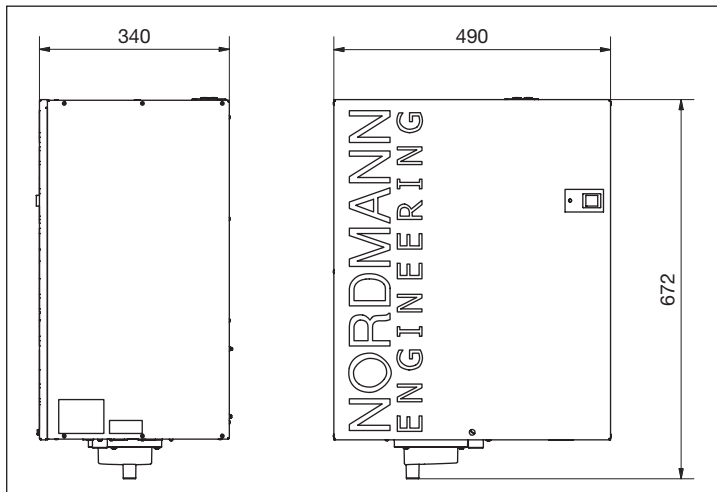


Fig. 3.3

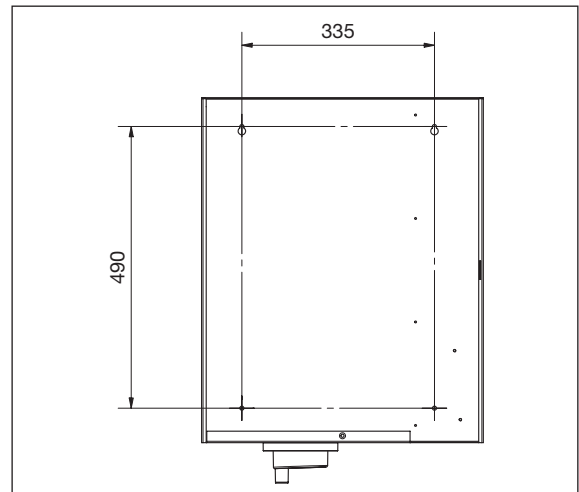


Fig. 3.4

Positioning of the humidifier

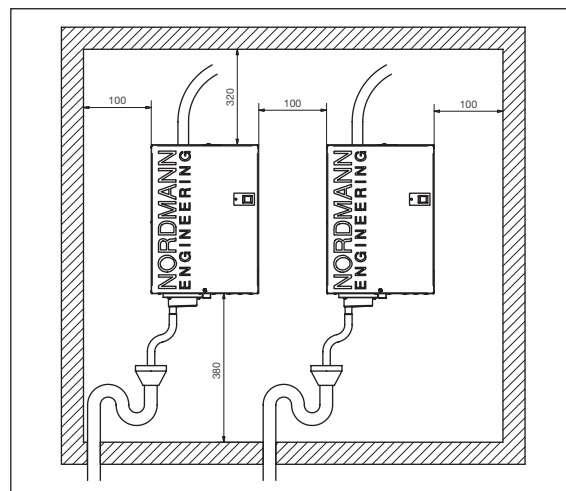


Fig. 3.5

Dimensions of the steam distribution pipes

Type	A (mm)	B (mm)	C (mm)	D (mm)	Fig.	Art. no.
22-300	300	Ø 22	176	60	3.6	902 00 00
22-450	450	Ø 22	300	70	3.6	902 00 01
22-650	650	Ø 22	504	70	3.6	902 00 02
22-850	850	Ø 22	696	70	3.6	902 00 03
35-300	300	Ø 35	200	55	3.6	902 00 04
35-450	450	Ø 35	300	80	3.6	902 00 05
35-600	600	Ø 35	425	90	3.6	902 00 06
35-900	900	Ø 35	680	110	3.7	902 00 07
35-1200	1200	Ø 35	935	110	3.7	902 00 08
35-1500	1500	Ø 35	1275	110	3.7	902 00 09

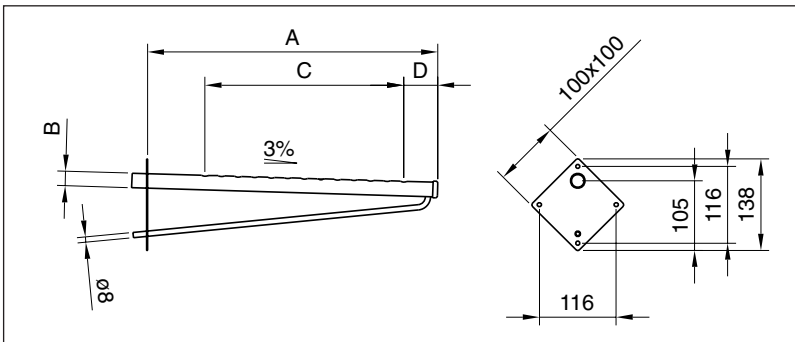


Fig. 3.6

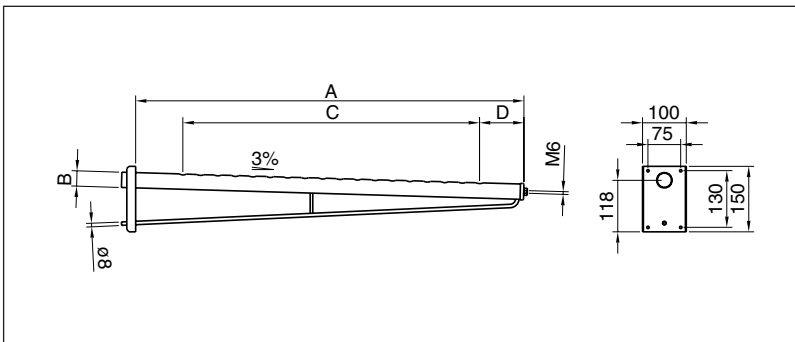


Fig. 3.7

3.2 Steam Nozzle

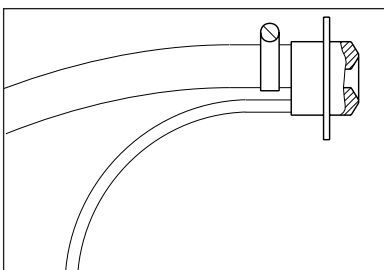


Fig. 3.8

For smaller outputs of up to 4 kg/h steam, we offer a nozzle which can be either fitted in air ducts, for instance, or used for direct room humidification. The rules for vaporisation lines (lines needed to mix the steam adequately with air) must be observed here too.



When the steam nozzle is used, the length of the steam hose should not exceed 1.5 meters.

Dimensions of the steam blowers 4-23 kg/h

Fig.	Type	A mm	B mm	C mm	D mm	E mm	F mm	G mm
3.10	4-8 kg/h	230	205	220	145	165	Ø 22	Ø 8
3.11	15-23 kg/h	310	275	295	255	285	Ø 35	Ø 8

Fixing holes for the steam blowers 4-23 kg/h

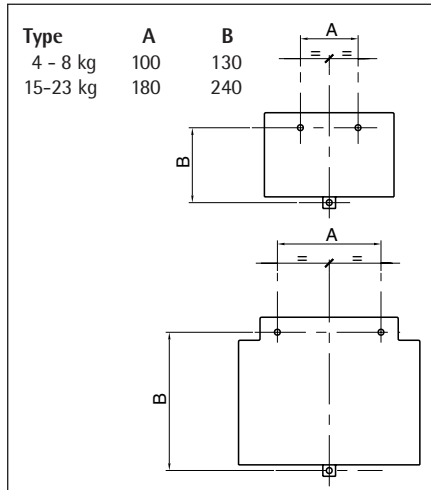


Fig. 3.9

Dimensions of the steam blowers 4-23 kg/h

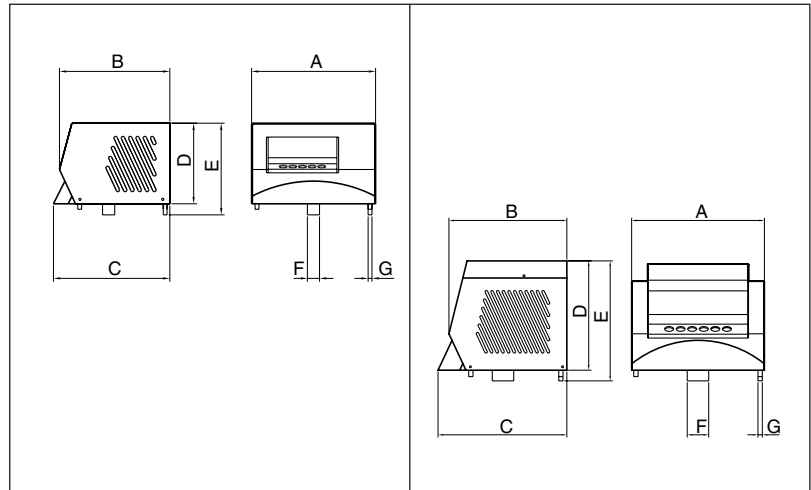


Fig. 3.10

Fig. 3.11

Dimensions of the Turbo steam blowers 32, 45 und 65 kg/h

Fig.	Typ	A	B	C	D	E	F	G	H	J
3.12	32 kg/h	Ø 200	505	255	Ø 35	M10	185	235	Ø 35	Ø 8
3.13	45-65 kg/h	Ø 200	505	255	Ø 35	M10	185	235	2 x Ø 35	Ø 8

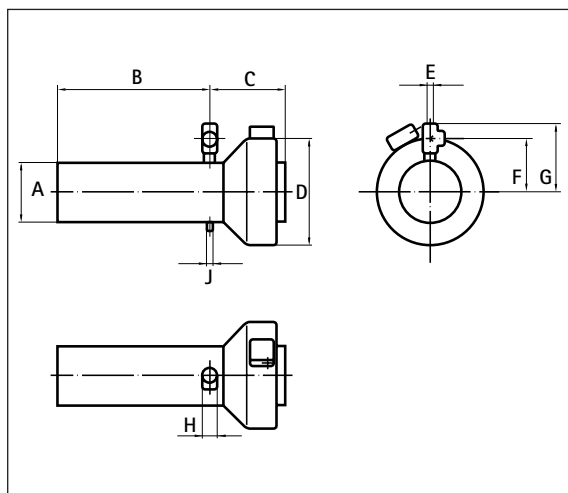


Fig. 3.12

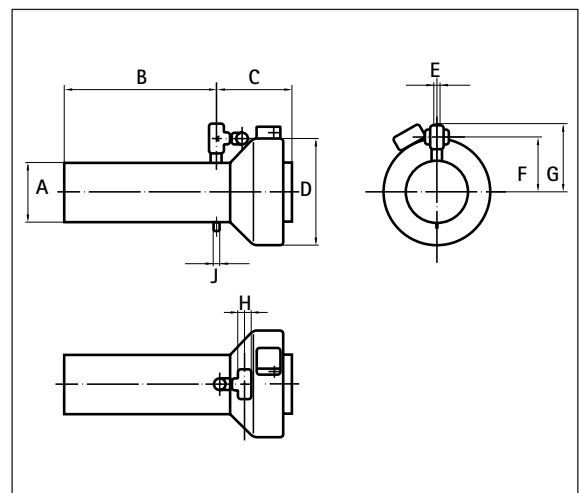


Fig. 3.13

3.3 Fitting the humidifier

For the fitting of the humidifier use the material supplied with the unit. Observe the various minimum distances as indicated in figure 3.5.

Ensure that there is sufficient room to perform servicing and maintenance work and that the unit is easily accessible. To facilitate such work, mount the unit at eye level.

We recommend that the unit is installed as near as possible to the steam-distribution pipe. The highest degree of efficiency is attained when the humidifier is linked to the steam-distribution pipe by the shortest possible steam hose.

3.4 Fitting the steam-distribution pipe

General guidelines for the installation:

The visible jet of steam issued from the steam-distribution pipe dissipates in the air only after a certain distance. In order to prevent condensation, a certain distance to other parts of the installation (such as ventilators, filters or pipe bends) must be maintained.

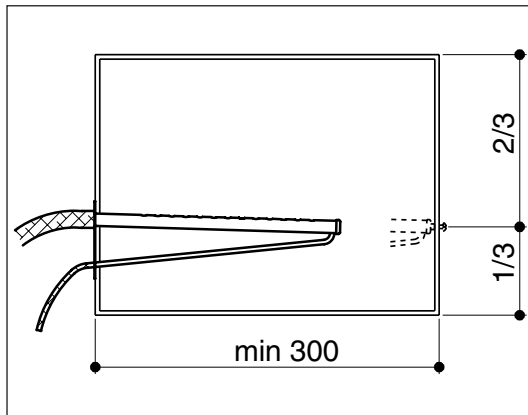


Fig. 3.14

The steam-distribution pipes can be fitted either vertically or horizontally, though it must be ensured that the steam outlets are always vertical to the flow. If fitted horizontally, these apertures must be at the top.

An adhesive template is supplied with each steam-distribution pipe to facilitate the installation, for example in an air duct. NORDMANN's steam-distribution pipes are designed so that, if fitted straight, there is automatically a slight decline of 3 % which ensures that any condensate flows back again. The ends (reverse side of mounting plate) of the longer steam-distribution pipes (types 35-900, 35-1200 and 35-1500) are equipped with an M6 fixing bolt.

Various fitting methods:

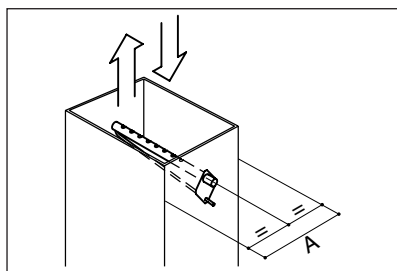


Fig. 3.15

A = min. 200

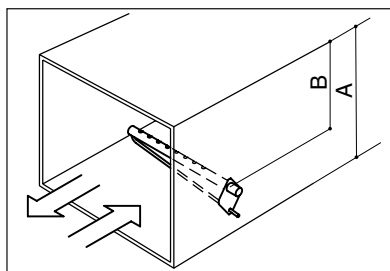


Fig. 3.16

A = min. 250
B = min. 150

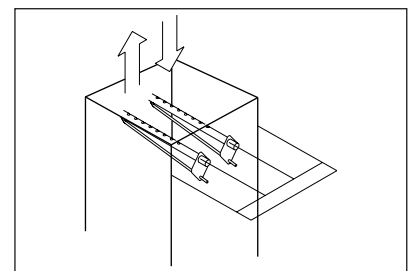


Fig. 3.17

A > 300
B = 0.5 A

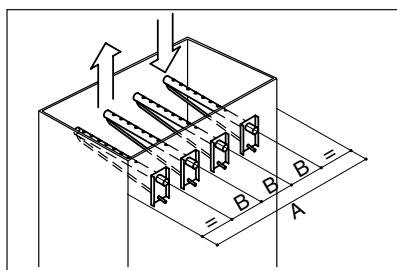


Fig. 3.18

A > 500
B = min. 100

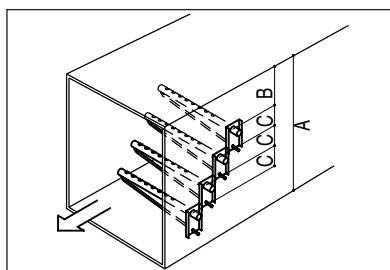


Fig. 3.19

A > 500
B = min. 150
C = min. 0.15 A

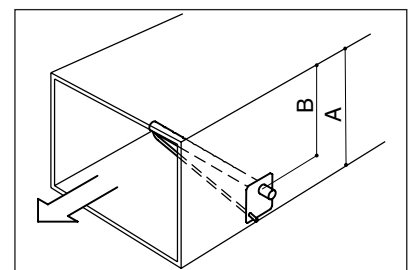


Fig. 3.20

A = min. 175
B = min. 100

Steam-distribution pipe fitted on suction side:

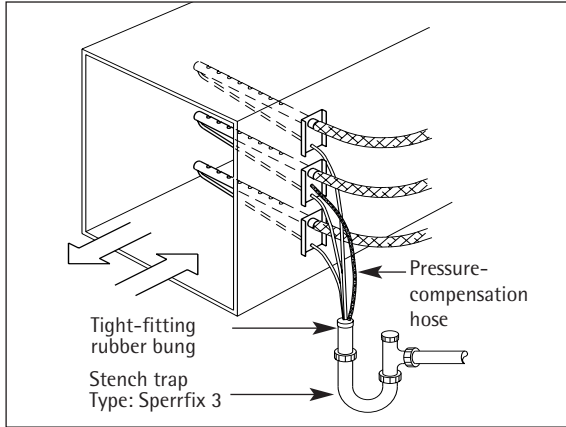


Fig. 3.21

Because of the under-pressure in the appliance or the duct part, condensate may be kept back in the steam-distribution pipe. If there is an outlet in the empty part of the humidifier, the condensate can be bled off in the immediate vicinity. An alternative method of bleeding off the condensate can be seen in the diagram.

3.5 Fitting the blowers

For the humidifier to work best, correct steam distribution is essential. For this reason, the minimum distances must be observed when installing the equipment.

Please note that only wall installation is possible with the econoVap.

Minimum distances for steam blowers 4–23 kg/h

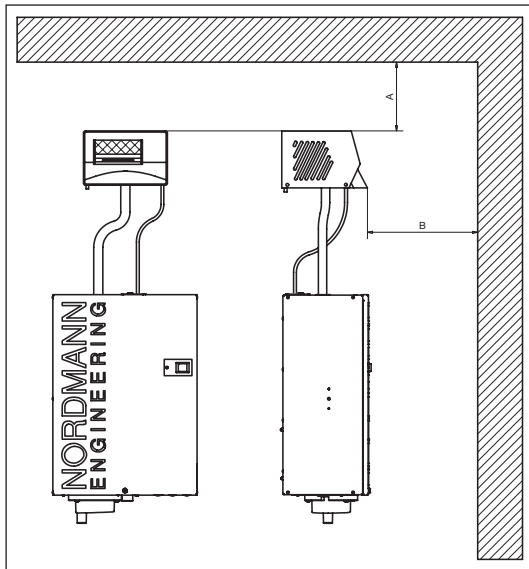


Fig. 3.22

Type	A min.	B min.
4 kg	600 mm	3 m
8 kg	900 mm	5 m
15 kg	1000 mm	7 m
23 kg	1000 mm	10 m

Minimum distances for steam blowers 32–65 kg/h

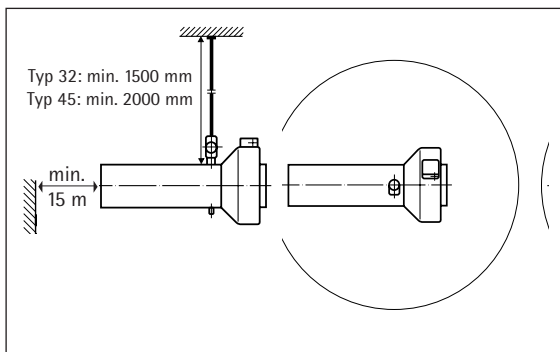


Fig. 3.22

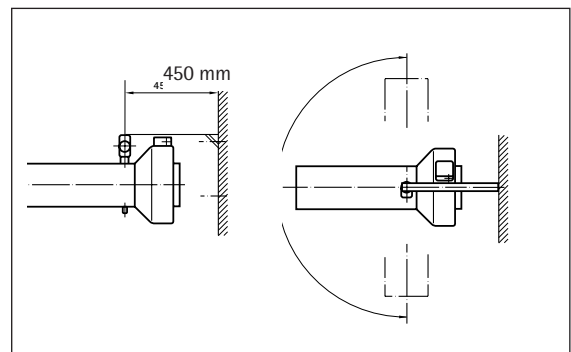


Fig. 3.22

Technical specifications steam blowers:

Max. steam output	Air volume m ³ /h	Power supply	Nominal rating	Weight kg	Steam pipe	Condensate pipe	Noise level (1 m)
4–8 kg/h	110	200/240 V	25 W	5	Ø 22 mm	Ø 8 mm	46 dB (A)
15–23 kg/h	650	50/60 Hz	170 W	15	Ø 35 mm	Ø 8 mm	54 dB (A)
32 kg/h	800	220/240 V	110 W	8	Ø 35 mm	Ø 8 mm	72 dB (A)
45–65 kg/h	800	50/60 Hz	110 W	8	2 x Ø 35 mm	Ø 8 mm	72 dB (A)

3.6 Laying the steam hose

The steam hose should be kept as short as possible. It should not be possible to block or obstruct the steam supply lines in any way. Furthermore, they must be protected from outside interference (e.g. deformities, kinking etc.). After the hose has been laid, it is advisable to re-check everything when the hose is warm. It is equally important to avoid condensation pockets in the hose. Any curves should have as large a radius as possible.

Installation Material



If a hose is used for the steam line it must be the original one supplied by NORDMANN. If other hoses are utilised, NORDMANN cannot be held responsible for any damage that may occur.

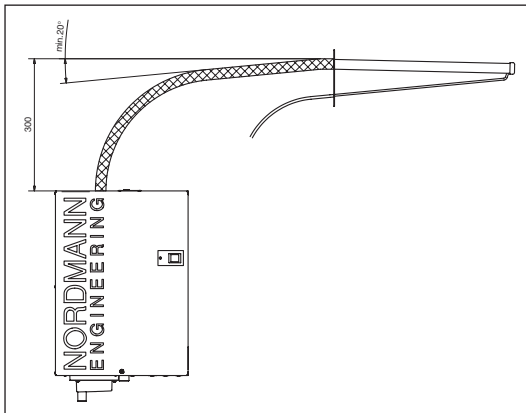


Fig. 3.25

A hose clamp should be used to link the hose to the steam-distribution pipe. When laying the steam hose in pipes, cable ducts etc., their resistance to high temperature (min. 100 °C) must be ensured. All insulation material must also be checked for its resistance to high temperature.

If the steam line installed is of copper, small radii should be avoided wherever possible. Every bend causes an additional resistance. A steam line of copper must have the same diameter as the hose.

If the steam lines are long, with a lot of bends and a relatively high internal duct pressure, water may be continuously forced out of the steam cylinder, which impairs the performance.

Possible installation

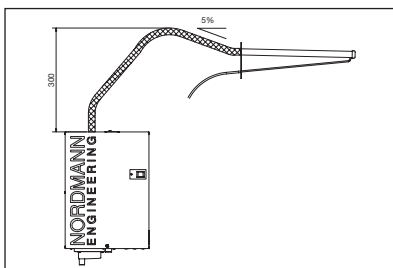


Fig. 3.26

Wrong installation

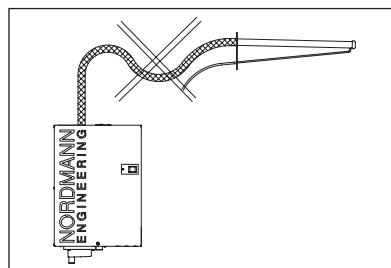


Fig. 3.27

Possible installation

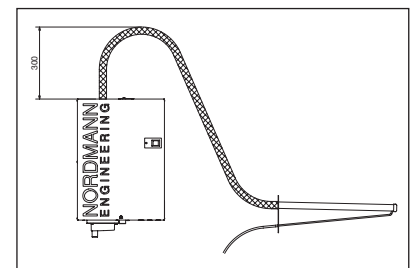


Fig. 3.28

3.7 Laying the condensate hose

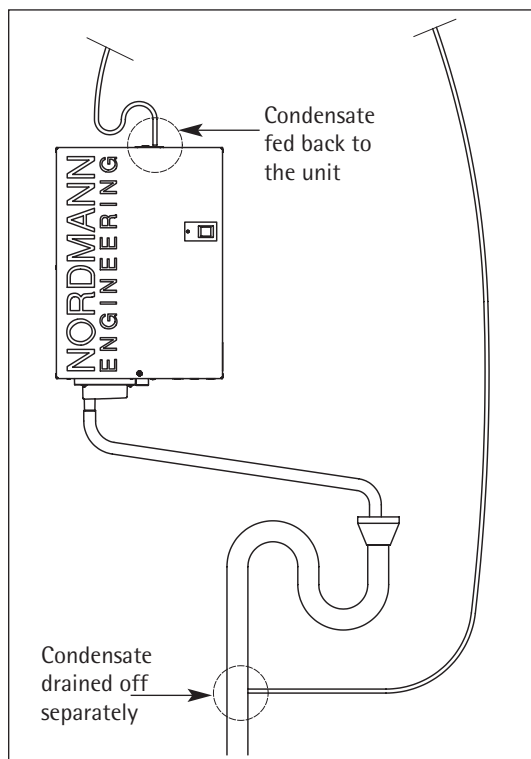


Fig. 3.29

It is advisable to lay the condensate hose as near to the vertical as possible and to feed the condensate either directly into an open funnel or below the siphon.

If the steam-distribution pipe is fitted above the humidifier, the condensate can be fed back to the unit by placing the end of the hose in the filling cup. In this case a small siphon should be formed with the condensate hose.

If the condensate is drained off directly, it is advisable to feed back the condensate hose separately. The end of the condensate hose should be in the open air, if the end of the hose is submerged in water, the condensate is prevented from draining away freely.

4 Water connections

4.1 Water quality

NORDMANN humidifiers use ordinary tap water for the production of pure steam. The electrical conductivity should be between 125 and max. 1250 microSiemens per cm.

The hardness of water is measured in accordance with the international unit millimol calcium and magnesium ions per litre (mmol/l), previously in degrees of German hardness (DH).

Soft water:	up to 1.3 mmol/l up to 7 ° DH
Fairly hard water:	1.3 bis 2.5 mmol/l 7-14 ° DH
Hard water:	2.5 bis 3.8 mmol/l 14-21 ° DH
Very hard water:	over 3.8 mmol/l over 21 ° DH

Other international units:	1° DH = 1.79° French hardness
	1° DH = 1.25° English hardness
	1° DH = 1.05° US hardness
	1° DH = 10 mg/l CaO
	1° DH = 17.9 mg/l CaCO ₃ (ppm)

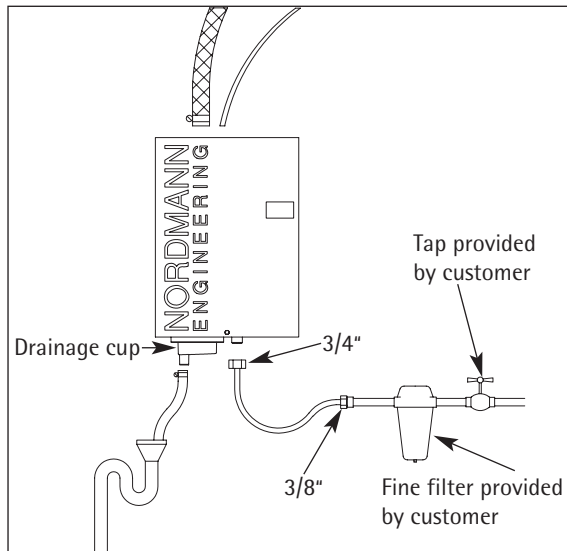
NORDMANN's electrode steam humidifiers function with water ranging from soft to very hard, without the need for prior treatment.

However, for fairly hard water and above, we recommend the use of the SC System (NORDMANN's patented self cleaning system), which greatly reduces the amount of maintenance required for the cylinder. The SC System is available as option built-in ex works or as a retrofit option.

4.2 Water intake and drainage

Please observe the local regulations concerning the connection of appliances to the pressure and drainage system. The humidifier is designed to operate on ordinary tap water only. If you intend to use treated or de-mineralised water, consult your NORDMANN representative beforehand.

Where the water pressure is between 1 and 10 bar (0.1–1 MPa) the unit can be connected directly to the water supply. If it is over 10 bar (1 MPa), connection must be made via a pressure-reduction valve (set to 4 – 6 bar or 0.4–0.6 MPa).



In any case the water feed pipes must be flushed thoroughly before connecting them to the humidifier. You should use copper piping only.

Note that the drainage facility should provide the possibility for cleaning and maintenance. The drainage pipe should have a decline of at least 5 %.

A fine filter should be fitted at the water intake to the humidifier to prevent the rapid built-up of impediments in the fine filter of the inlet valve.

5 Electrical connections

5.1 Safety instructions



All work pertaining to the electrical installation must be carried out by qualified personnel only.

Before performing any electrical work, all power to the humidifier must be disconnected.

Please observe local regulations concerning electrical installations.

The installation must be fitted with a device which disconnects the unit (with a contact opening of at least 3 mm) on all phases from the mains power supply.

NORDMANN humidifiers are designed to be connected to the earth lead and are categorised as belonging to "protection class 1" for electrical equipment.

The connection details are provided in the wiring diagrams for each type of unit. Each unit is supplied with the appropriate wiring diagram.

5.2 Control voltage

The standard control voltage of 220–240 V is taken from terminals L1 and N of the heating voltage. A 1.6 A Fuse (F1) is located on the electronic control board.

5.3 Heating voltage

The cross-section of the electrical wires and the minimum fuse size should be chosen in accordance with the connection requirements (cf. technical specifications) of the type of humidifier employed. The electric supply cables must be connected to the unit's terminals correctly. We recommend to re-tighten the screw terminals after a few days.

6 Putting the humidifier into operation

6.1 Start-up

Prior to starting the unit up, check the correct connections of the steam pipe, water feed pipe, drainage pipes and electrical cables.

Open the shut-off valve in the water feed pipe and switch the unit on with the black power switch.

As soon as the demand for steam is recognised, the green LED lights up, the contactor is activated and, soon after, water is let into the steam cylinder. As soon as the electrodes in the cylinder are covered with water, it is being heated and the fully automatic operation commences.

During the start-up phase, or after a new replacement cylinder has been fitted, the maximum water level can be attained. When Niveau max. has been reached, the inlet valve closes. This is a normal occurrence during the steam cylinder's concentration phase. The length of this phase can differ, it lasts until the cylinder has reached the nominal rating. When the Niveau max. is attained it will be indicated by a red flash in the green colour of the LED.

6.2 Setting the output limitation

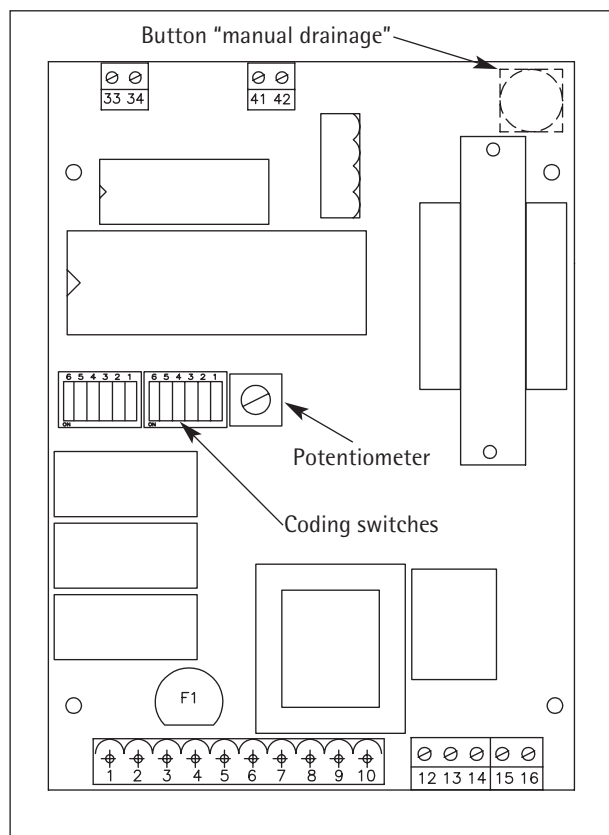


Fig. 6.1

The steam output can be set step less from 20 % to 100 % capacity. For setting the output limitation the electric compartment must be opened and the potentiometer on the electronic print must be adjusted. Turning clockwise increases the steam output and turning anticlockwise reduces the steam output. The output ex works is set at 100 %.

6.3 LED Display

The electronic controls unit of the econoVap monitors the operation of the humidifier continuously.

All operating conditions and system indications are shown with the two-colour LED. The status of the LED can be shining continuously or flashing in the red and green colours.

6.4 System- and servicing indications

LED shining "green" continuously

Operation

Humidification is demanded. The humidifier operates automatically. Without demand of humidity the LED remains dark.

red flash in the shining "green"

Niveau max. attained

Occurs when the Niveau max. sensor is activated. This causes a momentary closure of the inlet valve.

LED blinking "red-green-red-green"

Manual drainage open

Manual drainage is activated, the drainage-button has been pressed.

LED blinking "green"

Cylinder service "U1"

The steam cylinder can no longer attain the nominal output and needs to be cleaned or perhaps replaced (refer to chapter 7.3). This is purely a servicing code, the unit does not switch off automatically. The humidifier continues to function at a reduced output.

LED shining "red" continuously

Excess current "U2"

Whenever there is excess current (140 % of nominal value) the humidifier switches itself off for safety reasons. After the fault has been rectified, the humidifier is put back into operation by pressing the main power switch.

LED blinking "red"

Continuous fill "U3"

The humidifier tries to fill the cylinder continuously. Either a heating phase or the water is missing. The humidifier switches itself off automatically after 30 minutes. After the fault has been rectified, the unit is put back into operation by pressing the main power switch.

LED blinking "red-red-green-green"

Microcontroller uncoded "U4"

This signal appears if a replacement electronic control unit has been fitted to the humidifier without being coded. The humidifier is prevented from operating. The signal disappears as soon as the controls unit has been coded.

6.6 Remote indication

A standard, potential-free relay output enables the alarm messages to be remotely displayed.

6.7 Safety functions

NORDMANN humidifiers are protected against running dry, i.e. the power is cut off automatically as soon as the electrodes in the steam cylinder protrude above the water level.

If current consumption becomes excessive (25 % above the nominal level), the outlet valve is opened automatically. Because the electrodes are then in contact with less water, current consumption falls back to the nominal value.

If the current fails to fall below 140 % of the nominal level even after several drainage operations, the humidifier turns itself off automatically and the failure message "U2" (continuously red) appears on the LED display.



Regular servicing helps to maintain the operation of the humidifier.
The following work must be carried out by qualified personnel.

7.1 Regular checks

- Inspect the steam cylinder:
Are there any deposits in the steam cylinder?
⇒ Remove the drainage strainer and flush the cylinder thoroughly with tap water (without chemical additives). Replace the strainer after cleaning.
Are the electrodes worn?
⇒ Replace the steam cylinder.
- Inspect all hoses (steam-, condensate- and water hoses), also inside the unit:
Is the installation correct?
Are all clamps still fastened tightly?
- Inspect the intake and drainage valves:
⇒ If worn or covered with scale deposits the valve must be replaced.
- Inspect the drainage cup. Clean or replace if necessary.

7.2 Rectifying faults

The humidifier produces insufficient or no steam. Following causes are possible:

- The humidity controller is not demanding any steam production.
- There is no water in the steam cylinder because the water supply is interrupted.
- The filter or the nozzle in the inlet valve is blocked or damaged.
- The cylinder is worn out and needs to be replaced.
- The contactor coil is defective.

7.3 Replacing the steam cylinder

The serviceable life of the steam cylinder depends on the actual operation time and the hardness of the tap water used. The cylinder should be replaced when the system message "U1/cylinder service" appears on the LED display (flashing green). Under certain circumstances the cylinder can still be used before it has to be replaced.

Proceed as follows:



- Empty the cylinder by pressing the drainage-button
- **Let the cylinder cool down**



- **For the following procedures the equipment must be disconnected from the power supply!**
- Loosen the hose clamp on the head of the cylinder and then remove the steam hose. Remove the electrode plugs from the cylinder. Push the cylinder up and remove it.
- Check the seal O-ring in the cylinder admission and replace if necessary.
- To fit the new cylinder reverse above procedure.
- Connect the heating cables to the electrode pins according to the coloured dots (for cylinders up to 3 electrodes) respectively as shown in Fig. 7.1 (cylinders with 6 electrodes).
- Restart the humidifier according to section 6.1 (start-up).

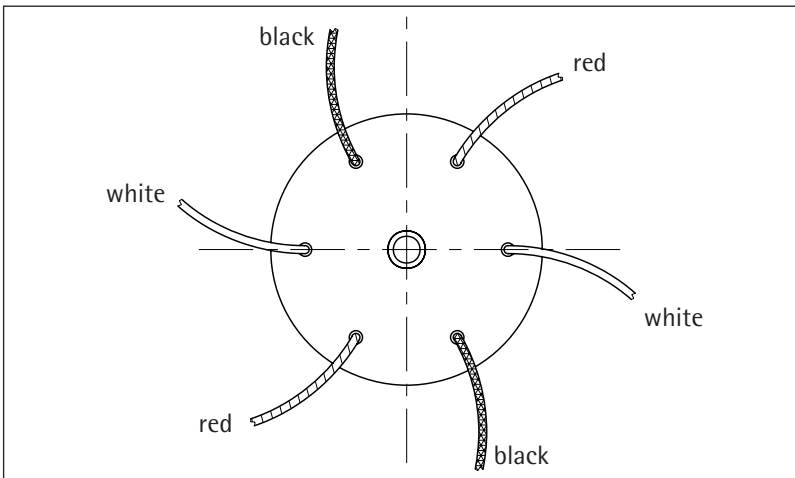


Fig. 7.1

7.4 Taking the humidifier out of operation

If the humidifier is out of operation for a longer period of time (e.g. in summer or when the air conditioning system is not operating), the steam cylinder must be emptied and the power supply disconnected.

8. Options

All options can be fitted either at the factory or subsequently.

Proportional adaptor

The steam output of the econoVap can be set anywhere between 20 % and 100 %. The proportional adaptor can be simply inserted onto the electronic controls unit.

Following signals can be processed by the adaptor:

Voltage: 0–2 V; 0–5 V; 0–10 V; 0–16 V; 0–20 V (SCS); 1–5 V; 2–10 V
 Current: 0–20 mA; 4–20 mA
 Potentiometer: min. 135 Ohm

SC-System

The SC-System is a patented self-cleaning system for the electrode steam humidifiers of NORDMANN.

The minerals are kept in suspension and as such are kept to a large extent from building up at the bottom of the cylinder. The suspended minerals are flushed away during the normal drainage operations. The service life of the steam cylinder is lengthened considerably and maintenance is made easier.

Cabinet Heating

If the unit is installed in an environment presenting the risk of frost, then the option "cabinet heating" is used. It prevents the water in the steam cylinder from freezing.

9. Technical specifications

Type mark:	Type		434		834	1534	2364	3264	4564	6564
Heating voltage	Volt	400 Volt, 50/60 Hz								
Number of phases	~		3		3	3	3	3	3	3
Heating current	A		4.4		8.8	16.5	25.2	35.1	49.4	71.3
External fuses p. phase	A		10		16	25	40	50	80	100
Type mark:	Type	422	432	822	832	1532	2362	3262		
Heating voltage	Volt	230 Volt, 50/60 Hz								
Number of phases	~	1	3	1	3	3	3	3		
Heating current	A	13.2	7.6	26.4	15.3	28.6	43.9	61.0		
External fuses p. phase	A	20	16	40	25	40	63	100		
Steam output	kg/h	4	4	8	8	15	23	32	45	65
Minimum capacity	kg/h steam	0.8	0.8	1.6	1.6	3	4.6	6.4	9	13
Nominal power	kW	3.0	3.0	6.1	6.1	11.4	17.5	24.3	34.2	49.4
Design data:										
Dimensions	width mm	354	354	354	354	490	490	490	490	490
	height mm	562	562	562	562	672	672	672	672	672
	depth mm	210	210	210	210	340	340	340	340	340
Steam outlet diameter	mm	1x22	1x22	1x22	1x22	1x35	1x35	1x35	2x35	2x35
Weight (empty)	kg	11.5	11.5	12	12	20	21	22.5	24	24
Operating weight	kg	15	15	18.5	18.5	35	36	47.5	49	49
Accessories:										
Humidity controller	qty	1	1	1	1	1	1	1	1	1
Control electronics:										
Supply voltage	Volt	220-240 Volt, 50/60 Hz, 1~								
Proportional adaptor	qty	1	1	1	1	1	1	1	1	1
Steam distributors for dct use:										
Steam nozzle	qty	1	1							
22-xxx mm	qtv	1	1	1	1					
35-300 mm	qty					1				
35-450 mm	qty					1	1		2	
35-600, 35-900 mm	qty					1	1	1	2	2
35-1200, 35-1500 mm										
Steam hose:										
Ø 22/29 mm	qty x m	1	1	1	1					
Ø 35/43 mm	qty x m					1	1	1	2	2
Condensate hose:										
Ø 6/10 mm	qty x m	1	1	1	1	1	1	1	2	2
Steam blowers for direct room humidification										
Split mounted	qty	1	1	1	1	1	1	1	1	1

Other heating voltages on request.

Manufacturer:

Walter Meier (Climate International) Ltd.

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